

Math 114 (10437) - Children's Mathematical Thinking – Fall 2012

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CD: [Integrating Mathematics and Pedagogy \(CD\)](#)

Drop Date with "W": September 21, 2012

Final Class: Friday, September 28, 2012

COURSE DESCRIPTION

Explore children's mathematical thinking with in-depth analysis of their understanding of operations, place value, algorithms, and multiple representations of problems. Examine interviews of children to assess understanding of mathematics topics, then plan tutoring sessions on basis of interviews.

COURSE OBJECTIVES

1. Demonstrate skill in recognizing representations of mathematical problems and their connections to children's understanding at 70% accuracy.
2. Demonstrate an understanding of problem types and solution strategies for addition and subtraction at 70% accuracy.
3. Demonstrate an understanding of problem types and solution strategies for multiplication and division at 70% accuracy.
4. Demonstrate alternative algorithms and a connection to complex elements of counting at 70% accuracy.
5. Demonstrate an understanding of place value concepts at 70% accuracy.

STUDENT LEARNING OUTCOMES

By the end of this course students will be able to express a cursory knowledge of a child's mathematical thinking through personal interview and written analysis

ATTENDANCE AND CAUTION!

This is a very short course – just six (6) class sessions. If you do not intend to come to every session, then drop the course now. It sounds harsh, but you will be dropped if you miss more than **one (1) hour** of class. Attendance and participation are essential in this class, not only for you to learn but also so that others may benefit from you input. If you do not want to receive a grade, the **drop with a "W" date is Friday, September 21, 2012. It is YOUR responsibility to drop or accept the grade.**

COURSE MATERIALS

- IMAP Select CD of Children's Reasoning
- Syllabus and Course Readings
- Counters you can use for your interviews
- Paper and writing tools for your interviews

COURSE COMPONENTS

HOMEWORK – MAY BE SUBMITTED ELECTRONICALLY

They are graded on the completeness of your answer. You do not have to be "wordy," but fully answer the question, using examples from the selected video when necessary. If it asks for your opinion, explain yourself. This is college and a short sentence answer is not appropriate for an intelligent opinion in a discussion class.

INTERVIEWS – There are three (3) interviews of elementary aged school children that are fully explained in a separate document.

GRADING CRITERIA

Unlike a traditional mathematics course, in which your grade is based upon your ability to correctly solve mathematics problems, this course is about focusing upon children's mathematical thinking, and your grade will be based upon your videotape reflections, your interview write-ups, and your discussion. It is subjective grading based on your ability to make me understand your analysis.

Your grade will be comprised of the following items and based on points accumulated:

Homework	130 points	~40%
1 st Interview - Early Number	50 points	~15%
2 nd Interview – Equal Sharing Tasks 1 and 2	50 points	~15%
3 rd Interview - Fraction Assessment	100 points	~30%
Total points	330 points	~100%

90% to 100%	297-330 points	A
80% to 89%	264-296 points	B
70% to 79%	231-263 points	C
60% to 69%	198-230 points	D
Below 60%	Below 198 points	F

TENTATIVE SCHEDULE AND DUE DATES

- Week 1 – Syllabus, introduction, reflection and discussion on videos.
 Week 2 – Video, discussion, in-class problems, **HW1 due**
 Week 3 – Video, discussion, in-class problems, **HW 2 and Interview #1 due**
 Week 4 – Video, discussion, in-class problems, **Interview #2 due**
 Week 5 – Video, discussion, in-class problems, **HW3 due**
 Week 6 – Final discussion and videos **Interview #3 due**

ASSESSMENT

HW 1 – Imagine that your mathematics instructor interviewed you to determine how well you understand something you are learning in your class. (Yes, this is probably many students' worst nightmare. Take solace in the fact that this is only a hypothetical question!)

- 1) What might the instructor learn about you? (10 pts)
- 2) What would you learn about yourself? (10 pts)

Consider the following two problems:

a) $4 - \frac{7}{8}$

b) If you have 4 large cookies and you eat $\frac{7}{8}$ of one of the cookies, how many cookies would you have left?

3) Do you think that intermediate-grade students would be more successful in solving one of these problems than the other? If yes, completely explain which why one is easier than the other. If no, completely explain why you think these are equally understood. (10pts)

HW 2 - Watch Video Clip #24, Richard. Answer **Reflection** Questions:
 #1 (10pts), #2 (10pts), #3 (10pts), and #6 (20pts).

HW 3 - Watch Video Clip #17 and answer **reflection** questions:

1 (10pts), **#2** (10pts), **#3** (10pts),

and this question: An important but often overlooked distinction in mathematics is the distinction between a *quantity* and the *value* of the quantity. One's weight is a quantity that may change, but the value of one's weight is what one reads when stepping onto a scale at a particular time. Did you notice that some children, in their solutions, in this video clip refer to the quantities whereas others refer more to the values of the quantities? Give an example of a solution that:

- a) referred more to quantities (10pts) and
- b) referred more to the values of the quantities. (10pts)

IVC POLICIES

- Under IVC policy, students are expected to attend every session of class in which they are enrolled. If a student is unable to attend the course or must drop the course for any reason, it will be the responsibility of the student to withdraw from the course. I will not drop you from the course. If the student does not withdraw from the course and fails to complete the requirements of the course, the student will receive a failing grade.
- Any student with a documented disability who may need educational accommodations should notify the instructor or the Disabled Student Programs and Services (DSP&S) office as soon as possible. The DSP&S office is located in Room 2117, in the Health Sciences Building. Their phone number is (760) 355-6312.
- Disruption of other students will result in a reprimand or expulsions from the class for that day. A second offense can result in administrative discipline. Disruption can be: cell phones, texting, talking with other students, unnecessary noise and movement.
- Cheating is not tolerated and will result in discipline from the administration.
- Bottled water is the only food or drink allowed in the room.