

## Math 114 (10655) - Children's Mathematical Thinking – Fall 2013

**Instructor:** Barbara Nilson

**Office:** 2762

**Phone:** 760-355-6477

**E-mail:** [bnilson@imperial.edu](mailto:bnilson@imperial.edu)

**CD:** Integrating Mathematics and Pedagogy (CD)

**Drop Date with "W":** Wednesday, September 25, 2013

**Final Class:** Wednesday, October 9, 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 Wednesday, September 25, 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 two (2) interviews of elementary aged school children that are fully explained separately.

#### 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 homework, your interview write-ups, your discussion, and your final. 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	75 points	~25%
1 <sup>st</sup> Interview - Early Number and Equal Sharing	75 points	~25%
2 <sup>nd</sup> Interview – Place Value	100 points	~33%
Final	50 points	~17%
Total points	300 points	~100%

### 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	Date	Assignment	Due Date
1	8/21/2013	HW1	
2	8/28/2013	HW2	HW1
3	9/4/2013	INT 1	HW2
4	9/11/2013	HW3	INT 1
5	9/18/2013		HW3
6	9/25/2013	INT 2	
7	10/2/2013		INT 2
8	10/9/2013	Final	

#### HW 1 – Learning Style Survey

Go online and search for ‘learning Style survey.’ Choose two sites and take the two different surveys of learning styles. You may want to try more than two, but only turn in two. (10 pts)

[Note: One of my favorites is from North Carolina State found at [enr.ncsu.edu](http://enr.ncsu.edu). I also like [edutopia.org](http://edutopia.org). There are MANY sites, but some of them want you to download something or join their site and I won’t do that.]

Print your results and the explanations.

Answer the following:

- 1) Explain why you agree or disagree with the findings. (5pts)
- 2) Explain why you think the explanations and study tips can be useful to persons wanting to become teachers.

(5pts)

- 3) Compare the two sites (and your results) and tell me which one you think is more accurate and/or useful. (5pts)

#### 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 at least one example from the video 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.
- 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.
- Cheating is not tolerated and will result in discipline from the administration.
- Bottled water is the only food or drink allowed in the room.