Math 114 (20315) - Children's Mathematical Thinking – Spring 2013
Instructor: Barbara Nilson   **Office:** 2762   **Phone:** 760-355-6477
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CD: Integrating Mathematics and Pedagogy (CD)
Drop Date with "W": February 22, 2013
Final Class: Friday, March 1, 2013

**Prerequisite: Math 91 (grade of C or better) or appropriate Placement Score.**

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, February 22, 2013. It is YOUR responsibility to drop or accept the grade.**

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. Quality work is expected for a grade of A or B.

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

Homework	65 points	~40%
1st Interview - Early Number and Equal Sharing	50 points	~15%
2nd Interview – Place Value	50 points	~15%
3rd Interview - Fraction Assessment and Equal Sharing	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.

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

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**

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? (5 pts)
    2) What would you learn about yourself? (5 pts)
    3) Consider the two problems below. Think about an early-grade elementary child and an intermediate-grade student. Explain why you think that early-grade students would be more successful in solving one of these problems than the other. (5 pts)

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

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

HW 2 - Watch Video Clip #24, Richard. Answer **Reflection** Questions:
        #1 (5 pts), **#2** (5 pts), **#3** (5 pts), and **#6** (10pts).

HW 3 - Watch Video Clip #17. Answer **reflection** questions: **# 1** (5 pts), **#2** (5 pts), **#3** (5 pts),
        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. 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 (5 pts) and
        b) referred more to the values of the quantities. (5 pts)

IVC POLICIES
- 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.
- Bottled water is the only food or drink allowed in the room.

MY POLICIES
- Disruption in my class is defined as behavior that interferes with another student's ability to learn or is distracting to myself or others. Some examples are: talking with other students during lecture, ringing phones, texting, reading non-math materials such as magazines, watching and/or playing videos or games on an electronic device, cleaning out your backpack…
- Cell phones or other electronic communication devices can only be used for appropriate math purposes. They may not be used during an exam. Texting or using your cell phone for calls during class can be grounds for dismissal from class.
- Multiple infractions of my policies can result in a lowering of your grade by 1 letter.