N101: Teaching and Learning Elementary School Mathematics
Syllabus
Fall Semester, 2013

Instructors
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*Email is the best method of contact. (?)

A little about me: I taught middle and high school students for 9 years in L.A. and outside of Chicago. Then for 2 years I was a mathematics assistant to teachers in an elementary school in Georgia. I have taught prospective and practicing teachers years in Georgia; Portland, Oregon; and Indiana. I love teaching students of all ages and look forward to working with you.

A little about me: I taught middle and high school math for 6 years in Wisconsin before coming to Indiana University. I am now in my fourth year as a doctoral student in mathematics education. Over the past eight summers I taught for Johns Hopkins University’s Center for Talented Youth at their gifted camp at the Stanford University location.

Course Tutors* All are successful N101 students from prior semesters.
Molly Cason, mcason@indiana.edu
Karen Goldstein, karegold@imail.iu.edu
Sarah Isaacson, sisaacso@indiana.edu
Jordan Pruis, jepruis@umail.iu.edu
Nora Shedd, nshed@umail.iu.edu
Kelly Singleton, kesingle@indiana.edu
Audrey Stuckey, audstuck@imail.iu.edu

*Information about tutoring days and times are listed on the Oncourse Home page; tutoring is free. No tutoring during the first or last week of classes, when school is not in session, or when exams are taken home. All tutoring sessions take place in the third floor atrium, and tutors will have signs up to help you locate them.

Class Times and Locations
Mondays and Wednesdays,
1:00-2:15 pm, (section 12314) Wright 1225 OR
2:30-3:45 pm, (section 12313) Wright 1220

Office Hours
Amy: MW 3:30-4:30 pm or by appointment
Crystal: MW 11:30-12:30 pm or by appointment
Feel free to email or stop by our offices (Wright 3060-Amy or 3002-Crystal); if we can’t talk at that moment, then we can arrange for another time.

Required Texts and Materials
Access to Google Sites to co-create and read the course website. (You will receive an email about this information.)

Oncourse, Google Sites, and Email
We will post assignments, class work documents, class notes, readings, questions about readings, and other important information regularly to Oncourse. We will also ask you to contribute to our class via forum discussions on Oncourse and wiki pages on Google Sites. Please become familiar with using Oncourse and the Google Site by the first week of classes. You are expected to check Oncourse, the Google Site, and email regularly.

Important Dates (see Student Calendar for more!)

<table>
<thead>
<tr>
<th>Aug</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>HW0 due</td>
<td>2 Labor Day – no class</td>
<td>15 Posting Form due</td>
<td>10 Posting Form due</td>
</tr>
<tr>
<td>30</td>
<td>First post due by 5 pm</td>
<td>4 HW1 due by 5 pm</td>
<td>16 In-class part of midterm</td>
<td>11 In-class part of final</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>23 Take-home part of midterm due in class</td>
<td>18 Take-home part of final due by 5 pm</td>
</tr>
</tbody>
</table>
Course Goals

This course has **two major foci**.

**The first focus is exploring and developing your own mathematical reasoning** with numbers and quantities. We will also use our numerical and quantitative reasoning as a basis to understand early algebraic reasoning. Developing your own mathematical reasoning is essential for communicating mathematically with your future students.

**The second focus is on how young students think mathematically.** Throughout the course we will examine the power of children’s reasoning, trying to understand how they generate mathematical ideas. Your understanding of children’s mathematical reasoning is critical in developing your own reasoning, as well as ways to help your future students advance their mathematical ideas.

Specific goals of the course are for you to:

1. **Engage in reasoning and problem solving to learn mathematics.** Remember, it is **never** too late for anyone to learn to reason numerically, quantitatively, and algebraically in ways that do not emphasize rule-bound manipulation of symbols. A major goal of the course is for you to experience reasoning with numbers and quantities in a way that will serve as a framework and guide as you help your future students to reason mathematically.

2. **Develop greater awareness of your own mathematical thinking.** This goal includes rethinking your conceptions about the nature of mathematics; coming to understand aspects of your own mathematical thinking that you take for granted; and developing a habit of searching for foundational (“big”) ideas in your own mathematical activity. We will also consider the meaningfulness of mathematical methods and ideas, and we will determine how we can (or cannot) generalize them.

3. **Communicate mathematically to your peers.** One of the five principles of school mathematics is communication (National Council of Teachers of Mathematics [NCTM], 2000), which allows people to expand their reasoning, understand the reasoning of others, debate the soundness of mathematical ideas, and convince others of mathematical processes and conclusions. However, good mathematical communication is not an in-born skill—it is an achievement! To help you communicate well with your future students, we will work hard in our class to communicate mathematically with each other.

4. **Explore and understand the mathematical thinking of children.** In addition to understanding one’s own mathematical ideas, we will work on understanding mathematical ideas that children develop. We will view videos of children reasoning to solve mathematics problems, and we will make interpretations of their ideas. This goal also includes learning to design tasks for elementary school students to help them develop their mathematical reasoning.

5. **Make mathematical connections.** We will make connections between seemingly different mathematical topics and explore how developing knowledge in some areas (e.g., multiplication of whole numbers) can be critical in building knowledge in other areas (e.g., fractions).

**NOTE:** Working toward these goals will involve exploring and understanding mathematical ideas at a level deeper than you may expect your elementary school students to explore and understand.

***Some of the most important “methods” you have as a teacher of mathematics are

(a) your own evolving, creative mathematical thinking; and

(b) your evolving understanding of your students’ mathematical thinking and how it can change through engaging students in productive mathematical activity.***
Abridged Description of Course Assignments

We will try to make the purpose of assignments clear. If you have questions about the purpose of an assignment or what is expected of you, please ask—we are always happy to discuss your concerns with you, either inside or outside of class.

On all written work, we expect you to demonstrate correct use of the English language with regard to grammar, punctuation, and spelling. Please proofread your work before submitting it. However, even more important, on all written work we will ask you to describe and explain your reasoning. This term we will discuss, in depth, what explaining one’s reasoning entails. You should expect to do a lot of writing in this class, even though you will not be submitting formal writing assignments.

Each course assignment has been allotted a certain number of points out of 400 possible points that you can earn in the course. Information on evaluation of your assignments is listed in the next section on Grading Policies.

1. **Mathematics Homework:** A major focus of this course is on deepening your own mathematical reasoning, which requires working on mathematics problems. You can expect to turn in a mathematics homework assignment once per week. 160 points of the total 400 course points are allotted to homework, and typically a single homework assignment is worth 20 points (see rubric on p. 4). Homework assignments can only be received on the due date by 5 pm, and they cannot be made up. After 5 pm on the due date (typically Wednesdays) we will NOT accept homework assignments except in the case of a *significant* medical issue. We will have at least 9 (most likely 10) homework assignments during the term, and we will count your best 8 assignments in your course grade. **You do not need to type mathematics homework.** Please complete these assignments legibly on paper and submit them by the due date and time.

2. **Readings:** For discussions in class, we will occasionally ask you to read short articles posted to Oncourse. These readings may also be the basis for a forum discussion via Oncourse (see On-line Course Work below).

3. **On-line Course Work:** On-line course work consists of participation in discussion forums (on Oncourse) and the creation of a Google website (wiki) for the course. In response to class discussion, a mathematical issue or problem, or a reading, we will ask you to post and respond to the postings of others in a discussion forum. We will also ask you to help create a Google website (wiki) of main ideas from our work together. 40 points of the 400 course points are allotted to on-line course work. You are expected to post approximately every two weeks, spreading your posts out over the term. We will assess your posting at the middle and at the end of the term (see rubric on p. 4; more details about these assignments are posted in the Assignments tab on Oncourse).

4. **Midterm Exam:** The midterm will cover approximately the first seven weeks of the course and is worth 100 points. There will be a short in-class portion (worth approximately 20 points) and a longer take-home portion (worth approximately 80 points).

5. **Final Exam:** The final exam will focus on the second half of the term, but topics from the first half of the course will also be included. The final is worth 100 points and its structure will be similar to the midterm.

Grading Policies

- **Grading Standards:** Grades are based on individual performance in all aspects of the course, with grading rubrics or point distributions provided for all assignments. Every attempt will be made to give grades that are close to those suggested by the Teacher Education Undergraduate Grading Guidelines. As noted in the guidelines, (1) an A is representative of outstanding performance and (2) “it is virtually impossible to pre-specify all details necessary to achieve a given grade.” The guidelines also state “Students should recognize that effort alone does not necessarily guarantee above average grades.”
• *Grading Standards (cont.)*: The grade distribution for mathematics courses for teachers suggests that most students obtain grades ranging between B and B+. However, with grades based on individual performance rather than a comparison to others, the average grade for the course could end up higher or lower than that.

• *Grading of Written Homework*: We evaluate and grade written homework according to the following rubric. Note that homework assignments are worth 20 points. A detailed description of this rubric will be handed out in class and is also available in the Resources tab on Oncourse.

<table>
<thead>
<tr>
<th>Homework Rubric</th>
<th>Weak</th>
<th>Average</th>
<th>Good</th>
<th>Exceptional</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Problems and Explanations Thoroughly Completed</td>
<td>1-2</td>
<td>3-4</td>
<td>5-6</td>
<td>7</td>
</tr>
<tr>
<td>Depth of Analysis and Explanation of Targeted Problems</td>
<td>1-2</td>
<td>3-4</td>
<td>5-6</td>
<td>7</td>
</tr>
<tr>
<td>Mathematical Correctness and Clarity of Communication</td>
<td>1-2</td>
<td>3-4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

• *Grading of On-line Course Work*: We evaluate on-line postings to forum discussions and the Google website (wiki) pages according to the following rubric. On-line postings are assessed in the middle of the term and at the end of the term. A detailed description of this rubric will be handed out in class and is also available in the Resources tab and in the Assignments tab on Oncourse.

<table>
<thead>
<tr>
<th>On-line Postings Rubric (Assessed in the middle and at the end of the term)</th>
<th>Weak</th>
<th>Average</th>
<th>Good</th>
<th>Exceptional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postings completed by specified dates</td>
<td>0</td>
<td>1</td>
<td>1.5</td>
<td>2</td>
</tr>
<tr>
<td>A Minimum of 4 Postings per assessment period</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Response to a Classmate or Posing of at least 1 Question (can be within a thread; typically on Oncourse forum; for at least 1 post)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Read at least 20% of the Forum Posts (on Oncourse)</td>
<td>5</td>
<td>1</td>
<td>1.5</td>
<td>2</td>
</tr>
<tr>
<td>Contribution to at least 1 Wiki Page &amp; 1 Oncourse Forum</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Mathematical Substance of 2 Best Posts</td>
<td>1-2</td>
<td>3-4</td>
<td>5-6</td>
<td>7-8</td>
</tr>
</tbody>
</table>

• *Policy on Resubmitting Assignments*: We do not allow resubmitting of assignments or exams. However, as noted on p. 3, in your course grade we count your best 8 homework assignments out of 9 or 10.

• *Policy on Late Assignments*: We expect that written homework, on-line course work, and exams will be submitted by the announced due dates and times. We will accept take-home exams (not homework or on-line course work) after the due date, but your grade will decrease by 10% of the allocated points for each day the exam is late. For example, if you turn in a take-home midterm two days late, you will earn 16 fewer points than you would have if you had turned it in on time.

• *Policy on Computer Accidents*: Please make sure you save your work frequently and keep backup copies of your files when using a word processor or saving files from JavaBars. **Computer accidents, while very unfortunate, are not an acceptable excuse to avoid penalties for late work.**

• *Policy on Lost Assignments*: You should always keep a copy of every paper and electronic file you turn in until your work is graded and you have received your course grade. We recommend that you make a copy of the take-home portions of your midterm and final exams before you turn them in.
• **Attendance**: Attendance is required for all class sessions. Attendance is important for the following reasons. First, as a future teacher it is important to develop the sense of responsibility needed to meet your class every day. This is one aspect of becoming a professional who is committed to playing a major role in the development of children. Second, activities, ideas, and concepts we work on in class are useful to you as a mathematical thinker and beginning teacher, and they cannot easily be built up through book readings or someone else’s notes. Third, class includes important whole-group and small-group discussions based on hands-on activities; many of these activities cannot easily be made up individually if you miss class.

• **Calculation of Final Grades**: As noted above, the points for the course total to 400 points as follows:

  - **Homework**: 160 pts (8 assignments counted out of 9 or 10)
  - **On-line course work**: 40 pts (2 assessments of 20 pts each)
  - **Midterm Exam**: 100 pts
  - **Final Exam**: 100 pts

The chart below shows the point totals required to achieve specific final course grades, based on a typical 90%-80%-70%-60% scale. **Note that the cut-off for an A is 95%, not 93%**.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points</th>
<th>Grade</th>
<th>Points</th>
<th>Grade</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (95% +)</td>
<td>380 points</td>
<td>B- (80%)</td>
<td>320 points</td>
<td>D+ (67%)</td>
<td>268 points</td>
</tr>
<tr>
<td>A- (90%)</td>
<td>360 points</td>
<td>C+ (77%)</td>
<td>308 points</td>
<td>D (63%)</td>
<td>252 points</td>
</tr>
<tr>
<td>B+ (87%)</td>
<td>348 points</td>
<td>C (73%)</td>
<td>292 points</td>
<td>D- (60%)</td>
<td>240 points</td>
</tr>
<tr>
<td>B (83%)</td>
<td>332 points</td>
<td>C- (70%)</td>
<td>280 points</td>
<td>F</td>
<td>&lt; 240 points</td>
</tr>
</tbody>
</table>

• **Attendance and Final Course Grades**: Students who are continually participating and have good attendance will have their point totals “rounded up” at the end of the semester if their score is a borderline case. For example, if someone who has earned 346 points has missed class only once and participated regularly, their score will be rounded up to a B+. Someone with more than two absences who has earned 346 points will not have their score rounded up to a B+ and will receive a B. **We usually do not round up scores in the A-range**. Students who accrue unexcused absences will be notified via email. An alert form for excessive number of absences will be filed for students who accumulate more than 4 unexcused absences. Students who accumulate 6 or more unexcused absences will receive an FN (failure for nonattendance) grade. A doctor’s note stating the student was too ill to attend class is needed for excused absences; there is a limit of 3 excused absences in the semester. After 3 excused absences, subsequent absences will be considered unexcused. **Please inform your instructor ahead of time if you have an unavoidable absence; please inform your instructor via email if you are experiencing an unexpected event that will cause an absence.**

• **If you do miss a class meeting**: (1) Talk in detail with at least one classmate about what we did during class. Preferably talk with two classmates, so you get more than one perspective. (2) Check Oncourse and the Google (wiki) website for all new postings, emails, etc. **You are responsible for any and all information that occurred during your absence.**

• **Tardiness**: For all the reasons given about attendance, please don’t be late to class. We have a short time together, and we will need to use all of it to accomplish the goals in the course. Tardiness not only is detrimental to the person who is late (who will miss important information and/or activities); it is disruptive to others. However, we know that occasionally life intervenes. **Please inform your instructor if you know you have an unavoidable conflict and will be late to class.**

• **Religious Holidays**: The policy at Indiana University is that instructors must reasonably accommodate students who want to observe their religious holidays at times when academic requirements conflict with those observances. If a conflict with a religious observance exists, a student must make a request to the instructor for a reasonable accommodation for that observance by the end of the second week of the course. Any relevant change to the course calendar affords a new opportunity to make such a request in a timely manner. The request is to be made in writing on a standardized form available at this website: [http://www.indiana.edu/~vpfaa/welcome/forms.shtml#Forms](http://www.indiana.edu/~vpfaa/welcome/forms.shtml#Forms) (scroll down).
• Cell phones, newspapers, etc.: Please turn cell phones off during class and store cell phones out of sight for the duration of the class time (i.e., do not rest cell phones on the desk or in your lap). Please do not send text messages during class. If we have to ask you twice not to text, you will accrue an absence. If you have an unusual circumstance, please inform your instructor. Also, please do not take out newspapers or other outside reading materials in class—we have plenty to do together to keep us busy!

• Checking email: When we work on computers in the course, please refrain from surfing the web, checking email, sending instant messages, etc. We know it’s very tempting to engage in these activities, especially if you finish a problem or discussion early. However, we have a short time together, and we need all of it for working on the problems at hand and discussing the many issues that arise.

• Academic Misconduct: We hope there will be no need to worry about academic misconduct (cheating, plagiarism, etc.). All university policies concerning academic misconduct will be strictly followed and can be found at http://studentaffairs.iub.edu/ethics/. In particular, it is our obligation to report any academic misconduct at the university level. Good information about plagiarism can be found at http://education.indiana.edu/~frick/plagiarism/. It is your responsibility to be familiar with these policies.

Final Note

We want to help you become an excellent mathematics teacher of elementary school students. Please feel free to contact us (email, or stop by our offices) if you’d like to discuss matters related to the course, to learning and teaching mathematics, to mathematics in general, or to teaching in general. We are always happy to discuss concepts and ideas, course assignments, your work on assignments, and the process of becoming a professional teacher. We look forward to working with you this semester!

Text Resources


Teaching Children Mathematics and Mathematics Teaching in the Middle School, two journals for teachers published by NCTM. These journals are available in the Education Library and also on-line (to NCTM members) at the url for NCTM above. TCM is focused on grades K-6, while MTMS is focused on grades 5-9.


Wright, R. J., Martland, J., Stafford, A. K., & Stanger, G. (2006). Teaching number (2nd ed.). London: Paul Chapman. [Note that they have three other books as well, all about teaching number in the elementary school.]

On-line Resources

Illuminations, a website of lesson resources published by NCTM: http://illuminations.nctm.org/


TRIAD (Technology-Enhanced, Research-Based Instruction, Assessment, and Professional Development), which includes a link to the Building Blocks curricular materials for preschool children: http://gse.buffalo.edu/org/triad/tbb/index.asp?local=parent

A video library of mathematics lessons by Annenberg Media, and other resources (grades K-4, 5-8, 9-12): http://www.learner.org/resources/browse.html?discipline=5