

## Math 114 (20142) - Children's Mathematical Thinking – Spring 2014

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

**Drop Date with "W":** Friday, February 28, 2014

**Final Class:** Friday, March 7, 2014

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 your input. If you do not want to receive a grade, the **drop with a "W" date is Friday, Feb 28, 2014**. 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	~30%
1 <sup>st</sup> Interview - Early Number and Equal Sharing	50 points	~20%
2 <sup>nd</sup> Interview – Place Value	100 points	~40%
Final	25 points	~10%
Total points	250 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	Assigned	Due Date
		HW1	1/27/2014
1	1/24/2014	HW2	1/31/2014
2	1/31/2014	INT1	2/07/2014
3	2/07/2014	INT2	2/21/2014
4	2/21/2014	HW3	2/28/2014
5	2/28/2014		
6	3/07/2014	Final	

**HW 1 – Learning Style Survey (25pt) – to be submitted electronically by Monday, Jan 27, 2014. Copy all requirements in a document and mail to me using your IVC email.** (All other email addresses will be automatically rejected as spam by IVC spam-blockers.)

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 engr.ncsu.edu. There are MANY sites, but some of them want you to download something or join their site and, personally, I won’t do that.]

Print your results **and** the explanations (usually explained on another page of the site).

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 (25pt).** Answer **Reflection** Questions:

**#1** (5 pts), **#2** (5 pts), **#3** (5 pts), and **#6** (10pts).

**HW 3 - Watch Video Clip #17 and #18 (25pt).** For #17 Answer **reflection** questions: **# 1** (5pts), **#2** (5pts), **#3** (5pts).

For #18 answer reflection questions: **#1** (5pt) and **#4** (5pt).

**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.

## Math 114 – Children’s Mathematical Thinking

### Interview Project

B. Nilson

#### First Interview Write-Up

Interview a younger elementary-age child (1<sup>st</sup> – 2<sup>nd</sup> grade). You must use the questions and problems from the interview documents included in the ‘Resource’ folder on your CD – **Early-Number Interview** and some from **Equal Sharing**. You do not have to use all of the questions. Choose a variety (minimum of 20) that will be suitable for the age of the child you choose. Be sensitive to the attention-span of the child.

Answer the following questions either typed or hand-written. (7pts ea)

1. The age and grade of the student you interviewed and pertinent information about the child, such as: documented disabilities, gifted, home-schooled, private school, second language, repeated grade, etc. Do not include last name of the child or information that would identify the child specifically to an outside reader.
2. What did you learn about the child’s learning style(s)? Give examples of what the child did or said that leads you to think this is their learning style. Ex: did they use fingers? Blocks? Look up to the right or left? Stare into space when they concentrate? Other?
3. How does this knowledge about the child’s learning style relate to your own style or experiences you had as a child? Give examples.
4. Did you provide manipulatives? What types? Did the child use them on their own or did you encourage them to use them? If you did not use them, what was your rationale for not doing so?
5. Give examples of a few problems and how the child showed you the solution. Example: used fingers, used blocks, drew a picture, wrote down the problem in numbers... EXPLAIN HOW THE CHILD SOLVED THE PROBLEM – SPECIFICALLY.
6. What did you think went well and what did not go so well? What would you improve or do differently? Did anything surprise you?
7. Summarize how your opinion of the child changed after you had interviewed them? Did the interview change your opinion of children in general?

To turn in:

- Your responses to these questions
- A copy of the problems you asked the child
- The child’s papers or drawings if they used any