Augustana’s Secondary Mathematics Program:
Response to NCTM SPA Report Critiques

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Overview: As part of the NCATE accreditation process, Mike Egan wrote and submitted an NCTM SPA report for Initial Preparation of Mathematics Education Teachers at the Secondary Level in the fall of 2010. The NCTM’s response to the report was issued in the spring of 2011 with a decision of “Nationally recognized with conditions.” This packet summarizes the NCTM critiques leading to the “conditions” in the response report, describes actions taken at Augustana to address these critiques, and provides appendices showing the full text of documents referenced in this packet.

Summary of NCTM Critiques

The NCTM Recognition Report raised three main concerns about Augustana’s secondary mathematics teacher preparation program: (1) Assessment Data Were Too Generic; (2) Not Enough Information on How Candidates Were Assessed; and (3) Not Enough Indicators Met.

Presented below are summaries of each critique as well as passages drawn directly from the Recognition Report that are indicative of the critiques. The next section will describe how we have taken action to address these critiques.

1. Assessment Data Were Too Generic

The initial SPA report included data on four assessment instruments: (1) Required Illinois content tests for mathematics teachers; (2) student performance on the “Work Sample”, a portfolio consisting of artifacts from the student teaching experience required of all Augustana teacher candidates documenting that they have met Illinois teaching standards; (3) Course grades in both education coursework and mathematics coursework; and (4) Supervisor Evaluation scores from the candidates’ student teaching experience (these assessment instruments are included in this packet as appendices A-D). A major critique offered by the NCTM was that the assessment data submitted in the SPA report was too generic. That is, many of the assessment instruments provided evidence about our candidates’ general teaching skills, but the instruments were designed for all teacher candidates (e.g., elementary, history, science, world languages, etc.), not secondary mathematics teaching candidates in particular. Specific passages from the Recognition Report indicative of this include:

- “The institution carefully analyzed the NCTM standards and conscientiously audited curriculum, but not necessarily assessments....It showed thought regarding the ways in which a generic student teaching assessment could address [NCTM] standards, but did not deal directly with how all indicators cited could actually be met during student teaching” (p. 2 of Appendix E).
- “…assessment descriptions to suggest how [indicators from the Communication process standard] are assessed were not provided. Assessment 4 suggests an alignment, but indicates that only a generic student teaching evaluation is used. Candidates are not explicitly assessed on these indicators” (p. 4 of Appendix E).
- “Assessments 2 and 4 address [indicators from Standard 7: Dispositions]. They would be stronger if the explicit NCTM alignment was utilized and made available to candidates” (p. 6 Appendix E).
- “A teacher work sample model is used [to assess indicators from Standard 8: Knowledge of Mathematics Pedagogy]; the unit has presented an alignment with standards, but the rubric that is used is generic. Expectations regarding NCTM standards are not evident nor explicated to candidates; expectations in the generic rubric do not specifically address these standards” (p. 7 of Appendix E).
- “Assessments 2 and 4 provide evidence of attention to pedagogy. There was no evidence of how candidates were specifically assessed in the mathematics methods class. There were alignments provided for the student teaching and teacher work sample assessments, but they are not provided to
the candidates; therefore, it was not clear that the indicators were actually assessed” (p. 14 of Appendix E).

- “Assessment 2 provides the most evidence that candidates are focused upon student learning. Again, the rubrics are quite generic; candidates are not provided with the alignment and it is not clear how the alignment is used to inform the completion of the rubric” (p. 14 of Appendix E).

- “The unit should consider revisions for assessments 2, 3, and 4, as well as additional clarifications. The unit needs to provide further evidence for Assessments 2 and 4 with regard to specific NCTM indicators” (p. 15 of Appendix E).

- “The BOE will need to follow up on how generic evaluations (2 and 4) are further delineated for specific content areas” (p. 15 of Appendix E).

2. Not Enough Information on How Candidates were Assessed

Perhaps related to the first critique listed above, the NCTM reviewers indicated that there should be more information on how our candidates are assessed (and, in turn, how the assessments provide evidence that the indicators were met). Specific passages from the Recognition Report indicative of this include:

- “There are no descriptions of candidate assessments to indicate how performance [relative to Standard 1: Problem Solving] is actually assessed” (p. 2 of Appendix E).

- “There are no descriptions of candidate assessments to indicate how performance [relative to Standard 2: Reasoning and Proof] is actually assessed” (p. 3 of Appendix E).

- “…assessment descriptions to suggest how these indicators [of Standard 3: Communication] are assessed were not provided” (p. 4 of Appendix E).

- “There was no description (in assessment 3) of how candidates are assessed” (p. 14 of Appendix E).

- “Assessments 2 and 4 provide evidence of attention to pedagogy. There was no evidence of how candidates were specifically assessed in the mathematics methods class” (p. 14 of Appendix E).

- “There is lack of clarity of some assessments (2 and 4)” (p. 16 of Appendix E).

3. Not Enough Indicators Met

As indicated on page 15 of Appendix E, “80% of the overall indicators must be met, including at least one indicator from each standard, to be nationally recognized.” Currently our unit has met 61% of the indicators (50 indicators met out of 82). We have met none of the indicators for Standard 3: Communication, but have met at least one indicator for all other standards.

**Actions Taken to Address Critiques**

1. Response to Critique “Assessment Data Were Too Generic”

- The “Work Sample” assessment (Appendix B) that was included as Assessment 2 in the Fall 2010 SPA report and critiqued by the NCTM as being too generic has been replaced effective Fall 2011. Henceforth, the teaching performance of Augustana’s secondary mathematics student teachers will be assessed using a version of the Teacher Performance Assessment Consortium (TPAC): Secondary Mathematics instrument (Appendix F). We are convinced that the TPAC assessment will provide a richer indication of our mathematics teacher candidates’ competence than the old work sample, and we are certain that this instrument is much more directly aligned to NCTM standards than the previous instrument.

The TPAC assessment requires teacher candidates to build a comprehensive work sample around a “learning segment” of 3-5 lessons focused on a particular mathematical concept. Rather than
representing a comprehensive portfolio including artifacts from throughout the student teaching experience, the TPAC assessment prompts teacher candidates to provide in-depth evidence about their approach to a single instructional unit. Thus, teacher candidates must demonstrate their ability to develop a mathematical concept, promote higher order thinking, assess student learning, accommodate exceptional learners, reflect on the teaching and learning process, utilize appropriate technology, and develop mathematical language and communication in the classroom. In short, the Secondary Mathematics TPAC provides rich evidence about candidates’ Dispositions for teaching, their Knowledge of Mathematics Pedagogy, their ability to foster appropriate Process Standards, and their ability to build student knowledge of specific Content.

The TPAC assessment was developed at Stanford University and earlier versions of this instrument have been used to assess teacher candidates in California for several years. The TPAC is currently undergoing nationwide field-testing and content validation, and more than 20 states (including Illinois) have agreed to adopt this instrument for all teacher candidates in the coming years. In the summer of 2011, the major teacher education SPAs reviewed the content-specific TPAC forms, highlighting aspects of the instrument that are well aligned to SPA standards and ways that the instruments can be more closely aligned to standards. Also during the summer of 2011, TPAC administrators gathered content-area experts from around the country to perform a content validation analysis of the instruments. Mike Egan of Augustana College was a participant in the content validation exercise of the Secondary Mathematics form, convening in St. Louis on July 21.

Hence, there is strong evidence that the TPAC is a reputable instrument, and it is an instrument that Augustana’s mathematics education expert is well familiar with. Mike’s exposure to the TPAC over the summer of 2011 prompted him to encourage colleagues at Augustana to adopt this instrument in place of the old Work Sample. Again, the instrument represents a pro-active step in making our teacher candidates’ “portfolio” requirement more specifically aligned to SPA standards (not only in mathematics but in other content areas as well). The department agreed to this programmatic change, and we immediately began to use the latest versions of the TPAC instruments available at the time: those developed in January 2011. A more recent version of the TPAC, one that includes amendments based on SPA and content expert feedback, was released in September. We will adopt these more up-to-date (and hence, more explicitly “SPA-approved”) versions in future terms.

- The NCTM also singled out Assessment 4: Student Teaching Evaluation (Appendix D) in the original SPA report as being too generic. This evaluation form was aligned to the Illinois Professional Teaching Standards (IPTS), a set of standards that all teacher preparation programs are required to address and evaluate. Feedback from the NCTM, coupled with recent changes to the IPTS, prompted us to create a new mathematics-specific Student Teaching Evaluation instrument (Appendix G) to be used effective fall 2011.

As with the older version of our Student Teaching Evaluation form, three distinct evaluators are required to assess each teacher candidate’s performance on each indicator listed on the form using the scoring rubric provided on the form. The three evaluators are (1) the cooperating teacher; (2) the college-based supervisor; and (3) the teacher candidate herself or himself. Hence, there is a level of triangulation across evaluators with each evaluator judging the teacher candidate’s performance with the same instrument.

The indicators listed on new Student Teaching Evaluation form include language drawn verbatim from NCATE/NCTM Standards 1-8 and 16.3 (e.g., Process Standards, Dispositions, Knowledge of Mathematics Pedagogy, and Ability to Increase Students’ Knowledge of Mathematics). The form also acknowledges the NCATE/NCTM Content Standards 9-15 with the following performance indicator:
“N.9-15 Content: Demonstrates and fosters firm understanding of the concepts, procedures, and processes involved in the subset of content standards the candidate is responsible for teaching.” An appendix is provided to teacher candidates, cooperating teachers, and the college supervisor that lists all of the Content standards, hence evaluators are able to reference the content standards directly as they perform this evaluation. The form also includes each of the required IPTS indicators, with language from the NCATE/NCTM indicators taking precedence in cases where there is overlap between the national standards and the Illinois standards.

This new Student Teaching Evaluation form is therefore aligned directly to mathematics-specific performance indicators that are endorsed by NCATE/NCTM. Three evaluators who are directly familiar with our student teachers’ performance in the classroom are able to use this instrument to judge each candidate’s competence in these standards.

- The NCTM’s critiques of Assessment 3: Course Grades (Appendix C) might also fall into the category of “more specificity required.” Course grades were submitted in the original SPA report largely to provide evidence that our candidates are held to high expectations relative to NCTM/NCATE Process and Content standards through their mathematics coursework. The NCTM raised questions about how (or whether) this coursework addresses the standards. The NCTM reviewers based their judgments about the content of Augustana math courses on the brief catalog descriptions of the courses that are available on the Augustana website (see, for example, the NCTM comment “Assessment 3 (course grades) suggests it assesses the process standards, but the catalog descriptions (obtained by reviewers from the college website) do no address process standards” p. 4 of Appendix E).

As exhibited in Appendix H of this packet, Mike Egan has been in communication with the Augustana mathematics department regarding gathering additional artifacts from the department that demonstrate that many of the NCATE/NCTM Process and Content standards are indeed addressed and assessed through mathematics coursework requirements. Artifacts requested include course syllabi, assessment instruments (tests, project descriptions with scoring rubrics, etc.). To date, three mathematics instructors have shared such artifacts and more are anticipated.

The documents in Appendix H have not yet been organized in order produce a coherent argument, but they are provided here as evidence that the Augustana Education Department is in the process of solidifying and improving the evidence related to Assessment 3: Course Grades in the SPA report.

2. Response to Critique “Not Enough Information on How Candidates were Assessed”

Each of the three points made in the previous section are also directly related to this critique.

- The TPAC assessment (Appendix F) provides explicit directions to teacher candidates regarding how to complete their work sample. Again, the TPAC tasks our candidates are required to perform in the context of student teaching align well to NCATE/NCTM performance indicators related to Dispositions for teaching, Knowledge of Mathematics Pedagogy, ability to foster appropriate Process Standards, and ability to build student knowledge of specific Content.
In addition, the TPAC instrument is also explicit about how this portfolio of work is to be assessed by college personnel. The instrument includes scoring rubrics for the different aspects of the portfolio. The rubrics include explicit language regarding what the assessor should look for in each candidate’s work, and the work is scored on a 4-point scale where “1” is considered unacceptable, “2” is considered target for a beginning teacher, “3” is considered advanced for a beginner or target for a veteran teacher, and “4” is considered exceptional for a beginner and advanced for a veteran. Again, this instrument has been developed over many years with a great deal of research behind it, and is gaining momentum as a nationally recognized and respected indicator of teacher competence.

- The previous section hinted at how the new Student Teacher Evaluation form (Appendix G) is used to assess our mathematics teacher candidates’ performance during student teaching. Again, the form calls on three separate evaluators (cooperating teacher, college supervisor, and the teacher candidate) to judge the competence of each teacher candidate’s student teaching performance relative to the indicators listed on the form. The indicators are drawn directly from the NCATE/NCTM indicators as well as the Illinois Professional Teaching Standards. All three evaluators are in positions to make informed judgments about the teacher candidates’ classroom competence as all three have observed the candidates teach on multiple occasions, have reviewed the candidates’ lesson plans and other classroom artifacts, etc. The assessment guidelines are also made clear to the evaluators via a scoring rubric printed on the front of the document.

- The documents in Appendix H reveal that the Augustana Education Department is in the process of gathering additional documentation from the Augustana Mathematics Department that will shed more light on how our teacher candidates are assessed in their mathematics coursework. The documents collected so far provide further detail about the specific content that candidates are held responsible for in their courses, ways in which our candidates are required to demonstrate the Process standards as they learn mathematics, and specific assessment instruments (such as tests, projects, etc.) that are used to measure their mathematical competence.

3. Response to Critique “Not Enough Indicators Met”

- The programmatic adjustments listed above will help our unit make a stronger case that we have indeed adequately met more than 80% of the NCATE/NCTM indicators. The new Student Teacher Evaluation form (Appendix G) requires evaluators to judge our teacher candidates relative to the indicators in Standards 1-8 and 16.3 directly. The TPAC assessment (Appendix F), though not directly aligned to the NCATE/NCTM indicators, is certainly much more mathematics-specific than the older Work Sample (Appendix B) and hence bolsters our body of evidence. Finally, we anticipate gathering convincing artifacts from the mathematics department indicating that our candidates are held to high standards relative to the NCATE/NCTM Process and Content standards (1-6, 9), and are indeed adequately assessed in this area. Indeed, much of the evidence from the mathematics department is already in place (see Appendix H).

- In addition to the adjustments mentioned above, several changes were made to the Secondary Mathematics Methods course in the spring of 2011. These changes were made in order to ensure that this required course robustly addresses the indicators related to pedagogy (such as Process Standards 1-6, Disposition Standard 7, Pedagogy Standard 8, and Ability to Increase Student Knowledge Indicator 16.3). Not only does the course “cover” these standards, but Augustana teacher candidates are required

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1 At Augustana, the student teaching seminar instructor is responsible for assessing the portfolios. In the fall of 2011, all three of Augustana’s secondary mathematics teacher candidates have Mike Egan, Augustana’s mathematics educator, for their seminar instructor.
to produce artifacts demonstrating that they have indeed developed competence relative to these indicators and explain why their artifacts are indicative of competence. The manner in which the candidates’ work in the Secondary Mathematics Methods course is assessed by the instructor is made clear via scoring rubrics that are accessible to the candidates. A rich sample of candidate work and how it is assessed is provided as Appendix I in this packet. Note, for example, the portfolio requirement. Through the portfolio, candidates are required to gather and organize work they produced during the term, aligning their work to NCATE/NCTM Standards 1-8 and 16.3, and explaining why these pieces of work demonstrate competence relative to the given indicator. Candidates in the course also “learn by doing” throughout the term as they are required to plan, implement, and assess a sequence of weekly lessons to 7th graders at a cooperating middle school. Two course assignments, the “Equity Paper” and the “Research Presentation,” were added to the methods course in the spring of 2011 in order to provide an explicit outlet for students to demonstrate their disposition toward equity and their use of research results in teaching, two indicators the NCTM had previously listed as “Not Met” in our program. Again, the manner in which all of this candidate work is assessed by the college instructor is made explicit via the scoring rubrics that are available to candidates and are presented in Appendix I.
Table of Contents for Assessment Documentation


b. NOTE: The Scoring Guide for this Assessment is not available to members of the Augustana Teacher Education Program since this is a standardized, state-administered test

c. Chart Providing Candidate Data from this Assessment.................................................................Page 14

d. Chart Aligning NCTM Standards and Indicators with ICTS Mathematics Test Objectives........Pages 15-32
a. Description of the Assessment

ILLINOIS CERTIFICATION TESTING SYSTEM

FIELD 115: MATHEMATICS
TEST FRAMEWORK

November 2003

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**Illinois Certification Testing System**

**FIELD 115: MATHEMATICS**

**TEST FRAMEWORK**

November 2003

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ILLINOIS CERTIFICATION TESTING SYSTEM

FIELD 115: MATHEMATICS

TEST FRAMEWORK

Processes and Applications
Number Sense and Measurement
Algebraic Patterns, Symbols, Functions, and Models
Geometric Methods
Probability and Statistics

SUBAREA I—PROCESSES AND APPLICATIONS

0001 Understand how to communicate mathematical content and concepts, and develop and utilize a variety of problem-solving techniques.

For example:

- Demonstrate an understanding of learning styles and learning strategies in mathematics.
- Recognize how to create effective learning environments in which mathematics students work collaboratively in one-on-one, small-group, and large-group contexts.
- Demonstrate an understanding of strategies for teaching reading in the content area of mathematics.
- Demonstrate knowledge of how to communicate verbally and in written, visual, and symbolic forms using appropriate technology.
- Demonstrate an understanding of problem-solving strategies (e.g., using a diagram, making an organized list, working backwards using logical reasoning, making a simpler problem, acting out or using objects, systematic guessing and checking, looking for patterns, estimating, eliminating extraneous information).
- Recognize how to use problem explorations and modeling to extend the mathematical knowledge of all students.
- Generalize the results of problems and extend them to other problem situations.
0002 Understand how to apply appropriate reasoning techniques to concepts, procedures, and conjectures, and make connections with and among the various branches of mathematics and other disciplines.

For example:

- Recognize valid justifications for the application of concepts, procedures, and theorems in a given situation.
- Distinguish between inductive and deductive reasoning.
- Demonstrate an understanding of how to develop conjectures and evaluate their validity.
- Identify and apply connections within the mathematics curriculum (e.g., geometric substantiations of algebraic formulae such as demonstrating the connection of the distance formula in coordinate geometry via the Pythagorean Theorem, geometric interpretation of the integral, applications of matrices to geometric figures).
- Demonstrate knowledge of mathematical connections to other disciplines (e.g., rate of change as applied to business, economics, physics, chemistry, biology).
- Demonstrate knowledge of the historical development of mathematics, including contributions of men and women from various cultures.

0003 Understand how to select, integrate, and use appropriate technologies.

For example:

- Demonstrate an understanding of the capabilities and benefits of current and emerging technologies in the content area of mathematics.
- Select appropriate technology (e.g., spreadsheet, graphing calculator, manipulatives) to solve problems throughout the mathematics curriculum.
- Demonstrate an understanding of how to select and integrate appropriate technology for mathematics instruction.
- Demonstrate knowledge of CAS (computer algebra systems).
- Develop and apply algorithms to solve problems using technology.
SUBAREA II—NUMBER SENSE AND MEASUREMENT

0004 Understand the concepts of number, number theory, and numeration systems.
   For example:
   - Demonstrate an understanding of place value, order, magnitude, absolute value, and estimation.
   - Represent and operate upon numbers using a variety of methods.
   - Perform operations in any number base and convert between different number bases.
   - Solve problems involving prime and composite numbers, least common multiples, modular arithmetic, and greatest common factors.
   - Solve problems involving integers, fractions, decimals, percents, and ratios and proportions.

0005 Understand properties of the real and complex number systems as they apply to algorithms of operations.
   For example:
   - Demonstrate an understanding of real number properties and operations and how they apply to algorithms and algebraic expressions.
   - Use polar and vector representations of complex numbers.
   - Compute and interpret the results of computations using complex numbers and matrices.
   - Demonstrate an understanding of iterative (e.g., infinite decimals, fractals) processes as they relate to fractals and other applications.
   - Use numeric approximations as a basis for numeric integration and numeric-based proofs.
0006 Understand customary, metric, and nonstandard measurement.

For example:

- Demonstrate knowledge of standard, nonstandard, and emerging units (e.g., graphic screen pixels, font size) of measurement.
- Apply attributes of length, area, volume, capacity, time, temperature, angles (degree and radian measure), weight, and mass to solve problems.
- Solve problems using derived measures (e.g., density, work, velocity), conversion factors, and dimensional analysis.
- Use nonlinear measuring scales (e.g., Richter, decibel, pH) to solve practical problems.
- Determine acceptable measures of accuracy and calculate relative error in a given situation.

0007 Understand procedures for computing or estimating measures of multidimensional objects.

For example:

- Read and interpret scale drawings, topographical maps, and architectural drawings.
- Explain how changing one measure of a multidimensional object may affect other measures.
- Use trigonometric ratios to solve a variety of problems.
- Apply measurement formulas to irregular shapes, regions, and solids.
- Solve problems involving indirect measurement.
- Use modeling and visualization to predict, estimate, and determine measurements.
SUBAREA III—ALGEBRAIC PATTERNS, SYMBOLS, FUNCTIONS, AND MODELS

0008 Understand concepts, representations, and relationships of variables and patterns.

For example:

- Represent mathematical situations symbolically, numerically, and graphically.
- Identify, complete, and extend patterns, sequences, and series and analyze their properties.
- Use recursion and the principle of mathematical induction to solve problems.
- Translate between word situations and algebraic sentences.
- Apply properties of real numbers in algebraic contexts to manipulate and simplify algebraic expressions and solve equations.
- Use the properties of relations and functions (e.g., domain, range) and their symbolic, numeric, graphic, and verbal representations.
- Use a formal axiomatic system to construct and analyze proofs.
- Demonstrate an understanding of group structures and their application to symmetry.
- Demonstrate an understanding of rings and fields and their relation to algebraic properties of real numbers.

0009 Understand and apply concepts and representations of linear relations and functions.

For example:

- Represent linear relations and functions in symbolic, numeric, graphic, and verbal forms.
- Recognize and apply slopes and intercepts to construct, analyze, and interpret linear equations and inequalities and their graphs.
- Apply linear relations, functions, and systems to model and solve a variety of problems.
- Represent and solve systems of linear equations and inequalities graphically and algebraically, including matrix methods.
- Apply principles and properties of linear algebra (e.g., vectors, matrix algebra, vector spaces) to solve problems.
0010 Understand and apply concepts and representations of quadratic relations (including conic sections) and functions.

For example:

- Represent quadratic functions and relations in symbolic, numeric, graphic, and verbal forms.
- Recognize and apply properties of symmetry, roots, intercepts, and vertices to construct, analyze, and interpret quadratic relations and their graphs.
- Recognize and apply the properties of hyperbolas, parabolas, circles, and ellipses to model and solve problems.
- Solve systems of quadratic equations and inequalities graphically and algebraically.
- Apply quadratic relations, functions, and systems to model and solve a variety of problems.

0011 Understand and apply concepts and representations of polynomial, absolute value, radical, and rational functions and inequalities.

For example:

- Represent polynomial, absolute value, radical, and rational functions and relations in symbolic, numeric, graphic, and verbal forms.
- Recognize and apply symmetry, roots, intercepts, critical points, asymptotes, and vertices to construct, analyze, and interpret polynomial, absolute value, radical, and rational functions and inequalities and their graphs.
- Recognize and apply the properties of polynomial, absolute value, radical, and rational functions and equations to solve problems.
- Solve systems of polynomial, absolute value, radical, and rational equations and inequalities graphically, algebraically, and numerically.
- Apply polynomial, absolute value, radical, and rational relations, functions, and systems to model and solve a variety of problems.
- Recognize and apply the algebraic properties of polynomial and rational functions (e.g., factoring, partial fractions).
0012 **Understand and apply concepts and representations of exponential, logarithmic, and trigonometric functions.**

For example:

- Represent exponential, logarithmic, and trigonometric functions in symbolic, numeric, graphic, and verbal forms.
- Recognize and apply properties of symmetry, roots, intercepts, critical points, and asymptotes to construct, analyze, and interpret exponential, logarithmic, and trigonometric functions and inequalities and their graphs.
- Apply the equations of exponential, logarithmic, and trigonometric functions and systems to model and solve a variety of problems (e.g., periodic motion, compound interest, exponential growth and decay).
- Solve systems of exponential, logarithmic, and trigonometric equations and inequalities graphically and algebraically.

0013 **Understand the historical development and applications of calculus.**

For example:

- Demonstrate knowledge of the history of mathematics leading up to calculus (e.g., slope of tangent line as rate of change, using geometric methods to determine the area under a curve).
- Apply the concept of a limit to analyze properties of functions (e.g., continuity, asymptotes) and series.
- Apply principles of differential calculus to solve a variety of problems (e.g., rates of change, optimization, analyzing functions).
- Apply principles of integral calculus to solve a variety of problems (e.g., finding areas and volumes, describing the motion of an object).
- Represent limits, derivatives, and integrals symbolically, numerically, graphically, and verbally.
SUBAREA IV—GEOMETRIC METHODS

0014 Understand properties of points, lines, planes, and space and their relationship to Euclidean and non-Euclidean geometry.

For example:

- Demonstrate an understanding of points, lines, planes, and space and their geometric applications.
- Apply definitions, axioms, and theorems of Euclidean geometry to develop different types of proofs (e.g., direct, indirect, flow, paragraph).
- Solve a variety of problems in Euclidean geometry (e.g., justify geometric constructions).
- Use the formal axiomatic system of geometry to construct and analyze proofs.
- Compare and contrast the structures of Euclidean and non-Euclidean geometries (e.g., hyperbolic, elliptic).

0015 Understand properties of two- and three-dimensional shapes.

For example:

- Apply characteristics of two- and three-dimensional figures to describe, analyze, and categorize two- and three-dimensional figures.
- Apply the principle of congruence to explore properties of geometric figures and prove theorems.
- Apply concepts of similarity and congruence to analyze the properties and compare the measures (e.g., perimeter, area, volume) of two- and three-dimensional figures.

0016 Understand and apply spatial visualization skills.

For example:

- Translate between two- and three-dimensional representations of geometric figures (e.g., cross sections, nets, projections, perspective drawings).
- Apply procedures for generating solids of revolution from two-dimensional figures.
- Apply techniques of graph theory (e.g., Eulerian and Hamiltonian circuits) to characterize geometric relationships.
- Apply the properties of two- and three-dimensional figures to solve real-world problems.
0017 Understand and apply geometric methods to model mathematical concepts and solve real-world problems.

For example:

- Use coordinate geometry and transformational methods to model mathematical concepts and solve problems involving similarity (including scale and size change), congruence, symmetry, and tessellations.
- Describe and analyze connections among Euclidean, coordinate, and transformational representations of geometric figures.
- Use two- and three-dimensional coordinate systems to represent and analyze geometric figures.
- Describe the relationships between geometry and algebra (e.g., transformations as a geometric equivalence of the function concept).
- Illustrate the applications of recursion and iteration geometrically (e.g., fractals).
- Use a variety of geometric methods (e.g., trigonometric ratios, similarity, proportionality) to solve real-world problems.

SUBAREA V—PROBABILITY AND STATISTICS

0018 Understand counting techniques and the theory of probability.

For example:

- Apply properties of sets and Venn diagrams.
- Determine probabilities in counting situations involving combinations and permutations.
- Find the probability of dependent and independent events.
- Use random variables to interpret and apply probability distributions.
- Analyze problem situations (e.g., fairness of games, lotteries) and determine the probability of events.
- Choose an appropriate simulation to model simple theoretical and experimental probabilities.
- Use probability models and simulations to make and interpret predictions.
FIELD 115: MATHEMATICS
TEST FRAMEWORK

0019 Understand the process of posing questions and collecting, organizing, and representing data to answer those questions.

For example:

- Apply criteria for data collection (e.g., random sample, survey techniques).
- Recognize potential sample bias in a given collection technique.
- Calculate and interpret measures of central tendency (mean, median, mode) and variation (e.g., range, standard deviation) to characterize a given set of data.
- Analyze the relationship between data transformations and measures of central tendency and variation.
- Organize and interpret data using a variety of graphs (e.g., bar graphs, line graphs, pictographs, scatter plots, box plots, stem-and-leaf diagrams, histograms, frequency distributions).
- Apply procedures (e.g., geometric, algebraic, calculus) for determining lines of fit and transformations (power and logarithmic transformations) to achieve linearity.

0020 Understand the process of analyzing and interpreting data to make predictions.

For example:

- Draw conclusions about data given summary statistics.
- Identify, analyze, and interpret discrete and continuous data distributions (e.g., binomial, normal distribution).
- Describe the link between probability theory and inferential statistics.
- Identify characteristics of appropriate observations and experiments used in hypothesis testing.
- Compare and contrast concepts of reliability and validity of results.
- Interpret correlation and regression.
c. **Candidate Data for This Assessment**

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<td>74.0</td>
<td>252.4</td>
<td>259.0</td>
<td>253.2</td>
<td>248.6</td>
<td>253.8</td>
<td>244.5</td>
</tr>
<tr>
<td>2009 [4, 6]</td>
<td>Augustana</td>
<td>8</td>
<td>100</td>
<td>260.8</td>
<td>271.5</td>
<td>256.1</td>
<td>261</td>
<td>255.6</td>
<td>258.8</td>
</tr>
<tr>
<td></td>
<td>All Illinois*</td>
<td>388</td>
<td>65.5</td>
<td>247.5</td>
<td>251.9</td>
<td>246.0</td>
<td>245.5</td>
<td>246.3</td>
<td>245.2</td>
</tr>
<tr>
<td>2008 [1, 3, 6, 9, 11]</td>
<td>Augustana</td>
<td>14</td>
<td>71.4</td>
<td>248.9</td>
<td>257.6</td>
<td>259.6</td>
<td>241.4</td>
<td>243.1</td>
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</tr>
<tr>
<td></td>
<td>All Illinois*</td>
<td>903</td>
<td>60.7</td>
<td>248.0</td>
<td>256.5</td>
<td>250.9</td>
<td>244.3</td>
<td>246.5</td>
<td>239.4</td>
</tr>
<tr>
<td>2007 [1, 3, 4, 6, 10]</td>
<td>Augustana</td>
<td>8</td>
<td>100</td>
<td>266.9</td>
<td>278.0</td>
<td>269.4</td>
<td>266.0</td>
<td>257.6</td>
<td>265.3</td>
</tr>
<tr>
<td></td>
<td>All Illinois*</td>
<td>963</td>
<td>64.8</td>
<td>245.6</td>
<td>253.5</td>
<td>255.1</td>
<td>237.1</td>
<td>246.6</td>
<td>233.9</td>
</tr>
<tr>
<td>2006 [3]</td>
<td>Augustana</td>
<td>3</td>
<td>100</td>
<td>268.0</td>
<td>293.0</td>
<td>260.0</td>
<td>257.3</td>
<td>261.7</td>
<td>279.3</td>
</tr>
<tr>
<td></td>
<td>All Illinois*</td>
<td>180</td>
<td>67.2</td>
<td>248.0</td>
<td>266.0</td>
<td>253.0</td>
<td>238.0</td>
<td>244.0</td>
<td>241.0</td>
</tr>
</tbody>
</table>

**Information in this column includes the calendar year when one or more Augustana students sat the ICTS Mathematics Test and also the months of that year when Augustana students sat for the test. For example, 2010 [4, 6, 7] means that during the year 2010, Augustana students sat for this test in the 4th, 6th, and 7th months (e.g., April, June, and July).**

*The Illinois Certification Testing System only provided statewide comparative data for test dates when Augustana students sat the test. So, considering the example of calendar year 2010, we only have information about the statewide performance of Illinois test-takers who sat the test in months of April, June, and July.*
### d. Alignment Between NCTM Standards/Indicators and Assessment Objectives

<table>
<thead>
<tr>
<th>NCTM Indicator</th>
<th>ICTS Mathematics Test Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard 1: Knowledge of Mathematical Problem Solving</strong></td>
<td></td>
</tr>
<tr>
<td>Candidates know, understand, and apply the process of mathematical problem solving.</td>
<td></td>
</tr>
</tbody>
</table>
| 1.1 Apply and adapt a variety of appropriate strategies to solve problems.      | Subarea I, 0001: Understand how to communicate mathematical content and concepts, and develop and utilize a variety of problem-solving techniques. For example:  
  - Demonstrate an understanding of problem-solving strategies (e.g., using a diagram, making an organized list, working backwards using logical reasoning, making a simpler problem, acting out or using objects, systematic guessing and checking, looking for patterns, estimating, eliminating extraneous information).  
  - Generalize the results of problems and extend them to other problem situations. |
| 1.2 Solve problems that arise in mathematics and those involving mathematics in other contexts. | Subarea I, 0001: Understand how to communicate mathematical content and concepts, and develop and utilize a variety of problem-solving techniques. For example:  
  - Demonstrate an understanding of problem-solving strategies (e.g., using a diagram, making an organized list, working backwards using logical reasoning, making a simpler problem, acting out or using objects, systematic guessing and checking, looking for patterns, estimating, eliminating extraneous information).  
  - Generalize the results of problems and extend them to other problem situations. |
| 1.3 Build new mathematical knowledge through problem solving.                   | Subarea I, 0001: Understand how to communicate mathematical content and concepts, and develop and utilize a variety of problem-solving techniques. For example:  
  - Recognize how to use problem explorations and modeling to extend the mathematical knowledge of all students. |
| 1.4 Monitor and reflect on the process of mathematical problem solving.        | Subarea I, 0001: Understand how to communicate mathematical content and concepts, and develop and utilize a variety of problem-solving techniques. For example:  
  - Recognize how to use problem explorations and modeling to extend the mathematical knowledge of all students. |
**Standard 2: Knowledge of Reasoning and Proof**
Candidates reason, construct, and evaluate mathematical arguments and develop an appreciation for mathematical rigor and inquiry.

<table>
<thead>
<tr>
<th>NCTM Indicator</th>
<th>ICTS Mathematics Test Objective</th>
</tr>
</thead>
</table>
| 2.1 Recognize reasoning and proof as fundamental aspects of mathematics. | Subarea I, 0002: Understand how to apply appropriate reasoning techniques to concepts, procedures, and conjectures, and make connections with and among the various branches of mathematics and other disciplines. For example:  
  - Recognize valid justifications for the application of concepts, procedures and theorems in a given situation. |
| 2.2 Make and investigate mathematical conjectures. | Subarea I, 0002: Understand how to apply appropriate reasoning techniques to concepts, procedures, and conjectures, and make connections with and among the various branches of mathematics and other disciplines. For example:  
  - Demonstrate an understanding of how to develop conjectures and evaluate their validity. |
| 2.3 Develop and evaluate mathematical arguments and proofs. | Subarea I, 0002: Understand how to apply appropriate reasoning techniques to concepts, procedures, and conjectures, and make connections with and among the various branches of mathematics and other disciplines. For example:  
  - Recognize valid justifications for the application of concepts, procedures and theorems in a given situation. |
| 2.4 Select and use various types of reasoning and methods of proof. | Subarea I, 0002: Understand how to apply appropriate reasoning techniques to concepts, procedures, and conjectures, and make connections with and among the various branches of mathematics and other disciplines. For example:  
  - Recognize valid justifications for the application of concepts, procedures and theorems in a given situation.  
  - Distinguish between inductive and deductive reasoning.  

Subarea III, 0008: Understand concepts, representations, and relationships of variables and patterns. For example:  
  - Use a formal axiomatic system to construct and analyze proofs. |
### Standard 3: Knowledge of Mathematical Communication
Candidates communicate their mathematical thinking orally and in writing to peers, faculty, and others.

<table>
<thead>
<tr>
<th>NCTM Indicator</th>
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</tr>
</thead>
</table>
| 3.1 Communicate their mathematical thinking coherently and clearly to peers, faculty, and others. | Subarea I, 0001: Understand how to communicate mathematical content and concepts, and develop and utilize a variety of problem-solving techniques. For example:  
- Demonstrate knowledge of how to communicate verbally and in written, visual, and symbolic forms using appropriate technology. |
| 3.2 Use the language of mathematics to express ideas precisely. | Subarea I, 0001: Understand how to communicate mathematical content and concepts, and develop and utilize a variety of problem-solving techniques. For example:  
- Demonstrate knowledge of how to communicate verbally and in written, visual, and symbolic forms using appropriate technology. |
| 3.3 Organize mathematical thinking through communication. | Subarea I, 0001: Understand how to communicate mathematical content and concepts, and develop and utilize a variety of problem-solving techniques. For example:  
- Demonstrate knowledge of how to communicate verbally and in written, visual, and symbolic forms using appropriate technology.  
- Demonstrate an understanding of problem-solving strategies (e.g., using a diagram, making an organized list,...) |
| 3.4 Analyze and evaluate the mathematical thinking and strategies of others. | Not directly addressed in the ICTS Test |

### Standard 4: Knowledge of Mathematical Connections
Candidates recognize, use, and make connections between and among mathematical ideas and in contexts outside mathematics to build mathematical understanding.

| Subarea IV, 0014: Understand properties of points, lines, planes, and space and their relationship to Euclidian and non-Euclidian geometry. For example:  
- Apply definitions, axioms, and theorems of Euclidian geometry to develop different types of proofs (e.g., direct, indirect, flow, paragraph).  
- Use the formal axiomatic system of geometry to construct and analyze proofs. |
<table>
<thead>
<tr>
<th>NCTM Indicator</th>
<th>ICTS Mathematics Test Objective</th>
</tr>
</thead>
</table>
| 4.1 Recognize and use connections among mathematical ideas. | Subarea I, 0002: Understand how to apply appropriate reasoning techniques to concepts, procedures, and conjectures, and make connections with and among the various branches of mathematics and other disciplines. For example:  
- Identify and apply connections within the mathematics curriculum (e.g., geometric substantiations of algebraic formulae such as demonstrating the connection of the distance formula in coordinate geometry via the Pythagorean Theorem, geometric interpretation of the integral, applications of matrices to geometric figures). |
| 4.2 Recognize and apply mathematics in contexts outside of mathematics. | Subarea I, 0002: Understand how to apply appropriate reasoning techniques to concepts, procedures, and conjectures, and make connections with and among the various branches of mathematics and other disciplines. For example:  
- Demonstrate knowledge of mathematical connections to other disciplines (e.g., rate of change as applied to business, economics, physics, chemistry, biology). |
| 4.3 Demonstrate how mathematical ideas interconnect and build on one another to produce a coherent whole. | Subarea I, 0002: Understand how to apply appropriate reasoning techniques to concepts, procedures, and conjectures, and make connections with and among the various branches of mathematics and other disciplines. For example:  
- Identify and apply connections within the mathematics curriculum (e.g., geometric substantiations of algebraic formulae such as demonstrating the connection of the distance formula in coordinate geometry via the Pythagorean Theorem, geometric interpretation of the integral, applications of matrices to geometric figures). |

**Standard 5: Knowledge of Mathematical Representation**
Candidates use varied representations of mathematical ideas to support and deepen students’ mathematical understanding.

<table>
<thead>
<tr>
<th>NCTM Indicator</th>
<th>ICTS Mathematics Test Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 Use representations to model and interpret physical, social, and mathematical phenomena.</td>
<td>Subarea III, 0008: Understand concepts, representations, and relationships of variables and patterns.</td>
</tr>
</tbody>
</table>
5.2 Create and use representations to organize, record, and communicate mathematical ideas.

<table>
<thead>
<tr>
<th>Subarea III, 0008: Understand concepts, representations, and relationships of variables and patterns.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subarea III, 0009: Understand and apply concepts and representations of linear relations and functions.</td>
</tr>
<tr>
<td>Subarea III, 0010: Understand and apply concepts and representations of quadratic relations (including conic sections) and functions.</td>
</tr>
<tr>
<td>Subarea III, 0011: Understand and apply concepts and representations of polynomial, absolute value, radical, and rational functions and inequalities.</td>
</tr>
<tr>
<td>Subarea III, 0012: Understand and apply concepts and representations of exponential, logarithmic, and trigonometric functions.</td>
</tr>
<tr>
<td>Subarea V, 0019: Understand the process of posing questions and collecting, organizing, and representing data to answer those questions.</td>
</tr>
<tr>
<td>Subarea V, 0020: Understand the process of analyzing and interpreting data to make predictions.</td>
</tr>
<tr>
<td>Subarea III, 0013: Understand the historical development and applications of calculus. For example:</td>
</tr>
<tr>
<td>• Represent limits, derivatives, and integrals symbolically, numerically, graphically, and verbally.</td>
</tr>
</tbody>
</table>
### Standard 6: Knowledge of Technology
Candidates embrace technology as an essential tool for teaching and learning mathematics.

<table>
<thead>
<tr>
<th>NCTM Indicator</th>
<th>ICTS Mathematics Test Objective</th>
</tr>
</thead>
</table>
| 5.3 Select, apply, and translate among mathematical representations to solve problems. | Subarea III, 0008: Understand concepts, representations, and relationships of variables and patterns.  
Subarea III, 0009: Understand and apply concepts and representations of linear relations and functions.  
Subarea III, 0010: Understand and apply concepts and representations of quadratic relations (including conic sections) and functions.  
Subarea III, 0011: Understand and apply concepts and representations of polynomial, absolute value, radical, and rational functions and inequalities.  
Subarea III, 0012: Understand and apply concepts and representations of exponential, logarithmic, and trigonometric functions.  
Subarea V, 0019: Understand the process of posing questions and collecting, organizing, and representing data to answer those questions.  
Subarea III, 0013: Understand the historical development and applications of calculus.  
For example:  
- Represent limits, derivatives, and integrals symbolically, numerically, graphically, and verbally. |
| 6.1 Use knowledge of mathematics to select and use appropriate technological tools, such as but not limited to, spreadsheets, dynamic graphing tools, computer algebra systems, dynamic statistical packages, graphing calculators, data-collection devices, and presentation software. | Subarea I, 0003: Understand how to select, integrate, and use appropriate technologies.  
For example:  
- Demonstrate an understanding of the capabilities and benefits of current and emerging technologies in the content area of mathematics.  
- Select appropriate technology (e.g., spreadsheet, graphing calculator, manipulatives) to solve problems throughout the mathematics curriculum.  
- Demonstrate an understanding of how to select and integrate appropriate technology for mathematics instruction.  
- Demonstrate knowledge of CAS (computer algebra systems) and the application of technology to meet the needs of diverse learners. |
<table>
<thead>
<tr>
<th>NCTM Indicator</th>
<th>ICTS Mathematics Test Objective</th>
</tr>
</thead>
</table>
| 7.1 Attention to equity                           | Subarea I, 0002: Understand how to apply appropriate reasoning techniques to concepts, procedures, and conjectures, and make connections with and among the various branches of mathematics and other disciplines. For example:  
  - Demonstrate knowledge of the historical development of mathematics, including contributions of men and women from various cultures. |
| 7.2 Use of stimulating curricula                  | Not directly addressed in the ICTS Test                                                                                                                                                         |
| 7.3 Effective teaching                            | Subarea I, 0001: Understand how to communicate mathematical content and concepts, and develop and utilize a variety of problem-solving techniques. For example:                                          
  - Recognize how to create effective learning environments in which mathematics students work collaboratively in one-on-one, small-group, and large-group contexts. |
| 7.4 Commitment to learning with understanding      | Subarea I, 0001: Understand how to communicate mathematical content and concepts, and develop and utilize a variety of problem-solving techniques. For example:                                          
  - Demonstrate an understanding of learning styles and learning strategies in mathematics                                                                 |
| 7.5 Use of various assessments                     | Not directly addressed in the ICTS Test                                                                                                                                                         |
| 7.6 Use of various teaching tools including technology | Subarea I, 0003: Understand how to select, integrate, and use appropriate technologies. For example:                                                                                              
  - Demonstrate an understanding of the capabilities and benefits of current and emerging technologies in the content area of mathematics.  
  - Select appropriate technology (e.g., spreadsheet, graphing calculator, manipulatives) to solve problems throughout the mathematics curriculum.  
  - Demonstrate an understanding of how to select and integrate appropriate technology for mathematics instruction.  
  - Demonstrate knowledge of CAS (computer algebra systems)  
  - Develop and apply algorithms to solve problems using technology. |
### Standard 8: Knowledge of Mathematics Pedagogy

Candidates possess a deep understanding of how students learn mathematics and of the pedagogical knowledge specific to mathematics teaching and learning.

<table>
<thead>
<tr>
<th>NCTM Indicator</th>
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</tr>
</thead>
<tbody>
<tr>
<td>8.1 Selects, uses, and determines suitability of the wide variety of available mathematics curricula and teaching materials for all students including those with special needs such as the gifted, challenged and speakers of other languages.</td>
<td>Not directly addressed in the ICTS Test</td>
</tr>
</tbody>
</table>
| 8.2 Selects and uses appropriate concrete materials for learning mathematics. | Subarea I, 0001: Understand how to communicate mathematical content and concepts, and develop and utilize a variety of problem-solving techniques. For example:  
  - Demonstrate an understanding of problem-solving strategies (e.g., …acting out or using objects….) |
| 8.3 Uses multiple strategies, including listening to and understanding the ways students think about mathematics, to assess students’ mathematical knowledge. | Subarea I, 0001: Understand how to communicate mathematical content and concepts, and develop and utilize a variety of problem-solving techniques. For example:  
  - Demonstrate an understanding of learning styles and learning strategies in mathematics |
| 8.4 Plans lessons, units and courses that address appropriate learning goals, including those that address local, state, and national mathematics standards and legislative mandates. | Not directly addressed in the ICTS Test |
| 8.5 Participates in professional mathematics organizations and uses their print and on-line resources. | Not directly addressed in the ICTS Test |
| 8.6 Demonstrates knowledge of research results in the teaching and learning of mathematics. | Not directly addressed in the ICTS Test |
| 8.7 Uses knowledge of different types of instructional strategies in planning mathematics lessons. | Subarea I, 0001: Understand how to communicate mathematical content and concepts, and develop and utilize a variety of problem-solving techniques. For example:  
  - Recognize how to create effective learning environments in which mathematics students work collaboratively in one-on-one, small-group, and large-group contexts. |
| 8.8 Demonstrates the ability to lead classes in mathematical problem solving and in developing in-depth conceptual understanding, and to help students develop and test generalizations. | Subarea I, 0001: Understand how to communicate mathematical content and concepts, and develop and utilize a variety of problem-solving techniques. For example:  
  - Recognize how to use problem explorations |
8.9 Develop lessons that use technology’s potential for building understanding of mathematical concepts and developing important mathematical ideas.

Subarea I, 0003: Understand how to select, integrate, and use appropriate technologies.
For example:
- Demonstrate an understanding of the capabilities and benefits of current and emerging technologies in the content area of mathematics.
- Select appropriate technology (e.g., spreadsheet, graphing calculator, manipulatives) to solve problems throughout the mathematics curriculum.
- Demonstrate an understanding of how to select and integrate appropriate technology for mathematics instruction.

### Standard 9: Knowledge of Number and Operation

Candidates demonstrate computational proficiency, including a conceptual understanding of numbers, ways of representing number, relationships among number and number systems, and meanings of operations.

<table>
<thead>
<tr>
<th>NCTM Indicator</th>
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</tr>
</thead>
</table>
| 9.1 Analyze and explain the mathematics that underlies the procedures used for operations involving integers, rational, real, and complex numbers. | Subarea II, 0004: Understand the concepts of number, number theory, and numeration systems. For example:  
  - Solve problems involving integers, fractions, decimals, percents, ratios, and proportions.  
Subarea II, 0005: Understand properties of the real and complex number systems as they apply to algorithms of operations. For example:  
  - Demonstrate an understanding of real number properties and operations and how they apply to algorithms and algebraic expressions.  
  - Compute and interpret the results of computations using complex numbers and matrices. |
| 9.2 Use properties involving number and operations, mental computation, and computational estimation. | Subarea II, 0004: Understand the concepts of number, number theory, and numeration systems. For example:  
  - Represent and operate upon numbers using a variety of methods.  
  - Perform operations in any number base and convert between different number bases. |
| 9.3 Provide equivalent representations of fractions, decimals, and percents.     | Subarea II, 0004: Understand the concepts of number, number theory, and numeration systems. |
| 9.10 Demonstrate knowledge of the historical development of number and number systems including contributions from diverse cultures. | For example:  
- Demonstrate knowledge of the historical development of mathematics, including contributions of men and women from various cultures. |
| 9.9 Recognize matrices and vectors as systems that have some of the properties of the real number system. | Subarea II, 0005: Understand properties of the real and complex number systems as they apply to algorithms of operations.  
For example:  
- Compute and interpret the results of computations using complex numbers and matrices. |
| 9.8 Represent, use, and apply complex numbers. | Subarea II, 0005: Understand properties of the real and complex number systems as they apply to algorithms of operations.  
For example:  
- Use polar and vector representations of complex numbers.  
- Compute and interpret the results of computations using complex numbers and matrices. |
| 9.7 Compare and contrast properties of numbers and number systems. | Subarea II, 0004: Understand the concepts of number, number theory, and numeration systems.  
For example:  
- Solve problems involving prime and composite numbers, least common multiples, modular arithmetic, and greatest common factors. |
| 9.6 Make sense of large and small numbers and use scientific notation. | Not directly addressed in the ICTS Test |
| 9.5 Apply the fundamental ideas of number theory. | Subarea II, 0004: Understand the concepts of number, number theory, and numeration systems.  
Subarea II, 0005: Understand properties of the real and complex number systems as they apply to algorithms of operations. |
| 9.4 Create, solve, and apply proportions. | Subarea II, 0004: Understand the concepts of number, number theory, and numeration systems.  
For example:  
- Represent and operate upon numbers using a variety of methods. |

For example:
- Represent and operate upon numbers using a variety of methods.
**Standard 10: Knowledge of Different Perspectives on Algebra**
Candidates emphasize relationships among quantities including functions, ways of representing mathematical relationships, and the analysis of change.

<table>
<thead>
<tr>
<th>NCTM Indicator</th>
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</tr>
</thead>
<tbody>
<tr>
<td>10.1 Analyze patterns, relations, and functions of one and two variables.</td>
<td>Subarea III, 0008: Understand concepts, representations, and relationships of variables and patterns.</td>
</tr>
<tr>
<td></td>
<td>Subarea III, 0009: Understand and apply concepts and representations of linear relations and functions.</td>
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<tr>
<td></td>
<td>Subarea III, 0010: Understand and apply concepts and representations of quadratic relations (including conic sections) and functions.</td>
</tr>
<tr>
<td></td>
<td>Subarea III, 0011: Understand and apply concepts and representations of polynomial, absolute value, radical, and rational functions and inequalities.</td>
</tr>
<tr>
<td></td>
<td>Subarea III, 0012: Understand and apply concepts and representations of exponential, logarithmic, and trigonometric functions.</td>
</tr>
<tr>
<td>10.2 Apply fundamental ideas of linear algebra.</td>
<td>Subarea III, 0009: Understand and apply concepts and representations of linear relations and functions. For example:</td>
</tr>
<tr>
<td></td>
<td>- Apply principles and properties of linear algebra (e.g., vectors, matrix algebra, vector spaces) to solve problems.</td>
</tr>
<tr>
<td>10.3 Apply the major concepts of abstract algebra to justify algebraic operations and formally analyze algebraic structures.</td>
<td>Subarea III, 0008: Understand concepts, representations, and relationships of variables and patterns. For example:</td>
</tr>
<tr>
<td></td>
<td>- Use a formal axiomatic system to construct and analyze proofs.</td>
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<tr>
<td></td>
<td>- Demonstrate an understanding of group structures and their application to symmetry.</td>
</tr>
<tr>
<td></td>
<td>- Demonstrate an understanding of rings and fields and their relation to algebraic properties of real numbers.</td>
</tr>
<tr>
<td>10.4 Use mathematical models to represent and understand quantitative relationships.</td>
<td>Subarea III, 0009: Understand and apply concepts and representations of linear relations and functions. For example:</td>
</tr>
<tr>
<td></td>
<td>- Apply linear relations, functions, and systems to model and solve a variety of problems.</td>
</tr>
<tr>
<td></td>
<td>Subarea III, 0010: Understand and apply concepts and representations of quadratic relations (including conic sections) and functions.</td>
</tr>
</tbody>
</table>
| 10.5 Use technological tools to explore algebraic ideas and representations of information and in solving problems. | Subarea I, 0003: Understand how to select, integrate, and use appropriate technologies. For example:  
- Select appropriate technology (e.g., spreadsheet, graphing calculator, manipulatives) to solve problems throughout the mathematics curriculum.  
- Demonstrate knowledge of CAS (computer algebra systems). |
| --- | --- |
| 10.6 Demonstrate knowledge of the historical development of algebra including contributions from diverse cultures. | Subarea I, 0002: Understand how to apply appropriate reasoning techniques to concepts, procedures, and conjectures, and make connections with and among the various branches of mathematics and other disciplines. For example:  
- Demonstrate knowledge of the historical development of mathematics, including contributions of men and women from various cultures. |

**Standard II: Knowledge of Geometries**
Candidates use spatial visualization and geometric modeling to explore and analyze geometric shapes, structures, and their properties.

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>11.1 Demonstrate knowledge of core concepts and principles of Euclidean and non-Euclidean geometries</td>
<td>Subarea IV, 0014: Understand properties of points, lines, planes, and space and their relationship to</td>
</tr>
</tbody>
</table>
| 11.1 Specify locations and describe spatial in two and three dimensions from both formal and informal perspectives. | Euclidian and non-Euclidian geometry. For example:
- Apply definitions, axioms, and theorems of Euclidian geometry to develop different types of proofs (e.g., direct, indirect, flow, paragraph).
- Solve a variety of problems in Euclidian geometry (e.g., justify geometric constructions).
- Compare and contrast the structures of Euclidian and non-Euclidian geometries (e.g., hyperbolic, elliptic). |
|---|---|
| 11.2 Exhibit knowledge of the role of axiomatic systems and proofs in geometry. | Subarea IV, 0014: Understand properties of points, lines, planes, and space and their relationship to Euclidian and non-Euclidian geometry. For example:
- Use the formal axiomatic system of geometry to construct and analyze proofs. |
| 11.3 Analyze characteristics and relationships of geometric shapes and structures. | Subarea IV, 0015: Understand properties of two- and three-dimensional shapes. For example:
- Apply characteristics of two- and three-dimensional figures to describe, analyze, and categorize two- and three-dimensional figures.
- Apply the principle of congruence to explore properties of geometric figures and prove theorems.
- Apply concepts of similarity and congruence to analyze the properties and compare the measures (e.g., perimeter, area, volume) of two- and three-dimensional figures. |
| 11.4 Build and manipulate representations of two- and three- dimensional objects and visualize objects from different perspectives. | Subarea IV, 0016: Understand and apply spatial visualization skills. For example:
- Translate between two- and three-dimensional representations of geometric figures (e.g., cross sections, nets, projections, perspective drawings).
- Apply procedures for generating solids of revolution from two-dimensional figures. |
| 11.5 Specify locations and describe spatial | Subarea IV, 0017: Understand and apply geometric methods to model mathematical concepts and solve real-world problems. For example:
- Use two- and three-dimensional coordinate systems to represent and analyze geometric figures. |
11.6 Apply transformations and use symmetry, similarity, and congruence to analyze mathematical situations.

Subarea IV, 0015: Understand properties of two- and three-dimensional shapes.
For example:
- Apply the principle of congruence to explore properties of geometric figures and prove theorems.
- Apply concepts of similarity and congruence to analyze the properties and compare the measures (e.g., perimeter, area, volume) of two- and three-dimensional figures.

Subarea IV, 0017: Understand and apply geometric methods to model mathematical concepts and solve real-world problems.
For example:
- Use coordinate geometry and transformational methods to model mathematical concepts and solve problems involving similarity (including scale and size change), congruence, symmetry, and tessellations.

11.7 Use concrete models, drawings, and dynamic geometric software to explore geometric ideas and their applications in real-world contexts.

Not directly addressed in the ICTS Test

11.8 Demonstrate knowledge of the historical development of Euclidean and non-Euclidean geometries including contributions from diverse cultures.

Subarea I, 0002: Understand how to apply appropriate reasoning techniques to concepts, procedures, and conjectures, and make connections with and among the various branches of mathematics and other disciplines.
For example:
- Demonstrate knowledge of the historical development of mathematics, including contributions of men and women from various cultures.

**Standard 12: Knowledge of Calculus**
Candidates demonstrate a conceptual understanding of limit, continuity, differentiation, and integration and a thorough background in the techniques and application of the calculus.

<table>
<thead>
<tr>
<th>NCTM Indicator</th>
<th>ICTS Mathematics Test Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.1 Demonstrate a conceptual understanding of and</td>
<td>Subarea III, 0013: Understand the historical</td>
</tr>
<tr>
<td>Section</td>
<td>Description</td>
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<td>---------</td>
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</tr>
<tr>
<td>12.2</td>
<td>Apply concepts of function, geometry, and trigonometry in solving problems involving calculus.</td>
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<tr>
<td>12.3</td>
<td>Use the concepts of calculus and mathematical modeling to represent and solve problems taken from real-world contexts.</td>
</tr>
<tr>
<td>12.4</td>
<td>Use technological tools to explore and represent fundamental concepts of calculus.</td>
</tr>
</tbody>
</table>
| 12.5    | Demonstrate knowledge of the historical development of calculus including contributions from diverse cultures. | Subarea I, 0002: Understand how to apply appropriate reasoning techniques to concepts, procedures, and conjectures, and make connections with and among the various branches of mathematics and other disciplines. For example: - Demonstrate knowledge of the historical development of mathematics, including contributions of men and women from various cultures. Subarea III, 0013: Understand the historical development and applications of calculus. For example: - Demonstrate knowledge of the history of mathematics leading up to calculus (e.g., slope
of tangent line as rate of change, using geometric methods to determine the area under a curve).

<table>
<thead>
<tr>
<th><strong>Standard 14: Knowledge of Data Analysis, Statistics, and Probability</strong></th>
<th><strong>ICTS Mathematics Test Objective</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Candidates demonstrate an understanding of concepts and practices related to data analysis, statistics, and probability.</td>
<td></td>
</tr>
<tr>
<td><strong>NCTM Indicator</strong></td>
<td><strong>ICTS Mathematics Test Objective</strong></td>
</tr>
</tbody>
</table>
| 14.1 Design investigations, collect data, and use a variety of ways to display data and interpret data representations that may include bivariate data, conditional probability and geometric probability. | Subarea V, 0019: Understand the process of posing questions and collecting, organizing, and representing data to answer those questions. For example:  
- Organize and interpret data using a variety of graphs (e.g., bar graphs, line graphs, pictographs, scatter plots, box plots, stem-and-leaf diagrams, histograms, frequency distributions). |
| 14.2 Use appropriate methods such as random sampling or random assignment of treatments to estimate population characteristics, test conjectured relationships among variables, and analyze data. | Subarea V, 0019: Understand the process of posing questions and collecting, organizing, and representing data to answer those questions. For example:  
- Apply criteria for data collection (e.g., random sample, survey techniques).  
- Recognize potential sample bias in a given collection technique. |
| 14.3 Use appropriate statistical methods and technological tools to describe shape and analyze spread and center. | Subarea V, 0019: Understand the process of posing questions and collecting, organizing, and representing data to answer those questions. For example:  
- Calculate and interpret measures of central tendency (mean, median, mode) and variation (e.g., range, standard deviation) to characterize the given set of data.  
Subarea V, 0020: Understand the process of analyzing and interpreting data to make predictions. For example:  
- Identify, analyze, and interpret discrete and continuous data distributions (e.g., binomial, normal distribution). |
| 14.4 Use statistical inference to draw conclusions from data. | Subarea V, 0020: Understand the process of analyzing and interpreting data to make predictions. For example:  
- Draw conclusions about data given summary statistics.  
- Describe the link between probability theory and inferential statistics.  
- Interpret correlation and regression. |
<table>
<thead>
<tr>
<th>14.5 Identify misuses of statistics and invalid conclusions from probability.</th>
<th>Not directly addressed in the ICTS Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.6 Draw conclusions involving uncertainty by using hands-on and computer-based simulation for estimating probabilities and gathering data to make inferences and conclusions.</td>
<td>Not directly addressed in the ICTS Test</td>
</tr>
</tbody>
</table>
| 14.7 Determine and interpret confidence intervals. | Subarea V, 0020: Understand the process of analyzing and interpreting data to make predictions. For example:  
- Identify characteristics of appropriate observations and experiments used in hypothesis testing. |
| 14.8 Demonstrate knowledge of the historical development of statistics and probability including contributions from diverse cultures. | Subarea I, 0002: Understand how to apply appropriate reasoning techniques to concepts, procedures, and conjectures, and make connections with and among the various branches of mathematics and other disciplines. For example:  
- Demonstrate knowledge of the historical development of mathematics, including contributions of men and women from various cultures. |

### Standard 15: Knowledge of Measurement
Candidates apply and use measurement concepts and tools.

<table>
<thead>
<tr>
<th>NCTM Indicator</th>
<th>ICTS Mathematics Test Objective</th>
</tr>
</thead>
</table>
| 15.1 Recognize the common representations and uses of measurement and choose tools and units for measuring. | Subarea II, 0006: Understand customary, metric, and nonstandard measurement. For example:  
- Demonstrate knowledge of standard, nonstandard, and emerging units (e.g., graphic screen pixels, font size) of measurement.  
- Use nonlinear measuring scales (e.g., Richter, decibel, pH) to solve practical problems. |
| 15.2 Apply appropriate techniques, tools, and formulas to determine measurements and their application in a variety of contexts. | Subarea II, 0006: Understand customary, metric, and nonstandard measurement. For example:  
- Apply attributes of length, area, volume, capacity, time, temperature, angles (degree and radian measure), weight, and mass to solve problems.  
- Solve problems using derived measures (e.g., density, work, velocity), conversion factors, and dimensional analysis.  
Subarea II, 0007: Understand procedures for computing or estimating measures of multidimensional objects. |
| 15.3 Completes error analysis through determining the reliability of the numbers obtained from measures. | Subarea II, 0006: Understand customary, metric, and nonstandard measurement. For example:  
- Determine acceptable measures of accuracy and calculate relative error in a given situation. |
|---|---|
| 15.4 Demonstrate knowledge of the historical development of measurement and measurement systems including contributions from diverse cultures. | Subarea I, 0002: Understand how to apply appropriate reasoning techniques to concepts, procedures, and conjectures, and make connections with and among the various branches of mathematics and other disciplines. For example:  
- Demonstrate knowledge of the historical development of mathematics, including contributions of men and women from various cultures. |
Augustana College Teacher Education Program

NCTM SPA Report for NCATE Accreditation Review

Assessment # 2: Work Sample

Table of Contents for Assessment Documentation

a. Description of the Assessment........................................................................................................ Pages 2-3

b. Scoring Guide for the Work Sample Assessment........................................................................ Pages 4-5

c. Chart Providing Candidate Data from this Assessment................................................................ Pages 6-7

d. Chart Aligning NCTM Standards and Indicators with Work Sample........................................ Pages 8-9
a. **Description of the Assessment**

The Professional Work Sample is completed during Student Teaching as one requirement within the Student Teaching Seminar. It is a critical component of the seminar experience and documents work completed during student teaching. It is a learning-centered portfolio that provides evidence of a carefully developed teaching unit that is planned, implemented, and assessed during the student teaching term. Teacher candidates are expected to teach the unit and collect student assessment data to evaluate their overall impact on student learning for the unit of study. It includes evidence of the following: preliminary unit planning, pre-assessment of students, lesson plans that reflect learning needs as determined via the planning and pre-assessment process, samples of student work, documentation regarding the assessment of learning outcomes, analysis of ‘pre’ and ‘post’ assessments and a comprehensive reflection on this unit of study. The Professional Work Sample serves as critical evidence of a teacher candidate’s performance and impacts on student learning. This is evidenced in the following assignment guidelines:

1. An “**Overview/Rationale**” and “**Philosophy Statement and Preface**” for the unit provide evidence of connections across the curriculum, curricular goals, and learning theory. The teacher candidate develops goal statements that are clearly tied to their mathematical content areas, the *Illinois Learner Standards*, the *Augustana Standards and Performance Indicators for Teacher Education*, and/or their district benchmarks. The identification of these goal statements is coupled with the selection of achievement targets so that the learning outcomes to be accomplished within the Work Sample unit are identified. The narrative provides salient examples of interdisciplinary connections, learning styles, community engagements, multiple intelligences, and varied teaching strategies. It is here that students present a snapshot of the class, address issues of student diversity, and describe any accommodations that might be appropriate.

2. Lesson plans, examples of student work, professional development opportunities, formative and summative assessments, videos, photos, and/or other visual representations of unit lessons, lesson reflections, and other key insights about the unit represent the teaching and learning that occurs during the student teaching experience. Lessons in the Work Sample unit must incorporate variety in pedagogy/ active learning techniques, supportive classroom materials, the use of technology, and accommodations for individual learners.

3. The Professional Work Sample requires a “**Pre-assessment**” that documents student knowledge prior to instruction and provides an opportunity for teacher candidates to examine the instructional practices that might contribute to learning outcomes. Teacher candidates are expected to choose an appropriate pre-assessment(s), provide a rationale for the type of pre-assessment(s) chosen, and interpret pre-assessment data so that they can plan instruction that is aligned with their students’ learning needs. Teacher candidates use the data obtained from the pre-assessment to generate specific teaching goals, content, methods, and outcomes.

4. The Professional Work Sample requires a “**Post-assessment**” that involves a thorough analysis of the data collected after instruction so that student learning can be measured. Teacher candidates are expected to submit evidence (displayed graphically) of whole-class progress and individual progress. A narrative that describes this data-based analysis is accompanied with substantial examples of formative assessments and additional student work. The feedback the teacher candidate provides to individual students, specific details about learning outcomes, and reflective insights into the teacher candidate’s perceived impact provide solid evidence of the candidate’s effects on student learning.

5. The Professional Work Sample requires a final “**Reflection**” and “**Conclusion.**” In these culminating sections of the Professional Work Sample, teacher candidates are asked to re-visit their philosophy
statement, articulate questions, make connections to previous coursework, examine the impact of their teaching the unit on student learning, and examine their own professional growth. Teacher candidates are required to summarize, interpret, question, and reflect so that they can assess the potential for improving their own professional growth.

The Augustana Education Department uses a standardized assessment rubric that evaluates candidate effectiveness in demonstrating their understanding of pedagogy and content and their effect on student learning. It is completed during the student teaching as one requirement within the Student Teaching Seminar. The student teaching seminar consists of candidates who student-teach in all different grades level and subject areas. The seminar instructor is one of our faculties who can be either from elementary teacher education program or secondary program, and he/she evaluates the work sample. We do require teacher candidates to align their unit with the Augustana Standards and Performance Indicators for Teacher Education. This broad set of standards aligns with NCTM standards, Illinois Learner Standards, and/or their district benchmarks. A thorough description of how the Augustana Standards align with NCTM standards is found in the report of Assessment 4: Student Teaching Evaluation.
b. **Scoring Guide for the Work Sample Assessment**

NOTE: Some Augustana Education faculty responsible for assessing candidates’ work samples piloted a new scoring rubric for the work sample during the 2009-2010 school year. The new rubric proved useful, and will be our common assessment tool as we move forward. This rubric, which uses a 3-point scale for all components, is shown below. An older scoring rubric was used by other faculty in 2009-2010, and the older rubric was used by all faculty prior to that year. The older rubric is provided on page 5 of this report. Due to the different scoring systems, readers will note that the candidate data provided in Part c of this report includes different scoring scales. The two rubrics include the same performance descriptors, though the language on the two rubrics is organized differently. For simplicity’s sake, the language found in the latest rubric is used in Part d of this document, the portion aligning our assessment with the NCTM Standards.

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### Work Sample Scoring Rubric (Piloted in 2009-2010 and to be Used Henceforward)

<table>
<thead>
<tr>
<th>Work Sample Descriptors</th>
<th>3</th>
<th>2</th>
<th>1</th>
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</thead>
<tbody>
<tr>
<td>Your work sample begins with a “Philosophy Statement” and “Preface.” The preface explains how each of the Augustana standards has been met. Specific artifacts are referenced from your unit.</td>
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<tr>
<td>You include an “Overview/Rationale” for the unit. This incorporates goal statements that are clearly tied to your primary and secondary content areas, the Illinois Learner Standards, and/or your district benchmarks.</td>
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<tr>
<td>You address the “Interdisciplinary Connections” of your unit with examples that illustrate the integration of additional content areas, learning styles, and/or the use of multiple intelligences.</td>
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<tr>
<td>You describe your “Pre-assessment” and explain how it led to significant insights into students’ thinking prior to planning the teaching and learning experiences.</td>
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<tr>
<td>You include a sequence of high quality “Lesson Plans” (Augustana template) and associated materials. These convey the nature of teaching and learning.</td>
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<tr>
<td>You include a thoughtful “Postlude” that captures the teaching and learning that occurred during each lesson in your Unit.</td>
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<tr>
<td>You provide a collection of “Artifacts” (quizzes, tests, graphs, performance demonstrations, pictures, student projects, KWL’s, etc.) throughout the work sample. These convey the process of student learning.</td>
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<tr>
<td>You describe your “Post-assessment”. This includes a thorough analysis of the data collected and culminates with a discussion that demonstrates the connections between pre-assessment measures, formative assessments, post-assessment results, and artifacts.</td>
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<tr>
<td>Your “Conclusion” articulates questions about teaching and learning. You make connections to previous coursework, clinical experiences, and your own professional growth.</td>
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<tr>
<td>Your “Index” includes the “Student Teaching Artifact Summary Sheet.”</td>
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</tbody>
</table>

The overall presentation of your work sample is neat, professional, clearly articulated, and technically sound.

<table>
<thead>
<tr>
<th>Target (3)</th>
<th>The teacher candidate addresses all aspects of the work sample descriptor accurately and thoroughly.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>There is a clear focus on the essential knowledge, skills, and dispositions addressed in the descriptor.</td>
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<tr>
<td>Developing (2)</td>
<td>The teacher candidate addresses most aspects of the work sample descriptor.</td>
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<tr>
<td></td>
<td>There is a need for a more thorough and accurate development of the descriptor.</td>
</tr>
<tr>
<td></td>
<td>The articulation of knowledge, skills, and dispositions needs refinement for clarity.</td>
</tr>
<tr>
<td>Concern (1)</td>
<td>The teacher candidate addresses very few aspects of the work sample descriptor.</td>
</tr>
<tr>
<td></td>
<td>There is a lack of thoroughness and accuracy.</td>
</tr>
<tr>
<td></td>
<td>The clear articulation of knowledge, skills, and dispositions is lacking.</td>
</tr>
</tbody>
</table>
Work Sample Scoring Rubric (Used Prior to the Pilot in 2009-2010)

1. Your work sample begins with a “Philosophy Statement” and Preface. The preface explains how each of the Augustana standards has been met. Specific artifacts are referenced from your unit. The “Student Teaching Artifact Summary Sheet” is used as an index to find where artifacts demonstrating each of the indicators can be found: ___/5 points

2. Clear communication of the nature of your work sample is necessary. This includes a “Table of Contents,” an overview/rationale for the unit and goal statements that are clearly tied to the Illinois Learner Standards and/or your District Benchmarks. There is also a clear demonstration of the interdisciplinarity of your unit (through multiple subject areas and/or the use of multiple intelligences): ___/5 points

3. Pre-assessment was enacted that led to significant insights into students’ thinking prior to the planned learning experience. Their understanding of the chosen topic was taken into consideration as you planned your lessons. Connections between planning and assessments are clearly stated: ___/5 points

4. A sequence of high quality lesson plans and associated materials (samples of student work, photographs, video examples, reflections, etc.) convey the nature of the learning experiences that you provided for your students. It is very helpful to include a brief “postlude” for each of the lessons that you taught: ___/10 points

5. Pre-assessment measures, post lesson reflections, and a collection of artifacts (quizzes, tests, performance demonstrations, student projects, KWL’s, etc.) clearly convey the nature of the learning of your students. There is evidence of analysis of the ‘data collected.’ This section of the work sample culminates with a discussion that demonstrates the connections between pre-assessment measures and artifacts: ___/5 points

6. A step is “taken back” from your current practice. You consider questions about the learning of your students with a critical eye. Connections are made to previous coursework. This section concludes with unanswered questions. Situate your inquiries within the context of your teaching, your classroom reflections, and your Augustana experience: ___/5 points

7. The overall appearance of your work sample is tidy, professional, clearly articulated, and technically sound: ___/5 points

Final Grade: ___/40
c. **Chart Providing Candidate Data from this Assessment**

NOTE: As you review the data below please notice the range presented — from Seminar grade only to individual scores on each of the 11 rubric descriptors from the rubric piloted as noted above. The variety of data reported is a result of different seminar instructors recording grades for the Work Sample with a variety of detail. All seminar instructors are now using the same rubric and will be reporting scores for candidates for each descriptor on the rubric. The future data, then, will be similar to those data reported for candidates 19 and 20 below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Candidate #</th>
<th>Grade</th>
<th>Maximum Points</th>
<th>Total Points (calculated from categories)</th>
<th>Preface</th>
<th>Artifact Record</th>
<th>Rationale/Standards/Interdisciplinary connections</th>
<th>Pre-assessment and analysis</th>
<th>Lessons</th>
<th>Post-Indications and Reflections</th>
<th>Artifacts</th>
<th>Reflection/Analysis regarding nature of learning</th>
<th>Post-Assessment</th>
<th>Final Reflection/Unanswered Questions</th>
<th>Appearance</th>
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<td>40</td>
<td>32</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>8</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>19</td>
<td>A</td>
<td>33</td>
<td>33</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>20</td>
<td>A</td>
<td>33</td>
<td>31</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
d. Chart Aligning NCTM Standards and Indicators with Work Sample

<table>
<thead>
<tr>
<th>Standard 7: Dispositions</th>
<th>Work Sample Performance Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NCTM Indicator</strong></td>
<td><strong>Work Sample Performance Descriptor</strong></td>
</tr>
<tr>
<td>7.1 Attention to equity</td>
<td>- Your work sample begins with a “Philosophy Statement” and “Preface.” The preface explains how each of the Augustana standards¹ has been met. Specific artifacts are referenced from your unit.</td>
</tr>
<tr>
<td>7.2 Use of stimulating curricula</td>
<td>- Your work sample begins with a “Philosophy Statement” and “Preface.” The preface explains how each of the Augustana standards¹ has been met. Specific artifacts are referenced from your unit.</td>
</tr>
<tr>
<td>7.3 Effective teaching</td>
<td>- Your work sample begins with a “Philosophy Statement” and “Preface.” The preface explains how each of the Augustana standards¹ has been met. Specific artifacts are referenced from your unit.</td>
</tr>
<tr>
<td>7.4 Commitment to learning with understanding</td>
<td>- Your work sample begins with a “Philosophy Statement” and “Preface.” The preface explains how each of the Augustana standards¹ has been met. Specific artifacts are referenced from your unit.</td>
</tr>
<tr>
<td>7.5 Use of various assessments</td>
<td>- Your work sample begins with a “Philosophy Statement” and “Preface.” The preface explains how each of the Augustana standards¹ has been met. Specific artifacts are referenced from your unit.</td>
</tr>
<tr>
<td>7.6 Use of various teaching tools including technology</td>
<td>- Your work sample begins with a “Philosophy Statement” and “Preface.” The preface explains how each of the Augustana standards¹ has been met. Specific artifacts are referenced from your unit.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standard 8: Knowledge of Mathematics Pedagogy</th>
<th>Work Sample Performance Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NCTM Indicator</strong></td>
<td><strong>Work Sample Performance Descriptor</strong></td>
</tr>
<tr>
<td>8.1 Selects, uses, and determines suitability of the wide variety of available mathematics curricula and</td>
<td>- Your work sample begins with a “Philosophy Statement” and “Preface.” The preface explains how each of the Augustana standards¹ has been met. Specific</td>
</tr>
</tbody>
</table>

¹ The Augustana Performance Standards for teacher candidates are an extensive list of professional competencies aligned with Illinois Professional Teaching Standards. These indicators are listed in their entirety in the report for Assessment 4: Student Teaching Evaluation. In brief, the indicators include teaching knowledge and performance related to Content, meeting the needs of diverse Learners, facilitating a productive teaching Environment, Planning appropriate short-term and long-term lessons, Enacting lessons competently in the classroom, Reflecting on the teaching and learning process, and Participating in school communities. Taken as a whole, these indicators address all of the NCTM Dispositions and many of the Pedagogy standards. Our teacher candidates are required to document how they met each of the Augustana Performance Standards in the Preface of the Work Sample. Hence, our candidates’ performance in the Preface is provided as evidence that our students are addressing numerous NCTM standards in their work.
<table>
<thead>
<tr>
<th>8.2 Selects and uses appropriate concrete materials for learning mathematics.</th>
<th>Not directly addressed in the Work Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.3 Uses multiple strategies, including listening to and understanding the ways students think about mathematics, to assess students’ mathematical knowledge.</td>
<td>You describe your “Pre-assessment” and explain how it led to significant insights into students’ thinking prior to planning the teaching and learning experiences.</td>
</tr>
<tr>
<td>8.4 Plans lessons, units and courses that address appropriate learning goals, including those that address local, state, and national mathematics standards and legislative mandates.</td>
<td>You include an “Overview/Rationale” for the unit. This incorporates goal statements that are clearly tied to your primary and secondary content areas, the Illinois Learner Standards, and/or your district benchmarks. You include a sequence of high quality “Lesson Plans” (Augustana template) and associated materials. These convey the nature of teaching and learning.</td>
</tr>
<tr>
<td>8.5 Participates in professional mathematics organizations and uses their print and on-line resources.</td>
<td>Not directly addressed in the Work Sample</td>
</tr>
<tr>
<td>8.6 Demonstrates knowledge of research results in the teaching and learning of mathematics.</td>
<td>You include a sequence of high quality “Lesson Plans” (Augustana template) and associated materials. These convey the nature of teaching and learning.</td>
</tr>
<tr>
<td>8.7 Uses knowledge of different types of instructional strategies in planning mathematics lessons.</td>
<td>You include a sequence of high quality “Lesson Plans” (Augustana template) and associated materials. These convey the nature of teaching and learning.</td>
</tr>
<tr>
<td>8.8 Demonstrates the ability to lead classes in mathematical problem solving and in developing in-depth conceptual understanding, and to help students develop and test generalizations.</td>
<td>Not directly addressed in the Work Sample</td>
</tr>
<tr>
<td>8.9 Develop lessons that use technology’s potential for building understanding of mathematical concepts and developing important mathematical ideas.</td>
<td>Your work sample begins with a “Philosophy Statement” and “Preface.” The preface explains how each of the Augustana standards has been met. Specific artifacts are referenced from your unit.</td>
</tr>
</tbody>
</table>

**Standard 16: Field-Based Experiences**

Candidates complete field-based experiences in mathematics classrooms.

<table>
<thead>
<tr>
<th>NCTM Indicator</th>
<th>Work Sample Performance Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.3 Demonstrate the ability to increase students’ knowledge of mathematics.</td>
<td>You describe your “Pre-assessment” and explain how it led to significant insights into students’ thinking prior to planning the teaching and learning experiences. You provide a collection of “Artifacts” (quizzes, tests, graphs, performance demonstrations, pictures, student projects, KWL’s, etc.) throughout the work sample. These convey the process of student learning. You describe your “Post-assessment”. This includes a thorough analysis of the data collected and culminates with a discussion that demonstrates the connections between pre-assessment measures, formative assessments, post-assessment results, and artifacts.</td>
</tr>
</tbody>
</table>
Augustana College Teacher Education Program

NCTM SPA Report for NCATE Accreditation Review

Assessment # 3: Course Grades

Table of Contents for Assessment Documentation

NOTE: NCATE requires that assessment reports based on Course Grades adhere to a specific set of formatting guidelines. These guidelines are available at http://www.ncate.org/public/GuidelinesGrades.asp?ch=90. Because of this, the organization of this document differs from the other assessment documents found in this report.

Part 1: Description of the Assessment.................................................................Pages 2-4

Part 2: Alignment with SPA Standards...............................................................Pages 5-7

Part 3: Grade Policy and Minimum Expectation...............................................Page 8

Part 4: Data Tables...............................................................................................Pages 9-11

Part 5: Brief Analysis of the Data Findings.........................................................Page 12
Part 1. **Description of the Assessment**

We monitor and assess the academic performance of the secondary mathematics teacher candidates on an individual candidate basis each term. We also monitor the performance of our candidates in the Course Group areas described below based on year of admission to the program cohorts. All courses listed below are required for all secondary mathematics teacher candidates.

**Psychology Course Group**

Courses: (1) Intro to Psychology, (2) Adolescent Development, (3) Educational Psychology & Measurement.

**Rationale for Course Selections:** Intro to Psychology helps our candidates fulfill general education requirements and prepares them for the other required psychology courses. Adolescent Development addresses the developmental stages of adolescents, the age group encountered by secondary school teachers. Educational Psychology & Measurement is the first course in the Education sequence. It exposes students to influential and foundational ideas in educational thought and psychology (e.g., Piaget, Vygotsky, Dewey).

**Alignment with NCTM Standards:** The psychology course group as a whole sets a foundation for NCTM Standard 8.6: “knowledge of research results in the teaching and learning of mathematics.” The psychology courses do not focus on mathematics teaching and learning specifically, but do expose students to the most robust research findings in educational psychology that have relevant application in mathematics education. These applications to mathematics teaching and learning are made explicit in the Math Methods course.

**Analysis of the Grades:** As shown in the table in Part 4, our secondary mathematics teacher candidates perform quite well relative to other Augustana students in the Psychology course group. For all course units these candidates averaged higher grades than other students. Furthermore, 100% of our candidates met the minimum grade expectation for these courses with the exception of one course unit: Educational Psychology in 2009-2010. The strong showing by our candidates is not surprising in the case of Intro to Psychology since our department requires a minimal grade in this course for entry into our program. However, we are quite pleased that our candidates scored relatively well compared to their peers in Adolescent Psychology (a course consisting of all secondary education majors and all psychology majors) and Educational Psychology (a challenging course consisting of all elementary and secondary education majors). Even in the disappointing case of Educational Psychology in 2009-2010 when only 75% of our candidates met the minimal grade expectation, our candidates were still more likely than other students in the class to meet the grade expectation. This suggests that the course is indeed challenging, and, as stated on Part 3 of this report, the few candidates who failed to meet the grade expectation did have opportunities to make amends for their performance in this course in other ways. We view the strong overall showing by our candidates in the Psychology Course Group as convincing evidence that our teacher candidates enter the education course sequence with a firm foundation in research-based psychological theories that our pertinent in our field.

**Education Course Group:**

Courses: (1) Developing Classroom Assessments of Student Learning, (2) Methods of Inclusion, (3) Secondary and Middle School (General) Methods, (4) Middle and Secondary School Methods: Mathematics, (5) Computers in Education, (6) School and Society

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1 A “course unit” will be defined as a given course taken by our candidates in a given year. So, for example, since four academic years are presented in the tables, and PSYC 100 was taken by our candidates all four of those years, there are a total of four PSYC 100 “course units” in the table.
Rationale for Course Selections: Assessing Learning is the second course in the education sequence (it follows Educational Psychology listed in the Psychology Course Group). It is offered early in the course sequence in order to emphasize the importance of assessing student knowledge in order to inform instruction, and also to familiarize students with various approaches to informal and formal assessment, and the potential value and limitations of these approaches. Methods of Inclusion emphasizes differentiation strategies in the classroom, highlighting methods teachers can use that help ensure that the diverse student needs exhibited in any given classroom can be met. The General Teaching Methods course follows Methods of Inclusion in the sequence. In this course, students learn about and engage with general teaching methods that are relevant across content areas (such as constructivist approaches, effective questioning techniques, student grouping strategies, etc.). The Secondary Math Methods course focuses on approaches, tools, and techniques for teaching secondary mathematics with particular emphasis on NCTM Principles and Process Standards as well as Illinois Content Standards. Computers in Education exposes students to various pieces of technology relevant to classroom instruction, thus expanding on the NCTM’s Technology Principle that is addressed in the methods course. Both the Secondary Math Methods and Computers in Education courses are taken after the General Methods course and before Student Teaching. School and Society is the capstone course of the program, taken in the term following student teaching. In this course students revisit questions raised throughout their time in the teacher education program (What does it mean to teach? What does it mean to learn? What are schools for?), and reflect on these question in light of their classroom experience as student teachers.

Alignment with NCTM Standards: The education sequence as a whole addresses the NCTM’s Standard 6 (Knowledge of Technology), Standard 7 (Dispositions), and Standard 8 (Pedagogy). Specific indication of how particular courses address the numerous indicators in these standards is provided in Part 2 of this document.

The Middle and Secondary School Methods: Mathematics course goes further in that it also addresses the majority of indicators in the NCTM Process Standards (Standards 1-5) and two of the indicator s in the Content Standard of Number and Operations (Standard 9). Further detail of how this course accomplishes this is presented in Part 2 of this document.

Analysis of the Grades: There is clear evidence in this cluster of courses that our secondary mathematics teacher candidates perform strongly when compared to their peers. For this particular course group, the “peers” include other education majors at Augustana. Since the teacher education program has high academic standards for all students (students must maintain a 3.0 overall GPA to be retained in the program), it is certainly noteworthy that the secondary mathematics teacher candidates stand out in this group. Our candidates earned higher grades than their peers in 18 of 22 (or 82%) of course units. Ironically, 3 of the 4 course units for which our teacher candidates’ grades were lower than peers were in content areas where our candidates have ample opportunity to “prove themselves” via other assessments. 2 of these courses were “Computers in Education” units (and our students can demonstrate their technological proficiency via a required course Introduction to Computer Science and via their ICTS test) and the other course was the Secondary Math Methods course (where the “other” students who outscored them were elementary education majors seeking a middle school mathematics endorsement). So, while it is disappointing that the secondary mathematics teacher candidates did not outperform their peers in these key courses, there is other evidence showing that our candidates are strong in the skills developed in these three course units. The 4th course in which “other” students outscored secondary mathematics teacher candidates was the General Methods course in 2009-2010. For this course, only 1 of our candidates was a participant, and this student earned an A-. Thus, that particular case is not a cause for concern. In summary, our candidates' strong grades relative to other education majors coupled with the alignment our courses have with NCTM’s Standards 6, 7, and 8, convince us that our pre-service secondary mathematics teachers are adept at utilizing technology in the classroom, have appropriate dispositions for their field, and are well prepared in the various skills of our profession (such as assessing students, planning instruction, accommodating special needs, etc.).
Mathematics Content Course Group

Rationale for Course Selections: At Augustana College, secondary mathematics teacher candidates are required to major in mathematics. “Education” is considered the candidates’ concentration within their major. Thus, the primary rationale for this selection of courses is that our colleagues in the mathematics department have decided that this sequence of courses must be completed by all majors. From a teacher preparation standpoint, we embrace these required courses as they align closely with NCTM standards in both content and process.

Alignment with NCTM Standards: These courses taken in the mathematics department rigorously address the NCTM Content Standards 10-15. Standard 9, Knowledge of Number and Operation, is not directly addressed in these college-level courses as the content in Standard 9 is less advanced than the content found in the collegiate sequence. Also, the Augustana mathematics major does not require a course in Number Theory. Note that two indicators from Standard 9 are addressed in the education department’s Secondary Math Methods Course. In addition to addressing mathematical content, several courses in the mathematics sequence explicitly address NCTM Process Standards 1-6. Further detail of how this occurs is presented in Part 2 of this document.

Analysis of the Grades: Our candidates’ performance in this cluster of classes indicates that our pre-service teachers possess firm knowledge of the content and processes of mathematics. As with the Psychology and Education Course Groups, our candidates perform strongly in relation to their peers. In this content group, the “peers” consist almost entirely of other Augustana students who are exceptionally strong in mathematics. Calculus 1 is not a general education requirement at Augustana, hence the students who choose to fulfill their general education Quantitative Reasoning requirement by taking Calculus 1 tend to be strong and confident mathematical thinkers. Calculus 2 typically consists of mathematics and science majors only. All other courses in this cluster are populated by students who have chosen to major in mathematics. The data table in Part 4 provides evidence that our teacher candidates perform quite well in this larger, specialized group. Our candidates averaged better grades than other students in 30 of 35 (or 86%) course units, and 100% of our candidates met the minimal grade requirement in 32 of 35 (or 91%) course units. Focusing on the 5 courses in which our candidates’ grades were lower than other students, the difference is nominal in 4 of the courses. That is, the GPAs of our candidates and other students are identical in these 4 courses if the GPA is rounded to the nearest tenth (note, for example, the case of EDUC 340 in 2008-2009 in which our candidates’ GPA was 3.21 and that of other students was 3.24). One mathematics course, Real Analysis, does stand out as somewhat of a disappointment. In both 2007-2008 and 2008-2009 our candidates scored lower than their peers, with a fairly significant gap of 0.2 grade points in the latter year. Additionally, during these two years only 13 of our 16 (81%) candidates earned the minimally expected grade of C or better in this course. Though Real Analysis stands out as our candidates’ weakest course, and their future performance in this course will be monitored, we are still confident that their overall performance in mathematics content courses shows convincingly that our students are well prepared in the Content and Process Standards laid out by the NCTM. As noted in the alignment chart in Part 2, the content in Real Analysis is largely more advanced than the content standards of the NCTM, so their relatively weak performance in that course does not detract from the content knowledge expected of teachers. Real Analysis does offer our candidates opportunities to demonstrate their abilities with several Process Standards, but this is also true of most other mathematics courses where they have demonstrated resounding success.
### Part 2. **Alignment with SPA Standards**

<table>
<thead>
<tr>
<th>Course Name and Number</th>
<th>SPA Standard(s) Addressed by Course</th>
<th>Brief Description of How the Course Meets Cited Standards (if course title is unclear)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Psychology Group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYC 100: Introduction to Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYC 214: Adolescent Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDUC 300: Educational Psychology and Measurement</td>
<td>8.6</td>
<td>Secondary mathematics teacher candidates enrolled in EDUC 300 may not necessarily be applying the psychological theories learned in this course to mathematical teaching and learning, but some of the foundational theories (particularly Piaget’s constructivism and Vygotsky’s socio-cultural theories) are re-examined and applied to mathematics specifically in EDUC 384.</td>
</tr>
<tr>
<td><strong>Education Group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDUC 330: Developing Classroom Assessments of Student Learning</td>
<td>7.4, 7.5, 8.3</td>
<td>This course helps students develop general knowledge of assessment strategies (and an appreciation of the central role of assessment in quality teaching). Secondary mathematics teacher candidates in this course are beginning to consider how they can apply these assessment strategies in the mathematics classroom, but they are not explicitly directed to apply assessment strategies in mathematics until EDUC 384.</td>
</tr>
<tr>
<td>EDUC 340: Methods of Inclusion</td>
<td>7.1, 7.3, 7.4, 7.5, 8.1, 8.7</td>
<td>This course exposes students to general differentiation methods geared at including special needs students in mainstream instruction (“special needs” includes ELLs, students with diverse learning needs and styles, etc.). Secondary mathematics teacher candidates in this course are beginning to consider how they can apply these differentiation strategies in the mathematics classroom, but they are not explicitly directed to apply such strategies in mathematics until EDUC 384.</td>
</tr>
<tr>
<td>EDUC 380: Secondary and Middle School Methods</td>
<td>7.2, 7.3, 7.4, 8.4, 8.6, 8.7</td>
<td>This course develops effective general teaching methods that can be applied in most secondary school settings. Emphasis is on developing engaging learning, fostering student construction of knowledge, active pedagogies, etc. Secondary mathematics teacher candidates begin to think of ways to apply these general teaching strategies in the context of mathematics, and then receive much more specific mathematically-focused methods in EDUC 384.</td>
</tr>
<tr>
<td>EDUC 384: Middle and Secondary School Methods: Mathematics</td>
<td>1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 3.4, 4.3, 5.1, 5.2, 6.1, 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8,</td>
<td>EDUC 384 is organized around the NCTM Principles and Process Standards (as evidenced in the syllabus). <em>Principles and Standards for School Mathematics</em> is a required text, and students spend the bulk of the term reflecting on and applying these Principles and Process Standards as they engage directly with these processes via mathematical...</td>
</tr>
</tbody>
</table>
activity, learn mathematics teaching techniques, plan lessons for particular content, and practice teaching via embedded clinical experiences. For this reason, most of the NCTM Process Standards and all of its Principles (referred to as “Dispositions” in the NCATE standards) are addressed in this course. Further, all of the Pedagogy standards are addressed (in this course, students learn about teaching methods, apply these methods by teaching actual middle school students each week, assess the middle schoolers’ knowledge, differentiate instruction for their students, etc.). Finally, specific strategies for teaching specific content are addressed in this class. This includes strategies for a wide range of content (including algebra, geometry, etc.). The Number and Operations Standards 9.1 and 9.3 are explicitly listed here because a great deal of time is devoted to strategies for teaching rational number concepts. And, since the basic content of Number and Operations is largely absent from college-level Mathematics Content courses, it is being emphasized that some of this content is explored in the methods course.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Content Standards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 310</td>
<td>Computers in Education</td>
<td>6.1, 7.6, 8.9</td>
<td>This course also focuses on general applications of educational technology (such as the use of interactive whiteboards, Web 1.0 and 2.0 resources, etc.). However, all students in this course are required to build instructional units around their chosen content area, hence secondary mathematics teacher candidates are able to further develop their knowledge of technology in the mathematics classroom via this course.</td>
</tr>
<tr>
<td>EDUC 450</td>
<td>School and Society</td>
<td>7.1</td>
<td></td>
</tr>
<tr>
<td>MATH 219</td>
<td>Calculus 1</td>
<td>1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 2.1, 2.2, 2.3, 2.4, 2.5</td>
<td>In addition to addressing the Content Standards associated with Calculus, this course also explicitly addresses Process Standards pertaining to Problem Solving, Connections, Representation, and Knowledge of Technology. Evidence of the presence of these Process Standards is found in both the Course Description in the catalog and the course syllabus.</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Calculus 2</td>
<td>1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 2.1, 2.2, 2.3, 2.4, 2.5</td>
<td>In addition to addressing the Content Standards associated with Calculus, this course also explicitly addresses Process Standards pertaining to Problem Solving, Communication, Connections, Representation, and Knowledge of Technology. Evidence of the presence of these Process Standards is found in both the Course Description in the catalog and the course syllabus.</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Discrete Mathematics</td>
<td>13.1, 13.2, 13.3, 13.4</td>
<td></td>
</tr>
<tr>
<td>MATH 315</td>
<td></td>
<td>4.1, 4.3, 6.1, 14.1</td>
<td>In addition to addressing the Content Standards associated</td>
</tr>
<tr>
<td>Course</td>
<td>Standards/Topics</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Probability and Statistics 1</td>
<td>14.2, 14.3, 14.4, 14.5, 14.6, 14.7, 14.8</td>
<td>with Data Analysis, Probability, and Statistics, this course also explicitly addresses Process Standards pertaining to Connections and Knowledge of Technology. Evidence of the presence of these Process Standards is found in both the Course Description in the catalog and the course syllabus.</td>
<td></td>
</tr>
<tr>
<td>MATH 329: Linear Algebra</td>
<td>6.1, 9.9, 10.1, 10.2, 10.4, 10.5, 10.6</td>
<td>In addition to addressing most of the Content Standards associated with Perspectives on Algebra and standard 9.9 (Number and Operations: matrices and vectors), this course also explicitly addresses the Process Standard pertaining to Knowledge of Technology. Evidence of this is found in the Course Description in the catalog.</td>
<td></td>
</tr>
<tr>
<td>MATH 340: Abstract Algebra</td>
<td>10.3, 10.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 350: Modern Geometry</td>
<td>2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 3.4, 5.1, 5.2, 5.3, 6.1, 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7, 11.8</td>
<td>In addition to addressing the Content Standards associated with Knowledge of Geometries, this course also explicitly addresses the Process Standard pertaining to Reasoning and Proof, Communication, Representation, and Knowledge of Technology. Evidence of the presence of these Process Standards is found in the Course Description in the catalog, the course syllabus, and artifacts of student work.</td>
<td></td>
</tr>
<tr>
<td>MATH 411: Real Analysis</td>
<td>2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 3.4, 4.1, 4.3, 12.5</td>
<td>The content of this upper-level course is largely more advanced than the Content Standards of the NCTM (though it does address the historical development of Calculus). The course is rich in mathematical processes, however, including Reasoning and Proof, Communication, and Connections. Evidence of the presence of these Process Standards is found in both the Course Description in the catalog and the course syllabus.</td>
<td></td>
</tr>
<tr>
<td>CSC 211: Introduction to Computer Science</td>
<td>6.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Part 3. **Grade Policy and Minimum Expectation**

The minimum required Grade-point Average at Augustana is 2.0 for all Augustana coursework and for all Augustana coursework in a major. Since secondary mathematics teacher candidates are mathematics majors, the minimum GPA for all courses is 2.0 and for all mathematics courses is 2.0. For the purposes of this report, any grade in a mathematics course lower than a C (e.g., lower than a 2.0) is considered below the minimum expectation.

Additional expectations apply to teacher candidates in the education department. These are described below.

Teacher Candidates must earn and maintain an overall GPA at Augustana of 3.0 to be fully admitted to the teacher education program. Candidates who are admitted provisionally with a GPA from 2.75-2.99 must earn a 3.0 in each term (we use a trimester calendar) until their overall GPA reaches 3.0.

Students must earn at least a B- in college writing to be admitted to the program as teacher candidates (students may be admitted provisionally if they earn a C-, C, or C+ and begin working with personnel in the Reading/Writing Center on campus). Students must also earn at least a C- in PSYC-100 and PSYC-214. Further, students must earn at least a B- in EDUC-300. Or, if students earn a C-, C or C+ in EDUC-300 they may be admitted when a plan of improvement is submitted with their application to the teacher education program.

Students may have no more than two grades of C+ or lower in their Education courses. For the purposes of this report, any grade in an Education course that is lower than a B- (e.g., lower that a 2.7) is considered below the minimum expectation.
## Part 4. Data Tables

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>PSYC 100</td>
<td>Average course grade and (range)**</td>
<td>3.42 (2.7-4)</td>
<td>100 (8)</td>
<td>3.29 (2.3-4)</td>
<td>100 (8)</td>
</tr>
<tr>
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<tr>
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<td>3.30 (3-4)</td>
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<td>PSYC 214</td>
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<td>3.19 (1-4)</td>
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</tr>
<tr>
<td>EDUC 300</td>
<td>Average course grade and (range)**</td>
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<td>100 (9)</td>
<td>3.33 (2.7-4)</td>
<td>100 (9)</td>
</tr>
<tr>
<td>EDUC 300</td>
<td>% of candidates meeting minimum expectation (n)</td>
<td>3.04 (1.7-4)</td>
<td>84 (56)</td>
<td>2.98 (0-4)</td>
<td>80 (81)</td>
</tr>
</tbody>
</table>

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@ Though the lowest grade awarded met the minimum expectation, one or more student had a grade of I (incomplete) or W (withdrew) and hence did not meet the expectations of the Augustana Education department.
<table>
<thead>
<tr>
<th>Course*</th>
<th>Average course grade and (range)**</th>
<th>% of candidates meeting minimum expectation (n)</th>
<th>Average course grade and (range)*</th>
<th>% of candidates meeting minimum expectation (n)</th>
<th>Average course grade and (range)*</th>
<th>% of candidates meeting minimum expectation (n)</th>
<th>Average course grade and (range)*</th>
<th>% of candidates meeting minimum expectation (n)</th>
</tr>
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<tbody>
<tr>
<td>EDUC 330</td>
<td>3.85 (3.3-4)</td>
<td>100 (9)</td>
<td>3.63 (3-4)</td>
<td>100 (9)</td>
<td>3.48 (3-4)</td>
<td>100 (9)</td>
<td>3.50 (3.3-3.7)</td>
<td>100 (4)</td>
</tr>
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<td>EDUC 330</td>
<td>3.71 (3-4)</td>
<td>100 (91)</td>
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<td>98 (55)</td>
<td>3.30 (2-4)</td>
<td>98 (51)</td>
<td>3.31 (2.7-4)</td>
<td>100 (49)</td>
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<tr>
<td>EDUC 330</td>
<td>3.89 (3.3-4)</td>
<td>100 (9)</td>
<td>3.58 (3.3-4)</td>
<td>100 (8)</td>
<td>3.54 (3-4)</td>
<td>100 (8)</td>
<td>3.67 (3.7-3.7)</td>
<td>100 (2)</td>
</tr>
<tr>
<td>EDUC 340</td>
<td>3.73 (2-4)</td>
<td>98 (54)</td>
<td>3.58 (3-4)</td>
<td>100 (51)</td>
<td>3.37 (3-4)</td>
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<td>100 (8)</td>
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<tr>
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<tr>
<td>EDUC 384</td>
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</table>

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<table>
<thead>
<tr>
<th>Course*</th>
<th>Average course grade and (range)**</th>
<th>% of candidates meeting minimum expectation (n)</th>
<th>Average course grade and (range)*</th>
<th>% of candidates meeting minimum expectation (n)</th>
<th>Average course grade and (range)†</th>
<th>% of candidates meeting minimum expectation (n)</th>
<th>Average course grade and (range)††</th>
<th>% of candidates meeting minimum expectation (n)</th>
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<tbody>
<tr>
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<tr>
<td>MATH 411</td>
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<td>2.74 (0-4)</td>
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<td>95 (19)</td>
<td>2.84 (1-4)</td>
<td>95 (19)</td>
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<td>CSC 211</td>
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<td>3.34 (2.7-4)</td>
<td>100 (4)</td>
<td>3.50 (3.3-3.7)</td>
<td>100 (2)</td>
<td>3.67 (3.3-3.4)</td>
<td>100 (2)</td>
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<tr>
<td>CSC 211</td>
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<td>2.70 (0-4)</td>
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<td>2.45 (0-4)</td>
<td>75 (20)</td>
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<td>94 (16)</td>
</tr>
</tbody>
</table>

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Part 5. **Brief Analysis of the Data Findings**

The alignment table in Part 2 shows that psychology, education, and mathematics courses all of our candidates take address most of the NCTM’s Standards and Indicators. Indeed, many indicators are emphasized in numerous courses, thus providing our candidates numerous opportunities to engage with and demonstrate their knowledge of the content, processes, and pedagogy of mathematics.

Two standards are, for the most part, absent from the course sequence. These are the Content Standard of Number and Operation and the Field-Based Experiences Standard. It has been argued that the Number and Operation Standard consists of content that is less advanced than the college-level content our candidates encounter at Augustana. Still, a Number Theory course is noticeably absent from our mathematics curriculum. As we look to the future, we are certainly willing to pursue the creation and requirement of such a course for our candidates. We hope to receive input from the NCTM and/or NCATE on this matter. Though our candidates do not encounter a rigorous course in Number Theory in college, the state licensure test for mathematics teachers adequately addresses the NCTM’s Number and Operation Standard. Hence, we do believe we have one assessment indicating that our candidates are adequately prepared in this area.

The second standard not currently found in our candidates’ course work is the Field-Based Experiences Standard. We anticipate that this standard will be addressed in course work by the time of our next NCATE review. Our department hired its first devoted mathematics education specialist, Dr. Mike Egan, in the fall of 2008. Dr. Egan has taken responsibility for the Secondary Mathematics Methods course, and has partnered with a local middle school in providing an embedded clinical experience within the course. Since the spring of 2010, teacher candidates in this course have planned and taught weekly lessons to middle school students, assessed the students’ learning at the beginning and end of the experience, differentiated instruction for special learners, etc. In short, they are applying the teaching methodologies they are learning in the Methods course directly with actual students. Dr. Egan’s assessments of teacher candidates in this embedded clinical experience should provide additional evidence of our candidates’ impact on student learning. Such evidence would supplement the Student Teaching Work Sample, the assessment we are using in the present report in order to document our candidates’ impact on student learning.

Excepting Standards 9 and 16, our candidates’ coursework demonstrates that they receive extensive exposure to all of the NCTM standards in the college classes. Their strong grades in these classes demonstrate that the students have truly gained knowledge of these standards. The data tables in Part 4 show that our students meet the minimal grade expectations in these courses with rare exceptions. More impressive than this, however, is that our students average higher grades than their peers in the vast majority of course units. This report highlighted 69 course units over 4 academic years. Our candidates averaged higher grades than other students in 60 (or 87%) of these course units. Not only did our students score well in their courses, but the peers they are being compared to are also strong students. In the Education Course Group, our candidates were compared with Augustana education majors who are required to maintain a 3.0 GPA. In the Mathematics Content Group, our candidates are being compared to other mathematics majors on campus. Hence, our candidates’ impressive performance in their collegiate course work demonstrates that they have firm knowledge of the NCTM’s Standards 1-8 and 10-15, and all of the indicators therein.
Augustana College Teacher Education Program

NCTM SPA Report for NCATE Accreditation Review

Assessment # 4: Student Teaching Evaluation

Table of Contents for Assessment Documentation

a. The Student Teaching Evaluation Assessment Tool and Scoring Guide........................................ Pages 2-6

b. NOTE: The Scoring Guide for this assessment is explained clearly on the first page of the tool itself, hence it is found on page 2 of this report.

c. Chart Providing Candidate Data from this Assessment...............................................................Pages 7-14

d. Chart Aligning NCTM Standards and Indicators with the Student Teaching Evaluation..............Pages 15-22
a. The Student Teaching Evaluation Tool and Scoring Guide

Brief Description of the Evaluation Tool and Its Use

The Augustana Student Teaching Evaluation Form is a common instrument used to evaluate the performance of all student teachers in our teacher education program. Our instrument organizes the Illinois Professional Teaching Standards into 53 performance indicators arranged in 7 categories (The Content, The Learner, The Environment, Planning, Enacting, Reflecting, and Participating). In addition to assessing our candidates’ performance in each of the 53 areas, evaluators also judge our candidates’ overall disposition in relation to the 7 major categories. The complete instrument and its scoring guide are available on pages 7-10 of this report.

The secondary mathematics teacher candidates are evaluated during their student teaching experience by both their cooperating teacher and their college-based supervisor. For consistency’s sake, the data highlighted in this report are those that were generated by the college supervisor. During our candidates’ student teaching term in their senior year, at least four of their lessons are formally observed by the college supervisor. A formally observed lesson includes submission of a detailed lesson plan, observation of the lesson itself, a post-conference between the supervisor and the candidate, a brief discussion between supervisor and cooperating teacher about the candidates’ daily performance, and a follow-up reflective paper written by the candidate. Each aspect of the (four or more) formally observed lessons informs the supervisor’s assessment of the candidate in the final Evaluation.

Since our Student Teaching Evaluation was designed to address the broad Illinois Professional Teaching Standards and also be relevant to all of our teaching candidates (including pre-service teachers in non-mathematical fields and elementary education), the language of the performance indicators is not specific to mathematics teaching and learning. However, the college supervisor¹ clearly communicates to the secondary mathematics teacher candidates that the language of the performance indicators will be interpreted using the lens of mathematical teaching standards. Part d of this report shows how we align our Student Teaching Evaluation indicators with the NCTM Standards.

¹ Dr. Mike Egan, Augustana’s mathematics education specialist, has supervised all secondary mathematics teacher candidates since his hiring in August 2008. Prior to Dr. Egan’s arrival, candidates were supervised by other knowledgeable secondary mathematics educators, including former teachers and Augustana’s science education specialist, Dr. Mike Schroeder.
The Content

GOAL: The teacher candidate understands the central concepts, methods of inquiry, and structures of the discipline(s) and creates learning experiences that make the content meaningful to all students. (Standard 1)

DISPOSITION: The teacher candidate holds a liberationist perspective on teaching and values multiple points of view, theories, “ways of knowing” and methods of inquiry in teaching subject matter concepts so student learners become scientists, poets, historians, mathematicians, etc. (1G)

CO P1: Evaluates teaching resources and curriculum materials for their comprehensiveness, accuracy, and usefulness for representing particular ideas and concepts. (1F & 4G)

CO P2: Introduces concepts and principles using a variety of explanations and learning activities that capture key ideas and encourage critical thinking. (1K 2I 6J, Tech 8D)

CO P3: Models for and engages students in generating and testing knowledge according to the process of inquiry and standards of evidence of the discipline. (1H, Tech 8B, Tech 8C)

CO P4: Anticipates and adjusts for common misunderstandings of the discipline(s) that impede learning. (1J)

CO P5: Models for and designs learning experiences to promote student skills in the equitable, ethical and legal (including issues related to copyright) use of technologies appropriate to the discipline (such as computer software, graphing calculators, language translators, scientific probeware, or an electronic thesaurus). (1I, 6N, Lang 3P*, Tech 2G, Tech 2H, Tech 3E, Tech 5F, Tech 5G)

CO P6: Creates approaches to learning that are interdisciplinary and that integrate multiple content areas in ways that reflect life and career experiences. (4O, 1L, 6L, Lang 3G)
**The Learner**

**GOAL:** The teacher candidate understands how students differ in their approaches to learning and creates instructional opportunities that are adapted to diverse learners. (Standard 3)

<table>
<thead>
<tr>
<th>DISPOSITION:</th>
<th>The teacher candidate advocates for the needs of all students in and out of the classroom. (9N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LE P1:</td>
<td>Adapts the general curriculum and uses instructional strategies and materials according to characteristics of the learner. (6O, Lang 3D*)</td>
</tr>
<tr>
<td>LE P2:</td>
<td>Utilizes technology and adaptive devices as necessary to provide access to general curricular content to all individuals. (1M, 3K, 4R, 6K, Lang 3F*, Tech 2F)</td>
</tr>
<tr>
<td>LE P3:</td>
<td>Incorporates experiences into instructional practices that relate to the students' current life experiences and to future career and work experiences. (4N, 1L)</td>
</tr>
<tr>
<td>LE P4:</td>
<td>Uses information about students’ families, cultures, and communities as a basis for enriching instruction and connecting learning to students’ experiences. (3I, 3J, Lang 3D*)</td>
</tr>
<tr>
<td>LE P5:</td>
<td>Demonstrates commitment to developing the highest educational and quality-of-life potential of individuals with disabilities. (11O)</td>
</tr>
<tr>
<td>LE P6:</td>
<td>Creates multiple learning activities that allow for variation in student learning styles and performance modes. (4M, 2I*, Lang 3D*)</td>
</tr>
<tr>
<td>LE P7:</td>
<td>Designs instruction so as to assist students whose communication skills may be impeded because their first language is not English. (Lang 3D*)</td>
</tr>
<tr>
<td>LE P8:</td>
<td>Designs instruction that meets learners’ needs in the cognitive, social, emotional, ethical, and physical domains at the appropriate level of development. (2G, 5L*)</td>
</tr>
</tbody>
</table>

**The Environment**

**GOAL:** The teacher candidate uses strategies to create a smoothly functioning learning community in which students assume responsibility for themselves and one another, participate in decision making, work collaboratively and independently, use appropriate technology, and engage in purposeful learning activities. (5K)

<table>
<thead>
<tr>
<th>DISPOSITION:</th>
<th>The teacher candidate demonstrates positive regard for the culture, religion, gender, sexual orientation, and varying abilities of students and their families. (3N 11P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EV P1:</td>
<td>Communicates using a variety of tools to challenge a diverse student population in a supportive manner and provide students with constructive feedback. (7H, 7I, 7K, Tech 7D)</td>
</tr>
<tr>
<td>EV P2:</td>
<td>Practices effective listening, conflict resolution, and group-facilitation skills as a team member. (7J, Lang 2H*)</td>
</tr>
<tr>
<td>EV P3:</td>
<td>Facilitates a learning community in which individual differences are respected and proper classroom decorum is maintained. (3G, 5I)</td>
</tr>
<tr>
<td>EV P4:</td>
<td>Engages students in and monitors individual and group learning activities that help to enhance social relationships, student motivation and engagement in productive work through mutual respect, cooperation, and support for one another. (5N, 5L*, Tech 8E*)</td>
</tr>
<tr>
<td>EV P5:</td>
<td>Makes appropriate provisions (in terms of time, circumstances for work, materials, tasks, physical space, communication, and response modes) for individual students who have particular learning differences or needs. (3H, 5P)</td>
</tr>
<tr>
<td>EV P6:</td>
<td>Demonstrates a variety of effective behavior management techniques appropriate to the needs of all students, including those with disabilities (including implementing the least intrusive intervention consistent with the needs of these students). (5O)</td>
</tr>
<tr>
<td>EV P7:</td>
<td>Provides active and equitable engagement of students in productive tasks, and maximizes the amount of class time spent in learning by creating expectations and processes for communication and behavior along with a physical setting conducive to achieving classroom goals. (5M, 5J)</td>
</tr>
<tr>
<td>EV P8:</td>
<td>Ensures policies and practices are in place to provide equal access to media and technology resources for students regardless of race, ethnicity, gender, religion or socioeconomic status. (Tech 2J)</td>
</tr>
<tr>
<td>EV P9:</td>
<td>Uses a variety of approaches for teaching social skill development and promoting social interaction between students with disabilities and students without disabilities. (5Q, 5R)</td>
</tr>
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</table>
### Planning

**GOAL:** The teacher candidate creates and selects learning materials and experiences appropriate for the discipline and curriculum goals, relevant to the students, and based on students’ prior knowledge and principles of effective instruction. (4L, see 1H, 2H, 3I)

**DISPOSITION:** The teacher candidate values collaboration and willingly shares and uses a variety of instructional resources developed with colleagues. (10H)

| PL P1: | Creates short-range and long-term plans that define the expectations for student learning and reflect the principles of scope and sequence. (4I, 4J, 4K) |
| PL P2: | Creates varied opportunities for all students to use effective written, verbal, nonverbal and visual communication. (7G, Lang 1G, Lang 3C) |
| PL P3: | Identifies and designs instruction appropriate to students’ stages of development, learning styles, strengths and needs. (3L) |
| PL P4: | Develops plans based on student responses and provides for different pathways based on student needs. (4P) |
| PL P5: | Uses IEP goals and objectives to plan instruction for students with disabilities. (4S) |
| PL P6: | Coordinates and/or collaborates in directing the activities of a classroom para-educator, volunteer, or peer tutor. (9P) |
| PL P7: | Demonstrates the ability to co-teach and co-plan. (9T) |
| PL P8: | Initiates and develops educational projects, programs, and instructional units that involve compiling, organizing, analyzing, and synthesizing of information, and uses technology to support these processes. (11L, Tech 7I, Tech 2C) |

### Enacting

**GOAL:** The teacher candidate uses multiple teaching and learning strategies to engage students in active learning opportunities that promote the development of critical thinking, problem solving, and performance capabilities that help students assume responsibility for identifying and using learning resources. (6G)

**DISPOSITION:** The teacher candidate believes that the role of the teacher in the classroom should vary between instructor, facilitator, coach, and audience in relation to the content, purposes of instruction and the needs of students. (6I)

| EA P1: | Stimulates student reflection on prior knowledge and links new ideas to already familiar ideas and experiences. (2H) |
| EA P2: | Conducts effective classroom discussions for specific instructional purposes by managing groups, asking questions, eliciting and probing responses, and summarizing for comprehension. (7F, Lang 1F, Lang 3E) |
| EA P3: | Monitors and adjusts strategies in response to learner feedback. (6H, Lang 2H*) |
| EA P4: | Uses a variety of instructional strategies and techniques for facilitating meaningful inclusion of individuals with disabilities and prior to initiating a referral of a student for special education. (6M, 11T) |
| EA P5: | Models the rules of English grammar, spelling, punctuation, capitalization, and syntax when conveying ideas and information and when asking questions and responding to students in written and oral contexts. (7E, Lang 2C, Lang 2D) |
| EA P6: | Practices effectively the language processes of reading, writing, and oral communication in the daily classroom exchange between student and teacher, between student and student, between teacher and “text” and between student and “text.” (Lang 1D) |
| EA P7: | Appropriately uses a variety of formal and informal assessments to evaluate the understanding, progress, and performance of the individual student and the class as a whole. (8J) |
| EA P8: | Involves students in self-assessments to help them become aware of their strengths and needs and encourage them to establish learning goals. (8K) |
| EA P9: | Uses assessment strategies, devices and procedures which are nondiscriminatory and take into consideration the impact of disabilities, methods of communication, cultural background, and primary language for adapting procedures and measuring knowledge and performance of students. (8O, 8Q) |
### Reflecting

**GOAL:** The teacher candidate is a reflective practitioner who continually evaluates how choices and actions affect students, parents, and other professionals in the learning community and actively seeks opportunities to grow professionally. (Standard 10)

<table>
<thead>
<tr>
<th>DISPOSITION:</th>
<th>The teacher candidate believes that reflection is an essential and powerful part of professional growth and improvement of instruction. (10A)</th>
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<tbody>
<tr>
<td><strong>RE P1:</strong></td>
<td>Evaluates how to achieve individual and group learning goals, and selects alternative teaching strategies and materials to achieve different instructional purposes and to meet individual student needs. (6F, 6P, 5L*, Tech 8E*)</td>
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<tr>
<td><strong>RE P2:</strong></td>
<td>Uses assessment results to determine student progress, diagnose student learning needs, align and modify instruction, and design teaching strategies. (8I, 8M)</td>
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<tr>
<td><strong>RE P3:</strong></td>
<td>Uses technology appropriately in conducting assessments and interpreting results. (8M, 8P)</td>
</tr>
<tr>
<td><strong>RE P4:</strong></td>
<td>Participates in professional dialogue and uses classroom observation, information about students, pedagogical knowledge, and research as sources for active reflection, evaluation, and revision of practice. (10E, 10F, 10G, Tech 8A)</td>
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<tr>
<td><strong>RE P5:</strong></td>
<td>Assesses his or her needs for knowledge and skills related to teaching students with disabilities and seeks assistance and resources when developing interventions to meet diverse student needs. (10I, 3M)</td>
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### Participating

**GOAL:** The teacher candidate understands education as a profession, maintains standards of professional conduct, and provides leadership to improve student learning and well-being. (Standard 11)

<table>
<thead>
<tr>
<th>DISPOSITION:</th>
<th>The teacher candidate is sincere, honest and trustworthy, and maintains a high level of integrity in the practice of the profession. (11Q)</th>
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<tr>
<td><strong>PA P1:</strong></td>
<td>Follows school policy and procedures, codes of professional conduct and exhibits knowledge and expectations of current legal directives, when working with students, colleagues, and families. (11J, 11K)</td>
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<td><strong>PA P2:</strong></td>
<td>Participates in collaborative decision making and problem solving with other professionals to develop an effective learning climate within the school to achieve student success. (9I, 10F)</td>
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<td><strong>PA P3:</strong></td>
<td>Participates, as appropriate, in policy development at the school, within professional or community organizations, and shares knowledge about teaching and learning while participating in such activities as curriculum development, staff development, and student organizations. (11I, 11M, 11N, Tech 4C, Tech 7K, Tech 7L)</td>
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<td><strong>PA P4:</strong></td>
<td>Maintains useful and accurate records of student work and performance and communicates student progress knowledgeably and responsibly to students, parents and colleagues. (8L)</td>
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<td><strong>PA P5:</strong></td>
<td>Confers with team members about individualized education programs, progress assessment, and characteristics of individuals with disabilities. (9O, 9Q, 9R, 9S, 8N)</td>
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<td><strong>PA P6:</strong></td>
<td>Complies with local, state, and federal regulations and policies related to students with disabilities. (11R, 11S)</td>
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<tr>
<td><strong>PA P7:</strong></td>
<td>Initiates and develops relationships with parents and guardians to acquire an understanding of the students’ lives outside of the school so as to promote student learning and well-being. (9H, 9K, 9L)</td>
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<tr>
<td><strong>PA P8:</strong></td>
<td>Identifies and uses community resources to enhance student learning and well-being and to provide opportunities for students to explore career opportunities. (9L, 9M)</td>
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</table>

### Comments

Please explain the circumstances and include specific examples to support and clarify your judgment of the teacher candidate’s performance for each item ranked at a level of 1 or 4. Use a separate page and attach it to this document.
### c. Chart Providing Candidate Data from this Assessment

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<sup>2</sup> This column represents the year that teacher candidates were admitted to the teacher education program. For this reason, the most recent data in this column is for students admitted in 2007. Students admitted in 2008 and afterward would not yet have completed their student teaching experience.

<sup>3</sup> This column represents the number of students who were admitted into the secondary mathematics teacher education program in the given year.

<sup>4</sup> This column represents the number of students from the cohort for whom we have a student teaching evaluation. If a candidate entered the program in 2004, that candidate likely completed their student teaching in 2006. Discrepancies between “AdmitCount” and “Count” can be due to (a) a candidate being removed from the program prior to student teaching, and/or (b) a candidate receiving an assessment of “N/A” for the given indicator if that indicator was not applicable to their teaching situation.

<sup>5</sup> Some supervisors judged that particular indicators were not applicable to the teaching situation of particular candidates at particular times. Some judgments are entered in our data as “N/A.” These entries are not factored in to our calculations of “Count” or “Average.”
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\(^2\) This column represents the number of students who were admitted into the secondary mathematics teacher education program in the given year.

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</tbody>
</table>

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26 This column represents the year that teacher candidates were admitted to the teacher education program. For this reason, the most recent data in this column is for students admitted in 2007. Students admitted in 2008 and afterward would not yet have completed their student teaching experience.

27 This column represents the number of students who were admitted into the secondary mathematics teacher education program in the given year.

28 This column represents the number of students from the cohort for whom we have a student teaching evaluation. If a candidate entered the program in 2004, that candidate likely completed their student teaching in 2006. Discrepancies between “AdmitCount” and “Count” can be due to (a) a candidate being removed from the program prior to student teaching, and/or (b) a candidate receiving an assessment of “N/A” for the given indicator if that indicator was not applicable to their teaching situation.

29 Some supervisors judged that particular indicators were not applicable to the teaching situation of particular candidates at particular times. Some judgments are entered in our data as “N/A.” These entries are not factored in to our calculations of “Count” or “Average.”
<table>
<thead>
<tr>
<th>AdmitYr&lt;sup&gt;30&lt;/sup&gt;</th>
<th>AdmitCount&lt;sup&gt;31&lt;/sup&gt;</th>
<th>Count&lt;sup&gt;32&lt;/sup&gt;</th>
<th>Standard</th>
<th>Avg</th>
<th>N/A&lt;sup&gt;33&lt;/sup&gt;</th>
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</tbody>
</table>

<sup>30</sup> This column represents the year that teacher candidates were admitted to the teacher education program. For this reason, the most recent data in this column is for students admitted in 2007. Students admitted in 2008 and afterward would not yet have completed their student teaching experience.

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<sup>33</sup> Some supervisors judged that particular indicators were not applicable to the teaching situation of particular candidates at particular times. Some judgments are entered in our data as “N/A.” These entries are not factored in to our calculations of “Count” or “Average.”
d. **Chart Aligning NCTM Standards and Indicators with the Student Teaching Evaluation**

<table>
<thead>
<tr>
<th>Standard 1: Knowledge of Mathematical Problem Solving</th>
<th>NCTM Indicator</th>
<th>Stdt. Teaching Evaluation Performance Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candidates know, understand, and apply the process of mathematical problem solving.</td>
<td>1.1 Apply and adapt a variety of appropriate strategies to solve problems.</td>
<td>DISPOSITION: The teacher candidate holds a liberationist perspective on teaching and values multiple points of view, theories, &quot;ways of knowing&quot; and methods of inquiry in teaching subject matter concepts so student learners become scientists, poets, historians, mathematicians, etc.</td>
</tr>
<tr>
<td></td>
<td>1.2 Solve problems that arise in mathematics and those involving mathematics in other contexts.</td>
<td>CO P3: Models for and engages students in generating and testing knowledge according to the process of inquiry and standards of evidence of the discipline.</td>
</tr>
<tr>
<td></td>
<td>1.3 Build new mathematical knowledge through problem solving.</td>
<td>Note: For secondary mathematics teacher candidates, &quot;ways of knowing and &quot;methods of inquiry&quot; and &quot;the process of inquiry and standards of evidence of the discipline&quot; are interpreted as utilizing the NCTM Process Standards appropriately in instruction. Depending on the particular content and grade level addressed in our candidates' formally observed lessons, it is expected that our candidates will appropriately utilize some subset of the standards Problem Solving, Reasoning and Proof, Communication, Connections, and Representation.</td>
</tr>
<tr>
<td></td>
<td>1.4 Monitor and reflect on the process of mathematical problem solving.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standard 2: Knowledge of Reasoning and Proof</th>
<th>NCTM Indicator</th>
<th>Stdt. Teaching Evaluation Performance Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candidates reason, construct, and evaluate mathematical arguments and develop an appreciation for mathematical rigor and inquiry.</td>
<td>2.1 Recognize reasoning and proof as fundamental aspects of mathematics.</td>
<td>DISPOSITION: The teacher candidate holds a liberationist perspective on teaching and values multiple points of view, theories, &quot;ways of knowing&quot; and methods of inquiry in teaching subject matter concepts so student learners become scientists, poets, historians, mathematicians, etc.</td>
</tr>
<tr>
<td></td>
<td>2.2 Make and investigate mathematical conjectures.</td>
<td>CO P3: Models for and engages students in generating and testing knowledge according to the process of inquiry and standards of evidence of the discipline.</td>
</tr>
<tr>
<td></td>
<td>2.3 Develop and evaluate mathematical arguments and proofs.</td>
<td>Note: For secondary mathematics teacher candidates, &quot;ways of knowing and 'methods of inquiry&quot; and &quot;the process of inquiry and standards of evidence of the discipline&quot; are interpreted as utilizing the NCTM Process Standards appropriately in instruction. Depending on the particular content and grade level addressed in our candidates' formally observed lessons, it is expected that our candidates will appropriately utilize some subset of the standards Problem Solving, Reasoning and Proof, Communication, Connections, and Representation.</td>
</tr>
<tr>
<td></td>
<td>2.4 Select and use various types of reasoning and methods of proof.</td>
<td></td>
</tr>
</tbody>
</table>
**Standard 3: Knowledge of Mathematical Communication**
Candidates communicate their mathematical thinking orally and in writing to peers, faculty, and others.

<table>
<thead>
<tr>
<th>NCTM Indicator</th>
<th>Stdt. Teaching Evaluation Performance Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Communicate their mathematical thinking coherently and clearly to peers, faculty, and others.</td>
<td>DISPOSITION: The teacher candidate holds a liberationist perspective on teaching and values multiple points of view, theories, “ways of knowing” and methods of inquiry in teaching subject matter concepts so student learners become scientists, poets, historians, mathematicians, etc.</td>
</tr>
<tr>
<td>3.2 Use the language of mathematics to express ideas precisely.</td>
<td>CO P3: Models for and engages students in generating and testing knowledge according to the process of inquiry and standards of evidence of the discipline.</td>
</tr>
<tr>
<td>3.3 Organize mathematical thinking through communication.</td>
<td>Note: For secondary mathematics teacher candidates, “ways of knowing and ‘methods of inquiry” and “the process of inquiry and standards of evidence of the discipline” are interpreted as utilizing the NCTM Process Standards appropriately in instruction. Depending on the particular content and grade level addressed in our candidates’ formally observed lessons, it is expected that our candidates will appropriately utilize some subset of the standards Problem Solving, Reasoning and Proof, Communication, Connections, and Representation.</td>
</tr>
<tr>
<td>3.4 Analyze and evaluate the mathematical thinking and strategies of others.</td>
<td>PL P2: Creates varied opportunities for all students to use effective written, verbal, nonverbal and visual communication.</td>
</tr>
</tbody>
</table>

**Standard 4: Knowledge of Mathematical Connections**
Candidates recognize, use, and make connections between and among mathematical ideas and in contexts outside mathematics to build mathematical understanding.

<table>
<thead>
<tr>
<th>NCTM Indicator</th>
<th>Stdt. Teaching Evaluation Performance Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Recognize and use connections among mathematical ideas.</td>
<td>DISPOSITION: The teacher candidate holds a liberationist perspective on teaching and values multiple points of view, theories, “ways of knowing” and methods of inquiry in teaching subject matter concepts so student learners become scientists, poets, historians, mathematicians, etc.</td>
</tr>
<tr>
<td>4.2 Recognize and apply mathematics in contexts outside of mathematics.</td>
<td>CO P3: Models for and engages students in generating and testing knowledge according to the process of inquiry and standards of evidence of the discipline.</td>
</tr>
<tr>
<td>4.3 Demonstrate how mathematical ideas interconnect and build on one another to produce a coherent whole.</td>
<td>Note: For secondary mathematics teacher candidates, “ways of knowing and ‘methods of inquiry” and “the process of inquiry and standards of evidence of the discipline” are interpreted as utilizing the NCTM Process Standards appropriately in instruction. Depending on the particular content and grade level addressed in our candidates’ formally observed lessons, it is expected that our candidates will appropriately utilize some subset of the standards Problem Solving, Reasoning and Proof, Communication, Connections, and Representation.</td>
</tr>
<tr>
<td></td>
<td>CO P6: Creates approaches to learning that are interdisciplinary and that integrate multiple content areas in ways that reflect life and career experiences.</td>
</tr>
</tbody>
</table>
## Standard 5: Knowledge of Mathematical Representation
Candidates use varied representations of mathematical ideas to support and deepen students’ mathematical understanding.

<table>
<thead>
<tr>
<th>NCTM Indicator</th>
<th>Stdt. Teaching Evaluation Performance Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 Use representations to model and interpret physical, social, and mathematical phenomena.</td>
<td><strong>DISPOSITION</strong>: The teacher candidate holds a liberationist perspective on teaching and values multiple points of view, theories, “ways of knowing” and methods of inquiry in teaching subject matter concepts so student learners become scientists, poets, historians, mathematicians, etc.</td>
</tr>
<tr>
<td>5.2 Create and use representations to organize, record, and communicate mathematical ideas.</td>
<td><strong>CO P3</strong>: Models for and engages students in generating and testing knowledge according to the process of inquiry and standards of evidence of the discipline.</td>
</tr>
<tr>
<td>5.3 Select, apply, and translate among mathematical representations to solve problems.</td>
<td><em>Note: For secondary mathematics teacher candidates, “ways of knowing and ‘methods of inquiry’ and “the process of inquiry and standards of evidence of the discipline” are interpreted as utilizing the NCTM Process Standards appropriately in instruction. Depending on the particular content and grade level addressed in our candidates’ formally observed lessons, it is expected that our candidates will appropriately utilize some subset of the standards Problem Solving, Reasoning and Proof, Communication, Connections, and Representation.</em>**</td>
</tr>
</tbody>
</table>

## Standard 6: Knowledge of Technology
Candidates embrace technology as an essential tool for teaching and learning mathematics.

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<tr>
<th>NCTM Indicator</th>
<th>Stdt. Teaching Evaluation Performance Indicator</th>
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</thead>
<tbody>
<tr>
<td>6.1 Use knowledge of mathematics to select and use appropriate technological tools, such as but not limited to, spreadsheets, dynamic graphing tools, computer algebra systems, dynamic statistical packages, graphing calculators, data-collection devices, and presentation software.</td>
<td><strong>CO P5</strong>: Models for and designs learning experiences to promote student skills in the equitable, ethical and legal (including issues related to copyright) use of technologies appropriate to the discipline (such as computer software, graphing calculators, language translators, scientific probeware, or an electronic thesaurus).</td>
</tr>
<tr>
<td></td>
<td><strong>LE P2</strong>: Utilizes technology and adaptive devices as necessary to provide access to general curricular content to all individuals.</td>
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</tbody>
</table>
### Standard 7: Dispositions
Candidates support a positive disposition toward mathematical processes and mathematical learning.

<table>
<thead>
<tr>
<th>NCTM Indicator</th>
<th>Stdt. Teaching Evaluation Performance Indicator</th>
</tr>
</thead>
</table>
| 7.1 Attention to equity | DISPOSITION: The teacher candidate advocates for the needs of all students in and out of the classroom.  
|                         | LE P1: Adapts the general curriculum and uses instructional strategies and materials according to characteristics of the learner.  
|                         | LE P4: Uses information about students’ families, cultures, and communities as a basis for enriching instruction and connecting learning to students’ experiences.  
|                         | LE P5: Demonstrates commitment to developing the highest educational and quality-of-life potential of individuals with disabilities.  
|                         | LE P7: Designs instruction so as to assist students whose communication skills may be impeded because their first language is not English.  
|                         | DISPOSITION: The teacher candidate demonstrates positive regard for the culture, religion, gender, sexual orientation, and varying abilities of students and their families.  
|                         | PL P5: Uses IEP goals and objectives to plan instruction for students with disabilities.  
|                         | EA P4: Uses a variety of instructional strategies and techniques for facilitating meaningful inclusion of individuals with disabilities and prior to initiating a referral of a student for special education.  
|                         | EA P9: Uses assessment strategies, devices and procedures which are nondiscriminatory and take into consideration the impact of disabilities, methods of communication, cultural background, and primary language for adapting procedures and measuring knowledge and performance of students.  
| 7.2 Use of stimulating curricula | CO P1: Evaluates teaching resources and curriculum materials for their comprehensiveness, accuracy, and usefulness for representing particular ideas and concepts.  
|                         | LE P1: Adapts the general curriculum and uses instructional strategies and materials according to characteristics of the learner.  
|                         | LE P4: Uses information about students’ families, cultures, and communities as a basis for enriching instruction and connecting learning to students’ experiences.  
| 7.3 Effective teaching | CO P2: Introduces concepts and principles using a variety of explanations and learning activities that capture key ideas and encourage critical thinking.  
|                         | CO P4: Anticipates and adjusts for common misunderstandings of the discipline(s) that impede learning.  |
| LE P1 | Adapts the general curriculum and uses instructional strategies and materials according to characteristics of the learner. |
| LE P6 | Creates multiple learning activities that allow for variation in student learning styles and performance modes. |
| EV P4 | Engages students in and monitors individual and group learning activities that help to enhance social relationships, student motivation and engagement in productive work through mutual respect, cooperation, and support for one another. |
| EV P7 | Provides active and equitable engagement of students in productive tasks, and maximizes the amount of class time spent in learning by creating expectations and processes for communication and behavior along with a physical setting conducive to achieving classroom goals. |
| PL P3 | Identifies and designs instruction appropriate to students’ stages of development, learning styles, strengths and needs. |
| PL P4 | Develops plans based on student responses and provides for different pathways based on student needs. |
| DISPOSITION | The teacher candidate believes that the role of the teacher in the classroom should vary between instructor, facilitator, coach, and audience in relation to the content, purposes of instruction and the needs of students. |
| EA P1 | Stimulates student reflection on prior knowledge and links new ideas to already familiar ideas and experiences. |
| EA P2 | Conducts effective classroom discussions for specific instructional purposes by managing groups, asking questions, eliciting and probing responses, and summarizing for comprehension. |
| EA P3 | Monitors and adjusts strategies in response to learner feedback. |
| RE P1 | Evaluates how to achieve individual and group learning goals, and selects alternative teaching strategies and materials to achieve different instructional purposes and to meet individual student needs. |
| 7.4 Commitment to learning with understanding | CO P2: Introduces concepts and principles using a variety of explanations and learning activities that capture key ideas and encourage critical thinking. |
| | LE P1: Adapts the general curriculum and uses instructional strategies and materials according to characteristics of the learner. |
| | LE P3: Incorporates experiences into instructional practices that relate to the students’ current life experiences and to future career and work experiences. |
| | LE P6: Creates multiple learning activities that allow for
| 7.5 Use of various assessments | variation in student learning styles and performance modes.  
| PL P3: Identifies and designs instruction appropriate to students’ stages of development, learning styles, strengths and needs.  
| PL P4: Develops plans based on student responses and provides for different pathways based on student needs.  
| EA P1: Stimulates student reflection on prior knowledge and links new ideas to already familiar ideas and experiences.  
| EA P8: Involves students in self-assessments to help them become aware of their strengths and needs and encourage them to establish learning goals.  
| EA P7: Appropriately uses a variety of formal and informal assessments to evaluate the understanding, progress, and performance of the individual student and the class as a whole.  
| EA P8: Involves students in self-assessments to help them become aware of their strengths and needs and encourage them to establish learning goals.  
| EA P9: Uses assessment strategies, devices and procedures which are nondiscriminatory and take into consideration the impact of disabilities, methods of communication, cultural background, and primary language for adapting procedures and measuring knowledge and performance of students.  
| RE P2: Uses assessment results to determine student progress, diagnose student learning needs, align and modify instruction, and design teaching strategies.  
| RE P3: Uses technology appropriately in conducting assessments and interpreting results. |

| 7.6 Use of various teaching tools including technology |  
| CO P5: Models for and designs learning experiences to promote student skills in the equitable, ethical and legal (including issues related to copyright) use of technologies appropriate to the discipline (such as computer software, graphing calculators, language translators, scientific probeware, or an electronic thesaurus).  
| LE P2: Utilizes technology and adaptive devices as necessary to provide access to general curricular content to all individuals.  
| RE P3: Uses technology appropriately in conducting assessments and interpreting results. |
## Standard 8: Knowledge of Mathematics Pedagogy
Candidates possess a deep understanding of how students learn mathematics and of the pedagogical knowledge specific to mathematics teaching and learning.

<table>
<thead>
<tr>
<th>NCTM Indicator</th>
<th>Stdt. Teaching Evaluation Performance Indicator</th>
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</thead>
</table>
| 8.1 Selects, uses, and determines suitability of the wide variety of available mathematics curricula and teaching materials for all students including those with special needs such as the gifted, challenged and speakers of other languages. | CO P1: Evaluates teaching resources and curriculum materials for their comprehensiveness, accuracy, and usefulness for representing particular ideas and concepts.  
LE P1: Adapts the general curriculum and uses instructional strategies and materials according to characteristics of the learner.  
LE P2: Utilizes technology and adaptive devices as necessary to provide access to general curricular content to all individuals.  
LE P6: Creates multiple learning activities that allow for variation in student learning styles and performance modes.  
LE P7: Designs instruction so as to assist students whose communication skills may be impeded because their first language is not English.  
PL P3: Identifies and designs instruction appropriate to students’ stages of development, learning styles, strengths and needs.  
PL P4: Develops plans based on student responses and provides for different pathways based on student needs. |
| 8.2 Selects and uses appropriate concrete materials for learning mathematics. | CO P1: Evaluates teaching resources and curriculum materials for their comprehensiveness, accuracy, and usefulness for representing particular ideas and concepts.  
LE P1: Adapts the general curriculum and uses instructional strategies and materials according to characteristics of the learner. |
| 8.3 Uses multiple strategies, including listening to and understanding the ways students think about mathematics, to assess students’ mathematical knowledge. | CO P4: Anticipates and adjusts for common misunderstandings of the discipline(s) that impede learning.  
PL P4: Develops plans based on student responses and provides for different pathways based on student needs.  
EA P7: Appropriately uses a variety of formal and informal assessments to evaluate the understanding, progress, and performance of the individual student and the class as a whole.  
EA P8: Involves students in self-assessments to help them become aware of their strengths and needs and encourage them to establish learning goals. |
<p>| 8.4 Plans lessons, units and courses that address | PL P1: Creates short-range and long-term plans that define the expectations for student learning and reflect the |</p>
<table>
<thead>
<tr>
<th>Learning Goals</th>
<th>Professional Principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>appropriate learning goals, including those that address local, state, and national mathematics standards and legislative mandates.</td>
<td>principles of scope and sequence.</td>
</tr>
<tr>
<td>8.5 Participates in professional mathematics organizations and uses their print and on-line resources.</td>
<td>PA P3: Participates, as appropriate, in policy development at the school, within professional or community organizations, and shares knowledge about teaching and learning while participating in such activities as curriculum development, staff development, and student organizations.</td>
</tr>
<tr>
<td>8.6 Demonstrates knowledge of research results in the teaching and learning of mathematics.</td>
<td>RE P4: Participates in professional dialogue and uses classroom observation, information about students, pedagogical knowledge, and research as sources for active reflection, evaluation, and revision of practice.</td>
</tr>
<tr>
<td>8.7 Uses knowledge of different types of instructional strategies in planning mathematics lessons.</td>
<td>LE P1: Adapts the general curriculum and uses instructional strategies and materials according to characteristics of the learner.</td>
</tr>
<tr>
<td></td>
<td>LE P6: Creates multiple learning activities that allow for variation in student learning styles and performance modes.</td>
</tr>
<tr>
<td></td>
<td>EV P4: Engages students in and monitors individual and group learning activities that help to enhance social relationships, student motivation and engagement in productive work through mutual respect, cooperation, and support for one another.</td>
</tr>
<tr>
<td></td>
<td>PL P3: Identifies and designs instruction appropriate to students’ stages of development, learning styles, strengths and needs.</td>
</tr>
<tr>
<td></td>
<td>PL P4: Develops plans based on student responses and provides for different pathways based on student needs.</td>
</tr>
<tr>
<td>8.8 Demonstrates the ability to lead classes in mathematical problem solving and in developing in-depth conceptual understanding, and to help students develop and test generalizations.</td>
<td>CO P3: Models for and engages students in generating and testing knowledge according to the process of inquiry and standards of evidence of the discipline.</td>
</tr>
<tr>
<td></td>
<td>PL P8: Initiates and develops educational projects, programs, and instructional units that involve compiling, organizing, analyzing, and synthesizing of information, and uses technology to support these processes.</td>
</tr>
<tr>
<td>8.9 Develop lessons that use technology’s potential for building understanding of mathematical concepts and developing important mathematical ideas.</td>
<td>CO P5: Models for and designs learning experiences to promote student skills in the equitable, ethical and legal (including issues related to copyright) use of technologies appropriate to the discipline (such as computer software, graphing calculators, language translators, scientific probeware, or an electronic thesaurus).</td>
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<td>LE P2: Utilizes technology and adaptive devices as necessary to provide access to general curricular content to all individuals.</td>
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<td>PL P8: Initiates and develops educational projects, programs, and instructional units that involve compiling, organizing, analyzing, and synthesizing of information, and uses technology to support these processes.</td>
</tr>
</tbody>
</table>
NATIONAL RECOGNITION REPORT
Initial Preparation of Mathematics Education Teachers at the Secondary Level

NCATE recognition of this program is dependent on the review of the program by representatives of the National Council of Teachers of Mathematics (NCTM).

PART A - RECOGNITION DECISION

SPA Decision on NCATE Recognition of the Program(s):
- Nationally recognized
- Nationally recognized with conditions
- Further development required OR Nationally recognized with probation OR Not nationally recognized [See Part G]

Test Results (from information supplied in Assessment #1, if applicable)
The program meets or exceeds an 80% pass rate on state licensure exams:
Summary of Strengths:
The institution carefully analyzed the NCTM standards and conscientiously audited curriculum, but not necessarily assessments. It audited the standards carefully and examined the curriculum, giving a clear picture of the academic preparation at Augustana. It cited candidates’ weaknesses in the course grades and provided clear data analysis. It showed thought regarding the ways in which a generic student teaching assessment could address standards, but did not deal directly with how all indicators cited could actually be met during student teaching. The analysis provides much data for continuous improvement in the future.

PART B - STATUS OF MEETING SPA STANDARDS

Standard 1. Knowledge of Problem Solving. Candidates know, understand and apply the process of mathematical problem solving.

Indicators:

1.1 Apply and adapt a variety of appropriate strategies to solve problems.

<table>
<thead>
<tr>
<th>Met</th>
<th>Not Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>jn</td>
<td>jn</td>
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1.2 Solve problems that arise in mathematics and those involving mathematics in other contexts

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1.3 Build new mathematical knowledge through problem solving.

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1.4 Monitor and reflect on the process of mathematical problem solving.

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Standard 1 comments:
Assessment 1 addresses 1.1, 1.2, 1.4. Assessment 3, course grades, indicates that these indicators are in the mathematics and pedagogy courses. There are no descriptions of candidate assessments to indicate how performance is actually assessed.

Indicators:

2.1 Recognize reasoning and proof as fundamentals aspects of mathematics.

Met | Not Met
--- | ---
jn  | jn

2.2 Make and investigate mathematical conjectures

Met | Not Met
--- | ---
jn  | jn

2.3 Develop and evaluate mathematical arguments and proofs.

Met | Not Met
--- | ---
jn  | jn

2.4 Select and use various types of reasoning and methods of proof.

Met | Not Met
--- | ---
jn  | jn

Standard 2 comments:

Assessment 1 meets indicators 2.1, 2.2, 2.4. Assessment 3, course grades, indicates that these indicators are in the mathematics and pedagogy courses. There are no descriptions of candidate assessments to indicate how performance is actually assessed.

Standard 3. Knowledge of Mathematical Communication. Candidates communicate their mathematical thinking orally and in writing to peers, faculty and others.

Indicators:

3.1 Communicate their mathematical thinking coherently and clearly to peers, faculty, and others.

Met | Not Met
--- | ---
jn  | jn

3.2 Use the language of mathematics to express ideas precisely.

Met | Not Met
--- | ---
jn  | jn

3.3 Organize mathematical thinking through communication

Met | Not Met
--- | ---
jn  | jn
3.4 Analyze and evaluate the mathematical thinking and strategies of others.

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**Standard 3 comments:**
Assessment 1 is a paper and pencil multiple choice test. This type of assessment cannot demonstrate the indicators for this standard (Mathematics Communication). Assessment 3 (course grades) suggests it assesses these process standards, but the catalog course descriptions (obtained by reviewers from the college website) do not address process standards. More importantly, assessment descriptions to suggest how these indicators are assessed were not provided. Assessment 4 suggests an alignment, but indicates that only a generic student teaching evaluation is used. Candidates are not explicitly assessed on these indicators.

**Standard 4. Knowledge of Mathematical Connections.** Candidates recognize, use, and make connections between and among mathematical ideas and in contexts outside mathematics to build mathematical understanding.

**Indicators:**

4.1 Recognize and use connections among mathematical ideas.

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4.2 Recognize and apply mathematics in contexts outside of mathematics.

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4.3 Demonstrate how mathematical ideas interconnect and build on one another to produce a coherent whole.

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**Standard 4 comments:**
Assessment 1 meets indicators 4.1 and 4.2.
Please see comments about Assessments 3 and 4 in Standard 3.

**Standard 5. Knowledge of Mathematical Representation.** Candidates use varied representations of mathematical ideas to support and deepen students’ mathematical understanding.

**Indicators:**

5.1 Use representations to model and interpret physical, social, and mathematical phenomena.

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5.2 Create and use representations to organize, record, and communicate mathematical ideas
Met Not Met

5.3 Select, apply, and translate among mathematical representations to solve problems
Met Not Met

Standard 5 comments:
Assessments 1 and 3 meets indicators 5.1, 5.2, and 5.3.


Indicators:

6.1 Use knowledge of mathematics to select and use appropriate technological tools, such as but not limited to, spreadsheets, dynamic graphing tools, computer algebra systems, dynamic statistical packages, graphing calculators, data-collection devices, and presentation software.
Met Not Met

Standard 6 comments:
This was addressed with Assessment 2 and direct consultation of the Augustana College website for catalog course descriptions of the mathematics courses.


Indicators:

7.1 Attention to equity
Met Not Met

7.2 Use of stimulating curricula
Met Not Met

7.3 Effective teaching
Met Not Met
7.4 Commitment to learning with understanding
Met Not Met
jn       jn

7.5 Use of various assessments
Met Not Met
jn       jn

7.6 Use of various teaching tools including technology
Met Not Met
jn       jn

Standard 7 comments:
Assessments 2 and 4 address these indicators. They would be stronger if the explicit NCTM alignment was utilized and made available to candidates.


Indicators:

8.1 Select, use, and determine suitability of the wide variety of available mathematics curricula and teaching materials for all students, including those with special needs such as the gifted, challenged and speakers of other languages.
Met Not Met
jn       jn

8.2 Select and use appropriate concrete materials for learning mathematics.
Met Not Met
jn       jn

8.3 Use multiple strategies, including listening to and understanding the ways students think about mathematics, to assess students’ mathematical knowledge.
Met Not Met
jn       jn

8.4 Plan lessons, units and courses that address appropriate learning goals, including those that address local, state, and national mathematics standards and legislative mandates.
Met Not Met
jn       jn

8.5 Participate in professional mathematics organizations and uses their print and on-line resources.
8.6 Demonstrate knowledge of research results in the teaching and learning of mathematics
Met Not Met
jn jn

8.7 Use knowledge of different types of instructional strategies in planning mathematics lessons.
Met Not Met
jn jn

8.8 Demonstrate the ability to lead classes in mathematical problem solving and in developing in-depth conceptual understanding, and help students develop and test generalizations.
Met Not Met
jn jn

8.9 Develop lessons that use technology’s potential for building understanding of mathematical concepts and developing important mathematical ideas.
Met Not Met
jn jn

Standard 8 comments:
A teacher work sample model is used; the unit has presented an alignment with standards, but the rubric that is used is generic. Expectations regarding NCTM standards are not evident nor explicated to candidates; expectations in the generic rubric do not specifically address these standards.

Standard 9. Knowledge of Number and Operations. Candidates demonstrate computational proficiency, including a conceptual understanding of numbers, ways of representing number, relationships among number and number systems, and meanings of operations.

Indicators:

9.1 Analyze and explain the mathematics that underlies the procedures used for operations involving integers, rational, real and complex numbers.
Met Not Met
jn jn

9.2 Use properties involving number and operations, mental computation, and computational estimation.
Met Not Met
jn jn

9.3 Provide equivalent representations of fractions, decimals, and percents.
Met Not Met
9.4 Create, solve, and apply proportions.
Met  Not Met

9.5 Apply the fundamental ideas of number theory.
Met  Not Met

9.6 Makes sense of large and small numbers and number systems.
Met  Not Met

9.7 Compare and contrast properties of numbers and number systems.
Met  Not Met

9.8 Represent, use and apply complex numbers.
Met  Not Met

9.9 Recognize matrices and vectors as systems that have some of the properties of the real number system.
Met  Not Met

9.10 Demonstrate knowledge of the historical development of numbers and number systems including contributions from diverse cultures.
Met  Not Met

Standard 9 comments:
Assessment 1 assesses indicators 9.1-9.9.


Indicators:

10.1 Analyze patterns, relations, and functions of one and two variables.
Met  Not Met
10.2 Apply fundamental ideas of linear algebra.
Met Not Met

10.3 Apply the major concepts of abstract algebra to justify algebraic operations and formally analyze algebraic structures.
Met Not Met

10.4 Use mathematical models to represent and understand quantitative relationships.
Met Not Met

10.5 Use technological tools to explore algebraic ideas and representations of information and in solving problems.
Met Not Met

10.6 Demonstrate knowledge of the historical development of algebra including contributions from diverse cultures.
Met Not Met

Standard 10 comments:
Assessment 1 assesses 10.1-10.3. Catalog descriptions for assessment 3 were reviewed. The report discusses artifacts of student work, but there are no descriptions of the student work that is referenced.


Indicators:

11.1 Demonstrate knowledge of core concepts and principles of Euclidean and non-Euclidean geometry in two- and three-dimensions from both formal and informal perspectives.
Met Not Met

11.2 Exhibit knowledge of the role of axiomatic systems and proof in geometry.
Met Not Met
11.3 Analyze characteristics and relationships of geometric shapes and structures.
Met Not Met
jn jn

11.4 Build and manipulate representations of two- and three-dimensional objects and visual objects from different perspectives.
Met Not Met
jn jn

11.5 Specify locations and describe spatial relationships using coordinate geometry, vectors and other representational systems.
Met Not Met
jn jn

11.6 Apply transformation and use symmetry, similarity, and congruence to analyze mathematical situations.
Met Not Met
jn jn

11.7 Use concrete models, drawings, and dynamic geometric software to explore geometric ideas and their applications in real-world contexts.
Met Not Met
jn jn

11.8 Demonstrate knowledge of the historical development of Euclidean and non-Euclidean geometries including contributions from diverse cultures.
Met Not Met
jn jn

**Standard 11 comments:**
Assessment 1 addresses 11.1-11.3 and 11.5-11.7. Catalog descriptions for assessment 3 were reviewed. The report discusses artifacts of student work, but there are no descriptions of the student work that is referenced.

**Standard 12. Knowledge of Calculus.** Candidates demonstrate a conceptual understanding of limit, continuity, differentiation, and integration and a thorough background in techniques and application of calculus.

**Indicators:**

12.1 Demonstrate a conceptual understanding of and procedural facility with basic calculus concepts.
Met Not Met
jn jn
12.2 Apply concepts of function, geometry, and trigonometry in solving problems involving calculus.

Met  Not Met

12.3 Use the concepts of calculus and mathematical modeling to represent and solve problems taken from real-world context.

Met  Not Met

12.4 Use technological tools to explore and represent fundamental concepts of calculus.

Met  Not Met

12.5 Demonstrate knowledge of the historical development of calculus including contributions from diverse cultures.

Met  Not Met

Standard 12 comments:
Assessment 1 addresses 12.1-12.3. Catalog descriptions for assessment 3 were reviewed. The report discusses artifacts of student work, but there are no descriptions of the student work that is referenced.


Indicators:

13.1 Demonstrate knowledge of basic elements of discrete mathematics such as graph theory, recurrence relations, finite difference approaches, linear programming, and combinatorics.

Met  Not Met

13.2 Apply the fundamental ideas of discrete mathematics in the formulation and solution of problems arising from real-world situations.

Met  Not Met

13.3 Use technological tools to solve problems involving the use of discrete structures and application of algorithms.

Met  Not Met

13.4 Demonstrate knowledge of the historical development of discrete mathematics including contributions from diverse cultures.
Standard 13 comments:
Catalog descriptions for assessment 3 were reviewed. The report discusses artifacts of student work, but there are no descriptions of the student work that is referenced.


Indicators:

14.1 Design investigations, collect data, and use a variety of ways to display the data and interpret data representations that may include bivariate data, conditional probability and geometric probability.

14.2 Use appropriate methods such as random sampling or random assignment of treatments to estimate population characteristics, test conjectured relationships among variables, and analyze data.

14.3 Use appropriate statistical methods and technological tools to describe shape and analyze spread and center.

14.4 Use statistical inference to draw conclusions from data.

14.5 Identify misuses of statistics and invalid conclusions from probability

14.6 Draw conclusions involving uncertainty by using hands-on and computer-based simulation for estimating probabilities and gathering data to make inferences and conclusions.

14.7 Determine and interpret confidence intervals.
14.8 Demonstrates knowledge of the historical development of probability and statistics including contributions from diverse cultures.

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**Standard 14 comments:**

Assessment 1 addresses 14.2, 14.4, and 14.7. Catalog descriptions for assessment 3 were reviewed. The report discusses artifacts of student work, but there are no descriptions of the student work that is referenced.

**Standard 15. Knowledge of Measurement. Candidates apply and use measurement tools.**

**Indicators:**

15.1 Recognize the common representations and uses of measurement and choose tools and units for measuring.

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15.2 Apply appropriate techniques, tools, and formulas to determine measurements and their application in a variety of contexts.

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15.3 Complete error analysis through determining the reliability of the numbers obtained from measures.

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15.4 Demonstrate knowledge of the historical development of measurement and measurement systems including contributions from diverse cultures.

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**Standard 15 comments:**

Assessment 1 addresses 15.1 and 15.2. Catalog descriptions for assessment 3 were reviewed. The report discusses artifacts of student work, but there are no descriptions of the student work that is referenced.

**Standard 16. Field-Based Experiences. Candidates complete field-based experiences in mathematics classrooms.**

**Indicators:**
16.1 Engage in a sequence of planned opportunities prior to student teaching that includes observing and participating in both middle and secondary mathematics classrooms under the supervision of experienced and highly qualified teachers.

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16.2 Experience full-time student teaching in secondary mathematics that is supervised by a highly qualified teacher and a university or college supervisor with secondary mathematics teaching experience.

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16.3 Demonstrate the ability to increase students’ knowledge of mathematics.

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**Standard 16 comments:**

Supervision is conducted with at least the student teaching supervisor having specific knowledge of mathematics education. There is a planned, progressive sequence of field experiences with scaffolded expectations. Assessments 2 and 4 address 16.3.

**PART C - EVALUATION OF PROGRAM REPORT EVIDENCE**

**C.1. Candidates’ knowledge of content**

Candidate knowledge is measured through the Illinois specialty content test. In addition, there is some evidence of course content in the mathematics courses. There was no description (in assessment 3) of how candidates are assessed.

**C.2. Candidates’ ability to understand and apply pedagogical and professional content knowledge, skills, and dispositions**

Assessments 2 and 4 provide evidence of attention to pedagogy. There was no evidence of how candidates were specifically assessed in the mathematics methods class. There were alignments provided for the student teaching and teacher work sample assessments, but they are not provided to the candidates; therefore, it was not clear that the indicators were actually assessed.

**C.3. Candidate effects on P-12 student learning**

Assessment 2 provides the most evidence that candidates are focused upon student learning. Again, the rubrics are quite generic; candidates are not provided with the alignment and it is not clear how the alignment is used to inform the completion of the rubric.

**PART D - EVALUATION OF THE USE OF ASSESSMENT RESULTS**

Evidence that assessment results are evaluated and applied to the improvement of candidate performance and strengthening of the program (as discussed in Section V of the program report)

The unit has been very thoughtful in its analysis; it does extensive comparisons of mathematics education majors and the other mathematics majors, as well as looking at where candidates are not
performing as well. There will be data available to focus upon modifications of the program, though this was not discussed explicitly.

PART E - AREAS FOR CONSIDERATION

Areas for consideration
The unit should consider revisions for assessments 2, 3, and 4, as well as additional clarifications. The unit needs to provide further evidence for Assessments 2 and 4 with regard to specific NCTM indicators. The guidelines for the use of grades need to be followed carefully for Assessment 3. 80% of the overall indicators must be met, including at least one indicator from each standard, to be nationally recognized. Please consult the NCTM web site for information and links to examples of assessment descriptions: www.nctm.org/ncate.

PART F - ADDITIONAL COMMENTS

F.1. Comments on Section I (Context) and other topics not covered in Parts B-E:

F.2. Concerns for possible follow-up by the Board of Examiners:
The BOE will need to follow up on how generic evaluations (2 and 4) are further delineated for specific content areas. The nature of candidate assessments that determined assessment 3 need to be examined further.

PART G - DECISIONS

Please select final decision:

Program is nationally recognized with conditions. The program will be listed as nationally recognized on websites and/or other publications of the SPA and NCATE. The institution may designate its program as nationally recognized by NCATE, through the time period specified below, in its published materials. National recognition is dependent upon NCATE accreditation.

NATIONAL RECOGNITION WITH CONDITIONS

The program is recognized through:

MM DD YYYY
02 / 01 / 2013

Subsequent action by the institution: To retain national recognition, a report addressing the conditions to recognition must be submitted on or before the date cited below.

The program has up to two opportunities to address conditions within an 18 month period.

If the program is submitting a Response to Conditions Report for the first time, the range of possible deadlines for submitting that report are 3/15/11, 9/15/11, 3/15/12, or 9/15/12. Note that the opportunity to submit a second Response to Conditions report (if needed), is only possible if the first Response to Conditions report is submitted on or before the 3/15/12 submission date noted above. However, the
program should NOT submit its Response to Conditions until it is confident that it has addressed all the conditions in Part G of this recognition report.

If the program is currently Recognized with Conditions and is submitting a second Response to Conditions Report, the next report must be submitted by the date below.

Failure to submit a report by the date below will result in loss of national recognition.

Failure to submit a report by the date below will result in loss of national recognition.

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The following conditions must be addressed within 18 months (see above for specific date):

- The SPA-required number of standards and indicators is not met.
- There is a lack of clarity for some assessments (2 and 4).
- The guidelines for use of grades as an assessment must be used.

Please see specific details in Parts B-D.

Please click "Next"

This is the end of the report. Please click "Next" to proceed.
Table of Contents

I. Overview of the TPAC Assessment

II. Task 1. Planning Instruction & Assessment
   • Planning Rubrics

III. Task 2. Instructing and Engaging Students in Learning
   • Instruction Rubrics

IV. Task 3. Assessing Student Learning
   • Assessment Rubrics

V. Task 4. Final Retrospective Reflection
   • Reflection Rubric
   • Academic Language Rubric

VI. Glossary

VII. Academic Language Appendix

VIII. Authenticity Sign Off Form

1 This Table of Contents provides links to each section (click text in BLUE). To return to the Table of Contents, click the “RETURN” link at the top of each section.
Overview of the TPAC Assessment

Conceptual overview

In this assessment, you will describe, analyze, and evaluate the teaching of a 3-5 lesson unit of mathematics instruction that will be referred to as a “learning segment”. The assessment is built around the proposition that successful teaching is based on knowledge of subject matter and subject-specific pedagogy, developing knowledge of one’s students, reflecting and acting on evidence of the effects of instruction on student learning, and considering research/theory about how students learn.

The TPAC assessment is clearly focused on student learning. To complete the assessment, you will describe your plans and what you actually did to achieve student learning (the “what”), provide a rationale for your plans and an analysis of the effects of your teaching on your students’ learning (the “so what”), and analyze and reflect on the resulting student learning to plan next steps in instruction or improvements in your teaching practice (the “now what”).

Submit teaching artifacts and commentaries

You will submit artifacts and commentaries. Artifacts are evidence of your teaching practice. They include lesson plans, copies of instructional and assessment materials, one or two video clips of your teaching, and student work samples. You will also write commentaries describing your plans and practice, explaining the rationale behind them, and analyzing and reflecting on what you learned about your teaching practice and your students’ learning. In a commentary, you respond to questions that prompt you to provide evidence of what you know and understand about your teaching practice. The commentaries will guide the assessors in interpreting the artifacts you submit. They also are evidence of your ability to communicate about and reflect on your teaching practice. Note that your writing ability will not be scored directly, but it is important that the writing is clear and focused on key elements of your descriptions, explanations, or reflections.

The instructions in the following pages will guide you in putting together the artifacts and commentaries required in this assessment. A Glossary of terms used in the assessment appears on pages 28-30.

Evaluation Criteria and Scoring

Your assessment evidence will be judged on five dimensions of teaching: planning, instruction, assessment, reflection, and academic language. The evidence for the planning, instruction, and assessment dimensions will come from the corresponding tasks. Evidence for the reflection dimension comes primarily from the daily reflections but may come from the Instruction and Assessment tasks. Evidence for the academic language dimension will come from across the tasks. To identify the teaching competencies that will be assessed, read the rubrics that appear at the end of each task.
### Overview of Secondary Mathematics

**TPAC Assessment**

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<th>TPAC Task</th>
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| 1. Planning Instruction & Assessment | ✓ Provide relevant information about your instructional context by completing the Context for Learning Information.  
✓ Select a learning segment of 3-5 lessons (or, if teaching mathematics within a large time block, about 3-5 hours of connected instruction) that support students in building conceptual understanding, procedural fluency, and mathematical reasoning skills.  
✓ Determine what content and related academic language you will emphasize.  
✓ Consider your students’ strengths and needs, create an instruction and assessment plan for the learning segment, and write lesson plans.  
✓ Respond to commentary prompts to describe your students and teaching context, and explain your thinking in developing the plans and how they reflect what you know about your students as well as research/theory  
✓ As you are teaching, complete daily reflections by answering the prompts. | ☐ Context for Learning Information  
☐ Lesson Plans for Learning Segment  
☐ Instructional Materials  
☐ Assessment tools and criteria  
☐ Planning Commentary  
☐ Daily reflections |
| 2. Instructing & Engaging Students in Learning | ✓ Identify lessons where you are engaging your students in developing knowledge of procedures, conceptual understanding, and mathematical reasoning and select appropriate lessons for filming.  
✓ Collect permission forms from parents and prepare for | ☐ Video Clip(s)  
☐ Video Label Form |
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| **2. Instructing & Engaging Students in Learning** | filming.  
✓ Video the lesson.  
✓ Review the video to identify one or two video clips that meet requirements. The total running time should not exceed 20 minutes.  
✓ Respond to commentary prompts to analyze your teaching and your students’ learning in the video clip(s). | □ Instruction Commentary |
| **3. Assessing Student Learning** | ✓ Analyze student performance across the class from one assessment completed during the learning segment.  
✓ Identify three student work samples that illustrate class trends in student understanding.  
✓ Select two focus students from the class whose learning you will analyze in more depth, and for whom you will document feedback on their work.  
✓ Respond to commentary prompts to analyze the extent to which the whole class met the standards/objectives, analyze the individual learning of two focus students and describe your feedback to them, and identify next steps in instruction based on your analysis. | □ Evaluation Criteria  
□ Student Work Samples  
□ Evidence of Feedback  
□ Assessment Commentary |
| **4. Final Retrospective Reflection** | ✓ Reflect back on your teaching throughout the learning segment and consider what you have learned about your teaching and students’ learning.  
✓ Respond to the commentary prompt about what you would do differently if you could teach this learning segment again. | □ Retrospective Reflection Commentary |
Task 1. Planning Instruction & Assessment

Purpose

The Planning Instruction & Assessment task asks you to describe your plans for the learning segment and explain how they are appropriate for the students and the content you are teaching. You will demonstrate your ability to organize curriculum, instruction, and assessment to help diverse students meet the standards for the curriculum content and to develop academic language related to that content. You will provide evidence of your ability to select, adapt, or design learning tasks and materials that offer your students equitable access to mathematics curriculum content.

What Do I Need to Do?

✓ If you teach more than one class, select one focus class for this assessment and complete the Context for Learning Information.

✓ Review the curriculum with your cooperating teacher and select a learning segment of 3-5 lessons (or, if teaching mathematics within a large time block, about 3-5 hours of connected instruction) to describe, analyze, and reflect upon. The learning segment should provide opportunities for students to develop conceptual understanding, procedural fluency, and mathematical reasoning skills and to understand how they are connected.

✓ Identify the big idea or essential question along with the content standards you will address in the learning segment. Consider how students might demonstrate their learning with respect to the standards and identify or adapt learning tasks to help your students develop related knowledge and skills.

✓ Consider the oral and written academic language that students will need to understand or produce in your learning segment and the genres that these texts represent. For more information on academic language, including subject-specific examples of genres, see Appendix A.

✓ Consider what your students need to learn and identify learning objectives for both content and related academic language. Write a lesson plan for each lesson in the learning segment.

---

2 The purposes of Academic Language are to clearly and explicitly define, classify, analyze, explain, argue, interpret and evaluate ideas for an audience that may not be present or known to the writer/speaker.
- Lesson plans should minimally include the following topics:
  - state-adopted student academic content standards that are the target of student learning.
  - learning objectives for both content and academic language
  - informal and formal assessment tools to monitor student learning (type of assessment and what is assessed)
  - instructional strategies and learning tasks to support student learning (what you and the students will be doing)
  - resources and materials
- To identify student academic content standards, please list the number and text of the standard. If only a portion of a standard is being addressed, then only list the relevant part(s).
- Your credential program may require you to use a specific lesson-plan format or template for this assessment.

✓ Submit copies of key instructional materials and all assessment tools used during the learning segment. The instructional materials might include class handouts, overheads, PowerPoint or SmartBoard slides. Select materials that, together with the plans, are needed to understand what you and the students will be doing. If any materials are included from a textbook, please provide a copy of the appropriate pages. If any of these individual items are longer than four pages, provide a summary of relevant features in lieu of a copy. To assist scorers in matching materials to lessons, label each document or group of documents with corresponding lesson number(s).³

✓ Respond to each of the prompts in the Planning Commentary. To protect confidentiality, please remove your name and use pseudonyms or general references (e.g., “the district”) for your school, district, or cooperating teacher. You may use either pseudonyms or first names only for students. Do this in all commentaries, and mask or remove proper names from all materials submitted, including lesson plans.

✓ During the learning segment, record and submit daily reflections on teaching and learning. Daily reflections may be in the form of bulleted notes rather than paragraphs. While these need to be clear to the assessor, they need not be polished prose.

³ Provide citations for all sources of materials that you did not create (e.g., published texts, websites, other educators). Citations can be listed on a written document or submitted as an additional page.
Task 1. Context for Learning Information

Provide the requested context information for the class selected for this assessment. This format is designed to be completed electronically. Use as much space as needed to respond.

About the school where you are teaching

1. Where are you teaching?
   ____ Middle school  ____ High school
   ____ Other (please describe) __________________

2. List any specialized features of your school or classroom setting (e.g., themed magnet, classroom aide, bilingual) that will affect your teaching in this learning segment.

3. Describe any district, school, or cooperating teacher requirements or expectations that might impact your planning or delivery of instruction, such as required curricula, pacing plan, use of specific instructional strategies, or standardized tests.

About the subject area/course you are teaching

4. What is the name of the course you are documenting? ____________________________

5. What is the length of the course?  ☐ one semester  ☐ one year ☐ other (describe) ________

6. What is the class schedule (e.g., 50 minutes every day, 90 minutes every other day)?

7. Is there any ability grouping or tracking in mathematics? If so, please describe how it affects your class.

8. Identify any textbook or instructional program you primarily use for mathematics instruction. If a textbook, please provide the name, publisher, and date of publication.

9. List other resources (e.g., SmartBoard, graphing calculators, on-line resources) you use for mathematics instruction in this class.

About the students in the class featured in this assessment

10. Grade level composition of the class ____________________
11. Number of:

a. students in the class ______

b. males ______ females ______

c. English language learners ______

d. students identified as gifted and talented ______

e. students with Individualized Education Plans (IEPs) or 504 plans ______

12. Complete the chart below to summarize the required accommodations or modifications for special education students or gifted and talented students that will affect your mathematics instruction in this learning segment. As needed, consult with your cooperating teacher to complete the chart. The first row has been completed in italics as an example. Use as many rows as you need.

<table>
<thead>
<tr>
<th>Special Education Category</th>
<th>Number of Students</th>
<th>Accommodations/Pertinent IEP Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: Learning Disability</td>
<td>Example: 4</td>
<td>Example: Close monitoring, follow up, and Resource Room</td>
</tr>
</tbody>
</table>
Planning Commentary

Write a commentary of 7-9 single-spaced pages (including prompts) that addresses the following prompts. If you are prompted for any explanations that can be found in your lesson plans, simply refer the assessor to the appropriate page(s) of your lesson plans.

1. Summarize the content focus of this learning segment. This summary might take the form of a “big idea” or “essential question.”

2. Describe what you know about your students with respect to this content focus, what they can do as well as what they are learning to do. Consider the variety of learners in your class, including individuals and subgroups requiring different strategies. Include how this knowledge influences your choices of instructional strategies to promote student learning of this content. Address the following areas:
   a. Academic development (e.g., prior knowledge, key skills, ways of thinking in the subject areas, developmental levels, and other special educational needs)
   b. Academic Language Development (students’ abilities to understand and produce the oral or written texts in English that are part of the learning segment)
   c. Mathematical dispositions (e.g., student attitudes, curiosity, flexibility, and persistence in mathematics)
   d. Social and emotional development (e.g., relationships with each other, expressing themselves in constructive ways, engaging in collaborative learning, contributions to a productive learning environment)
   e. Family/community/cultural assets (e.g., cultural norms, student interests, relevant experiences and resources)

3. How do your plans support your students’ learning of mathematics and academic language related to the big idea/essential question of the learning segment?
   a. Explain how key learning tasks are sequenced in the learning segment to build connections from prior knowledge to new knowledge. Include how you will help students make connections between and among prior and new mathematical procedures, concepts, and reasoning/problem solving strategies to deepen student learning of mathematics throughout the learning segment. As needed, reference the instructional materials you have included.
   b. Consult with experienced mathematics educators to identify students’ possible or common errors associated with the learning segment content. How will you construct...
your assessments and lessons to identify and address possible misconceptions and errors?

c. Identify the language demands embedded in the learning segment. Be sure to address relevant genres, key vocabulary or phrases for the concepts being taught and linguistic features that enable students to understand or produce the oral and/or written texts in the learning segment.

d. Explain how the learning tasks help students at different academic and language proficiency levels develop this academic language.

e. Describe any strategies planned to support students with specific learning needs.

4. How will you monitor student learning during the learning segment?

a. Explain how you will use the evidence from the planned informal and formal assessments to provide feedback to students and to monitor their progress toward meeting learning objectives.

b. Describe any modifications in the assessment tools or accommodations planned to allow students with specific needs to demonstrate their learning.

5. Reflection:

a. Indicate how specific research/theory guided your selection of specific strategies and materials to help your students develop the conceptual understanding, procedural fluency, and mathematical reasoning skills needed to meet the learning objectives.

b. Record a daily reflection after teaching each lesson by responding to the following prompts:

i. What is working? What is not? For whom? Why? (Consider teaching and student learning with respect to both content and academic language development.)

ii. How does this reflection inform what you plan to do in the next lesson?

iii. Submit these daily reflections in a document separate from the commentary. Daily reflections are not included when calculating the page range indicated above for the commentary.

---

4 Genres are generic designs applicable across multiple topics to guide the process of interpreting or constructing texts. The designs are structured to achieve specific purposes related to a particular cultural and situational context. See Appendix A.

5 E.g., vocabulary patterns, connector words, grammatical structures, or text organization strategies.

6 This will vary by class, but commonly includes students with IEPs, English learners, or gifted students needing a greater challenge.
# Planning Rubrics

## PLANNING: PLANNING FOCUSED, SEQUENCED INSTRUCTION

**M1: How do the plans support students’ development of conceptual understanding, procedural fluency, and mathematical reasoning skills?**

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Standards/objectives, learning tasks, and assessments are <strong>loosely aligned</strong> to a big idea or essential question.</td>
<td>● Standards/objectives, learning tasks, and assessments are <strong>clearly aligned</strong> to a big idea or essential question.</td>
<td>● Standards/objectives, learning tasks, and assessments are clearly aligned to a big idea or essential question. The <strong>learning tasks and assessments represent differing depths of understanding</strong>.</td>
<td>● Standards/objectives, learning tasks, and materials, and assessments are clearly aligned to a big idea or essential question and with each other. The learning tasks and the assessments represent <strong>similar levels of some depth of understanding</strong>.</td>
</tr>
<tr>
<td>● Candidate plans a <strong>focus solely on</strong> facts/computations/procedures or concepts with <strong>no connection</strong> between the two or to reasoning.</td>
<td>● Planned <strong>connections</strong> among mathematical procedures, concepts, and reasoning are <strong>vague</strong>.</td>
<td>● Candidate plans how to make clear <strong>connections</strong> among mathematical procedures, concepts, and reasoning.</td>
<td>● Candidate plans how to lead students to make clear <strong>connections</strong> among mathematical procedures, concepts, and reasoning.</td>
</tr>
<tr>
<td>● There are <strong>significant content inaccuracies</strong> that will lead to student misunderstandings.</td>
<td>● Learning tasks <strong>build on each other</strong> to promote an understanding of the designated mathematical concepts and procedures. Learning tasks (or their adaptations) are justified by explaining their <strong>appropriateness</strong> for the students.</td>
<td>● Learning tasks <strong>build on each other</strong> to promote an understanding of the designated mathematical concepts, procedures, and reasoning <strong>skil</strong>s. Learning tasks (or their adaptation) are justified by explaining their appropriateness for students with references to relevant research and/or theory.</td>
<td>● Learning tasks <strong>build on each other</strong> to promote an understanding of the designated mathematical concepts, procedures, and reasoning skills. Learning tasks (or their adaptations) are justified by explaining their appropriateness for students with references to anticipated effects on student learning based on relevant research and/or theory.</td>
</tr>
</tbody>
</table>

**NOTE:** Text representing key differences between adjacent score levels is **bolded.**
**PLANNING: USING KNOWLEDGE OF STUDENTS TO INFORM TEACHING**

**M2: How does the candidate use knowledge of his/her students to target support for students’ development of conceptual understanding, procedural fluency, and mathematical reasoning skills?**

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Learning tasks and materials reflect characteristics of student academic development, experiential backgrounds, prior learning, and/or interests that are not closely related to learning objectives OR that reflect only deficits and ignore strengths of struggling students.</td>
<td>• Learning tasks and materials draw upon students’ academic development AND social/emotional development, or experiences, or interests to help students reach the learning objectives.</td>
<td>• Learning tasks and materials draw upon students’ academic and social/emotional development, including strengths, as well as experiences and interests to help students reach the learning objectives.</td>
<td>• Learning tasks and materials draw upon students’ academic and social/emotional development, including strengths, as well as experiences and interests to help students reach the learning objectives.</td>
</tr>
<tr>
<td>• Little support for students who might struggle or opportunities for students needing greater challenge are planned.</td>
<td>• Planned support consists of general strategies and modifications, which are not closely tied to learning objectives.</td>
<td>• Planned support consists of strategically selected or modified tasks/materials and/or scaffolding of instruction that are closely tied to specific learning objectives. It is appropriate for specific individuals or subgroups.</td>
<td>• Planned support consists of multiple ways of engaging with content that are integrated to support students to meet or exceed the standards/objectives. These are appropriately designed to address a variety of student learning needs tied to specific learning objectives.</td>
</tr>
</tbody>
</table>

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7 These will vary with the class, but typically include English learners, gifted students, students with IEPs or 504 plans, and students who generally struggle or who are not challenged.

8 This might include different groupings, different tasks, or using different modes to represent content and making connections between them to help students understand.
**PLANNING: PLANNING ASSESSMENTS TO MONITOR AND SUPPORT STUDENT LEARNING**

**M3: How do the informal and formal assessments provide information to understand student progress toward the standards/objectives?**

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The set of assessments will provide little evidence to allow the candidate to monitor student learning relative to the standards/objectives for each lesson.</td>
<td>• The set of assessments will provide evidence of student learning relative to the standards/objectives for each lesson.</td>
<td>• The set of assessments will provide evidence of student learning relative to the standards/objectives for each lesson. At least one lesson’s assessments provide evidence of student learning that extends beyond the formulaic application of procedures or problem solving steps.</td>
<td>• The set of assessments will provide evidence of student learning relative to the standards/objectives for each lesson. Each lesson’s assessments provide evidence of student learning that extends beyond the formulaic application of procedures or problem solving steps.</td>
</tr>
<tr>
<td>• Assessments are focused on what students do and do not understand relative to each lesson’s objectives.</td>
<td>• Assessments are aligned to clearly defined benchmarks or criteria for student performance.</td>
<td>• Assessments are modified or adapted to be appropriate for students having difficulty demonstrating their learning.</td>
<td>• Assessments are modified, adapted, and/or designed in light of the standards/objectives to allow students with special needs opportunities to demonstrate their full progress toward meeting or exceeding the standards/objectives.</td>
</tr>
</tbody>
</table>
Task 2. Instructing & Engaging Students in Learning

Purpose

The Instructing & Engaging Students in Learning task asks you to demonstrate how you facilitate students’ developing understanding of mathematical concepts, procedures, and reasoning. You will provide evidence of your ability to engage students in meaningful mathematics tasks, monitor their understanding, and use your responses to students to guide their learning.

What Do I Need to Do?

Video your classroom teaching

✓ Examine your plans for the learning segment and identify learning tasks in which students are actively engaged in understanding mathematical concepts, procedures, and reasoning.

✓ View the video(s) to check the quality, analyze your teaching, and select the most appropriate video clip(s) to submit.

✓ Provide one or two video clips of no more than twenty minutes total. Select clip(s) that demonstrate how you engage students in developing their understanding mathematical concepts, procedures, and reasoning. The clip(s) should include interactions among you and your students and your responses to student comments, questions, and needs.

Video Guidelines

- A video clip should be continuous and unedited, with no interruption in the events.
- The clip(s) can feature either the whole class or a targeted group of students.
- Both you and your students should be visible and clearly heard on the video submitted.
- Tips for recording your class on video are available from your program.
- Before you video, ensure that you have the appropriate permission from the parents/guardians of your students and from adults that appear on the video.

✓ Provide a copy of any relevant writing on the board, overhead, or walls if it is not clearly visible on the video. Attach this document to the Instruction Commentary.
✓ Complete the Video Label Form and either attach it to a videotape or put it in a folder or CD/DVD with the video file(s) in an electronic format. The form is located after the instructions for this task.

✓ Respond to each of the prompts in the Instruction Commentary.

Instruction Commentary

Write a commentary of 2-4 single-spaced pages (including prompts) that addresses the following prompts.

1. In the instruction seen in the clip(s), describe strategies you used to engage students in the learning task(s) to build their own understandings of mathematical concepts, procedures, and reasoning.
   a. Cite examples of strategies aimed at engaging all your students and examples aimed at engaging specific individuals or subgroups. If you described any of these fully in the lesson plans or the planning commentary, just reference the relevant description.
   b. How did these strategies reflect students’ academic or language development, social/emotional development, or cultural and lived experiences?

2. Cite examples of language supports seen in the clip(s) to help your students understand the content and/or to build their academic language skills.
   a. How did these strategies reflect students’ varying language proficiencies and promote their language development?

3. Describe your strategies for eliciting student thinking and how your ongoing responses further their learning. Cite examples from the clip(s).

4. Reflection:
   a. Reflect on students’ learning of concepts and academic language as featured in the video clip(s). Identify both successes and missed opportunities for monitoring all students’ learning and for building their own understanding of mathematical concepts, procedures, and reasoning skills.
   b. If you could do it over, what might you have done to take advantage of missed opportunities or to improve the learning of students with diverse learning needs and characteristics?
Task 2. **Video Label Form**

Candidate ID # __________________________

**Secondary Mathematics Clip(s)**

**Clip # 1**

Lesson from which clip came: Lesson # _____

Focus of Clip (Check all that apply.)

☐ Developing understanding of a procedure
☐ Developing conceptual understanding
☐ Developing mathematical reasoning skills

**Clip # 2 (Optional)**

Lesson from which clip came: Lesson # _____

Focus of Clip (Check all that apply.)

☐ Developing understanding of a procedure
☐ Developing conceptual understanding
☐ Developing mathematical reasoning skills

**If Electronic, Video Format of Clip(s):** (check one)

☐ DVD format (no other media player involved)
☐ Flash
☐ QuickTime
☐ Windows Media Player
☐ Other (please specify) _______________________________
### INSTRUCTION: ENGAGING STUDENTS IN LEARNING

**M4: How does the candidate actively engage students in developing their own understanding of mathematical concepts, procedures, and reasoning?**

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
</table>
| • Strategies for intellectual engagement seen in the clip(s) **limit** opportunities for students to develop an understanding of mathematical concepts, procedures, and reasoning.  
   • Candidate accurately **identifies** successful and unsuccessful teaching practices.  
   • Student behavior or candidate’s disrespect for one or more students severely limits students’ engagement in learning. | • Strategies for intellectual engagement seen in the clip(s) offer opportunities for students to develop an understanding of mathematical concepts, procedures, and reasoning. These strategies reflect **attention to students’ academic or language development, social/emotional development, and/or cultural and lived experiences.**  
   • Candidate accurately identifies successful and unsuccessful teaching practices and proposes **reasonable improvements.** | • Strategies for intellectual engagement seen in the clip(s) offer **structured opportunities** for students to **develop their own understanding of mathematical concepts, procedures, and reasoning.** These strategies reflect attention to students’ academic or language development, social/emotional development, and/or cultural and lived experiences.  
   • Candidate identifies successful and unsuccessful teaching practices. The proposed improvements are reasonable and address the learning of a **subgroup or individual students.** | • Strategies for intellectual engagement seen in the clip(s) offer structured opportunities for students to develop their own understanding of mathematical concepts, procedures, and reasoning. These strategies are **explicit, and clearly reflect attention** to students with diverse academic or language development, social/emotional development, and/or cultural and lived experiences.  
   • Candidate identifies successful and unsuccessful teaching practices. The proposed improvements are reasonable and **address the learning of diverse students.** |
### INSTRUCTION: DEEPENING STUDENT LEARNING DURING INSTRUCTION

**M5: How does the candidate elicit and monitor students’ responses to deepen their understanding of mathematical concepts, procedures, and reasoning?**

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
</table>
| - Candidate primarily asks **surface-level questions** and evaluates student responses as **correct or incorrect**.  
  - Few **connections** are observed being made between and among **mathematical concepts, procedures, and reasoning**.  
  - Materials or candidate responses include **significant content inaccuracies** that will lead to student misunderstandings. | - The candidate **elicits student responses** that require mathematical reasoning or problem solving strategies.  
  - **Candidate makes connections** between and among mathematical concepts, procedures, and reasoning. | - Candidates and/or other students **build on what students are saying and/or doing**, using reasoning to improve understanding of mathematical concepts and procedures.  
  - Candidate and/or other students **prompt students to make connections** between and among mathematical concepts, procedures, and reasoning. | - Candidate’s and/or other students’ interactions **help develop or reinforce students’ abilities to evaluate their own ideas through reasoning**.  
  - Candidate and/or other students prompt students to make connections between and among mathematical concepts, procedures, and reasoning. |
Task 3. Assessing Student Learning

Purpose

The Assessment of Student Learning task asks you to assess student achievement, diagnose student learning strengths and needs, and inform instruction. You will provide evidence of your ability to 1) develop evaluation criteria that are aligned with your big idea or essential question, standards, and learning objectives; 2) analyze student performance on an assessment in relation to student needs and the identified learning objectives; 3) provide feedback to students; and 4) use the analysis to identify next steps in instruction for the whole class and individual students.

What Do I Need to Do?

✓ Select an assessment from the learning segment that you will use to evaluate your students’ developing knowledge and skills. The assessment should be the work of individuals, not groups. The assessment should give both you and the students a sense of how well they are progressing toward learning key knowledge, skills, and abilities targeted in the learning segment.

✓ Provide a copy of the directions/prompt for the assessment, if these are not apparent from the student work samples.

✓ Provide the evaluation criteria that you used to assess the student work from the learning segment. Evaluation criteria are performance indicators that you use to assess student learning. Examples of categories of evaluation criteria include the ability to identify characteristics of graphs from equations, use a counterexample to disprove an argument, solve inequalities, or translate a word problem into mathematical symbols. They can be represented in various ways, e.g., a rubric, a system of a possible number of points for different categories, or rules for awarding full vs. partial credit.

✓ Analyze the student work from the assessment to identify patterns in understanding across the class. You will need to collect student work from your entire class.

✓ To illustrate your analysis, submit three student work samples which together represent what students in the class generally understood and what a number of students were still struggling to understand. Remove names of students, yourself, and the school with correcting fluid, tape, or marker prior to copying/scanning the work samples. Label them as “Work Sample 1”, “Work Sample 2”, and “Work Sample 3”.

✓ Select two students as focus students whose learning you will discuss in more depth.
You may choose one or both of the students whose work samples were already submitted or choose two different students. **However, at least one of the students must be a student with identified learning needs, e.g., an English Language Learner, a student with an IEP, or a student identified as gifted**. If either of these students is not included among the three for whom you already submitted samples, provide the work sample and label it Work Sample 4 or (if needed) Work Sample 5.

Document feedback you provided to the two focus students, either as individuals or as part of a larger group. You may provide a copy of written feedback or video/audio evidence of oral feedback. If the feedback is written directly on the work sample, be sure that reviewers can distinguish the feedback from the students’ own work. If the feedback occurred in a video clip submitted as part of the Instruction task, identify the timestamp range on the video where the feedback can be found (e.g., Clip 1, 01:35 – 3:05). You may also submit an additional video clip showing oral feedback; label this video “Feedback clip”. Remember to obtain parental permission for all students appearing on the feedback video; one permission form can cover both the video in the Instruction task and any feedback video.

**✓ Respond to each of the prompts in the Assessment Commentary.**

**Assessment Commentary**

Write a commentary of **5-7 single-spaced pages** (including prompts) that addresses the following prompts.

1. Refer to your lesson plans and cite the specific standards/objectives from the learning segment plans that are measured by the assessment chosen for analysis.

2. Create a summary of student learning for the whole class at this point in the learning segment relative to your evaluation criteria.
   a. Summarize student performance in narrative and/or graphic form (e.g., table or chart such as the optional chart provided in Appendix B).
   b. Attach your evaluation criteria, and note any changes from what was planned for assessment as described in the lesson plans or in the Planning commentary, prompt 4.

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*If you do not have any students with identified needs, select a student who is challenged by academic English, who usually struggles with the content OR who usually needs a greater challenge.*
3. Discuss what most students appear to understand well, and, if relevant, any misunderstandings, confusions, or needs (including a need for greater challenge) that were apparent for some or most students. Cite evidence to support your analysis from the three student work samples you selected.

4. For the two focus students (see What Do I Need to Do? for how to select these students):
   a. Describe each student’s individual learning strengths and challenges (e.g., prior knowledge of the content, academic development, language proficiency, special needs) relative to what was measured by the assessment.
   b. What did you conclude from the work sample? Consider your knowledge of each student’s learning relative to the learning objectives. Use the work samples to cite specific evidence to support your conclusions.
   c. Explain how your feedback addressed individual student needs and learning objectives. To support your explanation, cite specific examples of written feedback (e.g., comments on work sample; e-mail; thread of conversation) or of oral feedback on an audio/video clip.
   d. What opportunities did students have to apply the feedback to improve the work or their understanding, either within the learning segment or at a later time?

5. Reflection:
   a. Based on the student performance on this assessment, describe the next steps for instruction for your students. These next steps may include a specific instructional activity or other strategies to support or extend continued learning of objectives, standards, central focus, and/or relevant academic language for the learning segment.
   b. If different, describe any individualized next steps for the two students whose individual learning you analyzed.
   c. In your description, be sure to explain how these next steps follow from your analysis of the student performances.
### Assessment Rubrics

**ASSESSMENT: ANALYZING STUDENT WORK**

*M6: How does the candidate demonstrate an understanding of student performance with respect to standards/objectives?*

<table>
<thead>
<tr>
<th><strong>Level 1</strong></th>
<th><strong>Level 2</strong></th>
<th><strong>Level 3</strong></th>
<th><strong>Level 4</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>● Criteria are <strong>not aligned with</strong> the identified standards/objectives.</td>
<td>● Criteria are <strong>well-defined</strong> and aligned with the indicated standards/objectives from the learning segment.</td>
<td>● Criteria are well-defined and <strong>reflect the depth of understanding</strong> stated in the indicated standards/objectives from the learning segment.</td>
<td>All components of Level 3 plus:</td>
</tr>
<tr>
<td>OR</td>
<td>● The conclusions in the analysis are <strong>not supported</strong> by either student work samples or the summary of learning.</td>
<td>● The analysis <strong>focuses only on listing what students did right or wrong</strong> in relationship to identified standards/objectives.</td>
<td>● The candidate is able to see areas of strength in a predominantly weak sample and/or areas for improvement in a predominantly strong sample.</td>
</tr>
<tr>
<td>● The conclusions in the analysis are <strong>not supported</strong> by either student work samples or the summary of learning.</td>
<td>● The analysis <strong>focuses on patterns of student errors, skills, and understandings</strong> in relation to standards and learning objectives. The analysis <strong>uses these patterns to understand student thinking.</strong></td>
<td>● The analysis is supported by work samples and the summary of learning. Specific patterns are identified for <strong>individuals or subgroup(s)</strong> in addition to the whole class.</td>
<td></td>
</tr>
</tbody>
</table>
## ASSESSMENT: USING ASSESSMENT TO INFORM INSTRUCTION

**M7: How does the candidate use conclusions about what students know and are able to do to plan next steps in instruction?**

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Next steps are <strong>not relevant to the standards/learning objectives</strong> assessed. OR • Next steps are <strong>vaguely related to improving student performance</strong> related to the identified standards/learning objectives or use the same, unmodified strategies. OR • Next steps are <strong>not described in sufficient detail</strong> to understand them.</td>
<td>• Next steps <strong>follow from the analysis</strong> and are <strong>related to the standards/learning objectives</strong>. • Next steps focus on improving student performance through <strong>new or slightly modified strategies</strong> for general support that addresses some identified student needs. • Next steps <strong>described in sufficient detail</strong> to understand them.</td>
<td>• Next steps follow from an <strong>accurate analysis</strong> of student learning and aim at improving student understanding of <strong>important features</strong> of the standards/learning objectives. • Next steps focus on improving student performance through <strong>targeted support</strong> to individuals and groups to address specific <strong>identified needs</strong>. • Next steps are <strong>based on whole class patterns</strong> of performance and some patterns for individuals and/or subgroups and are described in sufficient detail to understand them.</td>
<td>All components of Level 3 plus: • Next steps demonstrate a <strong>strong understanding</strong> of both the identified <strong>content and language standards/objectives</strong> and of individual students and/or subgroups.</td>
</tr>
</tbody>
</table>
### ASSESSMENT: USING FEEDBACK TO GUIDE FURTHER LEARNING

**M8: How does the candidate provide students feedback to guide their further learning?**

<table>
<thead>
<tr>
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<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Feedback <strong>focuses solely on errors</strong> with no elaboration or is vague.</td>
<td>• Feedback accurately identifies what students did well and areas for improvement related to specific learning objectives.</td>
<td>• <strong>Specific</strong> and accurate feedback helps the student understand what s/he did well, and provides guidance for improvement.</td>
<td>• Specific and accurate feedback on content and academic language helps the student understand what s/he did well, and provides guidance for improvement.</td>
</tr>
<tr>
<td>• Opportunities for applying feedback are <strong>not described</strong>.</td>
<td>• Candidate describes how students will use feedback to correct their errors.</td>
<td>• Candidate describes how students will use feedback to improve their work or their understanding.</td>
<td>• Candidate describes how students will use feedback to improve their work or their understanding and to evaluate their own work.</td>
</tr>
<tr>
<td>OR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• The feedback <strong>contains significant inaccuracies</strong>.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Task 4. **Final Retrospective Reflection**  

**Purpose**

The Final Retrospective Reflection task asks you to reflect on your experiences teaching the learning segment and to consider what you have learned about your teaching and the learning of your students. You will provide evidence of your ability to examine your teaching and propose changes that support the learning of your diverse students.

**What Do I Need to Do?**

- Reflect on your experiences teaching the entire learning segment and what you have written in your previous commentaries.
- Respond to the commentary prompt by explaining what you would do differently, given the opportunity to teach these lessons again.

**Retrospective Reflection Commentary**

Consider what you have learned about your teaching, your students, and their learning throughout the learning segment. Write a commentary of no more than one single spaced page (including prompts) in response to the following prompt.

1. If you could teach these lessons to the same group of students again, what would you change? Why?
### REFLECTION: MONITORING STUDENT PROGRESS AND ADJUSTING INSTRUCTION

**M9: How does the candidate monitor student learning and make appropriate adjustments in instruction during the learning segment?**

<table>
<thead>
<tr>
<th>Level 1</th>
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<th>Level 4</th>
</tr>
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<tbody>
<tr>
<td>• Daily reflections indicate <strong>inconsistent monitoring</strong> of student performance.</td>
<td>• Daily reflections <strong>identify what students could or could not do within each lesson</strong>.</td>
<td>• Daily reflections identify what students could or could not do within each lesson and consider the implications for meeting the standards/objectives at the end of the learning segment.</td>
<td>All components of Level 3 plus:</td>
</tr>
<tr>
<td>• There is <strong>limited evidence of adjusting</strong> instruction in response to observed problems, e.g., student confusion, a lack of challenge, time management.</td>
<td>• Adjustments to instruction are focused on <strong>improving directions for learning tasks, time management, or reteaching</strong>.</td>
<td>• Adjustments to instruction are <strong>appropriate</strong> and focused on addressing some individual and collective learning needs.</td>
<td>• Adjustments to instruction are focused on deepening students' conceptual understanding, procedural fluency, and mathematical reasoning.</td>
</tr>
</tbody>
</table>
## M10: How does the candidate identify the language demands of learning tasks and assessments relative to the students’ current levels of academic language proficiency?

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Candidate’s description of students’ academic language proficiency at lower levels is limited to what they CANNOT do.</strong></td>
<td><strong>Candidate describes academic language strengths and needs of students at different levels of academic language proficiency.</strong></td>
<td><strong>Candidate describes academic language strengths and needs of students at different levels of academic language proficiency.</strong></td>
<td><strong>Candidate describes academic language strengths and needs of students at the full range of academic language proficiency.</strong></td>
</tr>
<tr>
<td><strong>Language genre(s)</strong> discussed are only tangentially to the academic purposes of the learning segment.</td>
<td><strong>The language genre(s) discussed are clearly related to the academic purposes of the learning segment and language demands are identified.</strong></td>
<td><strong>The language genre(s) discussed are clearly related to the academic purpose of the learning segment and language demands are identified. One or more linguistic features and/or textual resources of the genre are explicitly identified.</strong></td>
<td><strong>The language genre(s) discussed are clearly related to the academic purpose of the learning segment and language demands are identified. One or more genre-related linguistic features or textual resources of the specific tasks/materials are explicitly identified and related to students’ varied levels of academic language proficiency.</strong></td>
</tr>
<tr>
<td><strong>Candidate identifies unfamiliar vocabulary</strong> without considering other linguistic features.</td>
<td><strong>Candidate identifies vocabulary that may be problematic for students.</strong></td>
<td><strong>Candidate identifies essential vocabulary for students to actively</strong></td>
<td><strong>Candidate identifies for instruction</strong></td>
</tr>
<tr>
<td><strong>OR</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Candidate did not identify any language demands</strong> within the learning and assessment tasks.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Academic Language Rubrics**

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10 Language demands might include: translating words or sentences into symbols or symbols into words and sentences; quickly decoding symbols into their abstract meanings; distinguishing mathematical uses of words used in everyday language (e.g., balance, product, irrational, factor, simplify, function); using technical language to explain intuitive understandings; using complex sentences to express conjectures; using precise language to explain mathematical concepts or reasoning; combining language and numbers to persuade an audience to accept a proposition.

11 Key genres in mathematics might include: interpreting or representing mathematical meanings represented symbolically, graphically or linguistically; recounting computational procedures or strategies used to solve mathematical problems; evaluating or constructing mathematical arguments; explaining mathematical concepts; defining technical terms; engaging in collaborative and oral mathematical reasoning.
## ACADEMIC LANGUAGE: EXPANDING STUDENTS’ ACADEMIC LANGUAGE REPERTOIRE

**M11: How do the candidate’s planning, instruction, and assessment support academic language development?**

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
</table>
| ● The candidate gives little or sporadic support to students to meet the language demands of the learning tasks.  

**OR**  

● Language and/or content is oversimplified to the point of limiting student access to the core content of the curriculum.  

|   | ● The candidate uses scaffolding or other support to address identified gaps between students’ current language abilities and the language demands of the learning tasks and assessments, including selected genres and key linguistic features.  

|   | ● Candidate articulates why instructional strategies chosen are likely to support aspects of students’ language development.  

|   | ● The candidate’s use of scaffolding or other support provides access to core content while also providing explicit models, opportunities for practice, and feedback for students to develop further language proficiency for selected genres and key linguistic features.  

|   | ● Candidate articulates why the instructional strategies chosen are likely to support specific aspects of students’ language development for different levels of language proficiency.  

|   | ● The candidate’s use of scaffolding or other support provides access to core content while also providing explicit models, opportunities for practice, and feedback for students to develop further language proficiency for selected genres and key linguistic features.  

|   | ● Candidate articulates why the instructional strategies chosen are likely to support specific aspects of students’ language development for the full range of language proficiency and projects ways in which the scaffolds can be  

---

12 Core content is the set of facts, concepts, skills, and abilities that are absolutely necessary to participate at least minimally in the learning/assessment tasks in the learning segment.

13 Such support might include one or more of the following: modeling of strategies for understanding word problems; explicit communication of the expected features of oral presentations of solutions (e.g., using rubrics, models, and frames); use of strategies that provide visual representations of content while promoting literacy development (e.g., graphic organizers); vocabulary development techniques (context cues, categorization, analysis of word parts, etc.); opportunities to work together with students with different kinds of language and literacy skills, etc.
removed as proficiency increases.
Glossary

**Academic Language:** Academic language is the oral and written language needed by students to understand and communicate in the academic disciplines for specific purposes and audiences. Academic language often requires the inclusion of context information to make the meaning clear for a distant audience. It has long been accompanied by visuals such as illustrations and charts, and is beginning to incorporate multi-media as well as oral and written forms. Academic language genres include the specialized vocabulary, linguistic features, and textual resources associated with genres within a field (e.g., literary criticism, explanations of historical phenomena, lab reports). It also includes instructional language needed to participate in learning and assessment tasks, including discussing ideas and asking questions, summarizing instructional and disciplinary texts, following and giving instructions, listening to a mini-lesson, explaining thinking aloud, giving reasons for a point of view, and answering multiple-choice questions or writing essays to display knowledge on tests.

**Assessment:** Evidence teachers collect of student prior knowledge, thinking, or learning in order to evaluate what students understand and how they are thinking. Informal assessments include such things as student questions and responses during instruction and teacher observations of students as they work. Formal assessments may include such things as quizzes, homework assignments, lab reports, papers, journals, and projects.

**Curriculum content:** Descriptions of what students are to know and be able to do, including various areas of knowledge, e.g., facts, concepts, procedures, methods of inquiry and making judgments.

**Engaging students in learning:** Teacher strategies that promote students to actively increase their knowledge, skills, and abilities related to the learning objectives for the lesson. Engagement contrasts with participation in learning tasks where students complete the activities, but little learning takes place because the tasks are not well-designed and/or implemented.

**Genres:** Generic designs applicable across multiple topics to guide the process of interpreting or constructing texts. The designs are structured to achieve specific purposes related to a particular cultural (e.g., science community, ethnic community) and situational context (e.g.,
classroom discussion, test, school newspaper, or The Concord Review, a national history journal for secondary students). Examples of subject-specific genres appear in Appendix A.

**Guiding Question:** Questions used to identify the focus of each rubric, i.e., what it measures about the candidate’s teaching practice as documented in the Teaching Event. Each rubric level descriptor provides an answer to the related guiding question at a different level of performance. (See Rubric level descriptor)

**Language Demands:** In the context of learning in classrooms, language demands are descriptions of the language students need to effectively participate in classroom tasks. This includes demands related to listening, speaking, reading, writing, and shifting between those modalities. These demands can be vocabulary, linguistic features of genres, and other language demands related to participating in learning tasks (e.g., sharing ideas with a partner, listening to instructions). Particular language demands vary with the purpose and audience, although academic language is often aimed at communicating with distant audiences when assumptions and needed context need to be made explicit. The degree of language demand also varies with the cognitive complexity of the content, a student’s current language development, a student’s relevant knowledge and experience, and the context in which the language demand occurs (e.g., participating in a discussion with or without notes). Teachers can draw upon students’ language strengths (including language abilities in another language or context) and supply scaffolds to enable students to understand or produce language beyond their current level of mastery.

**Learning Objectives:** Student learning outcomes to be achieved by the end of the lesson.

**Learning Segment:** A set of lessons that build one upon another toward a central purpose, with a clearly defined beginning and end.

**Learning Tasks:** Purposefully designed activities in which students engage (not just participate – see Engaging Students in Learning) to meet the learning objectives for the lesson.

**Linguistic Features of Texts:** Regular language patterns characteristic of specific genres in a specific context. They include such things as vocabulary patterns, connector words, grammatical structures, or text organization strategies. Conventional linguistic features help authors of oral and written texts achieve their purpose, enabling others to understand the communication.
**Scaffolding:** A special type of instructional support to allow students to do a task that they cannot yet do independently. Like scaffolding for buildings under construction, the support is designed to be temporary and to be removed or gradually reduced as students learn to do the task by themselves.

**Student academic content standards:** A set of knowledge, skills, and abilities that students are to learn by the end of a particular grade, grade level, or course. Student academic content standards are usually published by the state department of education to guide curriculum and instruction in public schools.

**Text:** A text is a coherent configuration of language (and other symbolic resources such as graphs, charts, illustrations) of any length with the intention to communicate meaning and achieve social purposes in particular contexts. Every clause simultaneously represents a version of reality (who did what to whom), negotiates social relationships (between author and audience) and organizes the message. Meaning is realized through language choices that simultaneously interweave language choices (grammar, technical words, linking words, text forms, organizational moves and other linguistic devises) into a coherent and cohesive whole to achieve particular cultural and situational purposes for specific audiences.

**Textual resources:** Textual resources help readers make sense of texts. They include formatting conventions, graphics, and organizational titles and headings.
Checklist of Required Evidence

Required Forms (this is in Appendix C)

☐ Teaching Event Authenticity Sign-Off Form

Task 1. Planning for Instruction & Assessment

☐ Context for Learning Information
☐ Lesson plans for learning segment
☐ Key instructional materials, e.g., class handouts, overheads, labeled by the lesson number(s) (e.g., Lesson 1, Lessons 2-3) for which each document will be used
☐ All assessment tools and evaluation criteria labeled by the lesson number(s) (e.g., Lesson 1, Lessons 2-3) for which each tool will be used
☐ Commentary explaining how the planned instruction and assessments draw upon what you know about your students as well as research and theory to support and monitor student learning
☐ Daily reflections

Task 2. Instructing & Engaging Students in Learning

☐ Video clip(s)
☐ Video Label Form
☐ Commentary explaining and analyzing the teaching and learning portrayed in the video

Task 3. Assessing Student Learning

☐ Evaluation criteria used to assess student performance on the assessment
☐ Work samples from three students to illustrate what students generally understood and what a number of students were still struggling to understand plus work samples from the two focus students, if different. (Be sure to mask or remove student names.)
☐ Evidence of oral and/or written feedback given to two focus students
☐ Commentary analyzing student learning based on performance on the assessment, describing feedback given to two students, and identifying next steps in instruction

Task 4. Final Retrospective Reflection

☐ Final Retrospective Reflection Commentary
Appendix A

Academic Language for Secondary Mathematics

Academic language differs from everyday language. The differences include:

- a defined system of genres with explicit expectations about how texts are organized to achieve academic purposes;
- precisely-defined vocabulary to express abstract concepts and complex ideas;
- more complex grammar in order to pack more information into each sentence;
- a greater variety of conjunctions and connective words and phrases to create coherence among multiple ideas;
- textual resources (formatting conventions, graphics and organizational titles and headings) to guide understanding of texts.

Academic language also includes instructional language needed to participate in learning and assessment tasks, such as:

- discussing ideas and asking questions,
- summarizing instructional and disciplinary texts,
- following and giving instructions,
- listening to a mini-lesson,
- explaining thinking aloud,
- giving reasons for a point of view,
- showing problem solving steps to display knowledge on tests.

Academic language takes the form of many genres. Genres are generic designs applicable across multiple topics to guide the process of interpreting or constructing texts. The designs are structured to achieve specific purposes related to a particular cultural (e.g., mathematics community, parent community) and situational context (e.g., classroom discussion, test, school newspaper, mathematics competition.)

Examples of genres in secondary mathematics:

- representing word problems mathematically
- explaining or justifying mathematical reasoning
- describing procedures
- recounting how a problem was solved
• defining and relating mathematical concepts
• evaluating or constructing mathematical arguments
• interpreting and explaining proofs

Examples of linguistic features of genres:

• related clusters of vocabulary to express the content such as angle, triangle or divide, divisor, dividend
• connector words that join sentences, clauses, phrases and words in logical relationships of time, cause and effect, comparison, or addition\textsuperscript{14}
• cohesive devices that link information in writing and help the text flow and hold together\textsuperscript{15}
• grammatical structures such as comparisons (The ___ is longer than the ____.); passive voice, nominalizations where verbs are turned into nouns like argue into argument to help condense text and make connections between sentences as in “Jacob argued that the sum of two odd numbers is an odd number. But his argument contained an error when he said...”
• text organization strategies

Examples of connector words for different purposes:

• Temporal: first, next, then
• Causal: because, since, however, therefore
• Comparative: rather, instead, also, on the other hand
• Additive: and, or, furthermore, similarly, while
• Coordinating: and, nor, but, so

Example of text organization strategies for increasingly complex arguments\textsuperscript{16}:

• Simple argument: point/proposition, elaboration, e.g., I added the exponents because that is how variables with exponents and the same base are multiplied.
• Argument with evidence: Proposition, argument, conclusion
• Discussion: statement of issue, arguments for, arguments against, recommendation
• Elaborated discussion: statement of issue, preview of pro/con positions, several iterations of point/elaboration representing arguments against, several iterations of point/elaboration representing arguments for, summary, conclusion

\textsuperscript{15} Knapp & Watkins, op. cit., p. 47
\textsuperscript{16} Adapted from Knapp & Watkins, op. cit., pp. 190-195.
Appendix B

Summary of Student Learning Chart

(Optional)

List the categories of evaluation criteria as well as the corresponding characteristics of student work at each level of performance. This chart is designed to be completed electronically, so the blank space does not represent the space needed. Use as much space and as many rows and columns as you need.

<table>
<thead>
<tr>
<th>Evaluation Criteria Category</th>
<th>Characteristics of Student Work</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Performance Level 1</td>
</tr>
<tr>
<td>(name of category)</td>
<td>(provide description of performance of class at this level)</td>
</tr>
<tr>
<td>(name of category)</td>
<td>(provide description of performance of class at this level)</td>
</tr>
<tr>
<td>(name of category)</td>
<td>(provide description of performance of class at this level)</td>
</tr>
</tbody>
</table>
Appendix C

TPAC Authenticity Sign-Off Form

Submit this form with your completed TPAC assessment.

This TPAC assessment has been submitted as part of a pilot of the assessment instrument. This attestation is acknowledgement that the ultimate responsibility for compiling the documentation (including writing the commentaries) lies with the credential candidate. However, credential candidates are encouraged to seek assistance, input and feedback from their university supervisors, cooperating/master teachers, university instructors, or other credential candidates during the completion of the assessment.

Attestation by Credential Candidate

- I have primary responsibility for teaching the students/class during the learning segment profiled in this assessment;
- The video clip(s) submitted show me teaching the students/class profiled in the evidence submitted;
- The student work included in the documentation is that of my students who are profiled in the learning segment documented in this assessment;
- I am sole author of the teacher commentaries and other written responses to prompts and other requests for information in this assessment;
- Appropriate citations have been made for all materials in the assessment whose sources are from published text, the Internet, or other educators.

__________________________________________  _________________________  __________
Teacher Candidate’s Signature  Teacher Candidate’s Name (printed)  Date

Teacher Candidate  ID #

Attestation by University Supervisor

To the best of my knowledge, the statements above are accurate.

__________________________________________  _________________________  __________
University Supervisor’s Signature  University Supervisor’s Name (printed)  Date

Secondary Mathematics 2010-11  ©Stanford Center for Assessment, Learning, and Equity 2011
Final Evaluation of Secondary Mathematics Teacher Candidate

Teacher Candidate: ________________________________

Cooperating Teacher: ________________________________

College Supervisor: ________________________________

Date of Report: ________________ Report Completed by: ________________________________

School: ________________________________ District: ________________________________

Grade Level(s): ________________ Content Area(s): ________________________________

To the evaluator: Successful secondary mathematics teacher candidates at Augustana College are required to demonstrate adequate competence in the professional standards of their field during the student teaching experience. These standards are articulated in the 2003 National Council for Accreditation of Teacher Education and National Council of Teachers of Mathematics (NCATE/NCTM) Program Standards as well as the 2010 Illinois Professional Teaching Standards (IPTS) Performance Standards. In this document, the language and indicators of these state and national standards have been organized within the seven Augustana Standards for Teacher Education, a framework reflecting Augustana’s institutional approach to teacher education.

Each Augustana Standard includes an over-arching Goal statement (drawn from the IPTS), a list of performance indicators (NCATE/NCTM indicators begin with N, IPTS indicators begin with I), and an indication of the NCATE/NCTM Disposition(s) related to the given standard. If a single teaching competency is articulated in multiple indicators, language from one standard is shown and the corresponding equivalent standard(s) is listed parenthetically. Evaluators are invited to review the appendices for further detail about the standards and dispositions. Appendix A includes a description of the NCATE/NCTM Dispositions, Appendix B lists the NCATE/NCTM Content Standards, and Appendix C lists the IPTS Performance Indicators.

Use the following rubric to rank the teacher candidate’s progress on each of the Performance Indicators and Dispositions at the end of the student teaching experience. We expect our teacher candidates to make continuous progress and improvement as they complete the requirements of the program. It is our goal as a faculty to prepare teacher candidates for each step of the program and for them to be “on target” at each point of review. Therefore, we anticipate “3” to be the most common ranking on each of the items. Please don’t think of these categories as poor, fair, good and excellent. They don’t equate to traditional letter grades in any way. Rather, consider the candidate’s consistency of performance, level of independence, and initiative relative to the Target statement when determining a ranking.

Make a determination of progress for each of the performance indicators and dispositions listed below. A teacher candidate ranked at Target demonstrates the expected level of performance and is ready for the next step -- in this case, the work and responsibilities of a first year teacher. For all areas ranked with a 1 or 4 please provide a written explanation as noted at the end of this document.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concern</td>
<td>Developing</td>
<td>Target</td>
<td>Distinguished</td>
</tr>
<tr>
<td>The teacher candidate has demonstrated minimal or no competence in this area. Intensive intervention by the cooperating teacher and college supervisor is needed and extensive work by the candidate is required. Recommendation for certification will be withheld until significant improvement is made.</td>
<td>The teacher candidate has made progress in this area, but further refinement of this skill is needed. Success in the first year of teaching is likely with focused effort by the candidate, mentoring, and administrative support.</td>
<td>The teacher candidate has demonstrated a level of competence that indicates readiness for the first year of teaching. It is expected that with the support of teacher colleagues the candidate will continue to develop skill in this area.</td>
<td>The teacher candidate has demonstrated a level of competence, initiative and independence usually associated with a second- or third-year teacher and needs virtually no support from the cooperating teacher or college supervisor.</td>
</tr>
</tbody>
</table>

The Learner: The teacher understands the diverse characteristics and abilities of each student and how individuals develop and learn within the context of their social, economic, cultural, linguistic, and academic experiences. The teacher uses these experiences to create instructional opportunities that maximize student learning. (IPTS Standard 1)

RELEVANT NCATE/NCTM DISPOSITIONS: N.7.1 Attention to equity; N.7.4 Commitment to learning with understanding.

N.8.1 Selects, uses, and determines suitability of the wide variety of available mathematics curricula and teaching materials for all students including those with special needs such as the gifted, challenged and speakers of other languages (I.1J, I.2P, I.64)

I.1H Analyzes and uses student information to design instruction that meets the diverse needs of students and leads to ongoing growth and achievement. (I.3K)

I.1I Stimulates prior knowledge and links new ideas to already familiar ideas and experiences.

I.1L Uses information about students’ individual experiences, families, cultures, and communities to create meaningful learning opportunities and enrich instruction for all students.

N.16.3 Demonstrates the ability to increase students’ knowledge of mathematics.
The Content.

GOAL: The candidate has in-depth understanding of mathematics that includes central concepts, methods of inquiry, structures of the discipline, and mathematical literacy. The candidate creates meaningful learning experiences for each student based upon interactions among content area and pedagogical knowledge, and evidence-based practice. (IPTS Standard 2)

RELEVANT NCATE/NCTM DISPOSITION: N.7.2 Use of stimulating curricula. (I.2J)

N.9-15 Content Demonstrates and fosters firm understanding of the concepts, procedures, and processes involved in the subset of content standards the candidate is responsible for teaching. (Appendix B for a listing of the NCATE/NCTM content standards).

N.1 Problem Solving (I.2J, I.2K) The four sub-indicators below represent specific aspects of the Problem Solving Process Standard. Please assign a holistic evaluation of the candidate’s ability to foster problem solving in the classroom here, and assign separate scores for each sub-indicator.

N.1.1 Applies and adapts a variety of appropriate strategies to solve problems.
N.1.2 Solve problems that arise in mathematics and those involving mathematics in other contexts.
N.1.3 Build new mathematical knowledge through problem solving.
N.1.4 Monitor and reflect on the process of mathematical problem solving.

N.2 Reasoning and Proof (I.2J, I.2K) The four sub-indicators below represent specific aspects of the Reasoning and Proof Process Standard. Please assign a holistic evaluation of the candidate’s ability to foster reasoning and proof in the classroom here, and assign separate scores for each sub-indicator.

N.2.1 Recognize reasoning and proof as fundamental aspects of mathematics.
N.2.2 Make and investigate mathematical conjectures.
N.2.3 Develop and evaluate mathematical arguments and proofs.
N.2.4 Select and use various types of reasoning and methods of proof.

N.3 Communication (IPTS Standard 6, I.2J, I.2K, I.2Q, I.6P) The four sub-indicators below represent specific aspects of the Communication Process Standard. Please assign a holistic evaluation of the candidate’s ability to foster communication in the classroom here, and assign separate scores for each sub-indicator.

N.3.1 Communicate their mathematical thinking coherently and clearly to peers, faculty, and others. (I.6M, I.6R)
N.3.2 Use the language of mathematics to express ideas precisely. (I.6K, I.6L)
N.3.3 Organize mathematical thinking through communication. (I.6O)
N.3.4 Analyze and evaluate the mathematical thinking and strategies of others. (I.6M, I.6N)

N.4 Connections (I.2J, I.2K, I.2N) The three sub-indicators below represent specific aspects of the Connections Process Standard. Please assign a holistic evaluation of the candidate’s ability to make meaningful connections, and foster students’ ability to do so, here. Then, assign separate scores for each sub-indicator.

N.4.1 Recognize and use connections among mathematical ideas.
N.4.2 Recognize and apply mathematics in contexts outside of mathematics. (I.3L)
N.4.3 Demonstrate how mathematical ideas interconnect and build on one another to produce a coherent whole.

N.5 Representation (I.2J, I.2K, I.2M, I.5L) The three sub-indicators below represent specific aspects of the Representation Process Standard. Please assign a holistic evaluation of the candidate’s ability to foster representation in the classroom here, and assign separate scores for each sub-indicator.

N.5.1 Use representations to model and interpret physical, social, and mathematical phenomena.
N.5.2 Create and use representations to organize, record, and communicate mathematical ideas.
N.5.3 Select, apply, and translate among mathematical representations to solve problems.

N.6.1 Knowledge of Technology Use knowledge of mathematics to select and use appropriate technological tools, such as but not limited to, spreadsheets, dynamic graphing tools, computer algebra systems, dynamic statistical packages, graphing calculators, data-collection devices, and presentation software. (I.2L, I.2M, I.2O, I.5O)

Planning.

GOAL: The candidate plans and designs instruction based on content area knowledge, diverse student characteristics, student performance data, curriculum goals, and the community context. The teacher plans for ongoing student growth and achievement. (IPTS Standard 3)

RELEVANT NCATE/NCTM DISPOSITION: N.7.2 Effective teaching.

N.8.4 Plans lessons, units and courses that address appropriate learning goals, including those that address local, state, and national mathematical standards and legislative mandates. (I.3I)

N.8.7 Uses knowledge of different types of instructional strategies in planning mathematics lessons. (I.3Q)

N.8.9 Develops lessons that use technology’s potential for building understanding of mathematical concepts and developing important mathematical ideas. (I.3N)

I.3J Uses data to plan for differentiated instruction to allow for variations in individual learning needs.

I.3M Develops plans based on student responses and provides for different pathways based on student needs.

I.3O When planning instruction, addresses goals and objectives contained in plans developed under Section 504 of the Rehabilitation Act of 1973 (29 USC 794), individualized education programs (IEP) (see 23 Ill. Adm. Code 226 (Special Education)) or individual family service plans (IFSP) (see 23 Ill. Adm. Code 226 and 34 CFR 300.24; 2006).

I.3P Works with others to adapt and modify instruction to meet individual student needs. (I.5Q, I.6Q, I.8K, I.8N, I.8O)
The Environment

GOAL: The candidate structures a safe and healthy learning environment that facilitates cultural and linguistic responsiveness, emotional well-being, self-efficacy, positive social interaction, mutual respect, active engagement, academic risk-taking, self-motivation, and personal goal setting. (IPTS Standard 4)

RELEVANT NCATE/NCTM DISPOSITIONS: N.7.2: Effective teaching; N.7.6 Use of various teaching tools including technology.

N.8.2 Selects and uses appropriate concrete materials for learning mathematics.
I.4I Creates a safe and healthy environment that maximizes student learning.
I.4J/I.4O Creates clear expectations and procedures for communication and behavior, creates a physical setting conducive to achieving classroom goals, and employs effective behavioral management techniques when appropriate.
I.4K/I.4N Uses strategies to create and monitor a smoothly functioning learning community in which students assume responsibility for themselves and one another, participate in decision-making, work collaboratively and independently, use appropriate technology, engage in purposeful learning activities, and are motivated to learn.
I.4L Analyzes the classroom environment and makes decisions to enhance cultural and linguistic responsiveness, mutual respect, positive social relationships, student motivation, and classroom engagement. (I.1K)
I.4M/I.4P Organizes, allocates, and manages time, materials, technology, and physical space to provide active and equitable engagement of students in productive learning activities; modifies such aspects of the environment when necessary to enhance learning.
I.4Q Analyzes student behavior data to develop and support positive behavior.

Enacting

GOAL: The candidate differentiates instruction by using a variety of strategies that support critical and creative thinking, problem-solving, and continuous growth and learning. This candidate understands that the classroom is a dynamic environment requiring ongoing modification of instruction to enhance learning for each student. (IPTS Standard 5)

RELEVANT NCATE/NCTM DISPOSITION: N.7.2 Effective teaching.

N.8.3 Uses multiple strategies, including listening to and understanding the ways students think about mathematics, to assess students’ mathematical knowledge, and uses this assessment information to adapt and modify curriculum and instruction in order to enhance learning. (I.5J, I.5P)
N.8.6 Demonstrates knowledge of research results in the teaching and learning of mathematics. (I.5S)
N.8.8 Uses multiple teaching strategies, including adjusted pacing and flexible grouping, in order to lead classes in mathematical problem solving and in developing in-depth conceptual understanding, and to help students develop and test generalizations. (I.5I)
I.5K Varies his or her role in the instructional process as instructor, facilitator, coach, or audience in relation to the content and purposes of instruction and the needs of students.
I.5M Uses strategies and techniques for facilitating meaningful inclusion of individuals with a range of abilities and experiences.
I.5N Uses technology to accomplish differentiated instructional objectives that enhance learning for each student.
I.5R Maximizes instructional time (e.g., minimizes transitional time).

Reflecting

GOAL: The candidate understands and uses appropriate formative and summative assessments for determining student needs, monitoring student progress, measuring student growth, and evaluating student outcomes. The teacher makes decisions driven by data about curricular and instructional effectiveness and adjusts practices to meet the needs of each student. (IPTS Standard 7)

RELEVANT NCATE/NCTM DISPOSITION: N.7.2: Effective teaching; N.7.5 Use of various assessments.

I.7J Uses assessment results to determine student performance levels, identify learning targets, select appropriate research-based instructional strategies, and implement this instruction to enhance learning outcomes. (I.6J)
I.7K Appropriately uses a variety of formal and informal assessments to evaluate the understanding, progress, and performance of an individual student and the class as a whole.
I.7L Involves students in self-assessment activities to help them become aware of their strengths and needs and encourages them to establish goals for learning.
I.7M Maintains useful and accurate records of student work and performance.
I.7N Accurately interprets and clearly communicates aggregate student performance data to students, parents or guardians, colleagues, and the community in a manner that complies with the requirements of the Illinois School Student Records Act [105 ILCS 10], 23 Ill. Adm. Code 375 (Student Records), the Family Educational Rights and Privacy Act (FERPA) (20 USC 1232g) and its implementing regulations (34 CFR 99; December 9, 2008).
I.7O Effectively uses appropriate technologies to conduct assessments, monitor performance, and assess student progress.
I.7P Collaborates with families and other professionals involved in the assessment of each student. (I.8K, I.8O)
I.7Q Uses various types of assessment procedures appropriately, including making accommodations for individual students in specific contexts.
I.7R Uses assessment strategies and devices that are nondiscriminatory, and take into consideration the impact of disabilities, methods of communication, cultural background, and primary language on measuring knowledge and performance of students.
I.9K Reflects on professional practice and resulting outcomes; engages in self-assessment; and adjusts practices to improve student performance, school goals, and professional growth.
**GOAL:** The candidate builds and maintains collaborative relationships to foster cognitive, linguistic, physical, and social and emotional development. This candidate works as a team member with professional colleagues, students, parents or guardians, and community members. The candidate is an ethical and reflective practitioner who exhibits professionalism; provides leaderships in the learning community; and advocates for students, parents or guardians, and the profession. (IPTS Standards 8 and 9)

**RELEVANT NCATE/NCTM DISPOSITION: N.7.2 Effective teaching.**

<table>
<thead>
<tr>
<th>N.8.5</th>
<th>Participates in professional mathematics organizations and uses their print and online resources.</th>
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<tr>
<td>L8J</td>
<td>Works with all school personnel (e.g., support staff, teachers, paraprofessionals) to develop learning climates for the school that encourage unity, support a sense of shared purpose, show trust in one another, and value individuals.</td>
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<tr>
<td>L8L/L8T</td>
<td>Initiates and/or participates in collaboration with others both inside and outside the school to create opportunities that enhance students’ knowledge of academic content, educational experience, knowledge of broad issues beyond the school, and/or awareness of career opportunities. (I.9O)</td>
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<td>L8M/L9M</td>
<td>Uses digital tools and resources to promote collaborative interactions with students, parents or guardians, and peers.</td>
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<tr>
<td>L8P/L8Q</td>
<td>Develops respectful and productive cooperative relationships with parents and guardians that result in fair and equitable treatment of each student, supports each student’s growth and learning, and promotes student well-being. (I.9L)</td>
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<td>L8R</td>
<td>Uses conflict resolution skills to enhance the effectiveness of collaboration and teamwork.</td>
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<td>L8S</td>
<td>Participates in the design and implementation of individualized instruction for students with special needs (i.e., IEPs, IFSP, transition plans, Section 504 plans), ELLs, and students who are gifted.</td>
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<tr>
<td>L9I</td>
<td>Models professional behavior that reflects honesty, integrity, personal responsibility, confidentiality, altruism and respect.</td>
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<tr>
<td>L9J</td>
<td>Maintains accurate records, manages data effectively, and protects the confidentiality of information pertaining to each student and family.</td>
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<tr>
<td>L9P</td>
<td>Participates in professional development, professional organizations, and learning communities, and engages in peer coaching and mentoring activities to enhance personal growth and development.</td>
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<tr>
<td>L9Q</td>
<td>Uses leadership skills that contribute to individual and collegial growth and development, school improvement, and the advancement of knowledge in the teaching profession.</td>
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<td>L9R</td>
<td>Proactively serves all students and their families with equity and honor and advocates on their behalf, ensuring the learning and well-being of each child in the classroom.</td>
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<td>L9S</td>
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<td>Models digital etiquette and responsible social actions in the use of digital technology.</td>
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<tr>
<td>L9U</td>
<td>Models and teaches safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources.</td>
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**Comments: strstrongt*

Please explain the circumstances and include specific examples to support and clarify your judgment of the teacher candidate’s performance for each item ranked at a level of 1 or 4. Use a separate page and attach it to this document, if necessary.

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Signature of Teacher Candidate

Signature of Cooperating Teacher of College Supervisor
Appendix A: NCATE/NCTM Dispositions

The six NCATE/NCTM dispositions are rooted in the NCTM’s Principles for School Mathematics, published in the NCTM’s Principles and Standards for School Mathematics, © 2000, Reston, VA. Key language describing each disposition/principle is reproduced below. Evaluators may refer to the original publication (which is also available electronically at nctm.org) for further detail.

7.1: Attention to equity (pp. 12-14).
- Equity requires high expectations and worthwhile opportunities for all.
- Equity requires accommodating differences to help everyone learn mathematics.
- Equity requires resources and support for all classrooms and all students.

7.2: Use of stimulating curricula (pp. 14-16).
- A mathematics curriculum should be coherent.
- A mathematics curriculum should focus on important mathematics.
- A mathematics curriculum should be well articulated across the grades.

7.3: Effective teaching (pp. 16-19).
- Effective teaching requires knowing and understanding mathematics, students as learners, and pedagogical strategies.
- Effective teaching requires a challenging and supportive classroom learning environment.
- Effective teaching requires continually seeking improvement.

7.4: Commitment to learning with understanding (pp. 20-21).
- Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.
- Conceptual understanding is an important component of proficiency.

7.5: Use of various assessments (pp. 22-24).
- Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.
- Assessment should enhance students’ learning.
- Assessment is a valuable tool for making instructional decisions.

7.6: Use of various teaching tools including technology (pp. 24-27).
- Technology enhances mathematics learning.
- Technology supports effective mathematics teaching.
- Technology influences what mathematics is taught.
Appendix B: NCATE/NCTM Content Standards

Listed below are the content standards found in the 2003 NCATE/NCTM Program Standards (available at http://www.ncate.org/ProgramStandards/NCTM/NCTMSECONStandards.pdf). Augustana secondary mathematics teacher candidates are expected to be proficient in each of these standards and indicators. Knowledge of this and other advanced content is required for the Bachelor of Arts degree in mathematics at the College. Teacher candidates’ knowledge of an appropriate subset of this content should also be made evident through their student teaching experience. This “appropriate subset” will depend on the specific teaching assignment, grade level(s) and content teaching responsibilities occurring during their student teaching term.

Content (Standards 9-15)

Candidates’ comfort with, and confidence in, their knowledge of mathematics affects both what they teach and how they teach it. Knowing mathematics includes understanding specific concepts and procedures as well as the process of doing mathematics. That knowledge is the subject of the following standards.

Standard 9: Knowledge of Number and Operation
Candidates demonstrate computational proficiency, including a conceptual understanding of numbers, ways of representing number, relationships among number and number systems, and meanings of operations.

Indicators
9.1 Analyze and explain the mathematics that underlies the procedures used for operations involving integers, rational, real, and complex numbers.
9.2 Use properties involving number and operations, mental computation, and computational estimation.
9.3 Provide equivalent representations of fractions, decimals, and percents.
9.4 Create, solve, and apply proportions.
9.5 Apply the fundamental ideas of number theory.
9.6 Make sense of large and small numbers and use scientific notation.
9.7 Compare and contrast properties of numbers and number systems.
9.8 Represent, use, and apply complex numbers.
9.9 Recognize matrices and vectors as systems that have some of the properties of the real number system.
9.10 Demonstrate knowledge of the historical development of number and number systems including contributions from diverse cultures.

Standard 10: Knowledge of Different Perspectives on Algebra
Candidates emphasize relationships among quantities including functions, ways of representing mathematical relationships, and the analysis of change.

Indicators
10.1 Analyze patterns, relations, and functions of one and two variables.
10.2 Apply fundamental ideas of linear algebra.
10.3 Apply the major concepts of abstract algebra to justify algebraic operations and formally analyze algebraic structures.
10.4 Use mathematical models to represent and understand quantitative relationships.
10.5 Use technological tools to explore algebraic ideas and representations of information and in solving problems.
10.6 Demonstrate knowledge of the historical development of algebra including contributions from diverse cultures.
Appendix B: NCATE/NCTM Content Standards

Standard 11: Knowledge of Geometries
Candidates use spatial visualization and geometric modeling to explore and analyze geometric shapes, structures, and their properties.

Indicators
11.1 Demonstrate knowledge of core concepts and principles of Euclidean and non-Euclidean geometries in two and three dimensions from both formal and informal perspectives.
11.2 Exhibit knowledge of the role of axiomatic systems and proofs in geometry.
11.3 Analyze characteristics and relationships of geometric shapes and structures.
11.4 Build and manipulate representations of two- and three- dimensional objects and visualize objects from different perspectives.
11.5 Specify locations and describe spatial relationships using coordinate geometry, vectors, and other representational systems.
11.6 Apply transformations and use symmetry, similarity, and congruence to analyze mathematical situations.
11.7 Use concrete models, drawings, and dynamic geometric software to explore geometric ideas and their applications in real-world contexts.
11.8 Demonstrate knowledge of the historical development of Euclidean and non-Euclidean geometries including contributions from diverse cultures.

Standard 12: Knowledge of Calculus
Candidates demonstrate a conceptual understanding of limit, continuity, differentiation, and integration and a thorough background in the techniques and application of the calculus.

Indicators
12.1 Demonstrate a conceptual understanding of and procedural facility with basic calculus concepts.
12.2 Apply concepts of function, geometry, and trigonometry in solving problems involving calculus.
12.3 Use the concepts of calculus and mathematical modeling to represent and solve problems taken from real-world contexts.
12.4 Use technological tools to explore and represent fundamental concepts of calculus.
12.5 Demonstrate knowledge of the historical development of calculus including contributions from diverse cultures.

Standard 13: Knowledge of Discrete Mathematics
Candidates apply the fundamental ideas of discrete mathematics in the formulation and solution of problems.

Indicators
13.1 Demonstrate knowledge of basic elements of discrete mathematics such as graph theory, recurrence relations, finite difference approaches, linear programming, and combinatorics.
13.2 Apply the fundamental ideas of discrete mathematics in the formulation and solution of problems arising from real-world situations.
13.3 Use technological tools to solve problems involving the use of discrete structures and the application of algorithms.
13.4 Demonstrate knowledge of the historical development of discrete mathematics including contributions from diverse cultures.
Appendix B: NCATE/NCTM Content Standards

**Standard 14: Knowledge of Data Analysis, Statistics, and Probability**
Candidates demonstrate an understanding of concepts and practices related to data analysis, statistics, and probability.

**Indicators**
14.1 Design investigations, collect data, and use a variety of ways to display data and interpret data representations that may include bivariate data, conditional probability and geometric probability.
14.2 Use appropriate methods such as random sampling or random assignment of treatments to estimate population characteristics, test conjectured relationships among variables, and analyze data.
14.3 Use appropriate statistical methods and technological tools to describe shape and analyze spread and center.
14.4 Use statistical inference to draw conclusions from data.
14.5 Identify misuses of statistics and invalid conclusions from probability.
14.6 Draw conclusions involving uncertainty by using hands-on and computer-based simulation for estimating probabilities and gathering data to make inferences and conclusions.
14.7 Determine and interpret confidence intervals.
14.8 Demonstrate knowledge of the historical development of statistics and probability including contributions from diverse cultures.

**Standard 15: Knowledge of Measurement**
Candidates apply and use measurement concepts and tools.

**Indicators**
15.1 Recognize the common representations and uses of measurement and choose tools and units for measuring.
15.2 Apply appropriate techniques, tools, and formulas to determine measurements and their application in a variety of contexts.
15.3 Completes error analysis through determining the reliability of the numbers obtained from measures.
15.4 Demonstrate knowledge of the historical development of measurement and measurement systems including contributions from diverse cultures.
Appendix C: 2010 Illinois Professional Teaching Standards (IPTS)

The 2010 IPTS are available at http://www.isbe.state.il.us/PEAC/pdf/IL_prof_teaching_stds.pdf. The Augustana “Final Evaluation of Secondary Mathematics Teacher Candidate” form utilizes only the Performance Indicators from the IPTS (the Knowledge Indicators are addressed in education coursework at the College). The nine Illinois Professional Teaching Standards and their related Performance Indicators are reproduced below.

**Standard 1 - Teaching Diverse Students** – The competent teacher understands the diverse characteristics and abilities of each student and how individuals develop and learn within the context of their social, economic, cultural, linguistic, and academic experiences. The teacher uses these experiences to create instructional opportunities that maximize student learning.

**Performance Indicators – The competent teacher:**
- 1H) analyzes and uses student information to design instruction that meets the diverse needs of students and leads to ongoing growth and achievement;
- 1I) stimulates prior knowledge and links new ideas to already familiar ideas and experiences;
- 1J) differentiates strategies, materials, pace, levels of complexity, and language to introduce concepts and principles so that they are meaningful to students at varying levels of development and to students with diverse learning needs;
- 1K) facilitates a learning community in which individual differences are respected; and
- 1L) uses information about students' individual experiences, families, cultures, and communities to create meaningful learning opportunities and enrich instruction for all students.

**Standard 2 - Content Area and Pedagogical Knowledge** – The competent teacher has in-depth understanding of content area knowledge that includes central concepts, methods of inquiry, structures of the disciplines, and content area literacy. The teacher creates meaningful learning experiences for each student based upon interactions among content area and pedagogical knowledge, and evidence-based practice.

**Performance Indicators – The competent teacher:**
- 2I) evaluates teaching resources and materials for appropriateness as related to curricular content and each student’s needs;
- 2J) uses differing viewpoints, theories, and methods of inquiry in teaching subject matter concepts;
- 2K) engages students in the processes of critical thinking and inquiry and addresses standards of evidence of the disciplines;
- 2L) demonstrates fluency in technology systems, uses technology to support instruction and enhance student learning, and designs learning experiences to develop student skills in the application of technology appropriate to the disciplines;
- 2M) uses a variety of explanations and multiple representations of concepts that capture key ideas to help each student develop conceptual understanding and address common misunderstandings;
- 2N) facilitates learning experiences that make connections to other content areas and to life experiences;
- 2O) designs learning experiences and utilizes assistive technology and digital tools to provide access to general curricular content to individuals with disabilities;
- 2P) adjusts practice to meet the needs of each student in the content areas; and
- 2Q) applies and adapts an array of content area literacy strategies to make all subject matter accessible to each student.

**Standard 3 - Planning for Differentiated Instruction** – The competent teacher plans and designs instruction based on content area knowledge, diverse student characteristics, student performance data, curriculum goals, and the community context. The teacher plans for ongoing student growth and achievement.

**Performance Indicators – The competent teacher:**
- 3H) establishes high expectations for each student's learning and behavior;
- 3I) creates short-term and long-term plans to achieve the expectations for student learning;
- 3J) uses data to plan for differentiated instruction to allow for variations in individual learning needs;
- 3K) incorporates experiences into instructional practices that relate to a student's current life experiences and to future life experiences;
- 3L) creates approaches to learning that are interdisciplinary and that integrate multiple content areas;
- 3M) develops plans based on student responses and provides for different pathways based on student needs;
- 3N) accesses and uses a wide range of information and instructional technologies to enhance a student's ongoing growth and achievement;
- 3O) when planning instruction, addresses goals and objectives contained in plans developed under Section 504 of the Rehabilitation Act of 1973 (29 USC 794), individualized education programs (IEP) (see 23 Ill. Adm. Code 226...
Appendix C: 2010 Illinois Professional Teaching Standards (IPTS)

(Special Education)) or individual family service plans (IFSP) (see 23 Ill. Adm. Code 226 and 34 CFR 300.24; 2006);
3P) works with others to adapt and modify instruction to meet individual student needs; and
3Q) develops or selects relevant instructional content, materials, resources, and strategies (e.g., project-based learning) for differentiating instruction.

Standard 4 - Learning Environment – The competent teacher structures a safe and healthy learning environment that facilitates cultural and linguistic responsiveness, emotional well-being, self-efficacy, positive social interaction, mutual respect, active engagement, academic risk-taking, self-motivation, and personal goal-setting.

Performance Indicators – The competent teacher:
4I) creates a safe and healthy environment that maximizes student learning;
4J) creates clear expectations and procedures for communication and behavior and a physical setting conducive to achieving classroom goals;
4K) uses strategies to create a smoothly functioning learning community in which students assume responsibility for themselves and one another, participate in decision-making, work collaboratively and independently, use appropriate technology, and engage in purposeful learning activities;
4L) analyzes the classroom environment and makes decisions to enhance cultural and linguistic responsiveness, mutual respect, positive social relationships, student motivation, and classroom engagement;
4M) organizes, allocates, and manages time, materials, technology, and physical space to provide active and equitable engagement of students in productive learning activities;
4N) engages students in and monitors individual and group-learning activities that help them develop the motivation to learn;
4O) uses a variety of effective behavioral management techniques appropriate to the needs of all students that include positive behavior interventions and supports;
4P) modifies the learning environment (including the schedule and physical arrangement) to facilitate appropriate behaviors and learning for students with diverse learning characteristics; and
4Q) analyzes student behavior data to develop and support positive behavior.

Standard 5 - Instructional Delivery – The competent teacher differentiates instruction by using a variety of strategies that support critical and creative thinking, problem-solving, and continuous growth and learning. This teacher understands that the classroom is a dynamic environment requiring ongoing modification of instruction to enhance learning for each student.

Performance Indicators – The competent teacher:
5I) uses multiple teaching strategies, including adjusted pacing and flexible grouping, to engage students in active learning opportunities that promote the development of critical and creative thinking, problem-solving, and performance capabilities;
5J) monitors and adjusts strategies in response to feedback from the student;
5K) varies his or her role in the instructional process as instructor, facilitator, coach, or audience in relation to the content and purposes of instruction and the needs of students;
5L) develops a variety of clear, accurate presentations and representations of concepts, using alternative explanations to assist students’ understanding and presenting diverse perspectives to encourage critical and creative thinking;
5M) uses strategies and techniques for facilitating meaningful inclusion of individuals with a range of abilities and experiences;
5N) uses technology to accomplish differentiated instructional objectives that enhance learning for each student;
5O) models and facilitates effective use of current and emerging digital tools to locate, analyze, evaluate, and use information resources to support research and learning;
5P) uses student data to adapt the curriculum and implement instructional strategies and materials according to the characteristics of each student;
5Q) uses effective co-planning and co-teaching techniques to deliver instruction to all students;
5R) maximizes instructional time (e.g., minimizes transitional time); and
5S) implements appropriate evidence-based instructional strategies.
Appendix C: 2010 Illinois Professional Teaching Standards (IPTS)

**Standard 6 - Reading, Writing, and Oral Communication** – The competent teacher has foundational knowledge of reading, writing, and oral communication within the content area and recognizes and addresses student reading, writing, and oral communication needs to facilitate the acquisition of content knowledge.

**Performance Indicators – The competent teacher:**

6J) selects, modifies, and uses a wide range of printed, visual, or auditory materials, and online resources appropriate to the content areas and the reading needs and levels of each student (including ELLs, and struggling and advanced readers);

6K) uses assessment data, student work samples, and observations from continuous monitoring of student progress to plan and evaluate effective content area reading, writing, and oral communication instruction;

6L) facilitates the use of appropriate word identification and vocabulary strategies to develop each student's understanding of content;

6M) teaches fluency strategies to facilitate comprehension of content;

6N) uses modeling, explanation, practice, and feedback to teach students to monitor and apply comprehension strategies independently, appropriate to the content learning;

6O) teaches students to analyze, evaluate, synthesize, and summarize information in single texts and across multiple texts, including electronic resources;

6P) teaches students to develop written text appropriate to the content areas that utilizes organization (e.g., compare/contrast, problem/solution), focus, elaboration, word choice, and standard conventions (e.g., punctuation, grammar);

6Q) integrates reading, writing, and oral communication to engage students in content learning;

6R) works with other teachers and support personnel to design, adjust, and modify instruction to meet students’ reading, writing, and oral communication needs; and

6S) stimulates discussion in the content areas for varied instructional and conversational purposes.

**Standard 7 - Assessment** – The competent teacher understands and uses appropriate formative and summative assessments for determining student needs, monitoring student progress, measuring student growth, and evaluating student outcomes. The teacher makes decisions driven by data about curricular and instructional effectiveness and adjusts practices to meet the needs of each student.

**Performance Indicators – The competent teacher:**

7J) uses assessment results to determine student performance levels, identify learning targets, select appropriate research-based instructional strategies, and implement instruction to enhance learning outcomes;

7K) appropriately uses a variety of formal and informal assessments to evaluate the understanding, progress, and performance of an individual student and the class as a whole;

7L) involves students in self-assessment activities to help them become aware of their strengths and needs and encourages them to establish goals for learning;

7M) maintains useful and accurate records of student work and performance;

7N) accurately interprets and clearly communicates aggregate student performance data to students, parents or guardians, colleagues, and the community in a manner that complies with the requirements of the Illinois School Student Records Act [105 ILCS 10], 23 Ill. Adm. Code 375 (Student Records), the Family Educational Rights and Privacy Act (FERPA) (20 USC 1232g) and its implementing regulations (34 CFR 99; December 9, 2008);

7O) effectively uses appropriate technologies to conduct assessments, monitor performance, and assess student progress;

7P) collaborates with families and other professionals involved in the assessment of each student;

7Q) uses various types of assessment procedures appropriately, including making accommodations for individual students in specific contexts; and

7R) uses assessment strategies and devices that are nondiscriminatory, and take into consideration the impact of disabilities, methods of communication, cultural background, and primary language on measuring knowledge and performance of students.

**Standard 8 - Collaborative Relationships** – The competent teacher builds and maintains collaborative relationships to foster cognitive, linguistic, physical, and social and emotional development. This teacher works as a team member with professional colleagues, students, parents or guardians, and community members.

**Performance Indicators – The competent teacher:**

8J) works with all school personnel (e.g., support staff, teachers, paraprofessionals) to develop learning climates for the school that encourage unity, support a sense of shared purpose, show trust in one another, and value individuals;

8K) participates in collaborative decision-making and problem-solving with colleagues and other professionals to achieve success for all students;

8L) initiates collaboration with others to create opportunities that enhance student learning;
Appendix C: 2010 Illinois Professional Teaching Standards (IPTS)

8M) uses digital tools and resources to promote collaborative interactions;
8N) uses effective co-planning and co-teaching techniques to deliver instruction to each student;
8O) collaborates with school personnel in the implementation of appropriate assessment and instruction for designated students;
8P) develops professional relationships with parents and guardians that result in fair and equitable treatment of each student to support growth and learning;
8Q) establishes respectful and productive relationships with parents or guardians and seeks to develop cooperative partnerships to promote student learning and well-being;
8R) uses conflict resolution skills to enhance the effectiveness of collaboration and teamwork;
8S) participates in the design and implementation of individualized instruction for students with special needs (i.e., IEPs, IFSP, transition plans, Section 504 plans), ELLs, and students who are gifted; and
8T) identifies and utilizes community resources to enhance student learning and to provide opportunities for students to explore career opportunities.

Standard 9 - Professionalism, Leadership, and Advocacy – The competent teacher is an ethical and reflective practitioner who exhibits professionalism; provides leadership in the learning community; and advocates for students, parents or guardians, and the profession.

Performance Indicators – The competent teacher:
9I) models professional behavior that reflects honesty, integrity, personal responsibility, confidentiality, altruism and respect;
9J) maintains accurate records, manages data effectively, and protects the confidentiality of information pertaining to each student and family;
9K) reflects on professional practice and resulting outcomes; engages in self-assessment; and adjusts practices to improve student performance, school goals, and professional growth;
9L) communicates with families, responds to concerns, and contributes to enhanced family participation in student education;
9M) communicates relevant information and ideas effectively to students, parents or guardians, and peers, using a variety of technology and digital-age media and formats;
9N) collaborates with other teachers, students, parents or guardians, specialists, administrators, and community partners to enhance students’ learning and school improvement;
9O) participates in professional development, professional organizations, and learning communities, and engages in peer coaching and mentoring activities to enhance personal growth and development;
9P) uses leadership skills that contribute to individual and collegial growth and development, school improvement, and the advancement of knowledge in the teaching profession;
9Q) proactively serves all students and their families with equity and honor and advocates on their behalf, ensuring the learning and well-being of each child in the classroom;
9R) is aware of and complies with the mandatory reporter provisions of Section 4 of the Abused and Neglected Child Reporting Act [325 ILCS 5/4];
9S) models digital etiquette and responsible social actions in the use of digital technology; and
9T) models and teaches safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources.
Dear Colleagues,

I believe most of you are aware that the education department is undergoing an accreditation review right now by the National Council of Accreditation of Teacher Education (NCATE). The review process is quite long and has many components, one of which I'm hoping you can help me out with for the mathematics teacher preparation program in particular.

Several months ago I prepared a report for the math education arm of NCATE, a committee affiliated with the National Council of Teachers of Mathematics (NCTM). The report template required me to make a case that Augie's pre-service math teachers possess the knowledge, skills, and dispositions outlined in the NCTM's professional standards for teaching. The template also dictated that I keep the evidence in that initial report brief....understandably, the committee preferred not reading hundreds of pages.

A few months ago, the NCTM issued its response to that initial report. The response indicated the standards they judged as "met" and those judged as "not met." My sense is that most of the "not met" standards were not met largely because I was unable to provide adequate evidence showing that we at Augie do indeed address these standards. Again, the guidelines of the initial report only allowed me to submit so much. Indeed, in the case of mathematics coursework, the committee only wanted catalog descriptions. I was unable to share syllabi or other richer pieces of evidence that would likely demonstrate that the courses address much more than what is shown in the catalog.

At the moment, our mathematics teacher education program is labeled as "Nationally Recognized with Conditions." These conditions can be removed if I produce a convincing rebuttal report, and I technically have until September of 2013 to get that report in. Furthermore, I WILL be able to draw out more evidence (syllabi, assessments, etc.) the second time around, so I am confident that we'll be in good shape.

Despite the nice amount of time I have to work with, I've been actively moving on the rebuttal. Since the NCATE review team will be on campus this month, I’d like to show them evidence that I am beginning the process of responding to the NCTM’s concerns. I’ve already made some adjustments to the education course and the student teaching evaluation process, and, with this message, I’m also reaching out to colleagues in the math department seeking further evidence from them.

The attached document lists the "not met" standards that pertain directly to mathematical content knowledge (and, possibly some computer science knowledge as well). I have further evidence from the education department indicating that we do indeed meet many of these standards at Augustana, but I sense that the math department might be able to offer further evidence in these areas that will either strengthen the overall case or fill in some missing gaps. All programs will have some gaps....the target is to hit 80% of all standards. At the moment we are at 61% with 50 of 82 standards "met." Convincing the NCTM that we also meet at least 16 additional standards will do the trick. The attached document lists 21 "not met" content-focused standards...if the
math department can help solidify any subset of these it will be very helpful. I really think that I could convince them of 16 additional standards all by myself, but I want the rebuttal report to be a "slam dunk," so any extra help I can get from you would be greatly appreciated!

Please review the document and be thinking of any "ready-to-go" evidence that might help make the case that we actually do this stuff at Augie. Evidence might include course syllabi that explicitly address some of the language in these standards; assessments used in courses (tests, quizzes, project descriptions, rubrics) showing that we hold our students accountable for this material, etc. My thinking is that this task shouldn't be too difficult for you. I'm sure that there are some standards in here that you KNOW you are doing already, and you know that a syllabus or a test or whatever will demonstrate this to others. Just focus on this stuff. There will be other standards that the math department either doesn't address or doesn't emphasize to the point that there would be clear documentary evidence....that's OK, because I don't need a case for each and every standard.

Though I have until 2013, I'd appreciate receiving whatever you might be able to provide during the current academic year. The current calendar year would be even better, but I won't get too pushy....

A nice way to deliver what you can would be to email me your evidence along with a note to the effect of, "This document shows that we address standard 9.2 in MATH 349" or whatever....

Thanks so much for your anticipated assistance. Please let me know if you need further information or clarification.

--

Mike Egan
Assistant Professor of Education
Augustana College
639 38th Street
Rock Island, IL 61201
(309) 794-8965
Listed below are standards judged as “Not Met” by the National Council of Teachers of Mathematics/National Council on the Accreditation (NCTM/NCATE) initial review.

Wherever possible, please forward evidence suggesting that Augustana’s mathematics teacher candidates are indeed held accountable for the standards below via their mathematics coursework. Appropriate evidence might include course syllabi explicitly listing these as content addressed in courses, assessment instruments (tests, quizzes, project descriptions, rubrics) demonstrating that students are assessed on this, or anything else that you think helps make the case that these standards are addressed via required coursework.

1.3: Build new mathematical knowledge through problem solving.  *I know for sure that BK does this…much of his teaching involves “students wrestle with problems first, then we formalize their ideas or “knowledge” later”; perhaps others use this approach as well. Do you have documents that provide evidence that you use this approach?*

3.1 Communicate their mathematical thinking coherently and clearly to peers, faculty, and others.

3.2 **Use the language of mathematics to express ideas precisely.**

3.4 Analyze and evaluate the mathematical thinking and strategies of others.

4.3 Demonstrate how mathematical ideas interconnect and build on one another to produce a coherent whole.

9.10 Demonstrate knowledge of the historical development of numbers and number systems including contributions from diverse cultures.

10.4 Use mathematical models to represent and understand quantitative relationships.

10.5 Use technological tools to explore algebraic ideas and representations of information and in solving problems.

10.6 Demonstrate knowledge of the historical development of algebra including contributions from diverse cultures.

11.4 Build and manipulate representations of two- and three-dimensional objects and visual objects from different perspectives.

11.5 Specify locations and describe spatial relationships using coordinate geometry, vectors and other representational systems.
11.7 Use concrete models, drawings, and dynamic geometric software to explore geometric ideas and their applications in real-world contexts.

11.8 Demonstrate knowledge of the historical development of Euclidean and non-Euclidean geometries including contributions from diverse cultures.

12.5 Demonstrate knowledge of the historical development of calculus including contributions from diverse cultures.

13.1 Demonstrate knowledge of basic elements of discrete mathematics such as graph theory, recurrence relations, finite difference approaches, linear programming, and combinatorics.

13.2 Apply the fundamental ideas of discrete mathematics in the formulation and solution of problems arising from real-world situations.

13.4 Demonstrate knowledge of the historical development of discrete mathematics including contributions from diverse cultures.

14.5 Identify misuses of statistics and invalid conclusions from probability

14.8 Demonstrates knowledge of the historical development of probability and statistics including contributions from diverse cultures.

15.3 Complete error analysis through determining the reliability of the numbers obtained from measures.

15.4 Demonstrate knowledge of the historical development of measurement and measurement systems including contributions from diverse cultures.
Mike,

Sorry for the massive number of files, especially the repeated names of some. They can be organized as follows (mostly according to the order they were uploaded to this message). My department might mount a more coordinated attempt, but it will be slow. BK

Discrete09: syllabus-test3a
Calc09: syllabus
Talks: RLMtalk, IBLtalk, MakingLearningVisible, MathFest Talk
CalcII10: syllabusCalc
Website: MA230descr
Geo10: syllabusGeo-T3
Discrete10: syllabus
Real10: syllabusReal, MidTerm2
Geo11: syllabusGeo, MidTerm1, MidTerm2

The Objectives:

1.3 - The syllabi for the IBL courses talk about how they will build knowledge. The MidTerms for these courses are now take-home exams that include a completely new definition, which is a prime example. The talks also contain slides that define IBL.

3.1 - All of my syllabi make a strong claim for learning to communicate and discuss the requirement that the students will present in class. I also have videos of oral presentations from MidTerms.

3.2 - This is more evident in my grading and class focus than in any of the documents. It's part of the definition of math, so I guess I don't write it down enough. I can probably produce something, though a video in class would be easiest. I don't know if it's kosher, but I have audio files of feedback that I gave on the Geometry take-home exams.

3.4 - The summary pages on my old tests (eg Discrete09) speak to this, as do my actions in class. The most common thing I ask in class is for a student to summarize another's claim.

4.3 - I have just put a copy of the Geo WikiTextbook in campus the mail for you. I know that this is the first instance of this here, but this is now a staple of my course design. There was a version in Real, but it came into its own in Geometry. I think that any IBL class I teach will contain this element for the rest of my foreseeable career.

10.4/11.7 - I think the projects for the conference might satisfy this claim. Brian's group made the models to understand their proof, and the other groups built things in Geogebra. This info is in the WikiTextbook. Let me know if you want to use it but need more.

13.1 - See the Discrete tests as well as the expanded course description attached (MA230).

13.2 - I attached the handout that uses their tools to justify RSA encryption.

The IBL courses are all sections of Discrete, Real, and Geometry.
Mike,

Here's what I've got from MATH219 Calc I and MATH220 Calc II that may help a little at meeting the standards you sent us. Tom has asked each of us to send you what we can. You should be getting an e-mail also from Stacey.

1.3: Build new mathematical knowledge through problem solving.
In Calc I, my students do two computer labs to lead them to an understanding of the connections between a function and its derivative and the antiderivative function. I have not "lectured" on these topics before the students do the computer lab. The labs are very leading, however, so perhaps not enough to be called problem solving as Brian does in Discrete or Geometry. I've attached copies of the labs.

3.1 Communicate their mathematical thinking coherently and clearly to peers, faculty and others.
3.2 Use the language of mathematics to express ideas precisely.
In Calculus II, my students do three "special assignments" or "extended assignments" (I've called them different things different years) which require them to communicate their thinking through writing. I've attached copies of two of the assignments and student work for each. You're getting different levels of student work on each assignment since I'm sending you what I submitted for my review last Spring. Hopefully the copy of the assignment matches the student work. I modify the assignments each year.

10.4 Use mathematical models to represent and understand quantitative relationships.
In our Calc I classes, we stress using calculus in "real world" contexts, but the function modeling the relationship is given to the students as an equation, table of values, graph or verbally. The students don't often come up with an equation for the function modeling the relationship themselves. I've attached a copy of my Calc I final to illustrate this.

Diane
Linear Algebra is required of all secondary ed majors. 
In Linear Algebra ( last year, this year and ? ) I have included significant
amounts of

3.1, 3.2 students had to present proof orally at the board at least once each week, we stressed
using correct language

3.4, In addition to asking questions of the student presenting at the board, we did "peer review"
of other students written proofs once a week.

(10.5 We used Mathematica a couple of times to visualize eigenvectors.. )

I have attached my syllabus and you can find on it my objectives and plans for weekly peer
review and presentations etc...

We dont do any historical stuff at all..

but I think a lot of the other stuff happens in Calc II ..

Stacey

Stacey Rodman, Ph.D.
Math and Computer Science Department
Augustana College
Rock Island IL

A few hours later:

I just asked Diane to sent you our objectivess for Calc I and II, I think that would be a better way
to deal with what happens in Calculus than though individual assignments that change term to
term etc.
Hi Clauss,
Moodle sounds like a good way to go. I might bug you a bit somewhere down the line to help me "connect the dots" from your materials on Moodle to the NCTM standards. I could imagine asking a question such as, "Gee....this assignment description seems to indicate that your students are expected to 'build new mathematical knowledge through problem solving.' Is my thinking accurate?" That is, I could imagine instances where I'd be hesitant to make claims about what is accomplished in your courses without getting some verification from you.
So, I hope you'll suffer me if I do come asking questions: that's the bad news. The good news is, I won't even think about sniffing around your Moodle sites or asking you questions for some time.....
-Mike E.
- Hide quoted text -

On Wed, Sep 28, 2011 at 3:27 PM, Jon Clauss <jonclauss@augustana.edu> wrote:

Hi Mike.

I'm writing to apologize: there is no way that I'll have the time to provide you with the kind of material that BK, Stacey and Diane did to help with NCATE. I am over my head with this ePortfolio thing....

BUT... all my classes are on (new and old) moodle with syllabi, quizzes/tests, projects, etc. And they are all open to guests. If it helps, please feel free to cruise and take what you need. If that doesn't help, then accept my humble apologies!

Jon M. Clauss, Ph.D.
Professor, Math/CS Dept
Director, Center for Teaching & Learning
Augustana College
639 38th Street
Rock Island, IL 61201
309.794.7260
NCATE Program Review

Educ384
Methods: 6-12 Mathematics*

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* EDUC 384 is offered every year during the spring term. The materials presented in this packet are drawn from the spring of 2011 as this is the most recent completed term.

** The final portfolio is the culminating assignment of EDUC384 (see pp. 16-18 of the syllabus for further details). For this assignment, students are required to provide evidence that they have demonstrated competence in all of the NCATE/NCTM pedagogical standards. Therefore, this single course requirement captures the breadth of the course and reviewers may find it necessary to only review the portfolio. The electronic portfolios include the names of the students and are normally kept private. However, permission was received to release the sample portfolio provided here. The sample assessment (which includes the scoring rubric, feedback, and grade of a portfolio) is NOT the assessment provided for the sample portfolio. This was done to maintain the privacy of the student who agreed to share the portfolio publicly. The name and portfolio url connected to the portfolio assessment has been deleted in order to protect that student’s privacy.

***The written work of one student on each written assignment, as well as the feedback and evaluations the student received, are provided in this section. This section therefore provides richer information about the course, providing examples of individual assignments throughout the term as well as information about how the assignments were assessed. The student selected for this sample performed at the median relative to his or her peers.
Course Abstract

EDUC 384: Methods: 6-12 Mathematics (Abstract for NCATE)

EDUC 384 serves two distinct groups of teacher candidates in the Augustana Teacher Education program: mathematics majors seeking certification for grades 6-12, and other Augustana teacher candidates seeking an additional qualification (called an “endorsement” in Illinois) to teach middle school mathematics. Mathematics majors enroll in EDUC 384 during the spring term of their junior year. For this group, EDUC 384 follows the three-course introductory education sequence required of all teacher candidates: Educational Psychology, Assessing Learning, and Methods of Inclusion. EDUC 384 also follows the General Teaching Methods course that is required for all secondary education majors. It is taken concurrently with the mathematics majors’ first or second clinical placement, and thus precedes their student teaching experience by one or two terms. As the final methods course for mathematics majors, EDUC 384 serves as a bridge between college-based education courses and student teaching. Other teacher candidates who take EDUC 384 in order to fulfill the requirement for the middle school mathematics endorsement typically take the course during the spring term of their senior year. These teacher candidates, a majority of whom are elementary education majors, are usually in their final term at Augustana and thus have completed student teaching and all coursework in their major (with the possible exception of the capstone course School and Society which might be taken concurrently).

The baseline function of this course is to introduce prospective mathematics teachers to effective, content-specific teaching methods. Teacher candidates learn this content in the context of two additional course objectives: (1) teacher candidates are expected to integrate the pedagogical knowledge they have gained through prior coursework and teaching experience and apply it in the context of middle and high school mathematics teaching; and (2) teacher candidates are required to learn and demonstrate competence in relation to modern standards for mathematics pedagogy¹, specifically NCATE/NCTM Program Standards (2003) 1-8 and 16.3 (Dispositions, Process Standards, Knowledge of Technology, Pedagogy, and Ability to Increase Students’ Knowledge).

The first objective is actualized through the course’s embedded clinical component. Through our partnership with a local middle school, the teacher candidates in EDUC 384 are able to teach sequences of lessons to small groups of 7th grade students as part of their EDUC 384 requirements. Each teacher candidate is assigned a group of five to nine 7th graders, assesses the preliminary knowledge of the students, plans a multi-lesson unit for the group with clearly defined learning objectives building on the students’ existing knowledge, plans and teaches a sequence of daily lessons, and measures the students’ learning gains via a final assessment. Hence, the teacher candidates experience the complete teaching cycle and are required to integrate and apply the full range of knowledge they have gained through their education coursework at Augustana. That is, they design, implement and interpret assessments of student learning; they apply methods of inclusion by planning explicit accommodations for learners with exceptional needs; they apply general teaching methods as they find ways to engage their students; and, of course, they utilize mathematics-specific teaching methods as they help their students learn specific content. The experience is also a useful scaffold for the mathematics

¹ Note that EDUC 384 focuses on pedagogical standards and dispositions, not content standards. Augustana teacher candidates meet the content standards via their collegiate coursework in the Augustana mathematics department.
majors who will engage in the complete teaching cycle on a full-time basis as student teachers the following academic year, and provides mathematics-specific experience for the “middle school endorsement” teacher candidates who may find themselves employed in such a teaching position after graduation.

This intensive teaching experience also addresses many of the NCATE/NCTM pedagogy standards. That is, teacher candidates typically demonstrate competence in relation to several of these standards via their teaching practice in EDUC 384 (for example, a particular teacher candidate might facilitate Problem Solving and Communication with her students, effectively utilize technology in instruction, document a successful effort in improving students’ knowledge, etc.). However, it is unlikely that a teacher candidate would be able demonstrate competence in relation to all of these standards via the limited teaching experience. For this reason, the course includes additional requirements that are designed to provide teacher candidates opportunities to demonstrate their competence in each standard. Candidates participate in a regional mathematics teachers’ conference, documenting and reporting what they learned at the conference, in order to demonstrate standard 8.5 on professional participation. They read and discuss several perspectives on equity in the mathematics classroom and then write a formal paper in which they articulate their own informed perspective on the appropriate meaning of equity, thus demonstrating their disposition in relation to equity. They investigate research literature related to a pedagogical question they have formed, synthesize the findings from the various pieces of literature, and present research-based recommendations for practice to their peers (standard 8.6). They are also exposed to various technological tools for mathematics instruction and create a technology-based learning activity that addresses a particular piece of content, thus ensuring that their skills are in line with the technology standards. It is the teacher candidate’s responsibility to provide a convincing case that they have indeed demonstrated competence in relation to each of the required NCATE/NCTM standards. The culminating assignment of the term is the Teaching Portfolio. This portfolio includes a section devoted to each of the standards. For each section, candidates are required to clearly explain how they demonstrated that particular standard and also provide documentary evidence (lesson plans, course assignments, etc.) that support their claims that the standard was met.
ED384: Middle and Secondary School Methods: Mathematics
Syllabus for Spring Term 2011
Mondays, Wednesdays, and Fridays 1:00-2:15
Carlsson Evald 212 and Jordan Middle School

**Instructor:** Mike Egan
**Office:** Evald 208
**Office Hours:** I will generally be in my office when I’m not teaching…hence, I’m likely to be found in my office between 8am and 12:30pm Monday through Friday. Feel free to knock on my door and drop in. However, if you wish to guarantee a meeting time with me, it will be a good idea to arrange an appointment ahead of time. E-mail is the best way to contact me…I will respond to your email within one business day.
**E-mail:** mikeegan@augustana.edu

**Course Overview/Learning Objectives**

ED384 students will gain knowledge of and experience with the full array of pedagogical competencies expected of middle and secondary school mathematics teachers in the twenty-first century†. ED384 is built on the assumption that teacher candidates learn most effectively through reflective practice. Teacher candidates in ED384 will not merely learn about teaching approaches and theory in the context of the college classroom, nor will they be asked to learn exclusively in the context of direct teaching practice. This course includes both traditional collegiate reading/writing/discussion and clinical teaching work in a partnering middle school. The two approaches to learning are synergistic: middle school teaching practice adds meaning and relevance to the theoretical considerations of the college classroom; course readings and assignments enhance teacher candidates’ knowledge of the teaching and learning process which in turn enables them to better serve their students in the classroom.

**Course Readings**

**Required Texts:**


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† As articulated in *Principles and Standards for School Mathematics* © 2000, National Council of Teachers of Mathematics and the 2003 Program Standards of the National Council for Teacher Accreditation (NCATE) and the NCTM. “Pedagogical competencies” are defined as Teaching Dispositions, Process Standards in the context of teaching, and Pedagogy Standards found in the NCATE/NCTM Program Standards.

‡ The instructor will be using the 8th edition, and the Augie bookstore will be selling the 8th edition. Thus, this is the ideal edition for students to use. The 7th edition is also acceptable for student use. If you buy an earlier edition than the 7th, be sure to touch base with the instructor so that we can ensure that your readings are in line with the rest of the class.
Course Syllabus

Readings Available on Moodle:


Course Schedule

<table>
<thead>
<tr>
<th>Week/Theme(s)</th>
<th>Day/ Place</th>
<th>To Read</th>
<th>To Do <em>(Graded assignments are in bold italics)</em></th>
</tr>
</thead>
</table>
- Teaching assignments discussed and finalized  
- Begin planning for WIU conference |
|               | Wednesday, March 9/ Evald 212 | NCTM Principles (on Moodle) | Teaching Lab 7B Pre-Assessment Instrument (Page 10) |
|               | Friday, March 11/ Jordan MS | NCTM Process Standards (on Moodle) | Teaching Lab: Pre-Assessment for Jordan 7B (Pages 9-12) |

\(^4\) In the 8th edition, read from the beginning of chapter 2 and stop on page 19 at the “Short-Range Planning” section (that is, DON’T read “Short-Range Planning”), then on page 160, start at “Assessment for Making Instructional Decisions” and stop on page 162 at “Evaluating Student Achievement.” In the 7th edition, read from the beginning of chapter 2 and stop on page 21 at the “Short-Range Planning” section, then on page 167 start at “Assessment for Making Instructional Decisions” and stop on page 168 “Evaluating Student Achievement.” NOTE that the 8th edition has additional material on “Data Driven Instruction” that you will need to read…let me know if you do not have the 8th edition and I will copy these pages for you.
<table>
<thead>
<tr>
<th>Standards</th>
<th>Wednesday, March 16/ Evald 212</th>
<th>Wednesday, March 23/ Evald 212</th>
<th>Wednesday, March 30/ Evald 212</th>
<th>Friday, April 1 Jordan MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Reasoning and sense-making in secondary school mathematics</td>
<td>Teaching Lab 7B Unit Plan (Page 11)</td>
<td>WIU Conference Assessment and Learning Outcomes (Pages 12-13)</td>
<td>WIU Conference Assessment and Learning Outcomes (Pages 12-13)</td>
<td>WIU Conference Assessment and Learning Outcomes (Pages 12-13)</td>
</tr>
<tr>
<td>- Pedagogical Strategies</td>
<td>Teaching Lab 7B Lesson 1 (Page 11)</td>
<td>Teaching Lab 7B Lesson 2 (Page 11)</td>
<td>Teaching Lab 7B Lesson 2 Postlude/Lesson 3 Plan (Page 11)</td>
<td>Teaching Lab 7B Lesson 2 Postlude/Lesson 3 Plan (Page 11)</td>
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</tbody>
</table>

- **Course Syllabus**
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading/Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday, April 6/</td>
<td>One More Strategy; Connecting math with student knowledge</td>
<td>Teaching Lab 7A Pre-Assessment Instrument (Page 10)</td>
</tr>
<tr>
<td>Evald 212</td>
<td>Evaluating student knowledge (Formal Assessment)</td>
<td>• Peer editing of Pre-Assessment Document (Bring your first draft of the Pre-Assessment to class...you will receive feedback on it from your peers. The final, “graded” version is then due as an email attachment by 11:59:59 PM)</td>
</tr>
<tr>
<td>Moses Chapter 8</td>
<td>Posamentier: pp. 162-188 (8th ed.) OR pp. 168-195 (7th ed.)</td>
<td>• Discuss Moses reading (reading guide will be provided)</td>
</tr>
<tr>
<td>Friday, April 8/</td>
<td>6</td>
<td>Teaching Lab: Lesson 3 with Jordan 7B (Pages 9-12)</td>
</tr>
<tr>
<td>Jordan MS</td>
<td>Algebra for all?</td>
<td>Teaching Lab 7B Lesson 3 Postlude/Lesson 4 Plan (Page 11)</td>
</tr>
<tr>
<td>Monday, April 11/</td>
<td></td>
<td>Research Proposal (Pages 13-14)</td>
</tr>
<tr>
<td>Jordan MS</td>
<td></td>
<td>Teaching Lab: Pre-Assessment for Jordan 7A (Pages 9-12)</td>
</tr>
<tr>
<td>Wednesday, April 13/</td>
<td>Viadero (2010) [on Moodle]</td>
<td>Teaching Lab 7A Pre-Assessment Analysis (Page 10)</td>
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<tr>
<td>Evald 212</td>
<td></td>
<td>Teaching Lab 7A Unit Plan (Page 11)</td>
</tr>
<tr>
<td>Friday, April 15/</td>
<td></td>
<td>Teaching Lab 7A Lesson 1 Lesson Plan 1 (Page 11)</td>
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<tr>
<td>Jordan MS</td>
<td></td>
<td>Teaching Lab: Lesson 4 with Jordan 7B (Pages 9-12)</td>
</tr>
<tr>
<td>Monday, April 18/</td>
<td>7</td>
<td>Teaching Lab 7B Lesson 4 Postlude/Lesson 2 Plan (Page 11)</td>
</tr>
<tr>
<td>Jordan MS</td>
<td>History of math education in the U.S.</td>
<td>Teaching Lab 7B Lesson 1 with Jordan 7A (Pages 9-12)</td>
</tr>
<tr>
<td>Wednesday, April 20/</td>
<td>Current issues in the field</td>
<td>Teaching Lab 7B Final Analysis (Pages 11-12)</td>
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<tr>
<td>Evald 212</td>
<td></td>
<td>• Teaching Lab reflections: Final reflections on 7B, where things are heading with 7A</td>
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<td></td>
<td></td>
<td>• Discuss Posamentier reading (reading guide)</td>
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<td>Date</td>
<td>Topic</td>
<td>Reading</td>
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<tr>
<td>Friday, April 22</td>
<td><strong>Problem solving</strong></td>
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<tr>
<td><strong>Good Friday:</strong> No School</td>
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<tr>
<td><strong>Monday, April 26</strong></td>
<td>Posamentier: pp. 105-116 (8th ed.) OR 109-121 (7th ed.)</td>
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<tr>
<td><strong>Tuesday, April 27</strong></td>
<td>Posamentier: pp. 117-128 (8th ed.) OR 121-133 (7th ed.)</td>
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<tr>
<td><strong>Wednesday, April 27</strong></td>
<td>Equity Paper (Pages 14-15)</td>
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<tr>
<td>Friday, April 29/</td>
<td><strong>Teaching Lab: Lesson 2 with Jordan 7A</strong></td>
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<tr>
<td>Jordan MS</td>
<td>(Pages 9-12)</td>
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<tr>
<td><strong>Tuesday, May 2</strong></td>
<td>Teaching Lab 7A Lesson 2 Postlude/Lesson 3 Plan (Page 11)</td>
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<tr>
<td><strong>Wednesday, May 4</strong></td>
<td>Posamentier: chapter 5</td>
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<tr>
<td><strong>Friday, May 6</strong></td>
<td><strong>Teaching Lab: Lesson 3 with Jordan 7A</strong></td>
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<td></td>
<td>(Pages 9-12)</td>
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<tr>
<td><strong>Saturday, May 7</strong></td>
<td>Teaching Lab 7A Lesson 3 Postlude/Lesson 4 Plan (Page 11)</td>
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<tr>
<td><strong>Monday, May 9</strong></td>
<td><strong>Teaching Lab: Lesson 4 with Jordan 7A</strong></td>
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<tr>
<td></td>
<td>(Pages 9-12)</td>
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<tr>
<td></td>
<td>Teaching Lab 7A Lesson 4 Postlude/(Page 11)</td>
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<tr>
<td></td>
<td>Research Presentations (Pages 13-14)</td>
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<tr>
<td></td>
<td>Teaching Lab 7A Final Analysis (Pages 8-9)</td>
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<td></td>
<td>Research Presentations (Pages 13-14)</td>
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<tr>
<td></td>
<td>Training with Technology Assignment (Pages 15-16) due by 11:59:59pm Monday night</td>
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<tr>
<td><strong>Friday, May 16</strong></td>
<td><strong>Teaching Portfolio (Pages 16-18)</strong></td>
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</tbody>
</table>
1. **Attendance, Participation (-∞, 4%), and Assignment Submission.** Continuity and active participation are crucial to the success of this course. Students are expected to complete all readings assigned for a given class period before the class begins, and be prepared to engage in discussions and other activities around the readings. In most cases a reading guide will be provided so that you will know in advance the aspects of the reading which will be emphasized in class. **If it becomes apparent that you have not adequately completed the readings in time for a given class, a point will be deducted from your attendance and participation grade.** Additionally, this class relies heavily on collaborative learning and student interaction. Your participation grade also depends on your willingness to collaborate and participate in class activities.

You may miss up to two **class sessions** for any reason (athletic competition, sickness, field trips, work, family visits, etc.) without penalty if you notify the instructor **prior to the class session.** If you fail to notify the instructor **in advance,** expect to have points deducted. You are expected to communicate with the instructor about how to make up for the lost time. There is no penalty if you arrange with me **ahead of time** to be late or leave early twice. **Any absence (including the first or second absence) which is not forewarned will result in a 2% deduction from your attendance grade.** If you are absent more than twice, a 2% deduction will be made for the additional absences which are forewarned. You must attend at least one hour of the class session to earn attendance credit.

**YOU SHOULD NOT MISS ANY OF THE TEACHING LABS** which are scheduled for four Mondays and six Fridays throughout the term. These experiences cannot be “made up.” Missing a lab will automatically result in a score of “0” on the assignments related to the lab (including the Lesson Plan, Postlude and Final Analysis) and, in addition, will automatically result in 2 points being deducted from your Attendance/Participation score.

Assignments are to be completed in full and passed in by the pre-stated due dates. It is preferred that all assignments be submitted as email attachments to mikeegan@augustana.edu. Emailed assignments must be received by 11:59:59 pm on the due date to be considered on-time. Assignments submitted in hard copy must be presented during class time prior to the deadline. A **lateness penalty of up to 1 point per day will be deducted from all late assignments.** Academic honesty is expected at all times in accordance with published Augustana College policies.

2. **Teaching Labs at Jordan Catholic Middle School (46%).** ED384 students will be working closely with 7th graders from Jordan Catholic Middle School (107 4th Avenue W., Milan, IL) throughout the term. Each Augustana student will be matched with two separate small groups of 7th graders (7A and 7B) and will be charged with the responsibility of providing a coherent, 5-week supplementary mathematics program for each group. The 7th graders’ teacher, Mrs. Herron, has grouped the students according to their mathematical needs, so the “supplementary
mathematics program” Augie students provide will range from remedial elementary work for struggling learners up to high school-level work for advanced students. You will have five different 45-minute sessions (from 1:25-2:10) with each group of 7th graders. Hence, you will have several opportunities to work through the teaching cycle of assessing knowledge, using assessment to inform instructional planning, engaging in instruction, reflecting on instruction, and evaluating learning outcomes.

The schedule for our teaching sessions is as follows:

<table>
<thead>
<tr>
<th>Group 7B</th>
<th>Group 7A</th>
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</thead>
<tbody>
<tr>
<td>Pre-Assessment Visit…</td>
<td>Pre-Assessment Visit…</td>
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<tr>
<td>Friday, March 11</td>
<td>Monday, April 11</td>
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<td>Lesson 1…………….</td>
<td>Lesson 1…………….</td>
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<td>Monday, March 21</td>
<td>Monday, April 18</td>
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<td>Lesson 2…………….</td>
<td>Lesson 2…………….</td>
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<td>Friday, April 1</td>
<td>Friday, April 29</td>
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<td>Lesson 3…………….</td>
<td>Lesson 3…………….</td>
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<td>Friday, April 8</td>
<td>Friday, May 6</td>
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<tr>
<td>Lesson 4/Post-Assessment..</td>
<td>Lesson 4/Post-Assessment..</td>
</tr>
<tr>
<td>Friday, April 15</td>
<td>Monday, May 9</td>
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</table>

Several documents related to your Teaching Lab work will be collected and graded as part of the ED384 course requirements. In addition, these documents will be shared with teachers and administrators at Jordan Middle School in order to provide them with further information about their students’ development. The documents include:

- **Pre-Assessment Instrument [Due March 9 for 7B (2%) and April 6 for 7A (2%)]**
  The initial visits with each group (March 11 and April 11) are devoted to introducing yourself to the group and, more importantly, administering a pre-assessment to the 7th graders in order to get a sense of their strengths and areas for growth. Your pre-assessment should measure skills and/or knowledge that are clearly related to the initial content guidelines provided by Mrs. Herron. The information you gather through the pre-assessment is vital to your subsequent teaching labs: the pre-assessment information will be used to craft your long-range plan with each group, and it will be a basis for the case you make about your students’ learning gains in the “Final Analysis” assignments. The pre-assessment instrument can take on any number of formats (it might be a traditional pencil-and-paper test, it might be a description of a performance task, etc.). Regardless of format, though, it should be clear that the document will help you gather helpful information about the 7th graders’ knowledge. Class time will be devoted to peer editing of each others’ pre-assessment documents.

- **Pre-Assessment Analysis [Due March 14 for 7B (3%) and April 13 for 7A (3%)]**
  After you administer the pre-assessment to your 7th graders, you will then analyze their performance on the pre-assessment. The first step of the analysis will be to evaluate the work the students produced (e.g., grade their pre-assessment tests, evaluate their performance on the task, etc.). Your analysis report will then summarize the mathematical strengths and areas for improvement of each student individually; a general statement about the strengths and areas of improvement of the group as a whole; and a preliminary statement about how this information will influence your sequence of lessons with the groups. A template for the Pre-Assessment Analysis report is available on Moodle. You should download the template, type in your response to each of the prompts, include your name in the electronic document’s file name, and email it to mikeegan@augustana.edu as an attachment.
Course Syllabus

- **Teaching Lab Unit Plan [Due March 16 for 7B (3%) and April 13 for 7A (3%)]**
  
  The Unit Plan will be completed soon after the pre-assessment analysis (indeed, for the 7A group, the due date of the two assignments is the same). Your unit plan will outline your over-arching goals for your sequence of lessons with each group. It will adhere to the unit planning recommendations found in the Posamentier textbook (pages 15-17 of the 8th edition), thus it will include a rationale, an indication of the Common Core Standards addressed, unit goals for the knowledge, skills and/or dispositions your students will develop, a brief outline of the content to be taught in each lesson and the teaching methods to be used, an indication of how your students’ learning will be assessed, and (if necessary) a statement about special materials to gather or other special considerations that will influence your sequence of lessons. Your 4th and final lesson with each group must include some form of a “post-assessment,” so a preliminary indication of what this will entail should be included. In addition, you will write a brief explanation stating how the results of the pre-assessment led to the development of the overall unit plan (e.g., how did you use your assessment of student knowledge in order to plan a sequence of lessons for them?). A template for the unit plan is available on Moodle. You should download the template, type in your response to each of the prompts, include your name in the electronic document’s file name, and email it to mikeegan@augustana.edu as an attachment.

- **Teaching Lab Lesson Plans and Postludes 1-4 [Due 3/18, 3/23, 4/4, 4/11, & 4/18 for 7B (12%) and 4/15, 4/20, 5/2, 5/7, & 5/11 for 7A (12%)]**
  
  You will write and implement a complete lesson plan for each individual lesson you teach using the Augustana template (available on Moodle). Soon after completing a lesson, you will then reflect on the experience by completing the “postlude” section of the lesson plan template. The lesson plans will include much more detail about each individual lesson than what was found in the unit plan. Also, as you teach the lessons, you may find that you need to reconsider some of the initial goals laid out in the unit plan. However, it is expected that the connections between the unit plan, individual lesson plans, and postludes will be clear throughout the teaching sequence. For example, it should be clear how the content of each particular lesson helps support the larger goals you described in the unit plan. Your reflections about each individual lesson that are written in the postludes should lead logically to your plan for the next lesson. Collectively, the unit plan, lesson plans, and postludes should display your ability to assess student needs, plan instruction for students, implement instruction, reflect on instruction, respond to student needs as new needs surface, adjust plans, etc. Effective teaching involves a reflective cycle, and evidence of your reflection should be found in these documents.

- **Teaching Lab Final Analysis [Due April 20 for 7B (3%) and May 13 for 7A (3%)]**
  
  The Final Analysis for each group will be a report detailing how your students developed over the course of your sequence of lessons. The Final Analysis will address questions such as: What progress was made toward the over-arching goals listed in the Unit Plan? Is there evidence that individual students improved between the pre-assessment and the post-assessment? Though you will not continue teaching these students, what recommendations do you have for the students’ teachers based on your work with them? A template for the Final Analysis report is available on Moodle. You should download the template, type in
your response to each of the prompts, include your name in the electronic document’s file name, and email it to mikeegan@augustana.edu as an attachment.

3. WIU Math Teachers Conference/Conference Assessment and Learning Outcomes (10%). On Friday, March 25 our class will be participating in the annual Mathematics Teachers Conference at Western Illinois University (WIU) in Macomb. We will participate both as presenters (all members of ED384, including the instructor, will co-lead a session at the conference) and as learners (we will all attend and learn from other sessions as we strive to develop professionally). Both roles (presenter and learner) will require a good deal of effort from each of us, and hence the quality of our effort will be “rewarded” by contributing to the ED384 grade. Further details about the expectations for the presentation and the other aspects of conference participation, and their impact on the course grade, are provided below:

- **Conference Presentation/”Conference Assessment” (8%)**
  We will collaboratively prepare our presentation during the first three weeks of the term. Some class time will be devoted to organizing the presentation, but we should all be prepared to take on responsibilities related to the presentation outside of class time (as one usually expects of course work). The presentation itself will last for 35 minutes, and it will adhere to the details provided in the speaking proposal (submitted to WIU in January 2011) shown below:

  **Title of Presentation:**
  They Should Know This Already! Strategies for Revisiting Elementary Content with Secondary Students

  **Program Description:** Write a concise, specific description of the essential content of your presentation suitable for the program book (limited to 350 characters, including spaces).

  Middle and high school mathematical content builds on material students should have learned by 6th grade. Unfortunately, many students enter grades 7-10 without adequate mastery of elementary content. Participants in this session will learn practical approaches for revisiting elementary content with secondary students, and also strategies for accelerating these students from remedial work to grade level expectations.

  **Abstract:** Provide/Attach a more detailed description of your presentation for the review committee. This may include goals/objectives of your presentation and what you hope your attendees will gain from their participation.

  Many (maybe all) secondary mathematics teachers have encountered situations in which their students have struggled to learn new material simply because they lack prerequisite, elementary-level knowledge and skills. It is very frustrating, for example, to teach slope to students who don’t understand fractions or polynomial factorization to students who haven’t memorized their multiplication and division facts.

  In this session my co-presenters and I will share useful techniques for revisiting elementary material with secondary students. Specifically, we will highlight ways to use physical manipulatives, virtual manipulatives, and age-appropriate games and challenges designed to solidify understanding and promote practice of baseline skills. Furthermore, we will discuss how these approaches can be incorporated into regular secondary-level instruction so that students can use these elementary concepts in their middle and high school work.

  Members of our audience will come away with ready-to-use teaching strategies. The teaching materials highlighted in the session are freely available on the internet, so participants will learn both methods for teaching elementary material to secondary students and will know where to source relevant teaching tools at little to no cost.

  All aspects of the presentation will be collaborative, including our assessment of its quality. Part of our preparation will include building an evaluative rubric that will be used to assign a
score or grade to the presentation. Once we have agreed on a rubric, it will be posted to Moodle with the other scoring rubrics used in the course. After the conference is completed, we will use the rubric to assign grades or scores for the presentation. The assessment scores should be submitted by 11:59:59 PM on Monday, March 28.

- **Conference Participation as Learners”Learning Outcomes” Document (2%)**
  In addition to sharing our knowledge at the conference via our presentation, we will also have the opportunity to learn from our colleagues in the profession by attending other sessions. You will earn points toward your ED384 grade by documenting what you learned at the other sessions. There is no expected format for how you document your learning, but you are encouraged to organize written notes taken at the conference, handouts, websites, etc., in such a way that you will be able to access and use what you learned in the future. Your final “learning document” should be emailed as an attachment by 11:59:59 PM on Monday, March 28. However, you should have at least a draft of the document prepared by the beginning of our class period on Monday, March 28 as we will informally share what we learned in class that day.

  A simple rubric stating how the “Learning Outcomes” document will be graded is available on Moodle. As indicated in the rubric, you can expect to earn full points for this assignment if you follow the spirit of the assignment (e.g., you make an effort to organize and share what you learned at the conference in such a way that it will benefit you in the future). In addition to completing this assignment for the grade indicated here, many students will also decide to include this conference “Learning Outcomes” document in their Teaching Portfolio (due Finals Week) as a way of demonstrating NCATE/NCTM Standard 8.5: “Participates in professional mathematics organizations and uses their print and on-line resources.”

4. **Research Proposal/Research Presentation (8%)**. By the midpoint of the term, the students in ED384 will have had multiple opportunities to practice the craft of mathematics teaching. Juniors will have completed their winter term clinical, will be half-way through their spring term clinical, and will have taught 3 lessons at Jordan for the ED384 Teaching Labs. Seniors will be quite experienced by then, having completed their student teaching in addition to their multiple clinical experiences.

  For reflective teachers, the practice of teaching inevitably leads to questions about how one’s teaching can be made more effective. There are many avenues for conscientious teachers to seek ways of improving their practice. These include consulting more experienced colleagues, attending conferences, and participating in professional development sessions. Another important avenue for developing one’s practice is through consulting the research literature. This assignment promotes the latter approach by prompting ED384 students to identify a question about mathematics teaching that is pertinent to their personal practice, investigate published research in order to gain deeper insight into the question and/or to find concrete suggestions for practice, and to share what they learned with peers in an oral presentation during Week 10.
By Monday of Week 6 (April 11) you will identify a personally relevant question or issue pertaining to mathematics education. The question should spring from an area of improvement you have identified in your own practice. That is, your motivation to improve in this area of your teaching should generate your interest in the question and your desire to learn more about the issue or question by consulting the literature. By 11:59:59 PM on April 11 you should email a paragraph or two to the instructor that states the question or issue you wish to explore and briefly explains your motivation for pursuing this issue (e.g., why is the question important to you? What prompted you to wonder about this issue?).

Between Weeks 6 and 9 you will locate and read at least four pieces of research literature related to your question/issue. The literature you collect must be gathered from professionally acceptable sources such as peer-reviewed journals, research handbooks published by acknowledged authorities such as the National Council of Teachers of Mathematics or the American Educational Research Association, research-based books or chapters written by professional researchers, research summaries published by the National Research Council or National Science Foundation, etc. Please consult the instructor if you are not certain that your sources meet this standard. We may hold a brief, in-class workshop on how to locate acceptable sources if necessary.

You will then share what you learned with others via an in-class Research Presentation during Week 10. Your presentation should state the nature of the question/issue you explored, indicate what the research literature has to say about the issue, and provide concrete, research-based suggestions for approaching the issue in the classroom. Your presentation should engage your audience of classmates, convincing them that the question/issue is important to teachers, providing them with helpful teaching ideas, and, if possible, providing them an opportunity to gain some direct experience with your topic (possibly by performing a mathematics problem, reviewing student work, role playing, etc.).

5. **Equity Paper (8%).** The issue of equity in mathematics education is explicitly woven throughout our course readings and in-class discussions during each of the first 7 weeks of the term. The Equity Principle is foremost in the *NCTM Principles.* The Moses and Viadero readings offer contrasting perspectives of what “equity” means in practice. Moses argues that access to quality college-preparatory mathematics instruction is a civil right, and his book *Radical Equations* chronicles how The Algebra Project has worked toward this vision of “algebra for all.” Viadero, however, offers evidence that the push toward universal access to algebra in the past ten years has had little or no impact on overall achievement, thus raising the question of what the concrete goals of an “equity vision” should be. Finally, during our Week 7 discussion of current trends in the field, we saw that “closing the achievement gap” is a primary concern of mathematics educators right now, and we saw NAEP achievement data providing evidence that the achievement gap is indeed significant.

In writing your “Equity Paper,” you will attempt to synthesize the various perspectives on equity in mathematics education, articulate your own vision for equity in mathematics education, and indicate how your commitment to equity will be expressed in your own classroom. Your paper should provide evidence that you have reflected on the arguments of one or more authors mentioned above and that the author’s (or authors’) viewpoints have helped you articulate your
own perspective (perhaps you completely disagree with an author, in which case you can establish your position in opposition to an author; or, perhaps various arguments made by multiple authors resonate with you, in which case you will draw on multiple sources in expressing your perspective). It is also expected that you will draw on your own experience as a teacher and/or student in explaining your point of view (e.g., what equity issues have you encountered in your clinical or student teaching work, and how has it helped you form an opinion; similarly, what equity issues did you encounter as a student, etc.).

Your paper should be at least 3 pages in length (Times New Roman 12 point font, double-spaced, 1 inch margins on all sides). You may structure your paper in any way you see fit, as long as you meet the intended purposes of the paper described above. However, if you are having difficulty “getting started,” you are free to use one of the writing prompts below, or consult with the instructor individually.

- A fairly common interview question is, “Why do you want to be a math teacher?” Perhaps one of your motivations to become a math teacher involves a desire to serve society. Use this paper as an opportunity to articulate this “desire to serve” more deeply, providing reasons why mathematics teaching in particular has potential to make a substantial social impact. Indeed, the book Radical Equations is essentially such an essay written by Bob Moses and his collaborator Charles Cobb. Moses provides many compelling reasons for his decision to be a mathematics educator, reasons rooted in his personal history, philosophy and vision for society.

- The Algebra Project has been designed to promote and spread mathematical literacy among the “target population” (p. 19) of African American, Latino, and poor White students. Are the principles and goals of the Algebra Project relevant to teachers who work in more affluent settings? If so, elaborate on what makes them relevant. For example, how would a teacher in a wealthy suburban high school benefit from heeding some of the ideas laid out in Radical Equations? If you feel this book has no relevance for such a teacher, what are your reasons for feeling this way?

- Our popular culture has a common story about success in urban schools: the heroic, committed individual teacher finds ways to connect with students and, hence, brings about change. Movies such as The Ron Clark Story, Freedom Writers, Dangerous Minds, Stand and Deliver, etc., are all variations of this same story. Moses and Cobb’s Radical Equations tells a different story, however. Radical Equations speaks of community organizing, bringing teachers, parents, and community leaders together in a common enterprise. What are your reflections on these seemingly contrasting storylines? What is your image of an effective teacher? Does this image connect to any of these storylines?

6. Teaching with Technology Assignment (8%). The National Council of Teachers of Mathematics has stated, “Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students’ learning” (NCTM, 2000, p. 8). During week 9 of the term, you will be exposed to some powerful technological tools with tremendous potential for enhancing students’ learning experiences. Specifically, you will encounter and work with The Geometers Sketchpad and free, web-based applications during class time and will also read about other technological teaching tools, such as graphing calculators, in the Posamentier text.
For your “Teaching with Technology Assignment,” design a learning experience for students that makes extensive use of technology. This “learning experience” can relate to any piece of mathematical content appropriate for middle and/or high school students. You may also use any the piece of technology highlighted in class or in the Posamentier reading.

You will not need to write a formal lesson plan for this assignment, but your “learning experience” should be sufficiently developed so that a teacher would be able to seamlessly implement it in instruction. For example, if your “learning experience” involves using Sketchpad to investigate the properties of similar figures, you might create a Sketchpad file that includes figures that are similar and designed to remain similar no matter how they are manipulated. This Sketchpad file might be accompanied by a worksheet that prompts students to explore the similar figures in a particular way, record particular data about the figures, make conjectures about the relationships between similar figures, etc. While you will not write a formal lesson plan, the intention and value of your “learning experience” should be obvious to another math teacher. Another teacher should be able to tinker with your creation and its supporting materials and be able to say, “Ah. This is a nice way to get students thinking about similarity.”

The completed assignment and all supporting materials should be emailed to me by 11:59:59 PM on Monday, May 16.

7. Teaching Portfolio (16%). The Teaching Portfolio, due Wednesday of finals week (May 18), is a compilation of artifacts gathered from your ED384 work. The Portfolio should demonstrate the extent to which your teaching adheres to the professional standards for mathematics teaching set out by the National Council for Accreditation of Teacher Education (NCATE) and the National Council of Teachers of Mathematics (NCTM). For ED384, your portfolio will focus on NCATE/NCTM Standards 1-8 and 16.3 **[Dispositions, Process Standards, Knowledge of Technology, Pedagogy, and Ability to Increase Students’ Knowledge of Mathematics].** The portfolio will include both “raw evidence” (e.g., the artifacts themselves) and explicit commentary explaining how the artifacts demonstrate that you have met a given standard.

The Portfolio can be collected in a three-ring binder or as an ePortfolio, and its general organizational structure will be as follows:

I. Dispositions (6 Indicators††): This section of the Portfolio will be an essay that serves as a general overview of the entire Portfolio. Here you will make the case that you have developed each of the dispositions suggested by the six indicators of

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**Prospective mathematics teachers in the Augustana College Education Department will have opportunities to demonstrate their competence in Standards 9-16.2 [Content Standards and Field-Based Experiences] through other avenues, including mathematics coursework, clinical and student teaching work, and performance on teaching licensure tests.

†† An “indicator” refers to language found in either the NCATE/NCTM Program Standards or Principles and Standards for School Mathematics (or both) that articulates a particular teaching competency. In this portfolio, each “indicator” will require a written explanation of how the indicator was met (similar to the “Cover Sheets” you wrote in ED300 that explained how you demonstrated an Augustana College Knowledge Indicator) and artifacts of your ED384 work that provide evidence that you met the indicator. The written explanations should state explicitly why the artifacts are appropriate pieces of evidence. The artifacts can include any ED384 assignment or other artifact, including teaching lab lesson plans, samples of your 7th graders’ work, your Equity Paper, etc.
NCATE/NCTM Standard 7: Dispositions. As this part of the Portfolio is about “dispositions” or “attitudes,” you should articulate how you have come to appreciate the value of these facets of teaching, or why you believe they are important, etc. While “dispositions” can be difficult to document with hard evidence, you still might choose to refer to certain artifacts within the Portfolio as a means of demonstrating that you “practice what you preach.” That is, rather than simply claiming that you believe in using stimulating curricula in the classroom, you might go the added step of referring readers to an actual classroom activity you implemented that is found in the Portfolio.

II. Process Standards (5 Indicators): This section will include descriptions of how you fostered each of the five NCTM Process Standards (Problem Solving, Reasoning and Proof, Communication, Connections, and Representation) in your teaching. That is, you will explain how you enabled your students to engage with these Process Standards as you facilitated their mathematical work. The descriptions of how you fostered the Process Standards will be similar in length to the “cover sheets” you completed in ED300, but they will be written in relation to the NCTM Process Standards rather than the Augustana Knowledge Indicators. In articulating how you fostered a given Process Standard, you may refer to any relevant indicators of the Standard listed in either Principles and Standards for School Mathematics (PSSM) or NCATE/NCTM Program Standards (NCATE/NCTM). For example, when you are focusing on Problem Solving, you can draw on language from either PSSM or NCATE/NCTM (or both) in making the case that you fostered Problem Solving. You do not necessarily need to make a case for all four indicators found in NCATE/NCTM, but the more indicators from either publication you can demonstrate the better. In addition to describing how you met each Standard, you will also provide actual teaching artifacts that serve as evidence that the Standard was met. As with ED300 cover sheets, the descriptions should refer explicitly to the artifacts and help explain why the artifacts provide evidence that a Standard was met.

III. Knowledge of Technology (1 Indicator): In this section you will document your awareness of how to use technology effectively in mathematics instruction. The description you write in this section can connect either to the language found in Standard 6 of the NCATE/NCTM document or to the Technology Principle in PSSM. You should include one or more evidentiary artifact: you may include your “Teaching with Technology” assignment or artifacts related to a lesson you taught with technology, etc. As with other sections in the Portfolio, your description should explain why the artifacts provide evidence that your teaching adheres to the NCTM’s expectations for technology use in the classroom.

IV. Pedagogy (9 Indicators): In this section you will demonstrate your adherence to each of the nine indicators found in NCATE/NCTM Standard 8: Knowledge of Mathematical Pedagogy. You will write a description explaining how you met each indicator (similar to the ED300 “cover sheets”), provide evidentiary artifacts for each, and ensure that your description draws connections between the artifacts and the indicators.
V. Ability to Increase Students’ Knowledge of Mathematics (1 Indicator): This section of the Portfolio will essentially be a re-packaging of one or both of your “Teaching Lab Final Analysis” papers in order to meet the format expectations of the Portfolio. The Final Analysis papers represent your opportunity to meet NCATE/NCTM Standard 16.3 during the ED384 term (note that you will be required to document your impact on student learning even more extensively during student teaching through your Work Sample assignment). By including one or both of these papers in your Portfolio, you will first write a brief explanation of how your paper(s) demonstrates your ability to increase students’ knowledge of mathematics, and you will then include the paper(s) in the Portfolio as documentary evidence.

Final Grades. Your final score will be determined by taking the sum of all scaled scores earned in the course. Final letter grades will be strictly determined using the scheme below:

\[
100 \geq A \geq 95 > A- \geq 90 > B+ \geq 87 > B \geq 83 > B- \geq 80 > C+ \geq 77 > C \geq 73 > C- \geq 70 > D \geq 60 > F
\]
Experiential Knowledge includes knowledge and insights required in the Teaching Portfolio. Non-field or practice-based learning.

**Academic Knowledge** includes knowledge and insights students will gain through course readings, in-class discussions, in-class activities, and course assignments that do not involve direct interaction with middle and secondary schools, students, or teachers. In short, this pertains to classroom-based learning. It seems unlikely that a candidate would be able to demonstrate or document his or her competence for this standard or in this area by the end of the term.

*Depending on the nature of the course experience, “adequate performance” might include (among other things): reading, understanding, synthesizing, evaluating, and/or being able to apply material found in course readings, actively participating in class discussions and activities; performing satisfactorily on course assignments; etc.

**“Academic Knowledge” includes knowledge and insights students will gain through course readings, in-class discussions, in-class activities, and course assignments that do not involve direct interaction with middle and secondary schools, students, or teachers. In short, this pertains to classroom-based learning. Non-italicized text represents course assignments that can potentially serve as evidentiary artifacts in the Teaching Portfolio.**

***“Experiential Knowledge” includes knowledge and insights students will gain through the actual practice of teaching and through sharing/interacting with colleagues at a professional conference. In short, this pertains to field-based or practice-based learning.***

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**Key:**
- **X** = This experience or assignment was designed specifically to help the candidate learn about or demonstrate skill with this particular competency. Therefore, if the candidate performs adequately* in relation to this course experience, he or she will be in a position to demonstrate and document his or her competence in this area by the end of the term.
- **x** = This experience or assignment is potentially connected to the competency suggested by the standard or indicator, but its relevance will depend on how each individual candidate approaches her or his work. For example, a candidate who utilizes technology in instruction during the teaching labs will be able to refer to this work as evidence for meeting standard 6. Another candidate may not have had an appropriate opportunity to use technology during the labs, and hence would not be able refer to this work as evidence for standard 6.
- **Blank** = It seems unlikely that a candidate would be able to demonstrate or document his or her competence for this standard or indicator via this particular course experience, but it is not beyond the realm of possibility. The candidate is encouraged to contact the instructor if she or he feels that her or his work on this assignment/experience actually does provide evidence for meeting the standard or indicator.

* Depending on the nature of the course experience, “adequate performance” might include (among other things): reading, understanding, synthesizing, evaluating, and/or being able to apply material found in course readings, actively participating in class discussions and activities; performing satisfactorily on course assignments; etc.
Summary of the EDUC384 Portfolio

The student portfolio is the culminating assignment for EDUC384. As described on pages 16-18 of the course syllabus, the portfolio is the medium through which each teacher candidate provides evidence that he or she is competent in each of the NCATE/NCTM pedagogical standards.

The portfolio is built with artifacts from the EDUC384 term (class assignments, lesson plans, etc.) and therefore captures the breadth of the course. Reviewers may decide that a review of the sample portfolio is sufficient for gaining a sense of the pedagogical knowledge, skills, and dispositions of Augustana’s secondary mathematics teacher candidates. However, a more comprehensive sample of student work is contained within this document for reviewers seeking additional evidence.

Sample Portfolio

Teacher candidates typically choose to create electronic portfolios. These eportfolios include the candidates’ names, and since the candidates are the creators of these web-based documents, the instructor is unable to protect their identities by hiding or deleting their names. Furthermore, most candidates choose to limit accessibility to their eportfolios. So, while they are stored on the internet, only specified viewers are permitted to review them.

One EDUC384 student from the spring of 2011 agreed to make his eportfolio public, and also gave his permission to share his eportfolio for this NCATE review. A link to this portfolio is provided below. PLEASE NOTE that the next section includes an example of how the portfolios are assessed. The sample assessment in the next section is NOT the assessment of the particular portfolio linked to below. This was done in order to protect the confidentiality of the teacher candidate who shared his portfolio. While reviewers will be able to see his portfolio (and his name), they will not be able to see the grade he earned for it. The sample assessment on the next page connects to the work of a different teacher candidate. That candidate’s identity is not revealed.

Sample Portfolio:  https://sites.google.com/a/augustana.edu/bgeportfolio/home
Sample Student Portfolio Assessment

NOTE: The scoring rubric, score, and comments provided below are NOT the evaluation of the sample portfolio linked to on the previous page. Since the name of that portfolio creator was revealed in the portfolio, it would be a violation of privacy to share that teacher candidate’s grade. The assessment shown here pertains to a different student whose identity has been protected. This is provided simply to give reviewers a sense of how the portfolio is assessed in EDUC 384.

Name: Sample Student

The Teaching Portfolio should demonstrate that the middle school or secondary school mathematics teacher candidate has developed the pedagogical skills, dispositions, and competencies expected of modern teaching professionals as articulated in Principles and Standards for School Mathematics (PSSM) and the NCATE/NCTM Program Standards for Initial Preparation of Mathematics Teachers (NCATE/NCTM). The portfolio serves as a case-making statement that the candidate has demonstrated proficiency in all of the relevant indicators mentioned in the first footnote. A convincing case, by nature, will include both convincing arguments and supporting evidence. Thus, for each required NCATE/NCTM indicator, the teacher candidate’s portfolio must accomplish three goals: (1) make a convincing argument or explanation that the candidate has met the expectations of the indicator; (2) provide relevant evidence supporting the argument; and (3) clearly explain how or why the evidentiary artifact(s) is indicative of the candidate’s proficiency relative to the indicator. The candidate’s proficiency on each indicator will therefore be evaluated using the following 3-point scale:

3 = Strong Evidence the Candidate is Proficient: All three goals listed above are effectively met. It is clear that the candidate understands the implications of the language in the indicator. The candidate makes a clear and convincing argument that he or she has met this standard. The supporting evidence is relevant, and the candidate’s arguments help explain why the evidence is relevant.

2 = Acceptable Evidence the Candidate is Proficient: There is evidence that the candidate has met the given standard. However, one of the goals listed above has not been completely met.

1 = Weak Evidence the Candidate is Proficient: There is some evidence that the candidate has met part of the expectations for a given standard. However, it is clear that the candidate must develop further in this area, or it is clear that the candidate must become more adept at documenting this particular skill, competency, or disposition. The evaluator can readily point to multiple aspects of the goals listed above that have not been met.

0 = No Evidence the Candidate is Proficient: Either the candidate literally provided no evidence that the standard has been met (and “no evidence” implies that either an argument or supporting evidence or both are missing), or the evidence provided is completely disconnected from the intended meaning of the indicator.

The portfolio should address 22 indicators, hence a maximum of 66 points can be earned for the case-making aspect of the portfolio.

A quality portfolio should include additional qualities beyond that which is indicated above, however. A portfolio should be well organized so that reviewers can easily navigate its contents. The written language in the portfolio should be grammatically and structurally sound in order to indicate that the creator is an educated professional. Finally, it should have a neat and professional appearance. These three aspects of the portfolio will also be evaluated and hence impact the final score for this ED384 assignment. Each aspect will be scored on a 5-point scale [5 = Excellent; 4 = Good; 3 = Fair; 2 = Marginally Acceptable; 0 = Unacceptable… note that a score of “1” is not possible]. Thus, these aspects of the portfolio contribute an additional 15 points to the final score, for an overall maximum total of 81 points.

The record of your score for each aspect of the portfolio, your final score, and final comments are shown on the next page:

---

7 This portfolio strictly addresses pedagogical competencies; it does not address content knowledge. Thus, candidates are only required to document their proficiency in relation to NCATE/NCTM Standards 1-8 and 16.3 in this portfolio.
10 Argument and evidence are mutually supportive and inextricably linked in any convincing case. One can argue that he or she is competent at something, but the argument is not convincing if there is no supporting evidence. Likewise, evidence cannot stand alone: an artifact or document does not tell its own story; one must argue or explain why the piece of evidence is indicative of competence or skill, etc.
11 For standards 1-6 and 16.3, the “relevant evidence” must include one or more tangible artifact (such as a course assignment, a piece of student work from a teaching lab, etc.). Note that it is possible that one artifact could serve as supporting evidence for multiple indicators. For standard 7 (Dispositions) and its six indicators, tangible artifacts are not necessarily required as supporting evidence. It can be difficult to document a “disposition,” as these have more to do with personal attitudes, beliefs, etc. than documentable practice. It may be appropriate to simply provide written ideas as the supporting evidence. However, there may be situations in which it is appropriate (and advisable) to point to tangible artifacts in order to demonstrate a disposition. For example, for Standard 7.6 you might explain why you believe technology is valuable in mathematics instruction and also point to a lesson plan or other artifact where technology played a central role.
12 Drawing on original language from PSSM or NCATE/NCTM may be useful in this regard. Some of the concepts in NCATE/NCTM are very broad. For example, Disposition 7.3 simply reads “Effective teaching.” It is not immediately obvious what this means, but the PSSM’s “Teaching Principle” does articulate the intended meaning much more precisely. Thus, candidate’s are encouraged to draw directly from language in the “Teaching Principle,” or effectively paraphrase its meaning, when making the case that their work adheres to Standard 7.3.
Sample Student Portfolio Assessment

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<th>7.3</th>
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<th>7.6</th>
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| Raw Score | 71.5/81 |
| Scaled Score | 14.12/16 |

Comments: The portfolio looks great and includes a great deal of content. You’ve definitely done a lot this term!

You’ve definitely demonstrated a strong knowledge of the professional standards of mathematics teaching, and, in most cases, provided strong evidence that you have also demonstrated these standards in your practice. There are aspects of the work that have further room for development, and there are also areas that you have likely developed well already but could have made a stronger case that you have met these competencies. Sections of the portfolio I have critiqued (e.g., sections earning a score of less than 3) have been described in detail below:

7.1: The claim, “In my lessons with the 7th grade Jordan students (A), I created a lesson in which my students would be doing math based on their personal interests, that called on their prior knowledge, and that played on their intellectual strengths. I had my students play different computer games that would help them practice and perfect their math skills and each game was geared toward the unique interests of my students.” was not well supported by the lesson plan. The lesson plan did not state explicitly that accommodating different student interests was a goal of the lesson. Indeed, that particular lesson plan had no “Accommodations for Exceptional Learners” section completed at all. Also, while there was a menu of internet game options made available to the students, it isn’t clear how students would know which game was “right for them” since the students had no prior knowledge of the games before the lesson.

7.3: This was well constructed for the most part, but the following passage weakened the overall argument: “although I sometimes don’t know how to do mental math (okay, all the time) I have a firm grasp on the deeper foundational….” The honesty of that line is appreciated, but the language is informal (hence, unprofessional).

13 The NCATE/NCTM document lists multiple indicators for each of the five NCTM process standards. For this portfolio, teacher candidates are not required to provide evidence pertaining to each process standard indicator. Rather, they should make a case for fostering these process standards in the context of teaching more generally. Teacher candidates are advised that demonstrating multiple indicators will correlate to stronger evidence for meeting the standard, but it is unrealistic to expect to be able to document all of the indicators prior to student teaching.

14 Note: As indicated on the first page of this rubric, the three “Professional Quality” indicators are scored a different scale and are NOT included in the NCATE/NCTM Standards.
Also, a more positive spin on the fact that you make calculation errors should have been made. Everyone makes such errors. Thus, a better way of expressing this might have been something like, “Like my students, I do make occasional calculation errors or express reasoning that proves to be faulty. Errors such as these are a part of the process of doing mathematics, however, and I am therefore able to model for my students how a mature mathematical thinker deals with and learns from mistakes. My deep understanding of foundational mathematical principles helps ensure that I eventually recognize errors when they occur…..”

7.4: The following passage needs a little more explanation: “I also demonstrate that I understand the importance of learning for understanding in Lesson Plan 1 with 7B (Jordan Lesson Plan 1) in that I have my students use the two-colored counters to understand the concepts of adding and subtracting integers and not only practice until it becomes second nature. It is important in mathematics to learn the concepts because it is difficult to memorize a number of different equations or ways of doing something. Learning for understanding is something that students can build off of and it enables them to use their knowledge outside of the math class.” How do the two color counters facilitate conceptual understanding? If two color counters are used poorly, they can become just another instance of students being asked to memorize procedures (e.g., just like a poor teacher could tell students: “here’s the rules for operations with integers: use them;” a poor teacher could also tell students: “here’s the rules for using two color counters to model operations with integers: use them.”). I think an added sentence or two in your argument explaining why you believe the counters helped develop the concepts and moved beyond a rules-based approach would have been helpful.

7.5: The argument here was reasonable (though there were quite a few typos on this page…if you get chance, you might want to dust them up). However, the connection between the argument and the attached evidence as not clear. You never really explained what those attachments were there for or how they supported your argument. In your argument you devoted an entire paragraph to your “post-assessments,” yet there was no attached document labeled post-assessment. You could have indicated in the argument that you used the same test for both pre-assessment and post-assessment. Why were there two lesson plans attached? I recognize that these lesson plans included sections on assessment, but your argument never explained what you would want a reviewer to notice about the assessment sections or how the assessment sections demonstrated your competence with assessment.

4: The lesson plan that was attached as evidence that you emphasized the Connection between solving equations and solving inequalities actually had no mention of inequalities whatsoever. The attached lesson plan was the “choose one of multiple online games” lesson, where the online games focused on solving equations and word problems. Indeed, this lesson was largely self-directed by students and the teacher played no role in helping students draw connections between different pieces of content. Your argument does indicate that you understand the meaning of the “Connections” standard, but the evidence that you actually facilitated this in your teaching is missing.

5: A central part of your argument here is that your students had a lot of exposure to the idea of variables serving as \textit{Representations} of numbers, and then you pointed to your 7A lesson plans as evidence of this. However, in looking at the 7A lesson plans, it seems that the spirit of the Representation standard was not met. Many of these lessons were game-based exercises of practicing the skill of solving equations (e.g., there was a BINGO game, the online games, etc.). Practicing this skill is important, but it is simply practicing the mechanics of solving equations. The students were not actively thinking about the idea, “Hmmm….these letters I’m seeing actually represent numbers…” Indeed, your argument might suggest that as long as a teacher is having students work with variables (e.g., as long as algebra is being taught), then the teacher is automatically engaging with Representation. Again, this misses the spirit of the standard. I think that your 7B lesson in which you had students use two-color counters to represent positive and negative integers came closer to the spirit of the Representation standard. Here the concrete manipulative gave students a way of thinking about positive and negative numbers that also helped them understand why the operation rules are what they are.
8.7: You could have made a more convincing case that you utilize multiple teaching strategies. You listed three strategies in the argument section (one of which seemed pretty bland... "going over word problems with the students"), and attached only two lesson plans. This didn’t seem like much variety. You could also have highlighted your use of manipulatives (two color counters), technology, discussion, and other teaching techniques you used this term that would help convince someone else that you do indeed utilize multiple strategies.

16.3: The evidence (e.g., the attachments) could have been stronger here. You only attached the final analysis document. So, an outside reviewer is forced to trust what you claim in the final analysis document. The evidence would be stronger had you attached the pre-assessment analysis so that a review could compare, and, even more powerfully, the original student work on both the pre- and post-tests.
Directions: Solve each equation (using the distributive property when necessary) without a calculator and **show your work** in the box provided.

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<tr>
<td>1.</td>
<td>( x + 6 = 4 )</td>
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<td>2.</td>
<td>( 2y = 8 )</td>
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<td>3.</td>
<td>(-x + 3 = 2x)</td>
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<tr>
<td>4.</td>
<td>( 2(x - 1) = 12 )</td>
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<td>5.</td>
<td>(-y - 2 = -4)</td>
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<tr>
<td>6.</td>
<td>(-3(x + 1) = 5 + x)</td>
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<tr>
<td>7.</td>
<td>( 1 - (y - 3) = 7 - 2y )</td>
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<tr>
<td>8.</td>
<td>( 4x + 2(x - 1) = -x - 5(x + 1) )</td>
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Please rate your confidence in the following areas from 1-5 using the scale below:

“Not confident at all”  “Somewhat confident”  “Very confident”

1  2  3  4  5

1. Solving one-step equations with addition and subtraction like x + 5 = 1.

2. Solving one-step equations with multiplication and division like 3x = 9.

3. Solving two-step equations with a combination of addition/subtraction and multiplication/division like x + 3 = 4x.

4. Solving multi-step equations with the distributive property like 3(x + 1) = 6.

Now I’d like to get to know you! Answer these questions in a sentence or two.

5. Describe yourself as a student. (do you come prepared to class, regularly turn in homework, pay attention, participate?)

6. Which part of math so far this year has been the most difficult for you? Explain.

7. What are your interests outside of school? (hobbies, sports, extra-curricular activities?)

8. Is there anything else you think I should know about you?
The pre-assessment instrument will be evaluated in relation to the five criteria listed in the table below. Note that there is potential overlap between the criteria; hence it will be possible to gain or lose points in multiple sections of the rubric for a single strength or weakness. Each criterion will be scored using the following 4-point scale:

4 = Well developed. The expectations for this criterion are met in full.
3 = Satisfactory. This aspect of the instrument is acceptable for the most part, but you are encouraged to amend one or more aspect before it is shared with the 7th graders.16
2 = Improvement needed. This aspect of the instrument has at least one major shortcoming that must be addressed before sharing it with the 7th graders.
1 = Multiple improvements needed. This aspect of the instrument has multiple serious shortcomings and should not be shared with 7th graders. You should schedule time to meet with the instructor so that we can craft a more appropriate assessment instrument.
0 = Incoherent or missing. This aspect of the instrument is either missing completely or is incoherent. You will not be permitted to meet with your group of 7th graders (and therefore will lose all coursework scores associated with the 7th grade visits) until you have met individually with the instructor and mutually agreed upon a plan of action.

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<th>Criterion</th>
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<tbody>
<tr>
<td>Mathematical Accuracy</td>
<td>There should be no mathematical errors in the instrument. All questions/problems/prompts must be unambiguous. Prompts intended to have one correct response have one correct response; prompts intended to be more open-ended still invite certain responses that will clearly be considered more appropriate than other responses. If diagrams are used, they should be reasonably neat, accurate, and interpretable.</td>
<td>4</td>
</tr>
<tr>
<td>Mathematical Relevance</td>
<td>Mrs. Herron set out content guidelines for each group. The pre-assessment instrument must be well connected to these guidelines. Only skills and content that are directly related to Mrs. Herron’s guidelines should be assessed with this instrument. “Directly related skills and content” can include lower-level content that is a definite pre-requisite for Mrs. Herron’s guidelines, content drawn directly from the guidelines, and possible “leap” items that can be viewed as a step or two beyond Mrs. Herron’s guidelines (if such items are included, it will be because you have concerns that some students might get all other items correct and hence you want to include more challenging items to ensure you will be able to identify room for growth in each student).</td>
<td>4</td>
</tr>
<tr>
<td>Reasonably Student-Friendly</td>
<td>A 7th grader should be able read and interpret the instrument. Vocabulary and sentence structure should be straightforward and appropriate for this age group. No 7th grader should look at the instrument and find it so confusing or advanced that he or she believes he cannot attempt any question or prompt.</td>
<td>4</td>
</tr>
<tr>
<td>Potential to Generate Useful Assessment Information</td>
<td>It is clear that this instrument will provide you with helpful information about the students' strengths and areas for improvement. Questions/prompts/tasks are structured so that the teacher will find student responses to be indicative of their mathematical knowledge.</td>
<td>4</td>
</tr>
<tr>
<td>Potential to Generate Varied Assessment Information</td>
<td>Questions/prompts/tasks should vary in difficulty so that the teacher will get a sense of the different individual strengths and needs in each group.</td>
<td>4</td>
</tr>
</tbody>
</table>

**Raw Score** 20/20

**Scaled Score** 2/2

---

16 Scores of 3 and less include language encouraging (or requiring) you to make changes before sharing the instrument with 7th graders. Following through with these changes will not change your score for this assignment, but it will potentially have a positive impact on your future assignments in the teaching lab.
Comments: Nice. Your first page had a very logical sequence of problems ranging from easy to challenging. I can’t imagine a single student getting 100% on this, which will be very helpful to you as you should definitely be able to identify areas to work on for each student. It’ll be fun reviewing their “attitude responses” on the second page!
The test found in the previous section (pages 25-26) was written by the sample student and used as a pre-assessment of her 7th graders’ skills.

The original work produced by the 7th graders on the test is available at:

https://docs.google.com/viewer?a=v&pid=explorer&chrome=true&srcid=0BzPIT22BneFIYmMwMDhhZTgtZDFjZS00MDk5LTk5ZDYiNTMxNzNiNmMxNDE0&hl=en_US

The next section of this document shows the sample student’s analysis of the 7th graders’ work.
ED384 Teaching Lab at Jordan Middle School
Pre-Assessment Analysis

Augie Teacher Name: Sample Student

Directions: Use this template to summarize and analyze your students’ performance on the pre-assessment. This template has three sections: (1) Individual Performance (where you will state the strengths and areas for improvement for each individual student); (2) Group Summary (where you will summarize the overall strengths and areas for improvement of the entire group); (3) Preliminary Teaching Strategy (where you will provide a brief description of how you will focus your sequence of lessons with the students so as to build on their strengths while pushing them toward improvement). You are free to insert additional data (such as gradebook tables, etc.) that you think will help illustrate your students’ performance, but this is not required.

You must include a copy of the students’ original work as an appendix. Part of the grade for this assignment will be awarded for the reasonableness of your assessment claims, and thus the original student work will be required for reference. Submit the student work in class, Mike will then scan it, email a scanned copy to you, and return the original hard copy for you to return to the students. Your scanned copy will likely be useful to you when you work on your Final Analysis assignment and/or your Teaching Portfolio.

Section 1: Individual Performance
Part A. Briefly describe the content area(s)/skill you assessed in the space below:
This group of students were identified as having difficulty with the following skills:

- Multi-step algebraic equations
- The Distributive Property

To determine the students’ ability to solve multi-step algebraic equations, I began the assessment with one-step equations. I gave the students both an addition and subtraction problem as well as a multiplication and division problem. This would allow me to determine if the issue was with their basic math facts.

I then added equations with a combination of the four operations to determine if the disconnect was due to the multiple operations.

The next equation was a basic distributive property problem to determine if the students understood the property.

My final few problems used the distributive property in multi-step equations to see if students could combine the skills.

Part B. Use the table below to summarize each individual student’s performance on the assessment:

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Strengths (e.g., what the student can do well; existing knowledge you can utilize and build on in future lessons)</th>
<th>Areas for Improvement (e.g., skill or content the student has not yet mastered; something you might attempt to address in your future lessons)</th>
</tr>
</thead>
</table>
| Amber        | ● (1) and (2) One-step algebraic equations with addition and subtraction and multiplication and division.  
               ● Applying an operation to both sides of an equation.                                                   | ● Simple mistakes: Negative use, (1) Amber solved 4-6 as 2, forgetting the minus sign.  
               ● Distributive Property (both positive and negative integers outside of the parenthesis).  
               ● Confusing habits: changing all subtraction problems to adding a negative number. Often loses the negatives.  
               ● Working with fractions in multi-step equations.                                                          |
### Teaching Lab: Pre-Assessment Analysis

#### Matthew
- (1) and (2) One-step algebraic equations with addition and subtraction and multiplication and division.
- Applying an operation to both sides of an equation.
- Distributive Property (positive integers outside of the parenthesis).
- Organization (separating work by underlining steps after performing an operation to both sides of an equation).

#### Austin
- (1) and (2) One-step algebraic equations with addition and subtraction and multiplication and division.
- Applying an operation to both sides of an equation.
- Organization (separating work by underlining steps after performing an operation to both sides of an equation).
- Distributive Property (both positive and negative integers outside of the parenthesis).
- Multi-step equations with distributive property (knows what to do but often makes simple mistakes).

#### Frankie
- (1) and (2) One-step algebraic equations with addition and subtraction and multiplication and division.
- Applying an operation to both sides of an equation.
- Organization (separating work by underlining steps after performing an operation to both sides of an equation).
- Understands what to do when an equation has a negative sign on both sides of the equals sign, i.e. \(-2 = -x\).

<table>
<thead>
<tr>
<th></th>
<th>Matthew</th>
<th>Austin</th>
<th>Frankie</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Distributive Property (consistency with negative integers outside of the parenthesis).</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>The meaning of the addition of a negative number.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Simple mistakes:</strong> (7) addition of variables.**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Consistency:</strong> what to do when an equation has a negative sign on both sides of the equals sign, i.e. (-2 = -x).**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Understanding what solving for a variable looks like (variable can exist only on one side of the equation i.e. (x \neq -x)).</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Consistency:</strong> (3) and (8) addition of variables.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Understanding what to do when an equation has a negative sign on both sides of the equals sign.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Negative use (7) and (8) – Austin forgets a negative sign on occasion or gets confused by double negatives.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Understanding what solving for a variable looks like (variable must exist on one side of the equation i.e. (0 \neq 7)).</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Simple mistakes:</strong> (5) added 1 and -2 instead of multiplying</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Knowing what to add or subtract when working with both sides of an equation (i.e. subtracting 3x instead of adding 3x).</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Consistency:</strong> Distributive Property (both positive and negative integers outside of the parenthesis).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Disconnect:</strong> (8) added a variable to a constant instead of performing distributive property first. – Order of operations?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Working with fractions in multi-step equations.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Section 2: Group Summary

In the space below, summarize the performance of the group as a whole. Were there common strengths? Common areas for improvement? If it is not appropriate to generalize strengths/weaknesses across the entire group, can you identify trends in sub-groups? For example, do four students share an area for improvement, while the remaining students require improvement in another area?

I was happy to see that all four students were able to solve the one-step problems at the beginning of the assessment. While one student did have trouble with the first problem, her error was with her subtraction and not with the process of solving the equation.

All four students also recognized that when something was done to one side of the equation they had to do it to the other side. This was a huge concept for the students to understand.

Three students were also strong in their organization. They regularly used lines to show their steps. This will help them isolate issues within their work.
Three students had weaknesses with the Distributive property. Some students had difficulty with only negative integers outside the parenthesis but others had difficulties with both positive and negative integers. We will definitely review this property.

Working with negative numbers was a problem for all four students. Some students simply lost negatives as they worked, while others multiplied two negative numbers and ended with a negative result.

Two students also need to clarify what solving for a variable means. This is a key concept we’ll have to address immediately.

As far as multi-step equations, all four students need work on isolating certain sections of the equation. Many students get confused when they see lots of numbers and variables and things get all jumbled up. This will be our focus for the next few weeks.

Section 3: Preliminary Teaching Strategy
Based on the results of the pre-assessment, what mathematical content or skill(s) will be the focus your sequence of lessons? What improvement would you expect to see after four lessons with the group? If it is clear that different students in the group have different learning needs, what preliminary ideas do you have for differentiating instruction so that all students will be challenged appropriately during your lessons?

I believe that my students are pretty much all in the same place. A few students have grasped small details better than others, but all four students have difficulty with the same big concepts. To begin my unit, I will do a quick review of some basic multi-step equations with addition and subtraction. This will show the students that they need to add like terms and simplify their equations. They will highlight their negatives in their equations, focusing on what the problem is asking them to do (i.e. multiply \(-1 \times -4\)). I will teach the students to use parenthesis for negatives, especially when changing a minus sign to the addition of a negative number.

I will then introduce the Distributive Property with both positive and negative integers outside the parenthesis. We will then gradually make the problems more difficult by using the DP in multi-step problems. We will also clarify when to add and when to subtract in a problem (i.e. \(x + 3 = 2x\) subtract \(x\) from both sides).

If the students do well with these first tasks, I plan to challenge the students by adding fractions and/or decimals into the equations.
Teaching Lab: Pre-Assessment Analysis

Name: Sample Student

<table>
<thead>
<tr>
<th>Component</th>
<th>Scoring Scheme</th>
<th>Score Earned</th>
</tr>
</thead>
</table>
| Individual Performance | 0 = More than six “areas of concern” are found in this section of the assignment. Descriptions of potential “areas for concern” are listed in the point description for the score of 3.5 below.  
1 = Five or six “areas of concern” are found in this section of the assignment. Descriptions of potential “areas for concern” are listed in the point description for the score of 3.5 below.  
2 = Three or four “areas of concern” are found in this section of the assignment. Descriptions of potential “areas for concern” are listed in the point description for the score of 3.5 below.  
3 = Two “areas of concern” are found in this section of the assignment. Descriptions of potential “areas for concern” are listed in the point description for the score of 3.5 below.  
3.5 = The teacher’s evaluation of each individual student is strong, but there is one area of concern for this section of the assignment. “Areas of concern” can include, but are not limited to, unclear communication of any one student’s strength or area for improvement; failing to identify a strength or area for improvement that is relevant and clearly present in the student’s work; making a claim about a student that is not clearly rooted in evidence; etc.  
Note that one “area of concern” involves such a shortcoming applying to a single student. If a common mistake was made for multiple students, it will be considered as multiple “areas for concern.”  
4 = It is clear that the teacher thoughtfully evaluated the performance of each individual student on the pre-assessment. The strengths and areas for improvement of each student are communicated clearly. The teacher’s conclusions are reasonable in all cases: that is, the teacher explicitly provides evidence for all assessment claims, or the claims are obvious in light of the original student work.                                                                 | 4            |
| Group Performance      | 0 = Three or more areas of concern are identified in this section. Descriptions of potential “areas for concern” are listed in the point description for the score of 1 below.  
1 = One or two areas of concern are identified in this section of the assignment. “Areas of concern” can include, but are not limited to, over-generalizing the group (making statements about the group as a whole which, in fact, pertain only to a subset of the group); over-individualizing the group (e.g., failing to identify trends in performance that could lead to the creation of common lessons that would be worthwhile to all students); making claims about the group that are not clearly rooted in the individual analyses; etc.  
2 = The teacher’s overall assessment of the strengths and areas of improvement for the group as a whole is reasonable and clearly written. The connections between the “Individual Performance” section and this section are clear. The teacher avoids over-generalizing the group (e.g., avoids making statements about the group as a whole that are accurate for some but not all students), but also identifies trends that will be helpful when he or she plans instruction for the group. If appropriate, useful “sub-group” trends are identified. It is clear that the statements about the group’s performance will serve as a helpful basis for the sequence of lessons to be planned in the near future. | 2            |
| Preliminary Teaching Strategy | 0 = Three or more aspects of the preliminary teaching strategy seem inappropriate in light of the assessment data. Descriptions of potential “inappropriate aspects” are listed in the point description for the score of 1 below.  
1 = One or two aspects of the preliminary teaching strategy seem inappropriate in light of the assessment data. “Inappropriate aspects” can include, but are not limited to, proposing learning goals that are clearly too challenging or too simplistic for the group as a whole; in cases when differentiated learning goals are appropriate, the needs of one or more sub-groups of students are not being met because the learning goals are too challenging or too simplistic; proposing learning goals that are disconnected from Mrs. Herron’s original suggestions or from the pre-assessment data; etc.  
2 = The teacher effectively utilizes the assessment data in proposing preliminary ideas about a sequence of lessons. It is clear that the teacher has identified areas where the students need to progress, and the skills or content listed in this part of the assignment are reasonable and manageable. If there are different learning needs in the group, the teacher has proposed reasonable ideas for how each individual student can be appropriately challenged during group instruction.                                                                 | 2            |

Raw Score 8/8  
Scaled Score 3/3

Comments: Good…nice job of identifying specific strengths and areas for improvement for each student, and providing helpful indications of which problems in the pre-test showed these performances. You found some material that all of the students will need work on, so your lessons should be focused and purposeful. It will be interesting to compare their initial performance to their final performance!
ED384 Teaching Lab at Jordan Middle School
Unit Plan

Augie Teacher Name: Sample Student

Directions: This Unit Plan template has seven sections. Responses to sections 1-5 and 7 are required, while a response to section 6 is optional. Complete the necessary sections.

Section 1: Rationale
Summarize the content and/or skills your students will be exposed to in this unit and explain why it is important for them to learn this material. For example, does the material in this unit lead to future learning goals? Will the students exercise particular mathematical habits of mind that will benefit them in other contexts?

In this unit, students will spend time developing their algebraic skills in solving multi-step equations and using the Distributive Property. Some lessons will also pay attention to what solving for a variable should look like and how to appropriately work with negatives.

These are basic algebra skills that students will need to grasp before they can attempt bigger concepts such as working with fractions and decimals and solving quadratic equations. Since the students were just learning about decimals, the next logical step is to solve equations with decimal coefficients. This unit should allow the students to become confident in their multi-step equation skills so that they can focus on the decimals.

These skills will be very helpful in real-life situations as well. When working with money (i.e. determining a profit), students will be required to use both the Distributive Property and solve multi-step equations.

Section 2: Standards Addressed
List the Common Core State Mathematics Standard(s) this unit will address. Also, list the NCTM Process Standards you anticipate your students will engage with, briefly explaining why you anticipate they will exercise these processes.

6th Grade: Expressions and Equations (6.EE) – Apply and extend previous understandings of arithmetic to algebraic expressions. 6th Grade: Expressions and Equations (6.EE) – Reason about and solve one-variable equations and inequalities. 7th Grade: Expressions and Equations (7.EE) – Use properties of operations to generate equivalent expressions.

Process Standards:
Communication – Students will be asked to communicate with their peers as to how they solved an equation and why they solved it a certain way. Students will learn from each other through discussion, helping each other identify disconnects and working together to find the correct answer.
Connections – Students will be asked to find a real-life connection to the Distributive Property. They will need to identify a situation where the DP could be used in their own lives. We will also preview how the DP will appear in mathematics classes to come.

Section 3: Unit Goals
What are the over-arching learning goals that will be accomplished over the sequence of lessons? What knowledge, skills, or dispositions do you expect your students to develop during their time with you? If some of the goals are differentiated (e.g., if there are different goals for different students), describe the differentiated goals.

Teaching Lab: Unit Plan

- Students will be able to solve equations using the Distributive Property with both positive and negative integers outside of the parenthesis.
- Students will be able to solve multi-step equations with a combination of addition, subtraction, multiplication, and division.
- Students will be able to solve multi-step equations with the Distributive Property.

Section 4: Unit Content and Methods

Briefly summarize your initial plan for what will occur during each of the four lessons. This section should indicate how your students will achieve the Unit Goals over time. Include a brief description of the content covered in each lesson, a brief description of potential learning activities, and an indication of when formal assessments will be administered and collected (recall that a final assessment of some form will be needed in the last lesson). If differentiated instruction will be used, briefly explain how it will be implemented.

Lesson One
* Students will complete a warm-up of 2-3 one-step equations.
* Students will volunteer to perform problems on the board, explaining how they solved the equation.
* Introduce new system for changing subtraction into the addition of a negative number. Students must use parenthesis to highlight where the negative sign is.
* Students will practice using this new system with a few problems.
* Students will then practice two-step equations with a combination of addition/subtraction/multiplication/division.
* Introduce new system for organization (write A for addition, S for subtraction, M for multiply, and D for divide followed by the number they are manipulating). Students have option of using my way (on top of their teacher’s expectations) after today.

Lesson Two
* Students will complete a warm-up of 2-3 two-step problems to review Lesson One’s skills.
* We will break down what the distributive property actually means. Give a few real-world examples.
* Students will practice using the property with problems with positive integers.
* Students will practice using the property with problems with negative integers.

Lesson Three
* Students will complete a warm-up of 2-3 problems using the Distributive Property to review Lesson Two’s skills.
* Students will be challenged to complete multi-step problems without the Distributive Property.
* Students will be challenged to complete multi-step problems with the Distributive Property.

Lesson Four
* Review Day – Students will be reviewing problems from the first three sessions.
* If students are doing really well, students will be challenged to try multi-step equations with fractions and/or decimals.
* Students will take post-assessment (same as pre-assessment).

Differentiation is a bit tricky with this unit. Students need to focus more on the computation than the actual understanding of the processes. Visual learners, read/write learners, and mathematics learners will have the most opportunities here. Intrapersonal and interpersonal learners will also have equal opportunities as some work will be individual and some will be group work. As the unit unfolds, I’m sure there will be more opportunities for other types of learners.

Section 5: Unit Assessment

Comment [ME1]: This seems redundant in relation to the first bullet (if a distribution is required in an equation, it will automatically be a multi-step equation).

Or, perhaps you intended the first bullet to read: “Students will be able to simplify expressions involving the Distributive Property with both positive and negative….”
Teaching Lab: Unit Plan

Indicate how you will assess your students’ progress toward the Unit Goals. How often will you collect and assess artifacts of student work? What types of artifacts will you collect for assessment purposes? What informal assessment strategies will you use during lessons? What will your summative assessment instrument entail?

Students will begin each session with me by completing a few warm-up problems. These problems will be a review of skills practiced during the previous session. The first session will ask the students to solve a few quick one-step equations to get the students thinking in the right direction. Students will be expected to turn these into me each day. I will also give a post-assessment at the end of the unit to determine if the students improved. The post-assessment will be identical to the pre-assessment.

During lessons, I will ask the students to communicate their understanding with me by handing out a green card, a yellow card, and a red card. Periodically during the lesson, I will ask for a comprehension check. If the students are following me and understand the material, they will hold up their green card. If they are somewhat confused, they will hold up their yellow card. And if they are completely unsure of what is going on, they will hold up their red card. This will allow me to set the pace as well as determine who understands the material.

Section 6: Materials and Other Special Considerations (If Necessary)
Are there other special considerations that will help you implement this unit? Are there special materials you will need to gather? Are there special spatial arrangements you'll need to look into before teaching a particular lesson?

One of my students has a vision impairment, so I will be required to enlarge all materials to 140%. This should not be a problem but might be easier with the use of a copy machine that can change the size.

I will need a white board or overhead for examples.

Section 7: Connections to the Pre-Assessment
State explicitly how the students' pre-assessment results influenced the development of this Unit Plan. What learning needs did the students reveal in the pre-assessment, and how does this plan address those needs?

The students all had similar results on their pre-assessment. They had the basic idea of how to solve one-step equations and knew how to attempt multi-step equations but made simple mistakes along the way. Those simple mistakes happened enough that there are key things we need to discuss (organization, ways to do math neatly, what solving for an equation looks like, etc.). Pretty much all of the students seemed to have some difficulty with the Distributive Property, so we will spend an entire day or two focused on learning/going over that.

I learned that the boxes I had given on the pre-assessment did not entail enough space for the students to show all of their work. Their teacher requires the students to show their work with extra steps, making a 3 step problem more of a 4 or 5 step problem. In the future, I will supply a lot of space for multi-step equations!

I think the biggest thing I learned is that the students have a general understanding of what they’re doing in multi-step equations but they get confused when they see so many numbers. During this unit, I will show them how to attack such an intimidating problem by outlining a list of steps that they can follow. Students will also clean up their work a little bit so that they can see exactly what happens during each step.

Comment [ME2]: Let me know if you need help sourcing these. Maybe you could use the classroom board, maybe we could get you a portable board, or maybe we could just get you a paper “flip chart.”
Augustana Individual Lesson Plan Format

For lessons which will be observed by a supervisor, we will require candidates to address the following pre-observation questions, which connect to Augustana Standards and Indicators:

The Content:

1. Previous learning- What is the context for this lesson? How will you build on content learned in previous lessons? On what knowledge, skills, and/or abilities is this lesson going to build?

Because this is the first time officially working with these students, our idea of their prior knowledge is basic. Any information known was gathered from the pre-assessment administered on Friday. Prior to our arrival, the students had been working on decimals. My group’s goals for this unit include performing multi-step algebraic equations and solving with the Distributive Property. To build on prior content, students will begin practicing with one-step equations and working their way up to several step equations. The students will learn how to isolate certain areas of their equations and keep their work organized.

2. Future learning- How do you anticipate using the content from this lesson in future lessons?

The next logical step for these students would be to work with inequalities, applying the same principles that they learned during the unit. It would also be possible that the students would work with decimals or fractions within the algebraic equations.

The Environment:

3. How will your choice of materials and resources and your arrangement of the physical environment enhance learning?

Students will be in desks that face the whiteboard. This will allow the students to see my examples and take notes. Students will also be seated in close rows so that they can work together in various problems. Some work will be group work, while some may be individual. This arrangement will facilitate the grouping styles. Since most of the work is computational during this lesson, students will only be required to bring a pencil and a notebook.

The Lesson

1. Unit title/grade level/course/date. Multi-step Equations/Distributive Property, 7th Grade, Math, 3/21/11
2. **Performance Objective** (in the teaching profession, you’ll also hear this called an aim, outcome, learning target/goal): Students will be able to identify like terms in a two-step equation and solve the equation for a given variable.

3. **Rationale** (Instructional Goal/Purpose):
   - 6th Grade: Expressions and Equations (6.EE) - Apply and extend previous understandings of arithmetic to algebraic expressions.
   - 6th Grade: Expressions and Equations (6.EE) – Reason about and solve one-variable equations and inequalities

4. **Assessment strategy:** Students will turn in their warm-up sheets so that I can determine how much they remember from prior lessons. This will tell me if I need to perform a quick review at the beginning of each lesson or not. I will also be monitoring student work as they solve problems in class. This way I can catch errors and help the students identify their disconnects.

5. **Accommodations for Exceptional Learners:**

   I have one student with a visual impairment. For this student, I will be making all papers 140% of the original draft. I will also write really big on the white board so that he has an equal opportunity to see the examples. I may even print out a copy of the examples so that the student has a copy in front of him.

6. **Grouping strategy:**

   Students will complete the warm-up activity individually. They will be seated in their desks in columns. For some problems, I will allow the students to work together with the students next to them.

7. **Materials:**

   Whiteboard, pencils, notebooks, warm-up sheets

8. **Enactment:**

   - **Hook** (Anticipatory Set; Introduction):
     Warm up: students solve the following one-step equations individually.
     \[ x + 5 = -6, \quad 3x = 15, \quad -9x = 27 \]
     Students volunteer to do examples on board, explaining how they

   - **Student Aim**
     1 min: “Today, we will be practicing how to solve two-step problems.”
Teaching Lab: Lesson Plan 1 and Reflection

- **Development** (the body of the lesson):
  - 5 min: Introduce new system for changing subtraction into the addition of a negative number. Students must use parenthesis to highlight where the negative sign is.
  - 10 min: Students will practice using this new system with a few problems.
  - 10 min: Introduce new system for organization (write A for addition, S for subtraction, M for multiply, and D for divide followed by the number they are manipulating). Students have option of using my way (on top of their teacher’s expectations) after today. Demonstrate with a few one-step problems.
  - 10 min: Mini-lesson on how to identify like terms. In order to see the pieces of information that they will manipulate, they will underline like terms (variables or constants) (i.e. $2x + 4 = 4x$). Students then know that they must do something to simplify this equation and solve for $x$.
  - 25 min: Students will then practice two-step equations with a combination of addition/subtraction/multiplication/division using the new system.

- **Culmination** (Conclusion, Closure, Recap, Wrap up)
  - *If students are grasping the two-step equations easily, I will advance to three and four step problems.*

- **Leap** (looking forward/next steps)
  - “Next lesson, we will learn/review how to use the Distributive Property.”

**Postlude: In reflecting on your teaching experience**, please address the following questions:

1. What did you feel went well? List and discuss 3 – 4 positive aspects of the lesson, making specific reference to events within the learning experience.
   - When I gave the students a few minutes to look over their pre-assessment, many of them were able to identify their mistakes. This tells me that they are able to follow their work looking for disconnects.
   - The students seemed to comprehend the material, understanding which steps to do when. This will help in our next few lessons when we learn distributive property and use the DP later with harder multi-step problems.
   - Using the parenthesis seemed to help the students identify which numbers were negative and which were positive. They seemed to hold onto the negatives this way.
   - During the lesson, I made the decision to not teach the underlining portion of the lesson. I had planned to ask the students to underline like terms before solving each step. However, the students seemed to know right away which terms they were going to combine that it seemed pointless. The purpose of the activity would have been useless because they already knew what they were looking for. So I think this decision was a wise one. It allowed the students to spend time practicing instead of going over something they already knew.
Teaching Lab: Lesson Plan 1 and Reflection

2. What happened during the lesson that was unexpected? (again, make specific reference to events within the lesson, and to why you feel the unexpected occurred).

They were incredibly bored! I tried to make the lesson engaging and a bit more exciting than just doing problems, but I really could not come up with a way to make solving two-step problems exciting. It had to be a bit of a dry lesson to focus on the key steps. I think my lesson on distributive property will be a bit more exciting. Hopefully I’ll manage to hold their attentions.

3. Complete the following sentence with a specific suggestion: I could have made this lesson better by... _

When I taught the students how to add the property that they used on the side, I only showed them one example. I thought that this might be enough since it’s a simple concept. But by not doing more examples, the students did not get enough practice using the method and often forgot to add the properties as they solved the problem. So to make this lesson better, I would have the students do at least three examples with me and then send them on their own to practice.

4. What important lesson did you learn from this experience that will influence your planning and conducting of future lessons?

I think part of the problem of this lesson was that there were three groups in one room. With such a boring, step by step process, I think the students need isolation. There was too much chaos going on in the room, and I noticed my students looking around the room a lot. Next time, I will try to isolate my group a bit more.

Comment [ME8]: Of course, I’ve never taught a boring lesson in my life.

Comment [ME9]: Possibly use the Algebra Tiles for this?

Comment [ME10]: Maybe the “closet room” is an option? Maybe if the weather is nice, the kids can have gym outside, in which case the closet room won’t be so bad. Even if the kids are in the gym, the noise will be annoying, but at least there won’t be visible distractions....
Teaching Lab: Lesson Plan 1 and Reflection

Name: Sample Student

Four complete lesson plans will be completed for each Jordan teaching group (7A and 7B). A “complete lesson plan” includes all components of the Augustana Lesson Plan Template, including the Postlude section. The Postlude cannot be completed until after the lesson is taught. Hence, you will receive a partial score for this assignment before the lesson is enacted (you will get a score and feedback on all aspects of the plan except for the postlude), and the final score will be provided after the postlude has been submitted.

Points are awarded for this assignment as follows:

The Content (2 points)

2 = Both prompts in this section of the rubric are addressed clearly and thoughtfully. This section of the lesson plan clearly indicates how this plan builds on student knowledge revealed in previous teaching encounters, how this plan “sets the stage” for more advanced work the students will do in future lessons (if this is your last lesson, then the “future lessons” will be with another teacher), and how this plan connects to the over-arching learning goals you laid out in your Unit Plan. If the plan includes differentiated learning goals, this section of the plan should also specify the student knowledge differences revealed in the past. If this is your 2nd, 3rd, or 4th lesson with the group, there should be a clear connection between Prompt 4 of the previous lesson’s postlude and Prompt 1 in this section.

1.5 = Both prompts are satisfactorily completed, but the clarity of one prompt could be improved. That is, while the prompt makes sense for the most part, but further detail would be helpful. For example, it may not be entirely clear how this lesson builds on the previous one; it may not be entirely clear how this lesson relates to the Unit Plan, etc.

1 = Either both prompts “could be improved” as described for the score description of 1.5 above, or one prompt is completely satisfactory while the other prompt is confusing and/or quite unclear. It is extremely difficult or even impossible to understand how this lesson connects to previous learning, future learning, or the over-arching learning goals.

0.5 = One of the prompts “could be improved” as described for the score description of 1.5, while the other prompt is confusing and/or quite unclear as described for the score description of 1.

0 = Both prompts are confusing and/or quite unclear.

The Environment (1 point)

1 = You make a convincing justification for why you are arranging the classroom environment as planned (that is, you explain why you feel that having students work individually or in groups at different times during the lesson will be helpful, you explain why you have chosen certain materials for the lesson, etc.). The key words in the writing prompt are “enhance learning,” so your response should go beyond simply describing how you plan to arrange the environment. You should also explain why you feel this arrangement will be beneficial to your students.

0.5 = You adequately describe how the environment will be arranged, but your justification for the arrangement could be more convincing. OR, the response in this section is well written, but the body of the lesson plan reveals that additional environmental decisions were made but were not mentioned in this prompt.

0 = The response provides little or no evidence that you thought seriously about the implications of environmental arrangements. Either no reasons are provided explaining why certain arrangements might be beneficial, or the reasons provided are baseless.

The Lesson (7 points)

Comment [M11]: Note comment M2.
Note: This section is scored differently than the other sections. In this section, points are awarded for discrete indicators. The total score for this section will be the sum of the points earned. Points are awarded as described below. Partial points might be awarded if a given indicator is adequate but not completely satisfactory.

1 point awarded for the Performance Objective. You should clearly indicate the student learning or performance goal for the lesson. It is expected that all other aspects of the lesson plan will support this Performance Objective. So, for example, if the Performance Objective is well articulated but the sequence of events in the lesson does not seem to support the Objective, this point (or a fraction of it) may be lost. It is also expected that the Performance Objective for this lesson will be clearly connected to the over-arching learning goals stated in the Unit Plan.

1 point awarded for the Rationale. You should be able to explain why the Performance (or Learning) Objective is important to your students. You should also indicate how this lesson connects to learning standards. You should list the related Common Core Standard(s) for Mathematics that indicate the content your students will learn, and also describe the appropriate NCTM Process Standards you expect your students to engage with during the lesson.

1 point awarded for the Assessment Strategy. By the end of the lesson (and possibly in the midst of the lesson) you should have some basis for knowing how the students are progressing toward the Performance (or Learning) Objective. You should explain and convincingly justify how you will assess students’ understanding, progress, or achievement during the lesson.

1 point awarded for articulating Accommodations for Exceptional Learners. This section of the plan should provide evidence that you have thoughtfully considered and/or anticipated special learning needs that may occur during the lesson. This may include (but is not limited to) making accommodations for students with disabilities; differentiating instruction so that more advanced and less advanced students are appropriately challenged; building in extra instructional supports for students who struggle, etc.

1 point awarded for “The Lesson” sections 1, 6, and 7 on the template. It is expected that the lesson will be appropriately labeled [including an indication of the particular 7th grade group (7A or 7B), the general content area (e.g., computations with integers), and the date]; a convincing rationale for your student grouping strategy will be provided; and a thorough list of the materials you will need to gather and prepare in advance of the lesson will be provided.

1 point awarded for the clarity, feasibility, and helpfulness of “The Enactment” section. In this section, you should clearly describe the sequence of events that will occur during the lesson. It should be written clearly enough so that another teacher, such as a substitute, would be able to enact the lesson based on your description. The temporal sequence of the lesson should be feasible. That is, it should be clear that your lesson will keep the students productively focused on learning throughout the class period, but at the same time you must ensure that your learning objectives are accomplished during the limited time. In short, you should strike the balance between planning too many activities during the lesson and planning too few. You are encouraged to identify aspects of the lesson that are more and less important, so that you will know what can be “cut out” if you begin to run out of time during the lesson. You are also encouraged to have “back-up” plans in place in case the lesson ends sooner than expected. “The Leap” section of the template can be helpful in this regard: it can include more advanced activities related to the content that you can move into during the lesson if there is time. Finally, the Enactment section should be a document that is helpful to you as a teacher. It should provide guidelines for how you will manage time during the lesson. Its information should be concise and well-organized so that you can quickly refer to it during the lesson itself and know how to proceed with the lesson. Thus, this section should strike the balance between having too much information and too little information. If this section includes paragraphs of text, detailed scripts of what you intend to say, etc., it will not be helpful in practice as you will not be able to quickly gather important information from it. Alternately, if the plan is not detailed enough you may not be adequately prepared for the lesson.

Comment [M12]: See Comment M3. A sub might struggle a bit because it seems that the problems you’ll use in the lesson are not already prepared. It would be helpful to prepare a worksheet or sample problems in advance and either attach these as an appendix to the lesson plan or as a separate attachment in your email. 0.25 points deducted.
Teaching Lab: Lesson Plan 1 and Reflection

1 point awarded for the pedagogical value of the lesson sequence described in The Enactment. It should be clear that the sequence of events in your lesson supports students’ progress toward the Performance (or Learning) Objective. The lesson should be mathematically sound in terms of both content and process. It is expected that students will learn or practice or apply or reason with mathematical content, and also that they will exercise one or more appropriate NCTM process standards during the lesson. Students should be active participants during the lesson. The lesson plan should provide evidence that the teacher recognizes that the focus of the students’ activity should be educational. That is, a “fun” lesson might be acceptable if it is clear that students’ mathematical knowledge will be enhanced through the lesson.

Postlude (2 points)

2 = All four of the questions on the “Postlude” sheet are thoughtfully addressed. It is clear that you reflected seriously on each question, and that you recognize the value of drawing on insights from previous teaching experiences (both positive and negative experiences) in order to improve future instruction. If this is your first, second, or third lesson with a group, then Question 4 should serve as a bridge between this lesson and the next lesson. That is, it is expected that your response to Question 4 will include some sort of assessment statement about the students’ performance in this lesson (based on the assessment strategy you articulated earlier in the plan) that will influence your plan for the next lesson.

1.5 = Any one of the following questions on the postlude does not meet the expectations listed above:
   Question 1, Question 2, Question 3, or Question 4

1 = Either this is one of the first three lessons with a group and Question 4 does not meet the expectations listed above OR any two of the following questions does not meet the expectations listed above:
   Question 1, Question 2, Question 3, or Question

4 IF this is the 4th lesson with the group.

0.5 = If this is one of the first three lessons with a group, then the response to Question 4 and one other question do not meet the expectations listed above OR Question 4 has the only acceptable response. If this is the fourth lesson with a group, then only one of the responses meets the expectations.

0 = If this is one of the first three lessons with a group, then the response to Question 4 and two or more other questions do not meet the expectations listed above. If this is the fourth lesson with a group, than none of the responses is acceptable.

The record of your scores for each section is shown on the next page:
Teaching Lab: Lesson Plan 1 and Reflection

<table>
<thead>
<tr>
<th>Content Score (2 points possible)</th>
<th>Environment Score (1 point possible)</th>
<th>Lesson Score (7 points possible)</th>
<th>Postlude Score (2 points possible)</th>
<th>Raw Score</th>
<th>Scaled Score*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.5</td>
<td>6.75</td>
<td>2</td>
<td>11.25/12</td>
<td>2.8125/3</td>
</tr>
</tbody>
</table>

* This assignment is 3% of your final ED384 score. This “scaled score” will be included in the sum of all scaled scores in determining your final score/grade.

Comments: This plan is well organized, easy to follow, and seems well reasoned. It seems relatively straightforward and somewhat traditional, but don’t let anyone ever tell you that the word “traditional” is necessarily a bad word. Sometimes relatively straightforward paper and pencil work is the best method to use. As we briefly discussed in class, you might want to check out the “Let’s Use Algebra Tiles” powerpoint posted on the class Moodle site for some ideas about how you might model equations with that manipulative.

I had a couple of minor critiques that are highlighted in Comments M2, M3, M5 and M6.

Nice job on the postlude. Please refer to the marginal comments for specific feedback on the thoughts you shared there.
For lessons which will be observed by a supervisor, we will require candidates to address the following pre-observation questions, which connect to Augustana Standards and Indicators:

**The Content:**

4. Previous learning - What is the context for this lesson? How will you build on content learned in previous lessons? On what knowledge, skills, and/or abilities is this lesson going to build?

   Prior to this lesson, the students have been working on one and two step problems. They learned to isolate negative signs by adding parentheses around the numbers. During this lesson, students will be re-introduced to the Distributive Property. We will begin with exploring what the Distributive Property actually represents. Students will first look at a word problem and then use algebra tiles to see what the distributive property does. We will then move on to the computation portion of the lesson, allowing the students to practice with both positive and negative numbers in front of the parenthesis.

5. Future learning - How do you anticipate using the content from this lesson in future lessons?

   The next logical step for these students would be to use the distributive property when solving several step equations. They will combine the information learned from the previous lesson with the information learned in this lesson to solve challenging, multi-step equations. This will greatly help when students begin working with inequalities and graphing.

**The Environment:**

6. How will your choice of materials and resources and your arrangement of the physical environment enhance learning?

   Students will be using manipulatives (algebra tiles and candy!) to visualize the distributive property. This will help the visual and kinesthetic learners because they will be able to see how the property works and actually manipulate the problem to understand what is happening. Students will also be completing a few computational problems to get practice in. Practice is very important when working with the distributive property. With my student with the vision impairment, the mini white board will help the student see what the rest of the students see, helping the student understand what is happening in each step of solving an equation.

**The Lesson**
9. **Unit title/grade level/course/date.** Multi-step Equations/Distributive Property, 7th Grade, Math, 4/1/11

10. **Performance Objective** (in the teaching profession, you’ll also hear this called an aim, outcome, learning target/goal): Students will be able to understand the distributive property and use it in a multi-step equation to solve for a variable.

11. **Rationale** (Instructional Goal/Purpose):

   - 6th Grade: Expressions and Equations (6.EE) - Apply and extend previous understandings of arithmetic to algebraic expressions
   - 6th Grade: Expressions and Equations (6.EE) – Reason about and solve one-variable equations and inequalities
   - 7th Grade: Expressions and Equations (7.EE) – Use properties of operations to generate equivalent expressions.

12. **Assessment strategy:** Students will turn in their warm-up sheets so that I can determine how much they remember from prior lessons. This will tell me if I need to perform a quick review at the beginning of each lesson or not. I will also be monitoring student work as they solve problems in class. This way I can catch errors and help the students identify their disconnects. Students will also be working together with their peers to solve a word problem as well as to create a problem of their own. I will be listening to their discussion and reasoning to follow their thinking.

13. **Accommodations for Exceptional Learners:**

   I have one student with a visual impairment. For this student, I will be making all papers 140% of the original draft. I will also write really big on the white board so that he has an equal opportunity to see the examples. I will even print out a copy of the examples so that the student has a copy in front of him. As the students solve problems on the board, I will copy their work on a smaller whiteboard for this student to see what his peers have done.

14. **Grouping strategy:**

   Students will complete the warm-up activity individually. They will be seated in their desks in two rows. For the hook activity (not the warm-up), the students may work together with their peers. When we use the Algebra Tiles, students may work near their group members for support but each student must show their work with their own algebra tiles. Students will work individually on computational problems. For the culmination activity, I will allow the students to work together with the students next to them.

Comment [ME13]: As always, think about whether you want to scan your students’ written work for the purposes of the portfolio. In this case, your plan is to quickly review the work in class and use that to decide whether or not to do a review during the lesson. I could imagine you including this student work in your portfolio with some explanatory text about “I adjusted my second lesson with the 7B group because of what I saw in their work…….”
15. **Materials:**
Whiteboard, pencils, notebooks, warm-up sheets, algebra tiles, candy, small whiteboard

16. **Enactment:**

- **Hook** (Anticipatory Set; Introduction):
  Warm up: students solve the following two-step equations individually.
  
  \[
  \begin{align*}
  15 &= 5x - 15 & \text{A: } x &= 6 \\
  -3x + 18 &= 6x & \text{A: } x &= 2 \\
  81x &= 255 & \text{A: } x &= -1/9
  \end{align*}
  \]

  5 min: “You’re getting ready to go to a party at a friend’s house when your friend, who is putting the party together, asks five of you to bring three cans of pop each. Suddenly, the phone rings. Your friend has realized that there may be more people there than she thought, so she asks each of her five friends to bring an additional two cans of pop. How many cans of pop has she asked for? How many more friends does she expect to come than originally planned? How can you find out?”

  3 min: Solution and Discussion:
  \[
  5x3 + 5x2 \rightarrow \text{Ask who can write this another way?} \ 5(3+2)
  \]

- **Student Aim**

  1 min: “Today, we will be practicing how to use the distributive property.”

- **Development** (the body of the lesson):

  15 min: Algebra Tiles: Students will use the algebra tiles to understand what the distributive property actually represents.

  3(Green + Red) = 3 rows of 1 green tile and 1 red tile. All together? Totals: 3 Green tiles and 3 Red tiles.

  - Can write this as: 3(G + R) = 3G + 3R.

  Another problem: 6(Blue + Red) = 6B + 6R.

  - What if we substitute the number 4 for Blue and 2 for Red?
    
    \[
    6(4 + 2) = 6*4 + 6*2 = 24 + 12 = 36.
    \]

  - What if we substitute the letter x for Blue and the number 2 for Red?
    
    \[
    6(x + 2) = 6x + 12
    \]

  - Now let’s set it equal to -18 and solve. 6(x + 2) = -18.
    
    \[
    x = -1
    \]

  20 min: Practice with distributive property. Reminder: students should write the property that they’re using next to each step (i.e. DP or A3 for add 3). I have a separate list of problems that I will give to the students.

Comment [ME14]: I’ve just made a note to myself that I need to bring the algebra tiles, small white board, and probably an eraser and dry erase marker.

Comment [ME15]: Nice tie-in to the day’s topic.
Teaching Lab: Lesson Plan 2 and Reflection

- **Culmination** (Conclusion, Closure, Recap, Wrap up)
  8 min: “I have 20 pieces of candy here. With a partner, how can we demonstrate the distributive property with this bag of candy? Come up with a problem that uses the number of students in our group.”
  - Have students explain their problem and why it represents the distributive property.

- **Leap** (looking forward/next steps)
  “Next lesson, we will learn/review how to use the Distributive Property in several step equations.”

**Postlude: In reflecting on your teaching experience**, please address the following questions:

5. What did you feel went well? List and discuss 3 – 4 positive aspects of the lesson, making specific reference to events within the learning experience.
   - One of the strongest parts of my lesson would be the addition of the white board for my student with a vision impairment. The student was able to see the problems much easier and did not have to ask for help when I walked around. I think this tool made him feel more like part of the group.
   - The algebra tiles activity also seemed to help the students understand what the distributive property actually does. The students were able to see the groups of objects (ex: 3(Red + Blue) is 3 groups of 1 Red block and 1 Blue block) as well as the distribution of objects (ex: organized into 3 Red blocks and 3 Blue blocks).
   - After the students solved the warm-up problems, I handed each a marker and asked them to show their work on the board. This saved time as they all wrote the problems at the same time, and we were able to go through them much quicker.
   - I also really liked the party example which asked the students to work together to solve the problem. I did not ask the student to use the distributive property, but most of the students did end up using it without knowing. One student was able to identify the property in his work and share with the class! Real-life examples!

6. What happened during the lesson that was unexpected? (again, make specific reference to events within the lesson, and to why you feel the unexpected occurred).
   - **I ran out of time**. The students spent a bit more time on the party example and the warm-up than I had planned for, so we didn’t get to practice as many computational problems as I had hoped. I did have a pretty jam-packed lesson, so I understand why we ran over on time. It won’t be a big issue though because I can just use those examples for my warm-up for the next lesson. We can spend a few minutes of that lesson going over the examples in depth if necessary and it won’t take away from the lesson.

7. Complete the following sentence with a specific suggestion: I could have made this lesson better by... _
   - I could have made this lesson better by being in another room. Once again, the fact that Jennie and I were teaching side-by-side was a distraction. Both of our groups would constantly be looking at the other, wondering what was happening. I will look into using the “closet” for next lesson to minimize these distractions.
8. What important lesson did you learn from this experience that will influence your planning and conducting of future lessons?

While the manipulatives helped some students, they confused one student a little. I learned that manipulatives can be helpful in many circumstances but that is not always true of all students. When the basic understanding of a concept is present, manipulatives can be confusing and actually cause a student to second guess their knowledge. What becomes important then is that you clarify with these students to make sure that knowledge is built upon instead of left in the dark.

Comment [ME15]: An important insight.
Teaching Lab: Lesson Plan 2 and Reflection

Name: Sample Student

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The Lesson (7 points)
Note: This section is scored differently than the other sections. In this section, points are awarded for discrete indicators. The total score for this section will be the sum of the points earned. Points are awarded as described below. Partial points might be awarded if a given indicator is adequate but not completely satisfactory.

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1 point awarded for the pedagogical value of the lesson sequence described in The Enactment. It should be clear that the sequence of events in your lesson supports students’ progress toward the Performance (or Learning) Objective. The lesson should be mathematically sound in terms of both content and process. It is expected that students will learn or practice or apply or reason with mathematical content, and also that they will exercise one or more appropriate NCTM process standards during the lesson. Students should be active participants during the lesson. The lesson plan should provide evidence that the teacher recognizes that the focus of the students’ activity should be educational. That is, a “fun” lesson might be acceptable if it is clear that students’ mathematical knowledge will be enhanced through the lesson.

Postlude (2 points)

2 = All four of the questions on the “Postlude” sheet are thoughtfully addressed. It is clear that you reflected seriously on each question, and that you recognize the value of drawing on insights from previous teaching experiences (both positive and negative experiences) in order to improve future instruction. If this is your first, second, or third lesson with a group, then Question 4 should serve as a bridge between this lesson and the next lesson. That is, it is expected that your response to Question 4 will include some sort of assessment statement about the students’ performance in this lesson (based on the assessment strategy you articulated earlier in the plan) that will influence your plan for the next lesson.

1.5 = Any one of the following questions on the postlude does not meet the expectations listed above:
   Question 1, Question 2, Question 3, or Question 4 IF this is the 4th lesson with the group.

1 = Either this is one of the first three lessons with a group and Question 4 does not meet the expectations listed above OR any two of the following questions does not meet the expectations listed above:
   Question 1, Question 2, Question 3, or Question 4 IF this is the 4th lesson with the group.

0.5 = If this is one of the first three lessons with a group, then the response to Question 4 and one other question do not meet the expectations listed above OR Question 4 has the only acceptable response. If this is the fourth lesson with a group, then only one of the responses meets the expectations.

0 = If this is one of the first three lessons with a group, then the response to Question 4 and two or more other questions do not meet the expectations listed above. If this is the fourth lesson with a group, than none of the responses is acceptable.

The record of your scores for each section is shown on the next page:
Comments:  Good.  Nicely designed plan.  Note that if you are new to using algebra tiles to model the distributive property, it would probably be a good idea to quickly review the “Using Algebra Tiles” powerpoint that is on the ED384 Moodle site (it’s toward the bottom in the “Class Handouts and PowerPoints” section, under Week 2.  I know that a couple of other students crashed and burned a bit during their first lesson because they thought they knew how to model the operation with the manipulatives, but it turned out they didn’t know it as well as they thought they did.  The powerpoint has many slides, but each slide has a clear title so you can quickly navigate to the distributive property stuff.

Nice job on the postlude.  Please read the marginal comments in that section for further detail.
Augustana Individual Lesson Plan Format

For lessons which will be observed by a supervisor, we will require candidates to address the following pre-observation questions, which connect to Augustana Standards and Indicators:

The Content:

7. Previous learning- What is the context for this lesson? How will you build on content learned in previous lessons? On what knowledge, skills, and/or abilities is this lesson going to build?

Prior to this lesson, the students have been working on solving one and two step equations and using the distributive property. During this lesson, students will be asked to apply their skills from the first two lessons as they solve a bit more complicated multi-step equations. Students will be expected to pay close attention to negatives and solving equations step-by-step. The main skill during this lesson that the students will need to develop is the ability to isolate each step, recognizing which terms are like terms.

8. Future learning- How do you anticipate using the content from this lesson in future lessons?

Because this is my last time teaching new content to these students, I do not know where the students will go from here. I do think that it would be important for students to apply these skills to working with inequalities or graphing (even if mere exposure). Also, since the students had just finished a unit on decimals, applying decimals as coefficients in the equations would also be a good next step to take.

The Environment:

9. How will your choice of materials and resources and your arrangement of the physical environment enhance learning?

Students will be solving most of the problems in their notebooks for individual practice and later use. Students will be working individually on these problems so that they can determine their own understanding and progress. For the student with the vision impairment, the mini white board will help the student see what the rest of the students see, helping the student understand what is happening in each step of solving an equation. The competition at the end of the lesson will allow the students to have fun while learning. Most of this material is pretty dry and boring, so by adding a little competition and movement, the students may get excited!

The Lesson

Comment [ME20]: Though I strongly encourage you to prepare something in addition to the post-test for your 4th lesson with the group. It’s conceivable that the students will complete the post-test in, say, 25 or 30 minutes, leaving you with 15 or 20 additional minutes to work with. This might be an opportunity for you to prepare a genuine “problem solving” activity that incorporates the skills they exercised during your lessons. That is, rather than having them work through more worksheets or whatever, locate or create an activity that is more open-ended but still utilizes the algebraic skills you’ve highlighted.

One seed of an idea that pops immediately to mind is to give the students a task such as: “Create an equation that involves the distributive property on both sides of the equation, and whose solution is –7”…this is a nice way to get them thinking about equations in a different way…e.g., starting with the answer and finding a potential “question”……

Following this advice might be helpful to you for your portfolio as well…I don’t believe you’ve had your students do much genuine Problem Solving this term. So, while you can definitely document process standards such as Representation and Communication, Problem Solving still needs to be done. Maybe this is your chance….
17. **Unit title/grade level/course/date.** Multi-step Equations/Distributive Property, 7th Grade, Math, 4/8/11

18. **Performance Objective** (in the teaching profession, you’ll also hear this called an aim, outcome, learning target/goal): Students will be able to isolate like terms and apply the distributive property in challenging multi-step equations to solve for a variable.

19. **Rationale** (Instructional Goal/Purpose):
   - 6th Grade: Expressions and Equations (6.EE) - Apply and extend previous understandings of arithmetic to algebraic expressions.
   - 6th Grade: Expressions and Equations (6.EE) – Reason about and solve one-variable equations and inequalities
   - 7th Grade: Expressions and Equations (7.EE) – Use properties of operations to generate equivalent expressions.

20. **Assessment strategy:** Students will turn in their warm-up sheets so that I can determine how much they remember from prior lessons. This will tell me how much they understand from previous lessons. I will also be monitoring student work as they solve problems in class. This way I can catch errors and help the students identify their disconnects. The competition at the end of the lesson will also help me identify who is having difficulty with certain steps. I will also be able to see who can catch mistakes and fix them.

21. **Accommodations for Exceptional Learners:**
   I have one student with a visual impairment. For this student, I will be making all papers 140% of the original draft. I will also write really big on the white board so that he has an equal opportunity to see the examples. I will also write the problems on a small whiteboard and leave it in front of him. This will allow him to see the problems easily and feel equally integrated within the group. As the students solve problems on the board, I will copy their work on this smaller whiteboard for the student to see what his peers have done.

22. **Grouping strategy:**
   Students will complete the warm-up activity individually. They will be seated in their desks in one/two rows, depending on space. Students will work individually on computational problems. For the competition at the end, students will be divided into two teams (one with 2 students, one with 3).

23. **Materials:**
24. Enactment:

- **Hook** (Anticipatory Set; Introduction):
  Warm up: students solve the following two-step equations individually.
  \[
  \begin{align*}
  2(x - 5) &= 20 & A: x &= -5 \\
  4(3 - x) &= 8 & A: x &= 1 \\
  -(x - 9) &= 15 & A: x &= -6
  \end{align*}
  \]

  5 min: Solutions and Discussion: students will solve problems on the board and explain their work.

- **Student Aim**
  1 min: “Today, we will be applying the distributive property to our multi-step equations that we practiced in a prior lesson.”

- **Development** (the body of the lesson):
  10 min: Mini-lesson on how to identify like terms. In order to see the pieces of information that they will manipulate, they will underline like terms (variables or constants) (i.e. \(2x + 4 = 4x\)). Students then know that they must do something to simplify this equation and solve for \(x\).
  20 min: Practice solving challenging multi-step equations. Reminder: students should write the property that they’re using next to each step (i.e. DP or A3 for add 3). I have a separate list of problems that I will give to the students.

- **Culmination** (Conclusion, Closure, Recap, Wrap up)
  15 min: Competition: students will divide into two teams, one team will go twice. Teams will be given a problem to solve and they must solve it one step at a time. Person 1 will write the problem on the board and solve the first step. Person 2 will continue the problem with the second step. Person 3 (or Person 1 again) will continue with a third step. This will continue until the equation has been solved. If at any time, a teammate notices an error, he/she can fix the error but that replaces their turn. They may not move on to the next step. 5 points will be awarded to the first team who finishes the problem correctly. 3 points will be awarded to the other team if they get the correct answer. 2 points will be subtracted if the students do not show sufficient work. And 10 bonus points will be added to teams who complete the problem correctly under a given time limit. **”Both teams get candy! 😊**

- **Leap** (looking forward/next steps)
“Next time we meet, you will take a post-assessment to determine how your algebra skills have improved.”

Postlude: In reflecting on your teaching experience, please address the following questions:

9. What did you feel went well? List and discuss 3 – 4 positive aspects of the lesson, making specific reference to events within the learning experience.
   - Isolating parts – The students were able to identify like terms easily and underline them so they knew which items to combine. This seemed to help classify aspects of the problem so that elements that were not “like terms” did not get combined. (i.e. $2x+3 \neq 5x$ but $2x+3x = 5x$). By underlining, the like terms seemed to jump out at the students so that they could focus on combining one thing at a time.
   - White boards – The students seemed to really like the white boards. They were able to write bigger, so many students “held onto” the negatives in their equations. While my students understand the basic concepts, they often lose negative signs and end up with the wrong answer. By writing bigger, the negative sign also ends up bigger, making it harder to lose track of.
   - My lessons have been pretty dry in the past, but the students like to get up and move around. To make things more interactive, I had students take turns being the ones at the chalkboard while the rest of the students told the “assistant” what to do next in the problem. This was engaging and also put more responsibility on the students. They had to work as a team to get the correct answer.
   - While we ran out of time during the lesson and couldn’t play the game, I was able to set it up. This way when we meet on Friday, the students will already know the basics of how to play. It was serve as a final review before the post-assessment.
   - Being in the back of the room! The students were focused on the lesson and what I or their peers were saying. It was much easier to hold their attentions today.

10. What happened during the lesson that was unexpected? (again, make specific reference to events within the lesson, and to why you feel the unexpected occurred).

   I ran out of time…again!! I wanted to play at least 3 rounds of the game before the day ended, but we barely made it through 4 problems for practice. When we first got to the school today, the students all had to meet in the gym for something. Because of this, we lost a good 8 minutes or so of valuable teaching time. So instead of rushing to get to the game, I focused on practice. The truth is that you have to be flexible as a teacher – sometimes things don’t go exactly as planned! Luckily, this game will be great for review, so we’ll play it on Friday right before the post-assessment.

11. Complete the following sentence with a specific suggestion: I could have made this lesson better by...

   I noticed that my student with the vision impairment wasn’t even looking at the board today even though I was writing pretty big. I think he has accepted the fact that he cannot read it, so he doesn’t even look up. Or he could have difficulty reading chalk on a dirty chalk board versus a dark mark on a white board. I’m hoping this means that he can follow what is happening by listening closely. Each time I wrote the problem on the board, I read it in a way that he could copy the problem. The tricky thing was that I wasn’t able to write down what the students had done on the board for him due to our fast pace. He seemed to be trying to follow along through his own work though. To make this lesson better, I probably could have been copying down the student work as they were writing it on the board. This might have helped him follow along.

12. What important lesson did you learn from this experience that will influence your planning and conducting of future lessons?

   Flexibility. Very rarely does a teacher ever cover exactly what they wanted to in the exact amount of time allotted. It just doesn’t happen. Activities will usually overlap with other subjects or activities may last longer/shorter than expected. Being flexible allows a teacher to stay sane! I have run out of time two sessions in a row now, but it is not the end of the world. Since last session ran long, I used the
extra problems for my warm-up today. And although we didn't get to our game today, it'll serve as a great review game. Flexibility is an important aspect of teaching, and it will allow me to be prepared for a variety of situations that may arise during the school day.
Teaching Lab: Lesson Plan 3 and Reflection

Name: Sample Student

Four complete lesson plans will be completed for each Jordan teaching group (7A and 7B). A “complete lesson plan” includes all components of the Augustana Lesson Plan Template, including the Postlude section. The Postlude cannot be completed until after the lesson is taught. Hence, you will receive a partial score for this assignment before the lesson is enacted (you will get a score and feedback on all aspects of the plan except for the postlude), and the final score will be provided after the postlude has been submitted.

Points are awarded for this assignment as follows:

The Content (2 points)

2 = Both prompts in this section of the rubric are addressed clearly and thoughtfully. This section of the lesson plan clearly indicates how this plan builds on student knowledge revealed in previous teaching encounters, how this plan “sets the stage” for more advanced work the students will do in future lessons (if this is your last lesson, then the “future lessons” will be with another teacher), and how this plan connects to the over-arching learning goals you laid out in your Unit Plan. If the plan includes differentiated learning goals, this section of the plan should also specify the student knowledge differences revealed in the past. If this is your 2nd, 3rd, or 4th lesson with the group, there should be a clear connection between Prompt 4 of the previous lesson’s postlude and Prompt 1 in this section.

1.5 = Both prompts are satisfactorily completed, but the clarity of one prompt could be improved. That is, while the prompt makes sense for the most part, but further detail would be helpful. For example, it may not be entirely clear how this lesson builds on the previous one; it may not be entirely clear how this lesson relates to the Unit Plan, etc.

1 = Either both prompts “could be improved” as described for the score description of 1.5 above, or one prompt is completely satisfactory while the other prompt is confusing and/or quite unclear. It is extremely difficult or even impossible to understand how this lesson connects to previous learning, future learning, or the over-arching learning goals.

0.5 = One of the prompts “could be improved” as described for the score description of 1.5, while the other prompt is confusing and/or quite unclear as described for the score description of 1.

0 = Both prompts are confusing and/or quite unclear.

The Environment (1 point)

1 = You make a convincing justification for why you are arranging the classroom environment as planned (that is, you explain why you feel that having students work individually or in groups at different times during the lesson will be helpful, you explain why you have chosen certain materials for the lesson, etc.). The key words in the writing prompt are “enhance learning,” so your response should go beyond simply describing how you plan to arrange the environment. You should also explain why you feel this arrangement will be beneficial to your students.

0.5 = You adequately describe how the environment will be arranged, but your justification for the arrangement could be more convincing. OR, the response in this section is well written, but the body of the lesson plan reveals that additional environmental decisions were made but were not mentioned in this prompt.

0 = The response provides little or no evidence that you thought seriously about the implications of environmental arrangements. Either no reasons are provided explaining why certain arrangements might be beneficial, or the reasons provided are baseless.

The Lesson (7 points)
Note: This section is scored differently than the other sections. In this section, points are awarded for discrete indicators. The total score for this section will be the sum of the points earned. Points are awarded as described below. Partial points might be awarded if a given indicator is adequate but not completely satisfactory.

1 point awarded for the Performance Objective. You should clearly indicate the student learning or performance goal for the lesson. It is expected that all other aspects of the lesson plan will support this Performance Objective. So, for example, if the Performance Objective is well articulated but the sequence of events in the lesson does not seem to support the Objective, this point (or a fraction of it) may be lost. It is also expected that the Performance Objective for this lesson will be clearly connected to the over-arching learning goals stated in the Unit Plan.

1 point awarded for the Rationale. You should be able to explain why the Performance (or Learning) Objective is important to your students. You should also indicate how this lesson connects to learning standards. You should list the related Common Core Standard(s) for Mathematics that indicate the content your students will learn, and also describe the appropriate NCTM Process Standards you expect your students to engage with during the lesson.

1 point awarded for the Assessment Strategy. By the end of the lesson (and possibly in the midst of the lesson) you should have some basis for knowing how the students are progressing toward the Performance (or Learning) Objective. You should explain and convincingly justify how you will assess students’ understanding, progress, or achievement during the lesson.

1 point awarded for articulating Accommodations for Exceptional Learners. This section of the plan should provide evidence that you have thoughtfully considered and/or anticipated special learning needs that may occur during the lesson. This may include (but is not limited to) making accommodations for students with disabilities; differentiating instruction so that more advanced and less advanced students are appropriately challenged; building in extra instructional supports for students who struggle, etc.

1 point awarded for “The Lesson” sections 1, 6, and 7 on the template. It is expected that the lesson will be appropriately labeled [including an indication of the particular 7th grade group (7A or 7B), the general content area (e.g., computations with integers), and the date]; a convincing rationale for your student grouping strategy will be provided; and a thorough list of the materials you will need to gather and prepare in advance of the lesson will be provided.

1 point awarded for the clarity, feasibility, and helpfulness of “The Enactment” section. In this section, you should clearly describe the sequence of events that will occur during the lesson. It should be written clearly enough so that another teacher, such as a substitute, would be able to enact the lesson based on your description. The temporal sequence of the lesson should be feasible. That is, it should be clear that your lesson will keep the students productively focused on learning throughout the class period; but at the same time you must ensure that your learning objectives are accomplished during the limited time. In short, you should strike the balance between planning too many activities during the lesson and planning too few. You are encouraged to identify aspects of the lesson that are more and less important, so that you will know what can be “cut out” if you begin to run out of time during the lesson. You are also encouraged to have “back-up” plans in place in case the lesson ends sooner than expected. “The Leap” section of the template can be helpful in this regard: it can include more advanced activities related to the content that you can move into during the lesson if there is time. Finally, the Enactment section should be a document that is helpful to you as a teacher. It should provided guidelines for how you will manage time during the lesson. Its information should be concise and well-organized so that you can quickly refer to it during the lesson itself and know how to proceed with the lesson. Thus, this section should strike the balance between having too much information and too little information. If this section includes paragraphs of text, detailed scripts of what you intend to say, etc., it will not be helpful in practice as you will not be able to quickly gather important information from it. Alternately, if the plan is not detailed enough you may not be adequately prepared for the lesson.
1 point awarded for the pedagogical value of the lesson sequence described in The Enactment. It should be clear that the sequence of events in your lesson supports students’ progress toward the Performance (or Learning) Objective. The lesson should be mathematically sound in terms of both content and process. It is expected that students will learn or practice or apply or reason with mathematical content, and also that they will exercise one or more appropriate NCTM process standards during the lesson. Students should be active participants during the lesson. The lesson plan should provide evidence that the teacher recognizes that the focus of the students’ activity should be educational. That is, a “fun” lesson might be acceptable if it is clear that students’ mathematical knowledge will be enhanced through the lesson.

Postlude (2 points)

2 = All four of the questions on the “Postlude” sheet are thoughtfully addressed. It is clear that you reflected seriously on each question, and that you recognize the value of drawing on insights from previous teaching experiences (both positive and negative experiences) in order to improve future instruction. If this is your first, second, or third lesson with a group, then Question 4 should serve as a bridge between this lesson and the next lesson. That is, it is expected that your response to Question 4 will include some sort of assessment statement about the students’ performance in this lesson (based on the assessment strategy you articulated earlier in the plan) that will influence your plan for the next lesson.

1.5 = Any one of the following questions on the postlude does not meet the expectations listed above:
  Question 1, Question 2, Question 3, or Question 4 IF this is the 4th lesson with the group.

1 = Either this is one of the first three lessons with a group and Question 4 does not meet the expectations listed above OR any two of the following questions does not meet the expectations listed above:
  Question 1, Question 2, Question 3, or Question 4 IF this is the 4th lesson with the group.

0.5 = If this is one of the first three lessons with a group, then the response to Question 4 and one other question do not meet the expectations listed above OR Question 4 has the only acceptable response. If this is the fourth lesson with a group, then only one of the responses meets the expectations.

0 = If this is one of the first three lessons with a group, then the response to Question 4 and two or more other questions do not meet the expectations listed above. If this is the fourth lesson with a group, than none of the responses is acceptable.

The record of your scores for each section is shown on the next page:
Comments: Nice job overall. Please read all of the marginal comments as they all provide important feedback and suggestions, I think. Comments ME4 and ME6 explain the lost half-point, but, again, the other comments are important, too.

Thoughtful postlude, as usual. I especially liked your concern about the visually impaired students and your thoughts about how you might better accommodate him moving forward.
Augustana Individual Lesson Plan Format

For lessons which will be observed by a supervisor, we will require candidates to address the following pre-observation questions, which connect to Augustana Standards and Indicators:

The Content:
10. Previous learning- What is the context for this lesson? How will you build on content learned in previous lessons? On what knowledge, skills, and/or abilities is this lesson going to build?

Prior to this lesson, the students have been working on solving complex, multi-step equations and using the distributive property. During this lesson, students will be asked to apply their skills from the previous sessions as they solve 8 problems in a post-assessment. Students will be reminded and expected to pay close attention to negatives and solving equations step-by-step.

11. Future learning- How do you anticipate using the content from this lesson in future lessons?

I still think that it would be important for students to apply these skills to working with inequalities or graphing (even if mere exposure). Also, since the students had just finished a unit on decimals, applying decimals as coefficients in the equations would also be a good next step to take.

The Environment:
12. How will your choice of materials and resources and your arrangement of the physical environment enhance learning?

The competition at the beginning of the lesson will allow the students to have fun while learning. Most of this material is pretty dry and boring, so by adding a little competition and movement, the students may get excited!

Students will then complete the post-assessment. For comparison purposes, the post-assessment will be almost identical to the pre-assessment. The assessment will be written so that students can show their work and so I can trace/understand their thinking. Students will be seated in their desks and away from others so that they can focus on their own paper.

The Lesson
25. Unit title/grade level/course/date. Multi-step Equations/Distributive Property, 7th Grade, Math, 4/15/11
26. **Performance Objective** (in the teaching profession, you'll also hear this called an aim, outcome, learning target/goal): Students will demonstrate their understanding of the distributive property and solving multi-step equations by completing a post-assessment.

27. **Rationale** (Instructional Goal/Purpose):

- 6th Grade: Expressions and Equations (6.EE) - Apply and extend previous understandings of arithmetic to algebraic expressions.
- 6th Grade: Expressions and Equations (6.EE) – Reason about and solve one-variable equations and inequalities.
- 7th Grade: Expressions and Equations (7.EE) – Use properties of operations to generate equivalent expressions.

28. **Assessment strategy:** The competition at the beginning of the lesson will serve as a review game for the students. It will also help me identify who is still having difficulty with certain steps. This will also be a good opportunity for me to see who can catch mistakes and fix them. The post-assessment then will show me what the students have learned since the beginning session. The students will be given a very similar test to the pre-assessment to compare results.

29. **Accommodations for Exceptional Learners:**

I have one student with a visual impairment. For this student, I will be making all papers 140% of the original draft. I will write really big on the white board so that he has an equal opportunity to see the examples. I will also write the problems on a small whiteboard and leave it in front of him. This will allow him to see the problems easily and feel equally integrated within the group. As the students solve problems on the board, I will copy their work on this smaller whiteboard for the student to see what his peers have done.

30. **Grouping strategy:**

Students will be divided into 2 groups to play the game (groups of 2 or 3). They will form a straight line when waiting for their partners to complete a step of the equation. Students will then work individually on the post-assessments.

31. **Materials:**

- Whiteboard/chart paper, pencils, candy, small whiteboards, markers, eraser, post-assessments

32. **Enactment:**

Comment [M28]: Please bring the same ones that you brought last time.
Teaching Lab: Lesson Plan 4 and Reflection

❖ **Hook** (Anticipatory Set; Introduction):
15 min: Competition: students will divide into two teams, one team will go twice. Teams will be given a problem to solve and they must solve it one step at a time. Person 1 will write the problem on the board and solve the first step. Person 2 will continue the problem with the second step. Person 3 (or Person 1 again) will continue with a third step. This will continue until the equation has been solved. If at any time, a teammate notices an error, he/she can fix the error but that replaces their turn. They may not move on to the next step. 5 points will be awarded to the first team who finishes the problem correctly. 3 points will be awarded to the other team if they get the correct answer. 2 points will be subtracted if the students do not show sufficient work. And 10 bonus points will be added to teams who complete the problem correctly under a given time limit. **Both teams get candy! 😊

1. \(2(x + 1) = 4(x + 3)\)
2. \(- (3 - x) = 9 - x\)
3. \(- 9 (1 + x) = 16 - 4x\)
4. \(- 6x - (3 - x) + 2x = 12\)
5. \(5 - x + 2(6 - x) = x + 3 (2x - 1)\)

❖ **Student Aim**
1 min: “Today, we will be taking a post-assessment to see how much you’ve learned.”

❖ **Development** (the body of the lesson):
30 min: Post-assessment

❖ **Culmination** (Conclusion, Closure, Recap, Wrap up)
3 min: Real-life applications – students will brainstorm ways that they might use the information learned from these lessons in any given day.

❖ **Leap** (looking forward/next steps)
   “Now that you have learned how to use the distributive property to solve complex equations, it should be easy to solve complex inequalities.”

**Postlude:** In reflecting on your teaching experience, please address the following questions:

1. What did you feel went well? List and discuss 3 – 4 positive aspects of the lesson, making specific reference to events within the learning experience.
   ❖ Review game – the students loved it! They got very excited and into the pressure of only solving one step at a time.
Teaching Lab: Lesson Plan 4 and Reflection

- I was most happy to see that the students were able to catch each other’s mistakes. Both teams were good at catching simple mistakes.
- The timing of the game before the assessment was good. Since we only see the students once or twice a week, it can be difficult for the students to remember the minor details that are really helpful in solving problems.
- Adding the element of time also forced the students to work quickly and efficiently. They knew that if they were sloppy that they would make simple mistakes. And then their partner(s) would have to catch their mistakes, adding more time. This told the students that they had to pay careful attention to their work, but work at a quick pace!

  - Post-assessment – I was shocked (yet excited) to see that most of the mistakes made on the assessment were simple mistakes. This told me that the students learned the proper procedures and were able to follow them correctly. The errors came from working with negatives and fractions. Either way, it means the students met my goals for them! They now know how to use the distributive property to solve multi-step equations!

2. What happened during the lesson that was unexpected? (again, make specific reference to events within the lesson, and to why you feel the unexpected occurred).

Looking at the post-assessments after the lesson, I saw that most of the errors for one of my students had to do with negative signs. Since the student has a vision impairment and it happened regularly throughout his assessment, I think it was due to the size of the font. This student generally knows the rules of working with negative signs (a negative times a negative is a positive), so I was really confused when he got only 2 out of 8 problems right. I had the font around size 20, but I think it's very easy for him to lose numbers or characters when he's working. I think if I were to do this assessment again, I might bold the negative signs or make them another color so that they stand out for the student.

3. Complete the following sentence with a specific suggestion: I could have made this lesson better by...

I could have made this lesson better by adjusting the time limit for the review game. For each problem, I gave the students extra points if they could solve it in a given amount of time. The students were easily able to solve the problems in that amount of time. I could have prepared for this better by solving it slowly myself and timing it, then adding another minute or so for partner switching. This way the students would have a better challenge.

4. What important lesson did you learn from this experience that will influence your planning and conducting of future lessons?

I learned that I am not an expert at accommodating just yet. It would be extremely helpful to do a little research on vision impairments if I was going to continue working with this student. I would want to make sure that I can help him in any/every way possible. I am very fascinated by the range of abilities and disabilities in this world, and I only wish that I had more experience/training in working with these students. For future lessons, I will try to do a little research on further accommodations or suggestions to aid in my students' success.
Directions: Solve each equation (using the distributive property when necessary) without a calculator and show your work in the box provided.

<table>
<thead>
<tr>
<th>Equation 1</th>
<th>Equation 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. $x + 5 = 1$</td>
<td>10. $4y = 12$</td>
</tr>
<tr>
<td>11. $6 - x = 2x$</td>
<td>12. $2(x - 1) = 16$</td>
</tr>
<tr>
<td>13. $-(y - 3) = -2$</td>
<td>14. $-3(x + 2) = 6 + x$</td>
</tr>
</tbody>
</table>
15. \(1 - (y - 3) = 7 - 2y\)  
16. \(4x + 2(x - 1) = -x - 5(x + 1)\)

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Please rate your confidence in the following areas from 1-5 using the scale below:

“Not confident at all” “Somewhat confident” “Very confident”

9. Solving one-step equations with addition and subtraction like \(x + 5 = 1\).

10. Solving one-step equations with multiplication and division like \(3x = 9\).

11. Solving two-step equations with a combination of addition/subtraction and multiplication/division like \(x + 3 = 4x\).

12. Solving multi-step equations with the distributive property like \(3(x + 1) = 6\).
Name: Sample Student

Four complete lesson plans will be completed for each Jordan teaching group (7A and 7B). A “complete lesson plan” includes all components of the Augustana Lesson Plan Template, including the Postlude section. The Postlude cannot be completed until after the lesson is taught. Hence, you will receive a partial score for this assignment before the lesson is enacted (you will get a score and feedback on all aspects of the plan except for the postlude), and the final score will be provided after the postlude has been submitted.

Points are awarded for this assignment as follows:

The Content (2 points)

2 = Both prompts in this section of the rubric are addressed clearly and thoughtfully. This section of the lesson plan clearly indicates how this plan builds on student knowledge revealed in previous teaching encounters, how this plan “sets the stage” for more advanced work the students will do in future lessons (if this is your last lesson, then the “future lessons” will be with another teacher), and how this plan connects to the over-arching learning goals you laid out in your Unit Plan. If the plan includes differentiated learning goals, this section of the plan should also specify the student knowledge differences revealed in the past. If this is your 2nd, 3rd, or 4th lesson with the group, there should be a clear connection between Prompt 4 of the previous lesson’s postlude and Prompt 1 in this section.

1.5 = Both prompts are satisfactorily completed, but the clarity of one prompt could be improved. That is, while the prompt makes sense for the most part, but further detail would be helpful. For example, it may not be entirely clear how this lesson builds on the previous one; it may not be entirely clear how this lesson relates to the Unit Plan, etc.

1 = Either both prompts “could be improved” as described for the score description of 1.5 above, or one prompt is completely satisfactory while the other prompt is confusing and/or quite unclear. It is extremely difficult or even impossible to understand how this lesson connects to previous learning, future learning, or the over-arching learning goals.

0.5 = One of the prompts “could be improved” as described for the score description of 1.5, while the other prompt is confusing and/or quite unclear as described for the score description of 1.

0 = Both prompts are confusing and/or quite unclear.

The Environment (1 point)

1 = You make a convincing justification for why you are arranging the classroom environment as planned (that is, you explain why you feel that having students work individually or in groups at different times during the lesson will be helpful, you explain why you have chosen certain materials for the lesson, etc.). The key words in the writing prompt are “enhance learning,” so your response should go beyond simply describing how you plan to arrange the environment. You should also explain why you feel this arrangement will be beneficial to your students.

0.5 = You adequately describe how the environment will be arranged, but your justification for the arrangement could be more convincing. OR, the response in this section is well written, but the body of the lesson plan reveals that additional environmental decisions were made but were not mentioned in this prompt.

0 = The response provides little or no evidence that you thought seriously about the implications of environmental arrangements. Either no reasons are provided explaining why certain arrangements might be beneficial, or the reasons provided are baseless.

The Lesson (7 points)
Teaching Lab: Lesson Plan 4 and Reflection (Evaluation)

Note: This section is scored differently than the other sections. In this section, points are awarded for discrete indicators. The total score for this section will be the sum of the points earned. Points are awarded as described below. Partial points might be awarded if a given indicator is adequate but not completely satisfactory.

1 point awarded for the Performance Objective. You should clearly indicate the student learning or performance goal for the lesson. It is expected that all other aspects of the lesson plan will support this Performance Objective. So, for example, if the Performance Objective is well articulated but the sequence of events in the lesson does not seem to support the Objective, this point (or a fraction of it) may be lost. It is also expected that the Performance Objective for this lesson will be clearly connected to the overarching learning goals stated in the Unit Plan.

1 point awarded for the Rationale. You should be able to explain why the Performance (or Learning) Objective is important to your students. You should also indicate how this lesson connects to learning standards. You should list the related Common Core Standard(s) for Mathematics that indicate the content your students will learn, and also describe the appropriate NCTM Process Standards you expect your students to engage with during the lesson.

1 point awarded for the Assessment Strategy. By the end of the lesson (and possibly in the midst of the lesson) you should have some basis for knowing how the students are progressing toward the Performance (or Learning) Objective. You should explain and convincingly justify how you will assess students’ understanding, progress, or achievement during the lesson.

1 point awarded for articulating Accommodations for Exceptional Learners. This section of the plan should provide evidence that you have thoughtfully considered and/or anticipated special learning needs that may occur during the lesson. This may include (but is not limited to) making accommodations for students with disabilities; differentiating instruction so that more advanced and less advanced students are appropriately challenged; building in extra instructional supports for students who struggle, etc.

1 point awarded for “The Lesson” sections 1, 6, and 7 on the template. It is expected that the lesson will be appropriately labeled [including an indication of the particular 7th grade group (7A or 7B), the general content area (e.g., computations with integers), and the date]; a convincing rationale for your student grouping strategy will be provided; and a thorough list of the materials you will need to gather and prepare in advance of the lesson will be provided.

1 point awarded for the clarity, feasibility, and helpfulness of “The Enactment” section. In this section, you should clearly describe the sequence of events that will occur during the lesson. It should be written clearly enough so that another teacher, such as a substitute, would be able to enact the lesson based on your description. The temporal sequence of the lesson should be feasible. That is, it should be clear that your lesson will keep the students productively focused on learning throughout the class period, but at the same time you must ensure that your learning objectives are accomplished during the limited time. In short, you should strike the balance between planning too many activities during the lesson and planning too few. You are encouraged to identify aspects of the lesson that are more and less important, so that you will know what can be “cut out” if you begin to run out of time during the lesson. You are also encouraged to have “back-up” plans in place in case the lesson ends sooner than expected. “The Leap” section of the template can be helpful in this regard: it can include more advanced activities related to the content that you can move into during the lesson if there is time. Finally, the Enactment section should be a document that is helpful to you as a teacher. It should provided guidelines for how you will manage time during the lesson. Its information should be concise and well-organized so that you can quickly refer to it during the lesson itself and know how to proceed with the lesson. Thus, this section should strike the balance between having too much information and too little information. If this section includes paragraphs of text, detailed scripts of what you intend to say, etc., it will not be helpful in practice as you will not be able to quickly gather important information from it. Alternately, if the plan is not detailed enough you may not be adequately prepared for the lesson.
1 point awarded for the pedagogical value of the lesson sequence described in The Enactment. It should be clear that the sequence of events in your lesson supports students’ progress toward the Performance (or Learning) Objective. The lesson should be mathematically sound in terms of both content and process. It is expected that students will learn or practice or apply or reason with mathematical content, and also that they will exercise one or more appropriate NCTM process standards during the lesson. Students should be active participants during the lesson. The lesson plan should provide evidence that the teacher recognizes that the focus of the students’ activity should be educational. That is, a “fun” lesson might be acceptable if it is clear that students’ mathematical knowledge will be enhanced through the lesson.

Postlude (2 points)

2  = All four of the questions on the “Postlude” sheet are thoughtfully addressed. It is clear that you reflected seriously on each question, and that you recognize the value of drawing on insights from previous teaching experiences (both positive and negative experiences) in order to improve future instruction. If this is your first, second, or third lesson with a group, then Question 4 should serve as a bridge between this lesson and the next lesson. That is, it is expected that your response to Question 4 will include some sort of assessment statement about the students’ performance in this lesson (based on the assessment strategy you articulated earlier in the plan) that will influence your plan for the next lesson.

1.5 = Any one of the following questions on the postlude does not meet the expectations listed above:
   Question 1, Question 2, Question 3, or Question 4 IF this is the 4th lesson with the group.

1  = Either this is one of the first three lessons with a group and Question 4 does not meet the expectations listed above OR any two of the following questions does not meet the expectations listed above:
   Question 1, Question 2, Question 3, or Question 4 IF this is the 4th lesson with the group.

0.5 = If this is one of the first three lessons with a group, then the response to Question 4 and one other question do not meet the expectations listed above OR Question 4 has the only acceptable response. If this is the fourth lesson with a group, then only one of the responses meets the expectations.

0  = If this is one of the first three lessons with a group, then the response to Question 4 and two or more other questions do not meet the expectations listed above. If this is the fourth lesson with a group, than none of the responses is acceptable.

The record of your scores for each section is shown on the next page:
<table>
<thead>
<tr>
<th>Content Score (2 points possible)</th>
<th>Environment Score (1 point possible)</th>
<th>Lesson Score (7 points possible)</th>
<th>Postlude Score (2 points possible)</th>
<th>Raw Score</th>
<th>Scaled Score*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>7</td>
<td>2</td>
<td>12/12</td>
<td>3/3</td>
</tr>
</tbody>
</table>

* This assignment is 3% of your final ED384 score. This “scaled score” will be included in the sum of all scaled scores in determining your final score/grade.

Comments: Good. The whiteboard game should be fun. Keep an eye on the clock, because you may need to cut the whiteboard game off early to ensure students have enough time to complete their post-tests. As noted in Comment ME2, you could always return to the game after the test if there’s extra time.

Your postlude reflection was well written and helpful.
Teaching Lab: Student Work on the Post-Assessment

The test found in the previous section (pages 67-68) was written by the sample student and used as a post-assessment of her 7th graders’ skills.

The original work produced by the 7th graders on the post-test is available at:

https://docs.google.com/viewer?a=v&pid=explorer&chrome=true&srcid=0BzPfT22BneFlYjE5MTc2OWQNTk0Ny00NzFlTkNTMDNTNjOTJjMjMxODkz&hl=en_US

The next section of this document shows the sample student’s final analysis of the 7th graders’ work. That is, the sample student compares the 7th graders’ work on the pre-test and post-test attempts to demonstrate learning gains.
**Augie Teacher Name:** Sample Student

**Directions:** Use this template to analyze and evaluate the teaching unit with this group. The template includes three sections: (1) Individual Development (where you will evaluate the learning or development of each individual student); (2) Unit Goals Statement (where you will evaluate the overall success of unit, stating the extent to which the Unit Goals were met); (3) Future Recommendations (where you will indicate how each student can develop further in their learning and also how you can develop as a teacher). You are free to insert additional data (such as gradebook tables, etc.) that you think will help illustrate your students’ performance, but this is not required.

You must include a copy of the students’ original work on the final assessment as an appendix. If you refer to other artifacts of student work in your analysis, copies of those artifacts should be included also. Part of the grade for this assignment will be awarded for the reasonableness of your assessment claims, and thus the original student work will be required for reference. Submit the student work in class, Mike will then scan it, email a scanned copy to you, and return the original hard copy to you. Mike can see to it that the students’ original work is returned to them if you feel this is appropriate. Your scanned copy will likely be useful to you when you work on your Teaching Portfolio.

**Section 1: Individual Development**

Use the table below to describe how each individual student developed over the course of your five encounters with them. Did the student learn new content, perform computational tasks more accurately, demonstrate more sophisticated reasoning skills, etc.? Be sure to include evidence to support your assessment claims (e.g., compare results on the pre-assessment and the final assessment; point to evidence in other artifacts of student work, etc.). If there is no evidence that a student progressed, or if the evidence suggests little or no growth, be frank about this. Note that in Section 3 you will be asked to make recommendations for future instruction for each student, hence an honest assessment of each student’s progress (or lack thereof) should serve as a basis for your recommendations.

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Areas for Improvement from Pre-Assessment</th>
<th>How the Student Developed</th>
</tr>
</thead>
</table>
| Amber        | • Simple mistakes: Negative use, (1) Amber solved 4-6 as 2, forgetting the minus sign.  
• Distributive Property (both positive and negative integers outside of the parenthesis).  
• Confusing habits: changing all subtraction problems to adding a negative number. Often loses the negatives.  
• Working with fractions in multi-step equations. | • Got 5/8 correct versus 1/8 correct on pre-assessment!  
• Simple mistakes were way down! The student only miscalculated once, saying that -2 - 3 = -1. (5) MUCH BETTER!  
• It is clear in several problems that the student understands the distributive property. Only once did the negative integer outside of the parenthesis not get distributed equally. (8) All other times, the student clearly distributed the integer to all parts inside the parenthesis.  
• While Amber chose to still change all subtraction problems to the addition of a negative number, she allowed more spacing between numbers so that the negative sign was visible. She only lost track of a negative sign once, whereas this was one of her biggest issues during the pre-assessment! (7).  
• We did not focus on working with fractions very much, so her solution from problem (8) is understandable that she answered 3/12 = 4. Given more time, this student would understand why that does not make sense. |
### Teaching Lab: Final Analysis

**Matthew**
- **Distributive Property** (consistency with negative integers outside of the parenthesis).
- The meaning of the addition of a negative number.
- Simple mistakes: (7) addition of variables.
- Consistency: what to do when an equation has a negative sign on both sides of the equals sign, i.e. \(-2 \equiv -x\).
- Understanding what solving for a variable looks like (variable can exist only on one side of the equation i.e. \(x \neq -x\)).
- Many mistakes with the distributive property; most problems occurred when there was a negative sign inside the parenthesis. (4,5,7,8).
- Matthew chose not to change subtraction to the addition of a negative number. I think this would have helped him hold on to negative signs.
- Simple mistakes: Matthew solved \(-6.6 \equiv 0\) and \(6/3 \equiv 3\). (3,6). Mistakes like these usually happen when working quickly and not double checking your work. The amount of simple mistakes will decrease over time with more practice.
- Matthew knows how to solve an equation when it has a negative sign on both sides of the equals sign (5).
- Matthew understands what solving for a variable looks like; all answers included one variable and a solution.

**Austin**
- Consistency: (3) and (8) addition of variables.
- Understanding what to do when an equation has a negative sign on both sides of the equals sign.
- Negative use (7) and (8) – Austin forgets a negative sign on occasion or gets confused by double negatives.
- Understanding what solving for a variable looks like (variable must exist on one side of the equation i.e. \(0 \neq 7\)).
- **Austin improved from 4/8 to 5/8 correct.**
- No problems with the addition/subtraction of variables.
- Understands what to do when an equation has a negative sign on both sides of the equals sign (5).
- Simple mistakes: solved \(-2.3 \equiv -6\). Austin also lost a variable when solving problem (6). Solved \(2 \times -1 \equiv -1\). (8).
- I attribute these mistakes to working quickly.
- Understands what solving for a variable looks like; all answers included one variable and a solution.
- We did not focus on working with fractions very much, so his solution from problem (8) is understandable that he answered \(4/-12 \equiv -3\). Given more time, this student would understand why that does not make sense.

**Frankie**
- Simple mistakes: (5) added \(-1\) and \(-2\) instead of multiplying.
- Knowing what to add or subtract when working with both sides of an equation (i.e. subtracting \(3x\) instead of adding \(3x\)).
- Consistency: Distributive Property (both positive and negative integers outside of the parenthesis).
- **Disconnected:** (8) added a variable to a constant instead of performing distributive property first. = Order of operations?
- Working with fractions in multi-step equations.
- **Frankie improved from 4/8 to 6/8 correct!**
- Simple mistakes: (4) solved \(18/2 = 6\) and (7) solved \(-3/-1 = -3\).
- No other problems!
- Knows what to add/subtract when working with both sides of the equation.
- Consistent and strong with the distributive property (both positive and negative integers).
- No issues with adding variables to constants.
- No problems with fractions in multi-step equations (8).

---

**Comment [ME31]:** The “font size” issue might be legit, but this would have been an issue for the pre-assessment also, right?

It’s OK to have one student (or a fraction of the students in a larger group) not provide evidence for learning gains over time, especially when the time frame is so brief. Indeed….it’s almost expected that there will be a “distribution of improvement” where some will improve dramatically, some will improve a little, and some will seemingly not improve at all.

In my mind, the fact that you can make a strong case that 4 of your 5 students improved over the course of your 4 lessons is good evidence that you impacted student learning.

There is also a silver lining in the fact one student’s results were somewhat disappointing: this one student can be a focal point for your reflections on how you might improve in the future.
Overall, Frankie has drastically improved since the beginning of the unit. Her confidence and willingness to participate has also improved. She clearly understands the distributive property and how to solve multi-step equations. She also takes her time and pays close attention to detail to avoid simple mistakes.

Gabrielle

- Knowing what to add or subtract when working with both sides of an equation (i.e. subtracting \(3x\) instead of adding \(3x\)).
- Simple mistakes: solved \(-5 \cdot 2 = -3\) (8).
- Consistency: Distributive Property (negative integers outside of the parenthesis) (7, 8)
- Working with fractions in multi-step equations (8).

- Simple mistakes: solved \(12/4 \div 3\) (lost the negative in the division) (6); subtracted 1 from the same side of the equation instead of both sides of the equation (7). This seems to be an organization issue and not a conceptual issue. If she had more space, she might not have made this mistake.
- Got 6/8 correct – improved from 5/8!
- Understands the distributive property very well and can solve multi-step equations with ease.
- Is GREAT at catching mistakes. This was really evident in our review game. Gabrielle was the first to fix errors in her partner’s work.
- Her work is organized, neat, and is easy to follow.

Overall, Gabrielle came in with a decent understanding of the distributive property but with the unit has developed good practice and organization. A few simple mistakes were the only thing keeping from a perfect score!

Section 2: Unit Goals Statement

To what extent did you meet the Unit Goals that were articulated in your Unit Plan? Was a particular goal met completely, partially, or not at all? Provide evidence supporting your claims.

- Students will be able to solve equations using the Distributive Property with both positive and negative integers outside of the parenthesis.
  - I definitely think that this goal was met. Students clearly showed in their post-assessments that they know that the distributive property is enacted by distributing the integer to any/all parts inside the parenthesis. Only one student seemed to have difficulty with this goal on the post-assessment, but I believe that it was due to his disability. Overall, all five students demonstrated correct usage of the distributive property in problems 4-5.

- Students will be able to solve multi-step equations with a combination of addition, subtraction, multiplication, and division.
  - Once again, I think that this goal was met. While all five students did make some simple mistakes, the process they used to solve the multi-step equations was correct. They recognized that if they were subtracting something from one side of the equation that they must do it to the other. They also knew how to combine like terms. This is evident in problems 3-8.

- Students will be able to solve multi-step equations with the Distributive Property.
  - I gave the students some pretty tough problems (6-8) with quite a few numbers. I was very impressed by the steps the students took in solving these difficult problems. The students recognized that they must perform the distributive property first, then they could simplify. Once they had made the problem easier to understand, they identified like terms and performed the necessary operation to end up with a solution. While again it was easy for the students to make simple mistakes (like leave out a negative sign or multiply a negative number by a negative number and get a negative number), they understood the procedure. And 2 students out of my five got the hardest problem right! ☺️

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  - I gave the students some pretty tough problems (6-8) with quite a few numbers. I was very impressed by the steps the students took in solving these difficult problems. The students recognized that they must perform the distributive property first, then they could simplify. Once they had made the problem easier to understand, they identified like terms and performed the necessary operation to end up with a solution. While again it was easy for the students to make simple mistakes (like leave out a negative sign or multiply a negative number by a negative number and get a negative number), they understood the procedure. And 2 students out of my five got the hardest problem right! ☺️
Section 3: Future Recommendations

Part A: Individual Students

In the table below, record recommendations you have for each student’s future mathematical work. What skills does the student need to hone, what more advanced work is the student ready for, etc.? Your comments should be helpful to any party interested in the student’s mathematical development, including the student’s regular teacher, parents, and the student him or herself.

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Future Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amber</td>
<td>Amber likes to work quickly. She does not reflect very much on her work, making it difficult for her to catch mistakes. However, she does a great job when she slows down and pays attention to detail. I’d say Amber deserves the “Most Improved” award and works best with small group attention. I also think that the best learning style for her is when she is forced to be interactive. When she was in front of the group writing on the board, I had her full attention. She was eager to do math! While Amber still makes simple mistakes, I think that removing the pressures like time and grades motivates her to do well. Amber is a great student and is on her way to being a great mathematician. As far as specific math skills, Amber would benefit from a bit more practice in these skills before moving on just yet. With practice, she will develop strong habits and minimize mistakes.</td>
</tr>
<tr>
<td>Austin</td>
<td>Austin is very confident in his math skills…sometimes a bit overconfident. He is very good at math, but he knows it, so he doesn’t check his work very often. That’s when he makes simple mistakes. I regularly reminded him to check his work, but he chose to sit there and draw a picture. Confidence is an important element, but I think it would be good for Austin to try to solve a few problems that he can’t figure out the answer to. In other words, Austin needs to be challenged in a new way. He needs to struggle (in a good way!) once in a while to understand that he has room to grow! Austin would be a great candidate for hands-on problem solving activities.</td>
</tr>
<tr>
<td>Matthew</td>
<td>Matthew is a very smart kid. He likes math but doesn’t often participate. Due to his vision impairment, I think he finds it difficult to follow along when others are showing their work. I tried a few different accommodations, some that worked and some that didn’t. In the end, I do not think that his post-assessment is an accurate portrayal of his math abilities. I think that Matthew is right on track when it comes to solving math problems. He tries very hard, works at a pace that is good for him, and pays attention to detail. With effective accommodations, he can properly demonstrate his math skills. I think Matthew would be ready to work with inequalities.</td>
</tr>
<tr>
<td>Frankie</td>
<td>Frankie is very quiet, but she always listens. She knows exactly what’s going on in the lesson and pays careful attention to detail. I think she learned a lot in this unit and benefitted from the small group environment. While she’s definitely not your eager student, she is a great listener and probably the most attentive. Frankie’s post-assessment showed me that she is a quick learner as well and would benefit greatly from a few challenging activities. I do think that she works best on her own, so a few group activities might take her out of her comfort zone but healthily force her to lean on others. Specifically, I think Frankie would be ready for working with inequalities and fraction/decimal integration.</td>
</tr>
<tr>
<td>Gabrielle</td>
<td>Gabrielle is a quick learner in math! She likes to be a leader and volunteer. Because of this, I believe she needs to be challenged a bit more. The organization of her work was fantastic, allowing me to clearly see her thinking. She is also great at catching mistakes, which means she is good at reflection as well. I also think Gabrielle would be ready for working with inequalities and fraction/decimal integration. I think she would enjoy the challenge.</td>
</tr>
</tbody>
</table>

Part B: Yourself as a Teacher

What have you learned from this experience that will help you become a better teacher in the future? If you felt you were not completely successful in meeting one or more of your Unit Goals, what might you do in the future to come closer to achieving the goal(s)? What aspects of your teaching were effective and how can you ensure that you will continue to hone these aspects in the future?

Well, first of all, I learned that middle school is VERY different from elementary school! The students expect a certain level of respect, and they deserve it. Even the way you talk to the students is different!

One of the things that really helped me was believe it or not teaching a few dry, boring lessons. This told me that I need to find a better way to make the lesson interesting and interactive. By adding a little competition and movement to my lessons, the students started to become more interested in what was happening.
I also learned just how much the environment plays a role on a lesson. Several times, we experienced a chaotic room, with multiple teachers competing for the white boards. It really distracted the students, and they couldn’t focus easily on what I was teaching. I wanted to switch rooms but needed the materials in the classroom. It was a tough situation, and if I were to teach this unit again, I’d probably use chart paper instead and isolate us from the other teachers.

I also had a great experience making accommodations for my student with a vision impairment. This student really challenged me to come up with new ways to allow him to be just as integrated as the rest of the students. By the end of the unit, I found some strategies that worked and some that didn’t. I will definitely keep those in mind when working with students with vision impairments in the future.

One of the things that I think was effective in my teaching was the constant review process. Each lesson began with a warm-up review from the previous lesson’s skills. The students used this as a quick refresher before we added to those skills. I also think that I tried to create good practice with the students. What I mean by that is that I tried to teach strategies like underlining like terms that the students can use (and remember) easily. I also taught them to check their work (which some of them used 😊) by plugging in their solution into the original problem.

Something else that I think was key was that I really tried to accommodate my student with a disability. I tried several different things until I found something that worked. This is something that will take me far in teaching. I know that I will not give up on my students, and I will work hard to accommodate them in any and all ways possible. I want my students to know that I truly care about their success, so I will try everything! To hone this skill, I will make sure to use all of my resources: special education programs, the Internet, books/research about the specific disability, etc.
Comments: This was very well organized and thorough. You did a nice job of describing your students’ improvement over the course of the 4 lessons and rooting your improvement claims in evidence from the assessments. The one slight exception to this was highlighted by Comment ME2: the assessment of Matthew seemed like a bit of a stretch. Again, it’s pretty much expected that a fraction of the students
won’t show the evidence of improvement that we’d like to see. If too many students fell into this boat it would reflect poorly on you as a teacher, but if this is true for only a small fraction of students it is nothing to be ashamed of (assuming that you are thinking about how you might better reach that one student in the future).
Western Illinois University Math Teachers Conference Presentation and Participation

During the spring term of 2011, the participants in EDUC384 organized and presented a “mini-workshop” for practitioners at the 60th Annual Western Illinois University Mathematics Teachers Conference. Our presentation was titled “They Should Know This Already!” and it focused on strategies for effectively revisiting elementary school content with secondary mathematics students.

Each member of EDUC384, including the sample student, was responsible for organizing and leading part of the “mini-workshop.” EDUC 384 members were also required to participate fully in the Conference as a whole, and were required to gather artifacts from the conference and report back to classmates about what they learned during the conference.

The description of our presentation is found on page 6 of the conference program, available at https://docs.google.com/viewer?a=v&pid=explorer&chrome=true&srcid=0BzPfT22BneFlODNkZGRjNjctM2Q5ZC00YTEzLWE4ZDAtMWEyZTg0YWy1Y2Nj&hl=en_US.

Collected documents that were created by the class and distributed during the presentation are available at http://wiumathconference2011.pbworks.com/f/egan_green_martin_mckey_radziejewski_rogers_wiu_handout_2011.pdf.

As a collaborative effort, the group as a whole self-assessed the quality of our presentation, using audience feedback to inform our self-assessment. The audience feedback we collected is available at https://docs.google.com/viewer?a=v&pid=explorer&chrome=true&srcid=0BzPfT22BneFlZjVhY2E4NTg tNDA4ZC00ZGYvLW1wZjMtODQvM2t3ZDFjZDky&hl=en_US. The sample student’s self-assessment of both the group’s performance during the presentation and her own performance as an individual is available at https://docs.google.com/viewer?a=v&pid=explorer&chrome=true&srcid=0BzPfT22BneFlYzdkJfMzMzk tZjRkMC00NzFhLTg0NWUtNDcxYjA1MjVhZWIw&hl=en_US.

The instructor of EDUC384 also assessed the students on the manner in which they shared their personal conference “learning gains” with the rest of the class. On the Monday after the conference, each student presented the materials they collected at the conference to the class, and shared insights they gained about mathematics teaching and learning. The assessment of the sample student’s conference learning outcomes is available at https://docs.google.com/viewer?a=v&pid=explorer&chrome=true&srcid=0BzPfT22BneFlNTg1YTY5Nz UtMzRhZC00MjdkLW1jNjQwNzkxODk5ZWU4NTIh&hl=en_US.
Research Proposal
Sample Student

For my research presentation, I would like to discover new ways to make a typically “boring” math lesson interesting and engaging. I would like to research this topic because I came across some very dry topics during my experiences at Jordan Middle School and hated watching my students check the clock every so often. There is nothing worse than knowing you are boring your students and having no ideas on how to change that.

My goal of this presentation is to find ways to “spice up” the seemingly boring topics that we math teachers still have to cover. I hope to use my findings in my own classroom (hopefully in the fall!) and share this information with other future teachers.

Research Presentation
Sample Student

*Note: the “proposal” above was submitted on April 11. This student’s presentation was made a month later. The PowerPoint file she used during her presentation is available via the link below. The assessment of both the proposal and presentation is found on the next page of this document.*

https://docs.google.com/leaf?id=0BzPfT22BneFlZDlhNGZiNWYtZDdkMy00ZThkLWJjZDYtZDkzM2E2N2IwODNl&hl=en_US
**Research Proposal and Presentation**

**Name:** Sample Student

For this assignment, points are awarded for discrete indicators. The total score earned for the assignment as a whole and for each sub-section is the sum of the points earned. Points are awarded as described below. Partial points might be awarded if a given indicator is adequate but not completely satisfactory.

<table>
<thead>
<tr>
<th>Component</th>
<th>Scoring Scheme</th>
<th>Score Earned</th>
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<tbody>
<tr>
<td><strong>Research Proposal</strong></td>
<td>1 point awarded for clearly articulating a focused, researchable question or issue. The language in the proposal should be clear and unambiguous, so that an outside reader can readily understand the issue the author plans to pursue. The question or issue is neither too broad nor too narrow. Thus it seems likely that the author will be able to find at least four pieces of literature that will shed some helpful light on the question or issue, but at the same time it is very unlikely that the author will be able to find hundreds of sources that are only vaguely related to the question or issue.</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Research Presentation</strong></td>
<td>1 point awarded for writing a convincing explanation of why this issue is important to you, or how further knowledge about this issue will improve your practice, etc.</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>1 point for clearly articulating the nature of your question or issue to the audience, and for providing a convincing case that the issue is important to secondary or middle school mathematics teachers.</td>
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<tr>
<td></td>
<td>4 points awarded for sharing a helpful summary of what each piece of acceptable research literature18 has to say about your topic or issue. Your summary will be considered “helpful” if the information seems applicable to the practice of classroom teachers. You may “share” your summaries in any number of ways, including providing each audience member with a written annotated bibliography as a handout, including information from each source in PowerPoint slides, etc. 1 point is awarded for each acceptable source of literature, up to a maximum of 4 sources.</td>
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<td>1 point for synthesizing the literature in a manner that is helpful to you and the audience. That is, in addition to providing separate insights from 4 or more research articles, you also share final recommendations or an over-arching summary that includes helpful recommendations for practice which are drawn holistically from the literature.</td>
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<td>4 points awarded for the quality of the audience engagement. “Audience Engagement Quality” will be scored as follows:</td>
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<td>4 points = Excellent. The audience benefits from your presentation in many ways. First, you have shared information with them that promises to improve their teaching practice. Second, you enabled them to actively participate in the presentation (and hence it is more likely that they will retain what they learned from you). For example, you may have solicited audience members’ perspectives on the issue, thus enabling them to connect your material to their own experience; you may have enabled them to directly experience your material from the eyes of a student; etc. Finally, you managed the limited time of your presentation effectively: the most important aspects of your planned presentation were addressed, audience members received the message you intended to send because you effectively delivered it before time ran out, etc.</td>
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<td>3 points = Very Good. You met most of the expectations described for a score of “4,” but one aspect of the presentation was lacking. Perhaps the audience did not seem entirely convinced that your recommendations were personally relevant, perhaps the audience participation piece seemed a bit “forced,” perhaps the time management could have been more effective, etc. One of these factors, or possibly another factor not listed here, detracted from the overall quality of the presentation.</td>
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<td>2 points = Good. A score of “2” will be awarded if the information was delivered effectively, but the audience was not enabled to actively participate in the presentation. A score of “2” will also be awarded if active audience participation was included, but two areas of critique (such as those suggested in the point description for 3 above) are identified.</td>
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<td>1 point = Fair. A score of “1” will be awarded if there is no active audience participation and the information is delivered in a questionable manner (e.g. if the nature of the issue is not entirely clear, if the recommendations for practice do not seem helpful, etc.). A score of “1” will also be awarded if active audience participation was included, but three areas of critique (such as those suggested in the point description for 3 above) are identified.</td>
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</tr>
<tr>
<td></td>
<td>0 points = Poor. The presentation failed to meet the criteria established for a score of 1 or higher.</td>
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| Raw Score | 11.5/12 |
| Scaled Score | 7.67/8 |

18 Guidelines for “acceptable research literature” are provided on page 11 of the course syllabus. You are expected to consult with the instructor in advance if you are not sure whether a particular piece of literature meets the guidelines.
Comments: As hinted in the marginal comments, your topic seems quite broad at the moment. What are “typically boring topics” (equations, statistics, fractions, something else)? More specificity would have been helpful. I’m sure you’ll be able to find some stuff….the NCTM publications *Mathematics Teacher* and *Mathematics Teaching in the Middle School* might be good places to start.

The comments above pertained only to the research proposal. The presentation itself was quite well done. You were engaging as a speaker….you seemed enthusiastic about your topic and that enthusiasm rubbed off on your audience. Beyond your speaking skill, though, you also did a great job of having us experience some of the teaching ideas you were talking about by having us play the card game. You did a nice job of pulling highlights from the articles you read and sharing the “meat” of the articles with us….nice job appropriately citing the sources of the ideas shared as well.
Equity, as defined by the NCTM Principles and Standards, is providing “high expectations and strong support for all students.” While this word may seem very similar to the word “equality,” the key difference lies in the fact that all students are different. Students have different likes and dislikes, learning styles and intelligences, backgrounds and histories. Treating them “equally” may actually hurt them. Equity brings in the idea of accommodating students so that they have the highest chance of success.

In the last few weeks, we have studied two very different opinions on equity in math classrooms. Bob Moses, the author of Radical Equations: Math Literacy and Civil Rights, and the founder of the Algebra Project, strongly believes that algebra is “a right” for all students. He believes that all students, no matter the race, the socioeconomic status, or the religion, deserve a proper math education. He believes in the equal access to a hands-on learning experience where students, teachers, administrators, and the community are jointly responsible for providing such education. With a proper team and the sincere efforts to provide algebra education to all students, Bob believes that there will be a higher success rate in mathematics classes as well as a higher enrollment rate in upper level classes.

Debra Viadero, author of “Algebra-for-All’ Push Found to Yield Poor Results,” on the other hand, believes that it’s all a fantasy. She thinks that our recent efforts to put more students in algebra classes have actually caused an increase in failure rates and showed no significant sign of improved performance. Her compilation of research has highlighted the flaws with tracking as well as the fact that putting more students into algebra classes doesn’t help those who are years behind in math education. She does, however, bring to our attention that general math classes are not doing enough to support all of our students. In Viadero’s eyes, by grouping
students together and enrolling more students in algebra, we are failing to provide equity to our students; they are not receiving the individual support and accommodations they need to be successful mathematicians.

After reading both of these authors’ opinions, I feel that my viewpoint is more of a combination of the two. First of all, I strongly agree with Bob Moses in that all students deserve the opportunity to take algebra classes. With tracking in so many schools, students in lower classes rarely get the chance for mobility. Many people agree that algebra classes in middle school prepare students for upper level math classes and even college. By preventing some students from taking these classes, they may be less likely to be successful in an upper level class or even attempt to go to college. Having started algebra classes in 6th grade, I think that it made a significant difference. While I have always been a bit of a numbers person, early introduction into algebra allowed me to eventually take Advanced Placement classes in high school and even consider becoming a math major in college. Equity tells us that we need to accommodate and support students so that they have the highest chance for success. I believe that early introduction of algebra is an important accommodation for students. Algebra skills should honestly be introduced at the elementary level, preparing students for the classes and skills they will see in middle and high school. Bob Moses is certainly right in my eyes; math education is a right. Preventing students from the opportunity could restrict students from a brighter future.

Debra Viadero has some interesting points though. We can put every student in an algebra class, but if they’re not ready for it, the optimistic end result of upper level classes and college are unlikely. The problem, we must realize, is not that students aren’t allowed to take algebra classes. The problem lies in the prior education. What exactly is happening in elementary and middle grade classrooms that students are seven or eight years behind?? Are
teachers just not noticing? Or are they doing nothing to fix the problem? My personal belief is
that excuses get made on both the teacher and student level, and students get left in the dark,
falling farther and farther behind. Equity…doesn’t that mean that we’re supposed to notice these
problems and do everything in our power to help them? To quote the NCTM Principles and
Standards, “Schools have an obligation to ensure that all students participate in a strong
instructional program that supports their mathematical learning.” It seems to me that if students
are that far behind in their math classes, schools are not holding up their end of the bargain.

While I understand that there are always going to be those that are good at math and
those that aren’t, that doesn’t mean that we can just let some students continue down that path.
When students struggle in a certain area, they expect and deserve the support that they need.
Students “who have difficulty in mathematics may need additional resources, such as after-
school programs, peer mentoring, or cross-age tutoring” (NCTM Principles and standards for
school mathematics 2000). As soon as students are identified as “having difficulty,” it is time to
use these resources to help these students to reach understanding. It cannot wait until high
school. For example, during my student teaching, I constantly asked the students to
communicate their understanding with a simple “thumbs up, thumbs down” procedure. When
the same students kept showing a thumbs down, I knew that they required more attention. I
would pull them aside during free time or give them more problems for practice. I even pulled
out the manipulatives to reach multiple intelligences and make sure that they understood the
concept. As teachers, it is our responsibility to make sure that our students actually understand
the material.

In my classroom, I will provide equity in a variety of means. As I did during my student
teaching, I will use many different forms of assessment, and I will use them frequently. By
making assessments on a regular basis, I can stay informed on my students’ progress and comprehension. With each assessment, I can monitor improvement and identify those who are bored/struggling. I will then create an individualized program for students needing help or further challenges. This individualized program will take into account each student’s intelligence/learning style, abilities/disabilities, and home life/background. In order to do this effectively, I must “confront [my] own beliefs and biases” (NCTM Principles and standards for school mathematics 2000). My goal is to find the method that will allow the student to reach his/her full potential. I truly believe that many problems at the secondary level stem from elementary teachers ignoring important disconnects. In my classroom, I will do everything I can to give my students the opportunity to reach upper level math classes and go on to college.

After we’ve evaluated two very different opinions on equity in the mathematics classroom, we can clearly see the difference between equity and equality. Providing accommodations and support must be individualized for the student, allowing the individual the greatest opportunity for success. Grouping students together and treating them “equally” may actually cause students to fail. When we consider Viadero’s research, we can see that while the ideal situation would put all students into algebra classes, it doesn’t quite work. Some students will always be better mathematicians than others. But Bob Moses has a point. Every student has the right to algebra. By deciding for them whether or not students can/will take algebra, we are taking away this right. The problem then ultimately lies with our math teachers. If we value equity like we should, then we can close the achievement gap and support our students as needed.

Works Cited
Equity Paper


**Name:** Sample Student

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<th>Component</th>
<th>Scoring Scheme</th>
<th>Score Earned</th>
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</table>
| Position Statements                    | 0 = Author’s positions are unclear, inconsistent, or contradictory.  
1 = Author’s positions are presented but difficult to decipher. The reader must put forth great effort in interpreting the paper. Helpful arguments or statements are clearly missing.  
2 = Author clearly puts forth her or his position statements. The writing structure can be improved, however. (e.g., arguments do not always flow logically from one statement to another; topic sentences are missing from paragraphs; introduction or conclusion fails to summarize main points; etc.)  
3 = Author makes her or his positions clear. Writing is clear and easy to follow. Arguments flow logically throughout the paper. Introductory and concluding sections reinforce the gist of the author’s work. | 3            |
| Defense/ Rationalization of Position    | 0 = Author fails to provide reasons for his or her position statements.  
1 = Author provides some reasons/rationalization for her or his positions, but reasons are simplistic and/or weak and/or unsupported by experiential or theoretical evidence.  
2 = Author provides a thoughtful and reasonable defense/rationalization of her or his views. Author draws on personal experience as a mathematics teacher/student or from existing literature, but does not reference both sources of knowledge.  
3 = Author provides a thoughtful and reasonable defense/rationalization of her or his views. Author draws on personal experience as a mathematics teacher/student AND from existing literature. | 3            |
| Writing Mechanics and Style            | 0 = More than six spelling/grammatical errors occur throughout the text.  
1 = Author commits 3 to 5 spelling/grammatical errors.  
2 = Author commits no more than 2 spelling/grammatical errors. | 2            |

**Total Score** 8/8

(This assignment is 8% of your final ED384 score. Hence there is no need to scale this particular score. The score shown here will be included in the sum of all scaled scores in determining your final score/grade.)

**Comments:** This was very well written! As alluded to in my first comment, you clearly expressed your own perspective, but you did a nice job of strengthening your stance by pulling ideas from other recognized sources. You did a nice job of establishing the tension between the Moses and Viadero readings, and then used language from *Principles and Standards* in arriving at a well reasoned middle ground.

I liked the practical pointers you shared about obtaining equity in the mathematics classroom (e.g., using assessments, finding time to work with students in need, etc.). It is, of course, quite challenging to pull this off on a full-time teaching load…I hope you’ll find ways to do things like this intelligently so that you don’t burn out (e.g., organize parents and/or older students to help in the effort of working individually students, etc.).
Teaching with Technology

As noted on pages 15-16 of the syllabus, students were required to create a self-contained, technology-based learning activity for this assignment. The sample student chose to create a statistics lesson using an Excel spreadsheet. Her spreadsheet file is available at https://docs.google.com/leaf?id=0BzPT22BncFlNDExNDg2ZTcZjBIOC00Y2VmLThjY2YtO TI2YTlmZjY2MzNl&hl=en_US.

The rubric and comments below show how the sample student’s work was assessed:

Name: Sample Student

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<th>Component</th>
<th>Scoring Scheme</th>
<th>Score Earned</th>
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| Mathematical Accuracy          | 0 = Two or more mathematical errors are found somewhere within the learning experience (see text below for examples of potential errors).  
1 = One mathematical error is found somewhere within the learning experience. Errors might include, but are not limited to, the following: a diagram is inaccurate; a problem has been posed which has no solution; students might come away from the learning experience with one incorrect idea about the mathematics, etc.  
2 = All aspects of the learning experience are mathematically sound and accurate. For example, all diagrams are accurate; all questions/problems have unambiguous solutions; students who work through the learning experience will come away from the experience with correct ideas about the mathematics, etc. | 2            |
| Richness of the Learning Experience | 0 = The learning experience is of questionable value. It is not clear that the activity will further students’ skills or knowledge.  
1 = The learning activity has value, but could clearly be enhanced so as to promote more higher-order-thinking among students. For example, the learning experience may provide useful practice of skills, but doesn’t provide students opportunities to demonstrate fresh thinking or problem solving.  
2 = The learning experience engages students in worthwhile mathematical thinking and activity. Students encountering this activity will demonstrate at least one of the five NCTM process standards. Another teacher would be eager to utilize this experience in his or her own classroom. | 1.5          |
| Appropriate Use of Technology  | 0 = The technology has little or no connection to student learning. The learning activity seems to be using technology for its own sake, not for the purpose of helping students learn mathematical content.  
1 = The learning activity makes good use of technology, but it is not clear that the technology was really necessary for the activity. That is, one could easily imagine accomplishing the same objectives without the use of technology (by using manipulatives, worksheets, etc.). So, while the technology might be viewed as a fun alternative to more traditional lessons, it is not clear that the technology enhances learning more than a traditional lesson would.  
2 = The learning activity harnesses the potential of technology in an appropriate way. It is clear that the technology used produces a learning experience or a new perspective on the content which would not be possible (or, at least, would be very difficult to pull off) without the use of technology. | 1.5          |
| Clarity/User-Friendliness      | 0 = Students or other teachers need to expend a great deal of effort in figuring out how to work with this learning experience. At least three of the following aspects of the learning experience, and possibly others not listed here, required further clarification: question(s) were phrased in a confusing manner; it was not always clear how to operate or manipulate the electronic mathematical object(s); tasks were too open-ended so that students and other teachers aren’t sure what should be accomplished, etc. A score of “0” may also be assigned if textual errors were found, all diagrams are accurate; all questions/problems have unambiguous solutions; students who work through the learning experience will come away from the experience with correct ideas about the mathematics, etc. | 2            |
portions of the technological artifact are poorly written from a grammatical standpoint. That is, it includes 2 or more major grammatical errors or 5 or more minor typographical errors.

1 = Students or other teachers need to expend some effort in figuring out how to work with this learning experience. At least one of the following aspects of the learning experience, and possibly others not listed here, required further clarification: question(s) were phrased in a confusing manner; it was not always clear how to operate or manipulate the electronic mathematical object(s); tasks were too open-ended so that students and other teachers aren’t sure what should be accomplished, etc. A score of “1” may also be assigned if textual portions of the technological artifact are understandable but reveal grammatical errors which reflect poorly on the creator. Specifically, there is at least one major grammatical error OR there are more than 2 minor typographical errors.

2 = The learning experience is clear and easy to use. All directions, questions, and/or expectations are clearly stated so that students and other teachers know exactly what they should be doing. Students and other teachers will not need advanced knowledge of the technology (software, graphing calculator, or applet) in order to work through the activity. Additionally, if the technological artifact includes text, the text is well written with no major grammatical errors and no more than 2 minor typographical errors.

Comments: This is a worthwhile statistical task involving the use of Excel in calculating the three major measures of central tendency and also using the software to quickly generate a graph. Tools like Excel that can quickly calculate statistics are very helpful when students progress to a point where the mechanics of calculation are no longer that important, and the focus should be more on thinking more analytically about data.

The activity was fairly cut-and-dried. That is, students were told what to do step-by-step, so the cognitive demand of the task was not that great. This isn’t necessarily a bad thing: if the objective is to familiarize students with how to use Excel to calculate statistics, then this is fine. Still, as indicated in the rubric, the expectation was that this activity would generate higher order thinking. Additionally, it seems fair that this activity lies somewhere between the language for the score of 1 and the language for the score of 2 in the “Appropriate Use of Technology” section of the rubric.

<table>
<thead>
<tr>
<th>Total Score</th>
<th>7/8</th>
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<tr>
<td>Comments:</td>
<td>This assignment is 8% of your final ED384 score. Hence there is no need to scale this particular score. The score shown here will be included in the sum of all scaled scores in determining your final score/grade.</td>
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<tr>
<th>Teaching with Technology</th>
<th>92</th>
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