Teaching Elementary School Mathematics
Mathematics for Teachers II
Loyola University Chicago

Spring 2015 CIEP 105 Syllabus
CIEP 105-001 Tues/Thurs 2:30 pm – 3:45 pm Cuneo Hall Room 107

Mr. J. Michael Rebeck
Home phone: 847-519-1966
E-mail: jrebeck@luc.edu
Office hours: by appointment

Required Instructional Material
- Scientific calculator (TI graphing calculator recommended)

Conceptual Framework
The School of Education at Loyola University Chicago supports the Jesuit ideal of knowledge in the service of humanity and the advancement of social justice. In fact the conceptual framework of the School of Education is “Professionalism in Service of Social Justice.” CIEP 105 emphasizes the importance of ethical teacher behavior, equitable student access to a quality education, and strong support for the success of all. It is through a unique bond between instructor and learner that enables schools to leave no child behind and realize social justice.

Diversity
Loyola University Chicago strives to partner with schools and community agencies in the Chicago area. This provides students with the opportunity to embrace the challenges and benefits of diversity that enhance the environment for learning. In CIEP 105, students will study and discuss important social structures that may affect students’ prior knowledge and attitudes.
Technology

This course will integrate technology into mathematics instruction facilitate inductive inquiry and provide multiple representations. Specific technology utilized includes: graphing calculator and computer productivity tools such as spreadsheets.

Students are expected to be expert in the use of the internet to access and use mathematical websites such as http://mathforum.org/, http://www.history.mcs.st, and http://www.ac.uk/~history/ to research historical information about mathematical topics, http://library.thinkquest.org/16661/ to make connections with mathematics and other topics, and http://nlvm.usu.edu/ to incorporate virtual manipulatives into a classroom setting.

Students will also be required to log on to Sakai (sakai.luc.edu) to monitor e-mail, announcements, and assignments posted to the class site and to submit assessments through LiveText.com.

Electronic Communication Policies and Guidelines

The School of Education faculty, students and staff respect each other’s rights, privacy and access to electronic resources, services, and communications while in the pursuit of academic and professional growth, networking and research. All members of the university community are expected to demonstrate the highest standards of integrity, communication, and responsibility while accessing and utilizing technology, information resources, and computing facilities. A link to the Loyola University Chicago and School of Education official policies and guidelines can be found at: http://www.luc.edu/media/lucedu/education/pdfs/SOE_Cyberbullying_Policy.pdf
Course Description
This course sequence provides the fundamental knowledge base for teaching elementary and middle school mathematics. This is the second of two courses. The emphasis is on algebra and problem solving. Candidates study the underlying principals of mathematics appropriate for grades K – 9. This course develops essential understanding of the historical development of mathematics, algebra, statistics, probability, and logic. The course focuses on the ability to apply mathematics and reasoning to solve problems. Students have an opportunity to discover patterns and use inductive and deductive reasoning. This experience encourages the application of algebra and logic to develop problem solving skills. Methods of instruction are presented to help prospective teachers develop teaching strategies that engage students in learning activities. The use of technology to aid in the learning process is addressed. The material presented is made relevant to and assessed using the local and state learning goals in mathematics, the NCTM standards, and the ACEI standards.

Chicago Academic Framework from the Chicago Public Schools (http://intranet.cps.k12.il.us/standards/CAS.html)
Illinois State Learning Goals (http://isbe.net/ils/Default1.htm)
Common Core State Standards (http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf)
Principals and Standards for School Mathematics from the National Council of Teachers of Mathematics (http://www.nctm.org/standards)
Association for Childhood Education International Elementary Education Standards http://education.uncc.edu/eportfolio/documents/word_files/Standards/acei_standards.htm

Included in this course are two ACEI Core assessment requirements.

- **Core Assessment #2** Assessment of content knowledge in elementary education. This will be evaluated by the student’s course grade.
- **Core Assessment #3** Assessment of the candidate’s ability to plan instruction. The student will be required to submit a lesson plan using LiveText.

Also included in this course is an NCATE technology assessment.

- **Conceptual Framework Assessment #5** Assessment of the candidate’s ability to demonstrate their knowledge and skill of technology to enhance education. The student will be required to present a mini-lesson incorporating the use of technology and submitting a write-up in LiveText.
Course Objectives
NCATE / NCTM Program Standards

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

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

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

**Standard 5: Knowledge of Mathematical Representation**
Candidates can vary representations of mathematical ideas to support and deepen students' mathematical understanding.

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

**Standard 7: Disposition**
Candidates support a positive disposition toward mathematical processes and mathematical learning.

**Standard 9: Knowledge of Numbers and Operations**
Candidates demonstrate computational proficiency, including a conceptual understanding of numbers, ways of representing numbers, relationships among numbers and number systems, and the meaning of operations.

**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.

**Standard 12: Knowledge of Data Analysis, Statistics, and Probability**
Candidates demonstrate an understanding of concepts and practices related to data analysis, statistics, and probability.

**Standard 13: Knowledge of Measurement**
Candidates apply and use measurement concepts and skills
CTPP Outcomes

K-8 MATHEMATICS TEACHER COMMON OUTCOMES

In order to teach young children, teachers should understand and accurately use knowledge in the following areas.

NUMBER AND OPERATIONS

- Use the understanding of the multiple interpretations of addition, subtraction, multiplication, and division to model these operations.

1. Use a variety of models for addition and subtraction, including discrete objects and length-based models (e.g., cubes connected to form lengths), to demonstrate add-to, take-from, put-together, take-apart, and compare situations;

2. Understand and demonstrate the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models;

3. Understand that multiplication is finding an unknown product, and division is finding an unknown factor in these situations;

4. Applications of these models and interpretations.

- Use the understanding of place value to represent, compare, order, and round numbers.

5. Use numerals with place value to 1,000,000 and millionths and understand how place value permits efficient representation of whole numbers and finite decimals;

6. Understand the value of each place is ten times larger than the value of the next place to the right;

7. Use place value understanding to order, estimate, round, and compare the relative magnitude of numbers;

8. Use place value understanding to describe equivalent representations of the same whole number by decomposing to a smaller unit and recomposing to a larger unit.
Use the understanding of place value and properties of numbers to calculate with standard and non-standard algorithms for addition, subtraction, multiplication, and division, and to perform mental calculations.

9. Perform multi-digit calculations accurately, including fluency with standard algorithms, “mental math,” and non-standard methods created by students that are efficient and generalizable;

10. Understand the reasoning behind the calculation procedures, how the base-10 structure of number is used in calculations;

11. Understand, apply, and justify fundamental ideas of number theory, including prime and composite number, least common multiple, greatest common factor, and divisibility, and their connections to elementary and middle school mathematics.

- Understand and use the properties of whole numbers and the four operations as extended to the rational number system.

12. Understand concepts of integers and rational numbers, including what integers and rational numbers are (represented as fractions and decimals), equivalent fractions, and a sense of their relative sizes;

13. Understand how addition, subtraction, multiplication, and division of whole numbers and properties of whole numbers extend to integers and rational numbers;

14. Convert easily among fractions, decimals, and percents and achieve a unified understanding of number that each of these are different representations of rational numbers.

15. Use knowledge of numbers and operations, estimation, approximation, and exact methods to solve both real-world problems and mathematical problems;

16. Interpret results and judge their reasonableness.

- Use the understanding of proportionality to solve problems.

17. Develop, analyze and explain methods in problem situations that involve proportional relationships, including ratio and rate;

18. Distinguish between proportional relationships and other relationships;

19. Solve a wide variety of percent applications including discounts, interest, taxes, tips, percent increase and decrease;
• Apply and extend previous understandings of arithmetic to algebraic expressions.

1. Understand the use of variables in mathematical expressions;
2. Understand the difference between expressions and equations;
3. Write expressions and equations that correspond to given situations;
4. Evaluate expressions and use expressions and formulas to solve problems;
5. Understand that expressions in different forms can be equivalent and use the properties of operations to rewrite expressions in equivalent forms;

• Use properties of operations to generate equivalent expressions.

6. Recognize commutativity, associativity, distributivity, identities, and inverses as properties of operations on a given domain;
7. Understand computation algorithms as applications of particular axioms;
8. Demonstrate algebraic skills and understand the reasoning behind standard algebraic manipulations

• Reason about and solve one-variable equations and inequalities.

9. Understand that the solutions of an equation/inequality are the values of the variables that make the equation/inequality true;
10. Understand that when using the properties of equality and the concept of logical equivalence that the solutions of the original equation are maintained.
11. Construct and analyze tables (such as tables of quantities that are in equivalent ratios) and use equations to describe relationships between quantities (such as 3x = y).
12. Represent and justify general arithmetic claims using variables, equality, and inequalities;
13. Use symbolic, numeric, graphical, and geometric representations to represent calculations, express identities, describe situations, and to solve problems.
• Understand the connections between proportional relationships, lines, and linear equations.

14. Recognize equations for proportions \(y/x = m\) or \(y = mx\) as special linear equations \(y = mx + b\);

15. Understand that the constant of proportionality \((m)\) is the slope and that the graphs of \(y = mx\) are lines through the origin; understand that the slope \((m)\) of a line is a constant rate of change, so that if the input or \(x\)-coordinate changes by an amount \(A\), the output or \(y\)-coordinate changes by the amount \(m\cdot A\);

16. Use a linear equation to describe the association between two quantities in bivariate data (such as arm span vs. height for students in a classroom)

• Analyze and solve linear equations and pairs of simultaneous linear equations.

17. Use properties of operations and the idea of maintaining the equality/inequality of both sides of an equation/inequality efficiently to implement procedures to solve linear equations/inequalities in one variable;

18. Solve systems of two linear equations in two variables and relate the systems to pairs of lines in the plane; these intersect, are parallel, or are the same line; use linear equations, systems of linear equations, linear functions, and their understanding of slope of a line to analyze situations and solve problems.

• Define, evaluate, and compare functions, and use functions to model relationships between two quantities.

19. Understand the concept of a function as a rule that assigns to each input exactly one output;

20. Understand that functions describe situations where one quantity determines another;

21. Translate among representations and partial representations of functions (noting that tabular and graphical representations may be partial representations), and describe how aspects of the function are reflected in the different representations.

22. Construct a function to model a linear relationship between two quantities, and describe their relationship by analyzing a graph of the function.
### Schedule of Topics

Assignments will be listed in class and on Sakai

<table>
<thead>
<tr>
<th>Class date</th>
<th>Topics or Issues</th>
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<tbody>
<tr>
<td>Week #1</td>
<td>- Introductions&lt;br&gt;- NCTM Standards&lt;br&gt;- Numbers, numbers everywhere&lt;br&gt;- Think, Think, Think&lt;br&gt;- Number Magic</td>
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<tr>
<td>January 13, 15</td>
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<tr>
<td>Week #2</td>
<td>- Mode, Median, Mean&lt;br&gt;- Patterns and Number Tricks&lt;br&gt;- Logic: Inductive and Deductive Reasoning&lt;br&gt;- Problem Solving</td>
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<td>January 20, 22</td>
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<tr>
<td>Week #3</td>
<td>- Factors and Special Numbers&lt;br&gt;- Fractions: Everyone’s favorite “F” word&lt;br&gt;- Ratios and Proportions</td>
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<td>January 27, 29</td>
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<tr>
<td>Week #4</td>
<td>- Spreadsheets&lt;br&gt;- Common Core Standards&lt;br&gt;- Writing Objectives&lt;br&gt;- Technology Assessment Due February 24</td>
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<td>February 3, 5</td>
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<td>Week #5</td>
<td>- Series and Sequences</td>
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<td>February 10, 12</td>
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<tr>
<td>Week #6</td>
<td>- Review&lt;br&gt;- Midterm Exam</td>
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<td>February 17, 19</td>
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<tr>
<td>Week #7</td>
<td>- Technology Assessment Presentations&lt;br&gt;- Rules for Divisibility&lt;br&gt;- The Human Number Line&lt;br&gt;- Lesson Plan Assessment Due April 14</td>
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<td>February 24, 26</td>
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<tr>
<td>Week #8</td>
<td>- Functions&lt;br&gt;- Linear Equations</td>
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<td>March 10, 12</td>
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<tr>
<td>Week #9</td>
<td>- Graphing Linear Functions&lt;br&gt;- Writing Equations&lt;br&gt;- Line of Best Fit</td>
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<td>March 17, 19</td>
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<tr>
<td>Week #10</td>
<td>- Solving Equations&lt;br&gt;- Polynomials&lt;br&gt;- Factoring</td>
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<td>March 24, 26</td>
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<tr>
<td>Week #11</td>
<td>- Solving Quadratic Equations&lt;br&gt;- Graphing Quadratic Functions&lt;br&gt;- Matrices</td>
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<td>March 31, April 2</td>
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<tr>
<td>Week #12</td>
<td>- Systems of Equations&lt;br&gt;- Solving Systems of Equations&lt;br&gt;- Using Matrices to Solve Systems of Equations</td>
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<td>April 7, 9</td>
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<tr>
<td>Week #13</td>
<td>Logarithms</td>
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<td>April 14, 16</td>
<td>Exponentials</td>
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<td></td>
<td>Topology</td>
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<tr>
<td>Week #14</td>
<td>Lesson Plan Presentations</td>
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<tr>
<td>April 21, 23</td>
<td>Probability Activities</td>
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<td></td>
<td>Best Math Movie Ever!!!</td>
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<tr>
<td>Final Exam Week</td>
<td>Final Exam</td>
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This calendar is subject to change at the professor’s discretion.
Clinical dates and location will be determined at a later date.
Class Assignments

Assignment #2
*Mathematics, A Human Endeavor*
Read Chapter 9 Lessons 1 and 3
P. 529  Set 1  1 - 13
P. 548  Set 1  1-26
P. 550  Set 2  12-15
Read Chapter 1 Lessons 1 – 6 and Summary and Review
P. 41   Set 1  1-13
P. 44   Set 3  1-4

Assignment #3
Ratios and Fractions Worksheet

Assignment #4
SpreadsheetsWorksheet
Core Assessment - Technology Mini Lesson *Due February 24, 2014*
Develop a short lesson to be used as a review, classroom opener, or a lesson preview that incorporates the technology of your choice.
Write up a brief description of your lesson and submit via LiveText.

Assignment #5
*Mathematics, A Human Endeavor*
Read Chapter 2 Lessons 1 – 6 and Summary and Review
P. 61   Set 1  12-17
P. 63   Set 2  1, 3, 5, 6
P. 69   Set 1  7 - 21
P. 94   Set 1  7 -14
P. 101  Set 1  1- 3
P. 108  Set 1  1 - 16
P. 110  Set 2  6 -12

Assignment #7
Core Assessment - Lesson Plan *Due April 14, 2014*
Write a lesson plan for a math class (middle school level).
Write the lesson plan in a Word Document following the Lesson Plan Template.
Submit your Word Document via LiveText .

Assignment #8
*Mathematics, A Human Endeavor*
Read Chapter 3 Lessons 1 - 3
P. 124   Set 1  1 - 14
P. 125   Set 2  1 – 14
Assignment #9

*Mathematics, A Human Endeavor*

P. 138   Set 1   1 - 23  
P. 141   Set 2   1 - 10

Worksheets:
Linear Functions

Assignment #10

Worksheets:
Equations and Polynomials

Assignment #11

*Mathematics, A Human Endeavor*

Read Chapter 3 Lessons 4

Worksheets:
Graphing Quadratic Functions Worksheet
Matrices

Assignment #12

Worksheets:
Solving Systems of Equations I
Solving Systems of Equations II
Solving Systems of Equations III

Assignment #13

*Mathematics A Human Endeavor*

Read Chapter 4 Lessons 1 – 6 and Summary and Review

p.186   Set 1   1 - 10, 14 - 24  
p.194   Set 1   9 - 11  
p.195   Set 2   1 - 9  
p. 201   Set 1   1 - 14

Assignment #14

Final Reflection (not for a grade and may be anonymous)

1. Your final impressions:
   a. positives about the class
   b. negatives about the class
   c. suggestions
2. What would you use in your classroom?
3. Final thoughts, comments, critiques, or general statements for the good of the cause.
Course Policy

1. IDEA Objectives
   a. Gaining factual knowledge (terminology, classifications, methods, trends)
   b. Learning to apply course material (to improve thinking, problem solving, and decisions)
   c. Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course
   d. Learning how to find and use resources for answering questions or solving problems

2. Academic Honesty: Academic honesty is an expression of interpersonal justice, responsibility and care, applicable to Loyola University faculty, students, and staff, which demands that the pursuit of knowledge in the university community be carried out with sincerity and integrity. The School of Education’s Policy on Academic Integrity can be found at: http://www.luc.edu/education/academics_policies_integrity.shtml. For additional academic policies and procedures refer to: http://www.luc.edu/education/academics_policies_main.shtml

3. Accessibility: Students who have disabilities which they believe entitle them to accommodations under the Americans with Disabilities Act should register with the Services for Students with Disabilities (SSWD) office. To request accommodations, students must schedule an appointment with an SSWD coordinator. Students should contact SSWD at least four weeks before their first semester or term at Loyola. Returning students should schedule an appointment within the first two weeks of the semester or term. The University policy on accommodations and participation in courses is available at: http://www.luc.edu/sswd

4. EthicsLine Reporting Hotline
   Loyola University Chicago has implemented EthicsLine Reporting Hotline, through a third party internet & telephone hotline provider, to provide you with an automated and anonymous way to report activities that may involve misconduct or violations of Loyola University policy. You may file an anonymous report here on-line or by dialing 855-603-6988. (within the United States, Guam, and Puerto Rico)

   The University is committed to the highest ethical and professional standards of conduct as an integral part of its mission of expanding knowledge in the service of humanity through learning, justice and faith. To achieve this goal, the University relies on each community member’s ethical behavior, honesty, integrity and good judgment. Each community member should demonstrate respect for the rights of others. www.luc.edu/ethicsline
Course Requirements

1. **Attendance:** Important! Time is short and there is much to be done. Absences should be for extreme circumstances only. Students should inform the instructor of such circumstance.

2. **Assignments:** There will be homework, papers, a midterm exam and a final exam. All written work should be handed in (hard copy or electronic) on the due date. Late assignments are penalized 50%. An assignment is considered late if it is not submitted by the end of the class session on the due date. Exceptions to this policy are rare and are for extreme cases supported by documentation such as a doctor’s note.

This course will contain a core assessment of **Conceptual Framework Standard 5:** Candidates demonstrate technological knowledge and skill which enhance education. Students will develop a short class-opener (2 – 3 minutes in length) presenting a mathematics topic of their choice. The student will utilize technology to enhance their mini-lessons. On the due date, Week #6, students will present their lessons to the class. A written summary of the lesson will be submitted in LiveText and will be evaluated using the following rubric:

### Core Assessment Rubric

<table>
<thead>
<tr>
<th>Conceptual Framework Standard</th>
<th>Target</th>
<th>Acceptable</th>
<th>Unacceptable</th>
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<tbody>
<tr>
<td>CF5: Candidates demonstrate technological knowledge and skill which enhance education</td>
<td>Targeted Performance is evidenced by the selection of an appropriate technological tool, such as but not limited to, spreadsheets, dynamic graphing software, computer algebra systems, calculators, and presentation software, that promotes conceptual understanding of a mathematical concept or facilitates student construction of knowledge</td>
<td>Acceptable performance is evidenced by the use of appropriate technology, as a curriculum amplifier (use of technology to replicate an existing task. e.g. electronic flashcards). The activity provide motivation for students</td>
<td>Unacceptable performance is evidenced by the use of technology as a curriculum amplifier that is not motivational</td>
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<tr>
<th>Overall Score</th>
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This course will require students to produce a lesson plan to assess their ability to plan instruction. This lesson plan will be submitted in LiveText. The lesson plan will be evaluated using the following rubric:

**CIEP 105: Mathematics Lesson Plan Template and Rubric**

[This is a basic template, which enables some customization in each discipline in the corresponding rubric elements.]

1. Introduction: Includes brief basic information such as area of curriculum, grade, topic, strategies, purpose for the lesson, and where/when it will be taught if applicable

2. Standards: ELA/Math/Science/Social Studies Common Core (when available)

3. Objectives

4. Assessment Plan

5. Materials

5. Procedure (any specific elements can be outlined in this section of the rubric – such as before, during and after for literacy).

6. Reflection (If applicable): This section is included and assessed if the lesson is taught. Candidates may self-assess their own lessons with respect to research strands or considerations they would have following the teaching of the lesson.
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<thead>
<tr>
<th>Element /Standard</th>
<th>Target</th>
<th>Acceptable</th>
<th>Unacceptable</th>
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<tbody>
<tr>
<td><strong>Content Knowledge:</strong></td>
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<tr>
<td><strong>Standard 1.0 Development Learning Motivation</strong>—Candidates know, understand, and use the major concepts, principles, theories, and research related to development of children and young adolescents to construct learning opportunities that support individual students’ development, acquisition of knowledge, and motivation.</td>
<td>Teacher candidate’s plan demonstrates a thorough understanding of the developmental, learning and motivational elements of this age student. Standards, objectives, strategies, assessment and attention to individual needs are well represented throughout the plan. Candidate considers and respects diverse language, learning and cultural needs.</td>
<td>Teacher candidate’s plan demonstrates recognition of the developmental, learning and motivational elements of this age student. Standards, objectives, strategies, assessment and attention to individual needs are represented throughout the plan. Candidate considers and respects diverse language, learning and cultural needs.</td>
<td>Teacher candidate’s plan does not demonstrate recognition of the developmental, learning and motivational elements of this age student. Standards, objectives, strategies, assessment and attention to individual needs are inappropriate or missing from the plan. Evidence that the candidate considered diverse language, learning and cultural needs of students is missing.</td>
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<tr>
<td><strong>Content Knowledge:</strong></td>
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<td><strong>Curriculum</strong></td>
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<tr>
<td><strong>Standard 2.1 Reading, Writing, and Oral Language</strong>—Candidates demonstrate a high level of competence in use of English language arts and they know, understand, and use concepts from reading, language and child development, to teach reading, writing, speaking, viewing, listening, and thinking skills and to help students successfully apply their developing skills to many different situations, materials, and ideas;</td>
<td>Literacy lesson plan thoroughly addresses diverse learners’ individual developmental, linguistic, learning and interest needs in the areas of reading, writing, listening, speaking and viewing. A variety of evidence based strategies are used appropriately to teach students to decode, comprehend, respond to and enjoy written texts in a balanced approach that addresses both word and text level skills. Critical responses to text are encouraged and supported. Plan provides specific steps and details for before, during and after reading/writing to guide students in their literacy learning based on the identified curriculum standards and objectives.</td>
<td>Literacy lesson plan addresses instructional considerations for teaching reading, writing, listening, speaking and viewing by attending to individual learner’s developmental, linguistic, learning and interest needs. Evidence based strategies are used purposefully to engage students and to allow them to respond to text in a balanced approach that includes critical and creative responses. Plan provides details for before, during and after reading/writing and it is aligned with the curriculum standards and objectives.</td>
<td>Literacy lesson plan fails to consistently provide adequate standards/objectives and instructionally aligned details needed to teach reading, writing, listening, speaking or viewing or to effectively address the needs of individual and diverse learners. Evidence based strategies may not be appropriately or purposefully used in order to engage learners or to help them develop both word and text level skills. Additional specific details may be needed in some or all of the before, during or after reading/writing instructional elements.</td>
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<tr>
<td><strong>Content Knowledge:</strong></td>
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<td><strong>Curriculum</strong></td>
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<td><strong>Standard 2.2 Science</strong>—Candidates know, understand, and use fundamental concepts of physical, life, and earth/space sciences. Candidates can design and implement age-appropriate inquiry lessons to teach science, to build student understand for personal and social applications, and to convey the nature of science.</td>
<td>Science lesson plan thoroughly addresses the nature of science and fundamental concepts related to more than one of the following content areas: physical, life, earth/space science. Major concepts and principles that are used in the applicable science discipline are appropriately addressed and the interrelationships between concepts are clearly emphasized. A thorough and thoughtful plan that engages students in scientific inquiry and emphasizes personal and social applications is included. The lesson clearly conveys the nature and utility of science by including a focus on identifying problems and on designing, implementing and evaluating possible solutions.</td>
<td>Science lesson plan addresses the nature of science and/or fundamental concepts related to at least one of the following content areas: physical, life, earth/space science. Major concepts and principles that are used in the applicable science discipline are addressed and the interrelationships between concepts are discussed. A plan that engages students in scientific inquiry and contains personal and social applications is included. The lesson includes a focus on identifying problems and on designing, implementing and evaluating possible solutions.</td>
<td>Science lesson plan does not adequately address the nature of science or fundamental concepts related to at least one of the following content areas: physical, life, earth/space science. Major concepts and principles that are used in the applicable science discipline are mentioned but not clearly addressed, and the interrelationships between concepts are not discussed. The plan does not engage students in scientific inquiry and does not contain personal and social applications. The lesson is missing a focus on identifying problems and on designing, implementing and evaluating possible solutions.</td>
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### Content Knowledge: Curriculum

#### Standard 2.3 Mathematics

Candidates know, understand and use the major concepts and procedures that define number and operation, algebra, geometry, measurement and data analysis and probability. In doing so they consistently engage problem solving, reasoning and proof, communications, connections, and representations.

| Mathematics lesson plan thoroughly addresses diverse learners’ individual developmental needs, knowledge and understanding of major concepts and procedures in more than one of the following content areas: number and operation, algebra, geometry, measurement and data analysis and probability. A variety of evidence based strategies are used appropriately to teach students more than one of the following: problem solving, reasoning and proof, communications, connections, and representations. | Mathematics lesson plan addresses instructional considerations that develop knowledge and understanding of concepts and procedures in at least one of the following content areas: number and operation, algebra, geometry, measurement and data analysis and probability. Evidence based strategies are used to purposefully engage students in problem solving, reasoning and proof, communications, connections, or representations. | Mathematics lesson plan fails to develop conceptual understanding of mathematical concepts, and instead concentrate on procedures and skills. Evidence based strategies may not be appropriately or purposefully used in order to engage students in problem solving, reasoning and proof, communications, connections, or representations. |

#### Social Studies

Candidates know, understand, and use the major concepts and modes of inquiry from the social studies—the integrated study of history, geography, the social sciences, and other related areas—to promote elementary students’ abilities to make informed decisions as citizens of a culturally diverse democratic society and interdependent world.

| Social studies lesson plan thoroughly addresses diverse learners’ individual developmental needs, knowledge, and understanding of major concepts and modes of inquiry from the integrated study of history, geography, the social sciences and other related areas. The lesson plan incorporates a variety of evidence-based strategies to promote students’ abilities to make informed decisions as citizens of a diverse society and world. | Social studies lesson plan addresses instructional considerations that develop knowledge and understanding of social studies concepts and modes of inquiry. The lesson plan incorporates evidence-based strategies that promote students’ abilities to make informed decisions as citizens of a diverse society and world. | Social studies lesson plan fails to provide instruction to develop knowledge and understanding of social studies concepts and modes of inquiry. Evidence based strategies may not be appropriately or purposefully used in order to promote students’ informed decision making as citizens of diverse society and world. |

#### Standards

##### Standard 3.1 Integrating and applying knowledge for instruction—Candidates plan and implement instruction based on knowledge of students, learning theory, subject matter, curricular goals, and community.

<p>| Teacher candidate has identified highly appropriate learning standards (from content specific or common core**) and has used this effectively to build a purposeful lesson that incorporates knowledge of learning theory and subject matter. These components are represented clearly in all parts of the lesson plan and in the instruction. | Teacher candidate has identified appropriate learning standards (from content specific or common core**) and has used the standards to build a lesson that incorporates knowledge of learning theory and subject matter. These components are represented in all parts of the lesson plan and in the instruction. | Teacher candidate has failed to identify appropriate learning standards (from content specific or common core**) and has created a lesson plan that is not focused; it lacks evidence of knowledge of learning theory and subject matter. |
| Objectives | Teacher candidate has written measureable objectives specifically aligned with the standards and plan for assessment. These are written in appropriate format with the action verb, conditions and criteria. Appropriate domains are presented. | Teacher candidate has written measureable objectives generally aligned with the standards and plan for assessment. These are written in appropriate format with the action verb, conditions and criteria. Appropriate domains are presented. | Teacher candidate has failed to provide measureable objectives and has not aligned objectives with the standards and plan for assessment. Objectives are not written in appropriate format with the action verb, conditions and criteria. Appropriate domains are missing. |
| Assessment | Teacher candidate has developed a coherent and cohesive plan for assessing the outcomes of the lesson and has provided the results or data from the lesson if possible or appropriate. Formative or summative assessment data along with analysis of instructional procedures is used to determine future plans for instruction. | Teacher candidate has developed a plan for assessing the outcomes of the lesson. Formative or summative assessment data is considered in the analysis of instructional procedures and is used to determine future plans for instruction. | Teacher candidate has not developed a plan for assessing the outcomes of the lesson. Formative or summative assessment data is missing or is not considered in the analysis of instructional procedures and is not used to determine future plans for instruction. |
| Materials | Teacher candidate identifies, develops and utilizes a variety of curricular materials and text genres appropriate for developmental, motivational, and diverse learning needs that support the curriculum and teaching of the standards. | Teacher candidate identifies, develops and utilizes curricular materials and text genres appropriate for developmental, motivational, and diverse learning needs that support the curriculum and teaching of the standards. | Teacher candidate fails to identify, develop and use curricular materials and text genres appropriate for developmental, motivational, and diverse learning needs that support the curriculum and teaching of the standards. |
| Procedure- Standard 3.2 Adaptation to diverse students | Lesson details demonstrate a thorough understanding of the developmental level and skills, strengths and weaknesses of the individual students to whom this lesson will be taught. Specific, creative and targeted strategies and approaches are clearly presented that respond directly to the needs of diverse students. Specific elements designed to differentiate the instruction are described in order to meet the needs of each individual learner. | Lesson details demonstrate an understanding of the developmental level and skills, strengths and weaknesses of the individual students to whom this lesson will be taught. Strategies and approaches are presented that respond directly to the needs of diverse students. Elements designed to differentiate the instruction are described in order to meet the needs of each individual learner. | Lesson details fail to demonstrate an understanding of the developmental level and skills, strengths and weaknesses of the individual students to whom this lesson will be taught. Strategies and approaches are generic and do not respond directly to the needs of diverse students. Differentiation of instruction is not specified. |
| Standard 3.3 Development of critical thinking, problem solving, performance skills | Lesson details provide specific activities and evidence based practices for engaging students and encouraging individual responses to instruction that include critical thinking, problem solving and performance skills. | Lesson details provide activities and evidence based practices for engaging students and encouraging individual responses to instruction that include critical thinking, problem solving and performance skills. | Lesson details lack activities and evidence based practices for engaging students and encouraging individual responses to instruction that include critical thinking, problem solving and performance skills. |</p>
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<tr>
<th><strong>Standard 3.4 Active engagement in learning</strong>—Candidates use their knowledge and understanding of individual and group motivation and behavior among students at the K-6 level to foster active engagement in learning, self motivation, and positive social interaction and to create supportive learning environments.</th>
<th>Details include varied evidence based strategies, approaches, materials, resources and technology designed to effectively engage students in the lesson. Management strategies are employed to motivate, guide, and support students to become independent learners. Candidate demonstrates recognition of cultural and gender differences and responds accordingly.</th>
<th>Details include evidence based strategies, approaches, materials, resources and technology designed to engage students in the lesson. Management strategies are employed to motivate, guide, and support students to become independent learners.</th>
<th>Details do not include evidence based strategies, approaches, materials, resources and technology designed to engage students in the lesson. Strategies to motivate, guide, and support students to become independent learners are missing.</th>
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<td><strong>Communication Skills</strong></td>
<td>Teacher candidate models effective use of English in written and spoken discourse and encourages a variety of opportunities for supportive, collaborative and interactive communication among students. Media communication used to effectively support active learning. Instructional practices promote active and creative thinking and problem solving.</td>
<td>Teacher candidate models appropriate use of English in written and spoken discourse and encourages opportunities for supportive, collaborative and interactive communication among students. Media communication is included when appropriate. Instructional practices promote active and creative thinking and problem solving.</td>
<td>Teacher candidate does not use appropriate language skills in written and spoken discourse. No effort to include media communication is present. There is a lack of evidence that the candidate would encourage opportunities for supportive, collaborative and interactive communication among students.</td>
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<td><strong>Standard 3.5 Communication to foster collaboration</strong>—Candidates use their knowledge and understanding of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the elementary classroom</td>
<td>Teacher candidate provides a thoughtful and perceptive analysis of the lesson in specific and detailed terms. Suggestions are provided for future lessons and data from the assessment is considered. Support or connections to this from research is provided. Candidate may suggest a plan for professional development or collaboration with other professionals.</td>
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<td>Teacher candidate provides a cursory analysis of the lesson. While suggestions are provided for future lessons, the data and research support for the suggestions is missing.</td>
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<td><strong>Reflection</strong></td>
<td>Teacher candidate provides a thoughtful and perceptive analysis of the lesson in specific and detailed terms. Suggestions are provided for future lessons and data from the assessment is considered. Support or connections to this from research is provided. Candidate may suggest a plan for professional development or collaboration with other professionals.</td>
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<td><strong>Overall Grade</strong></td>
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4. Participation and Responsibility: Participation is more than talking in class. Participation means allowing oneself to become engaged in the learning process. The following are examples of good class participation

- Contribute interesting insightful comments
- Presenting good examples of the comments on hand
- Raising good questions
- Listening and responding appropriately to others comments
- Being sensitive to your level of participation, making attempts to increase or decrease it if necessary
- Arriving on time for class

5. Dispositions
Each course in the School of Education focuses on one or more professional dispositions. Students are offered opportunities to receive feedback on their dispositional growth in the areas of **professionalism, fairness and the belief that all students can learn**. The descriptions for the expected behaviors for the disposition are as follows:

*Professionalism:* Is prepared. Is responsible toward work. Is open-minded. Works well with others. Responds with appropriate language, affect, and actions. Makes appropriate changes in response to feedback.

*Fairness:* Respects students, families, communities, and peers. Creates an inclusive classroom environment. Is responsive to students/learners’ needs. All Students Can Learn: Has high expectations for all students/learners.

*All students can learn.* Is not easily discouraged by lack of student/learners progress. Resists making assumptions about students/learners, families, and communities based on stereotypes. Reflects on practices and their impact on student/learners learning.
6. **Evaluation:** A wide variety of evaluation strategies are used. A point system is used, so the percentages are approximate.

- **Homework, Activities, and Projects 50%**
  Candidates are expected to complete assigned homework each week and hand it in the next class. Late assignments are awarded 50% credit. Students will make reflective statements at the end of each class relative to the content covered in class. Due to the nature of these reflections, they can not be made up when absent.

- **Midterm 25%**

- **Final Exam 25%**

**Grade Assignment** ("+" and "-" grades are the two percentage points at the high and low ends of the stated grade ranges)

- A 90-100%
- B 80-89%
- C 70-79%
- D 60-69%
- F 0-59%