EDCI 42500: FALL 2014
TEACHING MATHEMATICS IN THE SECONDARY SCHOOL
Tuesday & Thursday, 9:00-10:15 am (BRNG 3276)

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Office Hours: By appointment

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Office Hours: By appointment

COURSE DESCRIPTION

This course is designed for students who are planning to be secondary mathematics teachers. The course content is organized using Principles and Standards for School Mathematics (PSSM) published by the National Council of Teachers of Mathematics (NCTM) in 2000 and the Common Core State Standards for School Mathematics (CCSSM). The Principles and Standards proposes a vision for mathematics classrooms “where students of varied backgrounds and abilities work with expert teachers, learning important mathematical ideas with understanding, in environments that are equitable, challenging, supportive, and technologically equipped for the twenty-first century” (p. 3). In this course, we will focus on NCTM’s six overarching principles (i.e., equity, curriculum, teaching, learning, assessment, and technology); the eight mathematical practices from CCSSM (i.e., make sense of problems and persevere in solving them, reason abstractly and quantitatively, construct viable arguments and critique the reasoning of others, model with mathematics, use appropriate tools strategically, attend to precision, look for and make use of structure, and look for and express regularity in repeated reasoning) and five content standards for high school (i.e., number and quantity, algebra, functions, geometry, measurement, and statistics and probability).

COURSE GOALS

1. To develop lesson plans promoting students’ development of conceptual and procedural understanding of mathematics.
2. To develop understanding of student learning and development in mathematics by engaging in tasks similar to those that might be given to students.
3. To develop understanding of curriculum in context through teaching and working on mathematical problems from variety texts.
4. To develop understanding of the scope and significance of secondary school mathematics through an examination of state and national standards and mathematics education research.
5. To develop professionally through the demonstration of professional attitudes and work habits as well as the identification of professional organizations and resources that are available locally and nationally.

REQUIRED MEMBERSHIPS

Student membership to National Council of Teachers of Mathematics (NCTM):

Information regarding student e-membership and an online application can be found at: http://www.nctm.org/benefits-student.aspx. Establishing yourself within this organization is professionally beneficial and allows you to gain access to valuable resources. School administration likes their teachers to be connected to the professional organization in their
content area. A student membership costs $39 for a year and will allow you online access to the *Principles and Standards*. Additionally, you will be given online access to *The Mathematics Teacher* (the journal for high school mathematics teachers). If you would like to purchase a paper copy of the *Principles and Standards* or any other of their resources, your membership gives you a 20% discount.

Student membership to Indiana Council of Teachers of Mathematics (ICTM):

Affiliation with the state chapter of NCTM (in our case, ICTM) can also provide rich learning and collaborative possibilities. To apply for student membership, go to [http://www.indianamath.org/docs/membershipForm.pdf](http://www.indianamath.org/docs/membershipForm.pdf) and mail $6 along with your contact information to the address provided. In addition to your own learning, these memberships indicate to future potential employers that you take an active role in your professional development.

**COURSE REQUIREMENTS**

**PARTICIPATION (20 pts)**

Active participation in class discussions and activities, demonstrations that course assignments have been thoroughly read, and thoroughly completed assignments are required.

Class Participation Rubric

<table>
<thead>
<tr>
<th>Unsatisfactory (&lt;15 pts)</th>
<th>Satisfactory (15 – 16 pts)</th>
<th>Good (17-18 pts)</th>
<th>Excellent (19-20 pts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Often not prepared for class.</td>
<td>Participation is generally similar to one receiving an unsatisfactory rating, but there are one or two elements which are relatively well done.</td>
<td>Participation is as good as one receiving an excellent rating, but one or two elements are not quite at a distinguished level.</td>
<td>- Always well prepared for class.</td>
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<tr>
<td>- Evident that individual has not completed reading assignments prior to class</td>
<td>- Exhibits negative attitudes toward course and class members.</td>
<td>- Does not contribute to class discussions, in-class, or online activities</td>
<td>- Consistently contributes meaningfully to class discussion</td>
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<tr>
<td>- Does not contribute to class discussions, in-class, or online activities</td>
<td>- Does not bring required materials to class</td>
<td>- Does not bring required materials to class</td>
<td>- Consistently brings required materials to class</td>
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**FIELD EXPERIENCE: PARTICIPATION & REFLECTIONS**

A total of **15 hours** of field experience in a mathematics classroom is required during this course.

Field Experience:

10-15 hours of your field experience will fall into this category. These will be completed in a local secondary mathematics classroom to which you will be assigned based on your availability.

Anything stated above is subject to change through in-class announcement.
during the school day. You will reflectively observe the teacher and students, assist with classroom activities, and teach a minimum of one time. I strongly encourage you to teach and do as much as your teacher will allow, as it will facilitate your transition into student teaching. If at all possible, plan to observe one time per week or one time every other week until you have completed your hours. You will be able to make connections with more course content if you spread out your visits. While you may stay as long as you like for each visit, one visit can count for a maximum of two hours of credit. Thus you must visit the school at least 5 times during the semester. Please contact me if your cooperating teacher has any concerns about this structure because we ultimately defer to him or her. Only by completing the Field Experience Verification Form (posted on Blackboard) will the participation requirement be fulfilled. Please begin the participation as soon as you are able to coordinate your visits with your assigned teacher. Please turn in your form to the instructor with the appropriate signatures on or before Thursday December 11th, 2014. Be very appreciative of him/her for allowing you to come into his/her classroom!

Alternative Activities – You may get credit for up to 5 hours of participation with any combination of the alternate activities listed below. For each activity you need to provide documentation of participation.

1) Tutor students in mathematics
2) Attend ICTM or NCTM Conference
3) Classroom observations in other high schools
4) Assist with middle school or high school math teams/clubs such as MATHCOUNTS or Math Field Day at Purdue.

Note that one of the three NCTM Regional conferences is in Indianapolis this year, a great opportunity. It is October 29-31, 2014 and free to students. To encourage you to attend, for this activity only, driving time will be included in hours accrued. Thus, you can drive there, attend three one-hour sessions and drive home and you will be credited five hours.

Reflections (25 pts):

A total of 5 journal reflections are required, responding to the Field Experience Response Prompts (posted on Blackboard). Over 1 page of actual text (excluding headings, double-spaced, 1-inch margins, 12pt Times New Roman font) is expected for each reflection. These reflections should be based on your 10-15 hours of classroom observations and not on alternative activities. One reflection will be based on your classroom teaching experience. Your journals should be completed within one week of your visit to the classroom. At least two of your first three reflections should be submitted on Blackboard by October 21st (Tuesday) at 11:59 PM and the remaining reflections are due by December 9th (Tuesday) at 11:59 PM.

GATE B ASSIGNMENTS

The Gate B assessments connected with this course are requirements to proceed to student teaching. Note that you can pass this course, but not satisfy the requirements for Gate B assignments. Resubmissions of unsatisfactory work are permitted and encouraged. Your Gate B assessment items are to be included as an artifact in your electronic portfolio (Taskstream).

1) Gate B I. (Due by 10/2 at 11:59 PM on Blackboard)
Theory into Practice (30 pts.)
You will identify an area of practice that you are interested in learning more about (e.g., classroom discourse, technology, assessment, equity). You will, with the instructors’ help, identify at least three articles to read about this topic, including at least one article from a theoretical/experimental research journal. The other articles can be from actionable teaching journals such as Mathematics Teacher or Mathematics Teaching in the Middle School. You will write a five page paper in which you summarize the findings from the articles and discuss how you would incorporate this information into your teaching practice. This will include the design of an appropriate task in which you demonstrate the use of your findings from the articles and provide a justification for your selection and design. Given the wide range of possible topic choices, the task design may take a variety of forms. Finally, you will present your research findings and task to your classmates. This is an individual assignment.

2) **Gate B II.** (Due by 11/20 at 11:59pm)

UDL Lesson Plan (30 pts)

You will design a lesson plan (using the provided lesson plan format) that is appropriate for implementation in a secondary mathematics classroom. Along with the detailed lesson plan, you will describe how your lesson plan meets the Universal Design for Learning (UDL) principles: (1) Provide multiple means of representation, (2) Provide multiple means of action and expression, and (3) Provide multiple means of engagement. You will write one-page descriptions for each principle addressing its specific guidelines (12 pt font, double-spaced, Times New Roman, 1-inch margins). You will complete this assignment in groups to be determined in class.

3) **Gate B III.** (Due by 12/11 at 11:59pm)

Technology to Enhance the Teaching and Learning of Mathematics (Lesson Plan) (30 pts.)

Find or create a lesson plan that does not include the use of technology. If you are use a plan from an external source, be sure to cite as such. Revise the lesson to include the use of technology to *enhance the teaching and learning of mathematics*. Please avoid superficial use such as a simple PowerPoint presentation. I recommend having learners engage the technology as opposed to the instructor merely demonstrating. Good technologies include Excel, GeoGebra and free online applets (e.g., Wolfram Demonstrations, NCTM’s Illuminations). Submissions for this assignment include: (1) the original lesson, (2) the revised lesson, and (3) a detailed discussion (minimum of 2 pages double-spaced with 1-inch margins written in 12pt Times New Roman font) of the incorporated technologies and how their utilization enhances students’ opportunities to learn mathematics. You may want to include information from the technology principle as described in Principles and Standards (and information from other readings) to make the case that the use of technology enhanced the lesson. This is an individual assignment.

**TEACHING THE LAUNCH-EXPLORE-SUMMARY LESSON**

(30 pts) Students will team-teach a lesson using the Launch-Explore-Summary model. Students will submit a draft of the lesson plan to receive peer and instructor feedback before teaching the class using the lesson. After the whole-class instruction, students will submit a finalized lesson plan. You will be evaluated both for your teaching and your lesson plan. You will be put into groups and assigned topic areas which will determine when you will teach. No matter when you teach, the final, revised lesson plan is due December 2\textsuperscript{nd}, 2014 at 11:59 PM.

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DEVELOPING TECHNOLOGY PROFICIENCIES

(15 pts) You will achieve at least five “proficiency points” throughout the semester in technologies of your choosing. There are three technologies and three levels of proficiency for each. You receive one point for each level you successfully complete but you must reach Level III with one technology (so think of it as 3+2 or 3+1+1). Contact the instructor for the specific requirements to achieve the levels. Note that Level III is essentially implementing the technology in the context of a lesson, so this work may coincide with your Gate C III assignment. However, LaTeX alone is not sufficient for a Gate C III lesson. You may complete these at any time before the end of the semester. You may work with others on this assignment, but you will have to demonstrate your proficiencies individually.

<table>
<thead>
<tr>
<th>Level</th>
<th>GeoGebra - Open source dynamic geometry software with complementing algebraic tools.</th>
<th>Excel - Basic spreadsheet program with some built-in mathematical functions.</th>
<th>LaTeX - Typesetting standard which allows you to produce professional-looking mathematical writing.</th>
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<tbody>
<tr>
<td>Level I</td>
<td>Produce interactive drawing with sliders.</td>
<td>Produce spreadsheet with dynamic formulas.</td>
<td>Typeset a calculus problem.</td>
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<tr>
<td>Level II</td>
<td>Integrate the use of matrices and the computer-algebra system.</td>
<td>Produce simulation with graphical output.</td>
<td>Create presentation.</td>
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<tr>
<td>Level III</td>
<td>Create a multistep interactive task.</td>
<td>Create a self-contained task, including instructions.</td>
<td>Create a leading handout for students with appropriate blank spaces.</td>
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POINT DISTRIBUTION

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
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<tr>
<td>Gate C I. Process Standards</td>
<td>30</td>
</tr>
<tr>
<td>Gate C II. Unit Lesson Plan</td>
<td>30</td>
</tr>
<tr>
<td>Gate C III. Technology Lesson Plan</td>
<td>30</td>
</tr>
<tr>
<td>Launch, Explore, Summary Lesson</td>
<td>30</td>
</tr>
<tr>
<td>Journal Reflections for Field Experience</td>
<td>25</td>
</tr>
<tr>
<td>Technology Proficiencies</td>
<td>15</td>
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<tr>
<td>Class Participation</td>
<td>20</td>
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<tr>
<td>TOTAL</td>
<td>180</td>
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<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A+</td>
<td>97 - 100.0%</td>
</tr>
<tr>
<td>A</td>
<td>92 - 96.9%</td>
</tr>
<tr>
<td>A-</td>
<td>90 - 91.9%</td>
</tr>
<tr>
<td>B+</td>
<td>87 - 89.9%</td>
</tr>
<tr>
<td>B</td>
<td>82 - 86.9%</td>
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<tr>
<td>B-</td>
<td>80 - 81.9%</td>
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<tr>
<td>C+</td>
<td>77 - 79.9%</td>
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<tr>
<td>C</td>
<td>72 - 76.9%</td>
</tr>
<tr>
<td>C-</td>
<td>70 - 71.9%</td>
</tr>
<tr>
<td>D+</td>
<td>67 - 69.9%</td>
</tr>
<tr>
<td>D</td>
<td>62 - 66.9%</td>
</tr>
<tr>
<td>D-</td>
<td>60 – 61.9%</td>
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<tr>
<td>F</td>
<td>&lt; 60%</td>
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TASKSTREAM

Taskstream is a commercial electronic portfolio system for which you must purchase a license. A four-year license as well as a short-term license is available. You may purchase your license directly from Taskstream or from Purdue University (but licenses available from the Boiler Copy Maker are limited). You will use Taskstream to submit your Gate B assessments. See section GATE B ASSESSMENT for

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more details. Taskstream can be found online at: http://www.taskstream.com. Go to the Taskstream website and log-in to confirm that you have access to Gate B. If you do not have access or would like a refresher training session, please contact the e-Portfolio Coordinator, Betsy Kersey, at edit@purdue.edu.

POLICIES

CAMPUS EMERGENCY

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. In order to get information about changes in this course, contact Andrew Hoffman at hoffma45@purdue.edu or 765-496-3027.

BEERING HALL EMERGENCY

Students are required to visit http://www.education.purdue.edu/emergency/ to review the response procedures for emergencies in Beering Hall. It is necessary that you review these directions within the first week of your Beering classes. If you have any questions, contact your instructor.

DISABILITY RESOURCE CENTER

Students with disabilities must be registered with the Disability Resource Center in the Office of the Dean of Students before classroom accommodations can be provided. If you are eligible for academic accommodations because you have a documented disability that will impact your work in this class, please schedule an appointment with me as soon as possible to discuss your needs.

ACADEMIC DISHONESTY

Purdue prohibits "dishonesty in connection with any University activity. Cheating, plagiarism, or knowingly furnishing false information to the University are examples of dishonesty." [Part 5, Section III-B-2-a, University Regulations]. Furthermore, the University Senate has stipulated that "the commitment of acts of cheating, lying, and deceit in any of their diverse forms (such as the use of substitutes for taking examinations, the use of illegal cribs, plagiarism, and copying during examinations) is dishonest and must not be tolerated. Moreover, knowingly to aid and abet, directly or indirectly, other parties in committing dishonest acts is in itself dishonest." [University Senate Document 72-18, December 15, 1972]

ATTENDANCE

Purdue University policy states that all students are expected to be present for every meeting of classes in which they are enrolled. All matters relative to attendance, including the make-up of missed work, are to be arranged between you and the instructors. Only the instructors can excuse you from classes or course responsibilities. In the case of an illness, accident, or an emergency, you should make direct contact with your instructors as soon as possible, preferably before the class. If the instructors cannot be reached directly, a message should be left in the instructor’s department mailbox or with the instructor’s secretary, Kim Deardorff, at 765-494-7290 or deardoka@purdue.edu. If you will be absent for more than five days, have not been able to reach the instructor in person or by telephone or through leaving notification of your circumstances with the instructor's secretary, you or your representative should notify the Office of the Dean of Students (765-494-1254) as soon as possible after becoming aware that

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the absence is necessary. Be advised, you may be asked to provide documentation from an authorized professional or agency which supports an explanation for your absence.

Your attendance to each class meeting is critical to the success of our learning community. You are expected to attend each class session, to arrive on time, and to stay for the entire class session. You should contact me as soon as you are aware that you will be unable to attend a class session. An unexcused absence results in a 5% reduction of the total possible points available for this course. Official documentation is required in order for an absence to be deemed as excused.

CELLULAR PHONES

Please silence cell phones before entering the classroom. If you must leave your cell phone on, please put the cell phone on vibrate and take calls outside of class.

LATE ASSIGNMENTS

Assignments submitted late resulting from an excused absence will be accepted without penalty. A revised due date for these assignments should be negotiated with the instructor as soon as possible after you have missed class. Five percent per day late will be deducted from all other late assignments.

PROFESSIONALISM

You are expected to demonstrate professionalism (including dressing professionally), particularly when conducting classroom observations and making presentations in class. You will sign a professionalism agreement in class. The Professionalism Agreement can also be found at www.edci.purdue.edu/misc/Professionalism_Agreement.pdf or the course Blackboard page.

REVISIONS

An assignment may be deemed unsatisfactory, and consequently, you will be expected to revise or redo the assignment. Under such circumstances, you are expected to schedule an appointment with an instructor, immediately, to discuss the revision. Rewrites are due one week from the date of which the assignment is returned with a request for a resubmission. To help ensure that you meet the deadline for all requirements to student teach, all revised work must be submitted by 5:00 p.m. on December 16th, 2014.

WORK SUBMITTED

Unless otherwise noted, all assignments are to be submitted electronically on the due date. Five percent per day late will be deducted for work submitted late. Assignments should be double-spaced and use 12 point font. References should follow the APA (American Psychological Association, 6th edition) format. Each assignment should be proofread before submission. Rewrites are not granted to address errors related to proofing or grammar.

COURSE EVALUATION

During the last two weeks of the semester, you will be provided with an opportunity to evaluate this course and your instructor. Near the end of classes, you will receive an official email from evaluation administrators with a link to the online evaluation site. You will have up to two weeks to complete this
evaluation. Your participation is an integral part of this course, and your feedback is vital to improving education at Purdue University. We strongly urge you to participate in the evaluation system.
## Tentative Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>To Have Completed Prior To Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Aug 26</td>
<td>Course Introduction</td>
<td></td>
</tr>
</tbody>
</table>
|        | Aug 28 | CCSSM                                      | Completed: Online reflective questionnaire  
Read: *CCSSM* pgs. 3-8                                                                           |
| Week 2 | Sep  2 | Intro to NCTM & Theory Into Practice assignment | Read: Battista (1999)  
Registered: Become NCTM member                                                                |
|        | Sep  4 | CCSSM Practices 1 & 2                     | Read: CCSSM Practices 1 & 2  
Read (opt.): *PSSM* Problem Solving Standard for Grades 9-12                                      |
| Week 3 | Sep  9 | CCSSM Practices 3 & 4                     | Read: CCSSM Practices 3 & 4  
Read (opt.): *PSSM* Communication Standard for Grades 9-12                                         |
|        | Sep 11 | Overviews of available technologies and research | Read: *PSSM* Curriculum Principle  
Read (opt.): *PSSM* Connections Standard for Grades 9-12                                               |
| Week 4 | Sep 16 | CCSSM Practices 5 & 6                     | Read: CCSSM Practices 5 & 6  
Read (opt.): *PSSM* Representations Standard for Grades 9-12                                              |
|        | Sep 18 | CCSSM Practices 7 & 8                     | Read: CCSSM Practices 7 & 8  
Read (opt.): *PSSM* Reasoning and Proof Standard for Grades 9-12                                             |
| Week 5 | Sep 23 | LES Lesson – Launch                        | Posted: Topics for Theory into Practice                                                            |
| Week 6 | Sep 30 | LES Lesson – Summary                       | Read: *PSSM* Equity Principle                                                                        |
|        | Oct  2 | Equity                                     | Posted: Gate B.I Theory into Practice                                                                 |
| Week 7 | Oct  7 | Theory into Practice presentations         | Read: Hunt (2011)                                                                                   |
|        | Oct  9 | Theory into Practice presentations (cont.) |                                                                                                |
| Week 8 | Oct 14 |                                            | October Break                                                                                      |
|        | Oct 16 | Algebra Part I                             | Posted: Team 1 lesson draft  
Read: Choike (2000)  
Read (opt.): *PSSM* Algebra Standard                                                                          |
| Week 9 | Oct 21 | Algebra Part II                            | Posted: Feedback for Team 1 (from Team 3)  
Posted: Field Experience Reflections I  
Read: *CCSSM* Algebra Standards Overview                                                                       |
|        | Oct 23 | Team #1 lesson                             | Posted: Team 2 lesson draft                                                                         |

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| Week 10 | Oct 28 | Geometry | Posted: Feedback for Team 2 (From Team 4)  
Read: Groth (2005)  
Read (opt.): *PSSM* Geometry Standard |
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<tbody>
<tr>
<td></td>
<td>Oct 30</td>
<td>Team #2 lesson</td>
<td>Posted: Team 3 lesson draft</td>
</tr>
</tbody>
</table>
| Week 11 | Nov 4  | Measurement | Posted: Feedback for Team 3 (From Team 5)  
Read: *PSSM* Measurement Standard |
|         | Nov 6  | Team #3 lesson | Posted: Team 4 lesson draft |
| Week 12 | Nov 11 | Data Analysis and Probability | Posted: Feedback for Team 4 (From Team 1)  
Read: *PSSM* Data Analysis and Probability Standard |
|         | Nov 13 | Team #4 lesson | Posted: Team 5 Lesson draft |
| Week 13 | Nov 18 | Number and Operations | Posted: Feedback for Team 5 (from Team 2)  
Read: *PSSM* Number and Operations Standard |
|         | Nov 20 | Team #5 lesson | Posted: Gate B.II UDL Lesson Plan |
| Week 14 | Nov 25 | Technology & Gate B.III | Read: *PSSM* Technology Principle |
|         | Nov 27 | Thanksgiving Break |  |
| Week 15 | Dec 2  | Mathematics Classroom Management Techniques | Posted: Revised LES lesson plan |
|         | Dec 4  | Mathematics Classroom Management Techniques (cont.) |  |
| Week 16 | Dec 9  | Assessment | Read: *PSSM* Assessment Principle  
Posted: Field Experience Reflections II |
|         | Dec 11 | Reflection Day | Posted: Gate B.III Technology-enhanced Lesson  
Submitted: Field Experience Verification Form  
Demonstrated: Tech Proficiencies |
| Finals Week | Dec 15-20 |  | Posted on Taskstream: Gate B Assignments |
References


