

Portfolio Instructions

MATH 4010 - Allison

Objectives for your portfolio:

- have models and examples appropriate for teaching mathematics to children
- reflect on material covered in the course
- have examples of good assessment tools
- review for the final exam

NOTE: This is an activity that you should keep updated throughout the semester rather than assembling hurriedly as the semester comes to an end. Give it "personality"! Make it colorful. Play with your displays and decorate them to make it your own. Avoid overuse of Internet printouts. I'd rather see your own explanations creative ideas than something produced on a website.

Separate sections with dividers and label with index tabs. Place a table of content at the front. You'll probably want to avoid plastic sleeves for your documents. They can be expensive, and they make it awkward for me to evaluate documents.

Can we work together? That depends on what you mean by this. Don't simply copy someone else's materials to place in your portfolio. But you can discuss with each other how in general to respond to the items below here to help others understand what is intended.

PORTFOLIO REQUIREMENTS:

- **State Core Curriculum:** a copy of the complete Utah State Core for mathematics in Grades K-6
- **Problem-Solving:**
 - Georg Polya's contributions to the study of problem-solving
 - include three problem-solving activities from class (or elsewhere?) with solutions that you liked or found interesting. Explain why you like them or how they helped you to understanding some aspect of this course
- **Number Systems:**
 - illustrate counting in base-2, base-6, and base-12
 - include Venn diagrams of the four basic set operations (union, intersection, etc) and include examples of problems whose solutions illustrate how Venn diagrams are helpful
 - include a flowchart or a Venn diagram of the real number system, showing the relationship between natural numbers, whole numbers, integers, rational numbers, irrational numbers, and real numbers. Place several representative numbers in each region to exemplify the numbers found there.
- **Operations:**
 - include a list of arithmetic properties (commutative, associative, etc) for each operation with examples of each
 - a description of the order (or hierarchy) of operations with illustrative examples
 - **Subtraction or Multiplication:** represent the development of either subtraction or multiplication across grade levels by exemplifying the operation using models and algorithms, including its most elementary form and a series of multi-digit algorithms. Then, extend this to fractions (rectangular cakes) and decimals. This portion of your portfolio ranges over most of the course.
 - **Division:** develop in a similar fashion to that above, spanning all grade levels

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• Investigations:

- include information on prime and composite numbers, including the sieve of Eratosthenes and how one goes about deciding whether a number is prime or composite with examples and more.
- include descriptions of divisibility tests with examples
- demonstrate algorithms for GCD and LCM discussed in class
- include applications of GCF and LCM to story problems and well as to fraction arithmetic

• Explanations: Choose TWO of the following and justify with an explanation:

- why we can't divide by zero
- how we know there are infinitely many prime numbers
- why we can *invert and multiply* when dividing by a fraction
- how we know $\sqrt{2}$ is irrational (This item may arrive in class too late to include in your portfolio.)

• Personal Favorites: In this portion you should also include other material from this course that you find interesting or which will be useful to you later. I expect you to have several items here, though your choices can vary. Be selective and thoughtful about this. With each item, write a brief statement that explains what made this a personal favorite of yours.

• A final typewritten reflection that allows you to focus on specific ideas, methods and problems from this course that have made the greatest impression on you. Be specific. Avoid generalities that lack support, such as "I really learned a lot" or "Now I understand mathematics much better" without saying why. Include specifics that back up such statements. This is an open-ended opportunity for you to reflect on the value of this course - both pro and con - to your career as an elementary school teacher. Responses will vary but of course should show forethought.

• Practicum Report

• Assignments and Exams: Exam 3 may be returned too late. If so, you can insert it later.