Student Portfolios in Mathematics

National Council of Teachers of Mathematics

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Why Use Portfolios . . .

"One of the major goals in the *Evaluation Standards* is to help students value mathematics, a very hard goal to assess. With examples in portfolios collected over time and with documented reactions to assignments and problems, we can begin to see how close we are coming to this goal" (p. 36).

Mathematics Assessment, NCTM, edited by Jean Kerr Stenmark, ©1991

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Collecting Evidence through Portfolios

There is no universal definition of a mathematics portfolio or of its purpose in assessing student learning. All portfolios have some common characteristics:

- They represent collections of student work.
- The collection represents work done over a substantial period of time – at least a two- or three-week unit.
- The collection is useful to teachers and students as well as to parents and administrators.

Mathematics Assessment, A Practical Handbook, NCTM ©1999, fourth reprint 2005

Contents . . .

- Student selection vs. teacher selection
- Growth over time vs. best work
- Work reflects math goals and habits of mind vs. work reflects math goals only

Mathematics Assessment, A Practical Handbook, NCTM

Important Questions . . .

What does the portfolio mean to the students?

What does the portfolio mean to the teacher?

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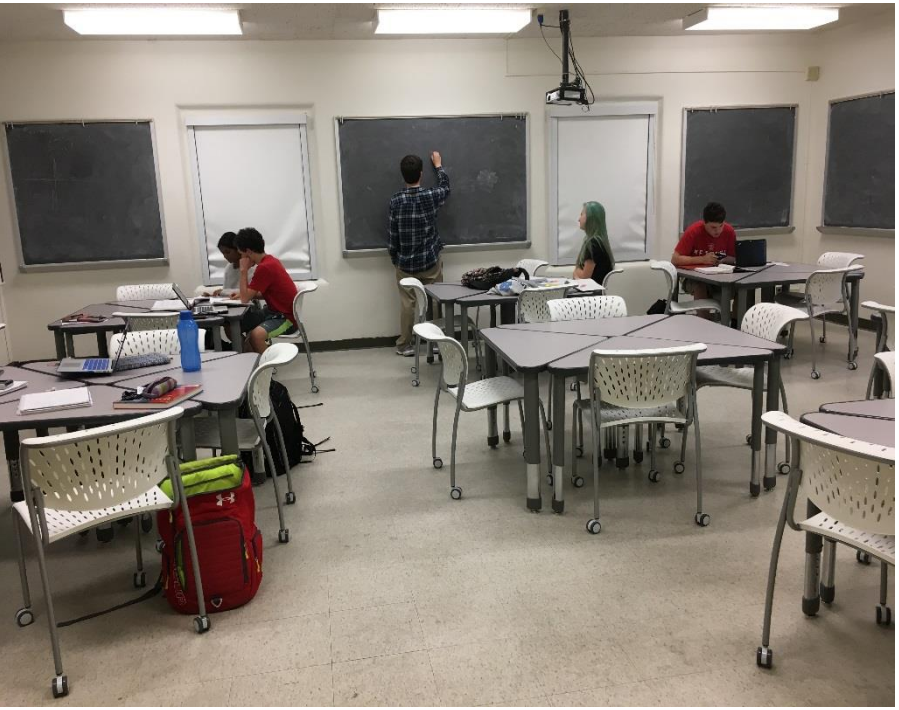
Assessment in Mathematics



The *NCTM Assessment Standards* tell us that classroom assessment should –

- provide a rich variety of mathematical topics and problem situations;
- give students opportunities to investigate problems in many ways;
- question and listen to students;
- look for evidence of learning from many sources;
- expect students to use concepts and procedures effectively in solving problems.

Mathematics Assessment, A Practical Handbook, NCTM ©1999, fourth reprint 2005

Student Portfolio excerpts . . .

Final Summary. "It was, needless to say, wrong. But we learned from it. And I think that is whole point. Learning. In a new way. This class is one of my most challenging classes, and I'm enjoying it . . . I'm working harder than I've ever worked in math and I still like it. All this learning is making my head spin."

BC Calculus Chapter 2 Test. "I worked especially hard on this test because I felt it was a worthwhile assignment. I took it very seriously, and I am proud of the problems that I came up with . . . This test allowed me to show what I learned in a different way than the traditional and gave me a chance to show some of my creativity, which usually isn't stressed in such disciplines as math (much less, calculus)."

Student Portfolio excerpts . . .

Graph Composition Notes. "I chose these notes because they represent something that I have figured out that I need to do in this class, which is summarize work and take notes . . . I then find it helpful to compile the notes into one page of my notebook that I can refer back to . . . when I go to study for tests and midterms. I am planning on using this strategy and perhaps even flagging really important pages in my notebook in the future. This will ensure that I am up to date on what we are learning, organized, and will help me quickly refer back to important notes . . . I think that using this strategy will help me on homework, assignments, and even tests."

Student Portfolio excerpts . . .

Heart Catheter Problem. "I chose this assignment because I was really unhappy with my grade. I felt like I understood the material, but when it came to writing up this assignment, I definitely felt a little lost . . . This assignment was a good learning experience because I realized that math is about more than just solving a problem: you need to be able to apply knowledge and also explain how to solve things. Even though I didn't do as well as I had hoped, I'm glad I had this experience because on the next assignment (Wire Problem) I really tried to be concise and articulate the main points of how I solved the problem. Further, this grade made me want to work harder in this class and gain a deeper understanding of what we are learning."

Collection of Information . . . .

A portfolio is a collection of information that paints a portrait. In this collection of documents, you should represent what you have learned, your progress, and your accomplishments in this course. Examples may come from class activities, group work, homework, labs, projects, assignments, readings, quizzes, tests, or anything else you think is appropriate.

There should be **at least five entries** in each portfolio. **Along with each entry, you should write a reflection about why each was included** -- what does it illustrate in your portrait of progress in Algebra 3. **Each entry should have some kind of title for identification.** If possible, you should also include the work you are referring to in your entry. **In addition to the entries, you should include a summary.** The summary should reflect your view of your overall progress and thoughts about the first trimester of the class.

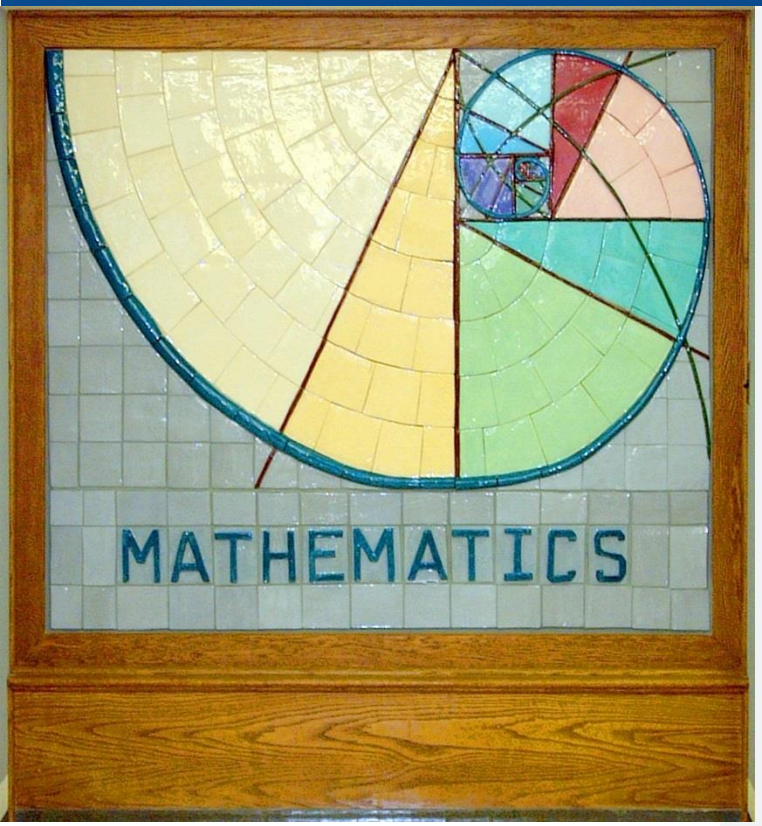
Setting Individual Goals

- You will be assigned a reflection early in the term that requires you to set two goals for yourself in algebra this term. The goals may NOT be directly related to your algebra grades. Your teacher will give you feedback on your goals and will help you revise or refine them if necessary.

- Your portfolio is due in class Thursday, January 31. It should include **your initial reflection in which you set your goals** and **a minimum of five entries** that provide strong evidence of your efforts to accomplish your two goals for the term. Evidence may come from class activities, group work, homework, labs, projects, assignments, readings, quizzes, tests, or anything else you think is appropriate. **Along with each entry, you should write about why each piece of evidence was included** -- what does it illustrate about your progress in meeting your term goals for Algebra 3. Each entry should have some kind of **title for identification**. If possible, you should also **include the work or a photocopy of the work** you are referring to in your entry.

- In addition to the entries, you should include a **summary reflection**.

Math in Your Everyday Life



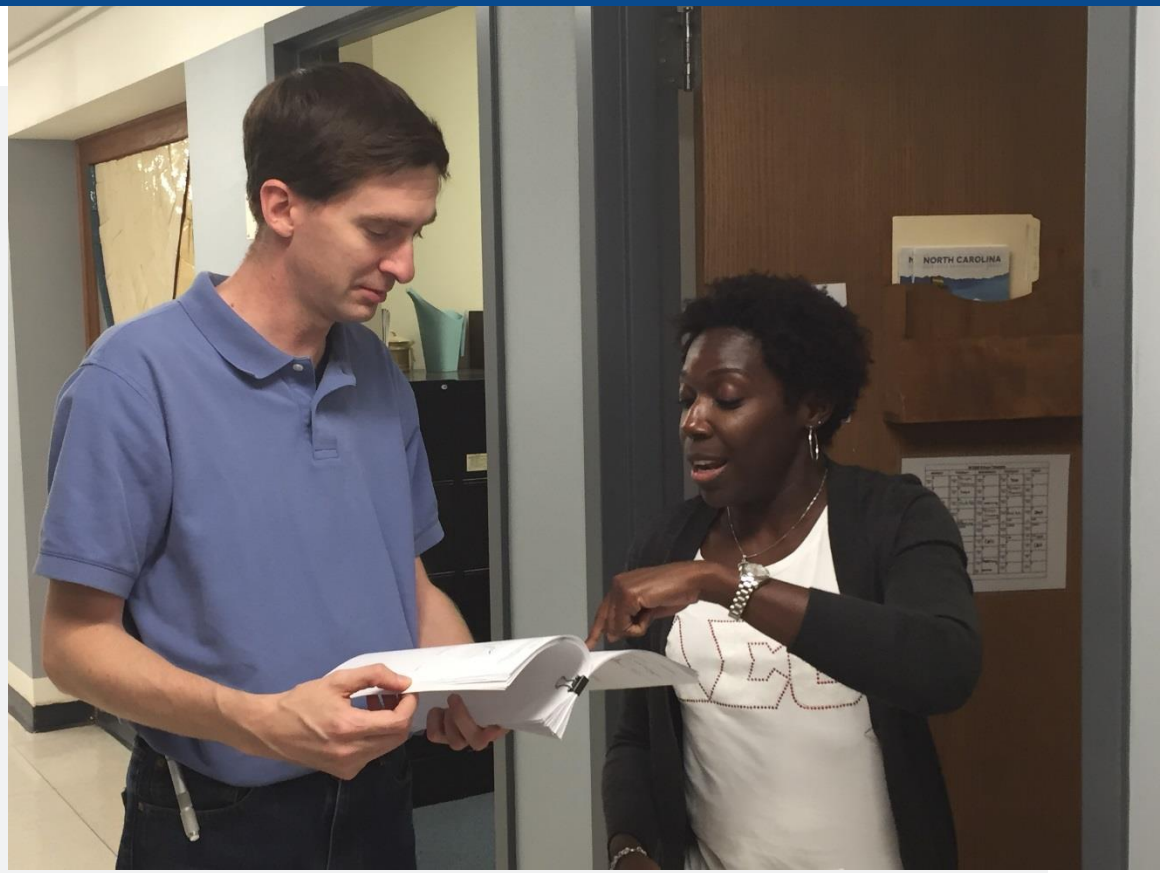
- A data set from a newspaper or magazine article, the internet, or other source. Create a homework assignment for a future Algebra 3 class with questions that require the students to model, interpret, and answer questions about the data. Include an answer key, and cite the source.
- A photograph of something on our campus or in our neighborhood that is related to mathematics, along with an analysis of the math.
- Your favorite activity of the year in our class and why it was your favorite.
- What you are most proud of from our class and why.
- A letter to an incoming junior next year that has been placed into the same math class as you are currently taking. Include, but don't limit yourself to, what you expected the class to be like, what it was really like, and suggestions for what they should do to be successful.
- An overall summary of your year.

Goals for Mathematics Students at NCSSM

- Appreciate and value learning mathematics through their lives because of its intrinsic beauty and its strength in modeling the world; develop the skills to continue to learn mathematics through their lives.
- Value mathematics and its role in the development of our contemporary society, and explore the relationship between mathematics and the disciplines that it serves, the physical and life sciences, the social sciences, and the humanities.
- Develop their communication skills in mathematics in order to share insights with others and clarify their own ideas.
- Cultivate their ability to use a flexible set of strategies to investigate and make sense of new problem-solving situations both from within and outside mathematics; to make and provide arguments from conjectures (recognizing memorization and rote computation as limited problem-solving tools).
- Develop self-confidence and perseverance in exploring mathematical ideas and in trying alternative methods in solving problems.

Discussion

- Experiences
- Questions
- Thoughts
- Ideas



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