Guidelines for Assignments

A. Math Problems and Reflections (10 points, typed, 1 to 2 pages double spaced)
Purpose: To consider critical issues in mathematics education and to provide further practice in solving mathematics problems and in conducting effective mathematics lessons in your future classroom.
Read the assigned chapter(s) in Cathcart, skimming all activities and problems within the reading and at the end. Investigate the related websites (URLs in the text or you may access them at http://www.prenhall.com/cathcart)

1) TRY some of the activities and problems described throughout the reading. Spend a minimum of one hour per week DOING the activities and problems you choose. Turn in your notes from these problems--don't feel you need to type up this work; hand-written is fine. (Note: exceptions: Chapters 1, 2, 4, & 7)
2) Write one learning objective associated with one activity or problem in the assigned chapter—e.g. Students will be able to demonstrate their understanding of _____ by _____ (Note: exceptions: Chapters 1, 2, 4, & 7). Identify the appropriate grade level when you write the objective.
3) Write a brief response to the reading—a personal reflection, summarizing what you learned (about mathematics concepts, about teaching math, or about your own math skills) from the reading assignment, the activities and problems, and the websites. This should be 1-2 page typed, double-spaced (with the work on problems and the learning objective stapled to it).

AV. Video Reflections (10 points)
Purpose: To view and discuss with colleagues mathematics lessons conducted by practicing teachers that embody the NCTM Standards 2000.
View the assigned video online and answer the related questions posted on the course WebCT site.

1) Answer **one** of the questions that most interests you at the WebCT course discussions page in a paragraph or two. Then participate in the class discussion of the video by responding to others in the class as appropriate (at least two responses). (5 points)
2) Complete the "Try This!" Activity distributed in class (WITH the correct materials!) and include the written work that accompanies the activity with the assignment you turn in. Summarize in two or three sentences what you learned from the activity. (5 points)

B. Science Teacher Development Assignments (20 points, typed, 1 to 2 pages double-spaced)
Purposes: Each Science Teacher Development Assignment will address one or more *Essential Question*s of becoming an inquiry-based science teacher. Some of these EQs include:

- What is my image of "good" science teaching? Where does this image come from?
- How can we define *science literacy*?
- How can we define *inquiry-based science teaching*?
- How do children learn science?
- What are some structures for inquiry and how do I enact these in my classroom?
- What is the learning cycle?
- How do I assess inquiry?

You will receive *Science Teacher Development Assignments* periodically through the semester; some of these will be discussed/worked on in class.

C. Mathematics and Science Autobiography (10 points)
Purpose: To reflect on the experiences you had in mathematics and science as an elementary student and to help us get to know you better.
We are all products of our experiences. As teachers, this is particularly true. How we operate in the classroom – our interactions with children, the activities we facilitate, the methodologies we implement, etc. – are often connected to the ways in which we experienced school and learning as children ourselves. As a prospective teacher, it is important that you carefully examine your own experiences as a learner even as you prepare to teach others.

There is no particular format for this writing exercise. Rather, you are to free-write about anything that comes to mind. You might want to recall your impressions of mathematics or science as a young child. You might want to describe activities or classroom events that caused you to think about mathematics and science in a particular way. Perhaps you have a "horror story" about math that you have never been able to shake. Or, perhaps you engaged in a hands-on science experiment that really stimulated your thinking and creativity. Whatever the case, you are to write from one to three pages (double spaced) on your early experiences, and how those experiences have contributed to your present understanding of both mathematics and science.

D. Lesson Sampler (10 points)
Purpose: To gather a collection of thoughtfully selected lesson plans to consider for use in their future classroom.
Write a brief summary of *three* lessons from the readings, from your observations in your school placement, or from resources you borrow from the Science/Mathematics/Health Resource Cabinets. Choose lessons that make effective use of manipulatives, equipment or other concrete materials.

1) TRY some of the activities and problems described throughout the reading. Spend a minimum of one hour per week DOING the activities and problems you choose. Turn in your notes from these problems--don't feel you need to type up this work; hand-written is fine. (Note: exceptions: Chapters 1, 2, 4, & 7)
2) Write one learning objective associated with one activity or problem in the assigned chapter—e.g. Students will be able to demonstrate their understanding of _____ by _____ .
3) Write a brief response to your work—a personal reflection, summarizing what you learned (about mathematics concepts, about teaching math, or about your own math skills) from the reading assignment, the activities and problems, and the websites. This should be 1-2 page typed, double-spaced (with the work on problems and the learning objective stapled to it).

E. School Survey (20 points)
Purpose: To provide you with the opportunity to learn about the types and quantity of materials, equipment, manipulatives, software, and other resources typically available to teachers in an elementary or middle school building.
Talk to your mentor teacher, the principal, and other teachers in your school to gather the following information. Summarize your findings and type to hand in.
1) What are the textbooks used in a) mathematics and b) science throughout the school? (Publisher, author, title) Are there individual math and science textbooks in

each classroom for each student? Is there a district health education curriculum? What health topics does your mentor teacher teach?
2) What manipulatives, equipment, and/or supplies are available for teaching 'hands-on' lessons in math and science? (Describe or list)
3) Give an overview of the availability of films, filmstrips, videotapes and videodiscs available for use in math and science. To what extent are these used in the school?
4) Give an overview of the computer software available in the school. What computers and how many are available for teachers? for students? List specific examples of some of the software available.
5) What other resources are used for teaching science/mathematics/health, other than those previously described?
6) How dependent are teachers upon the textbook for the design of the curriculum and lessons? Comment.

F. MicroTeaching Presentations (20 points)
Purpose: Practice teaching a small group of peers or children.
This assignment gives you the opportunity to practice developing a science lesson at your favorite grade level and in your favorite subject. You will be given some flexibility in the context of this assignment to work with children in your preferred grade level and setting.

Possible Context Options (For each option, you will videotape your session with the children and colleagues will comment and provide feedback.
1) Create a *Discovery Box* (see *Nurturing Inquiry*, p. 30-43) and work with young children in the Early Learning Community.
2) Create and teach a lesson to a group of your peers during class time.
3) Create and teach a lesson to a small group of children visiting Pacific from a local school.
4) Create and teach a lesson to a small group of Tillamook middle-school children in the field, site and circumstances TBA.

Planning (10 points)
Your lesson plan should describe objectives, activities, instructions to students, questions you will ask, manipulatives/equipment you will use, and a timeline. Attach student hand-outs if you use any. You may choose to prepare a detailed script, or your plans may be in a concise outline form. You may choose to use the standard MAT Lesson Plan form, or some other format.

Be certain that your plans are clear, neat and easy to follow. Include at least 6 probing questions/prompts which you will use during the lesson.

Note: Cite any references that you used as sources for your plan.

Teaching (not scored)
You will be allotted 30 minutes for your work with students. Of that, plan on 5 minutes for set-up and preparing your group. If teaching to peers, inform them of their age, grade and ability level, what teaching/learning may have preceded your lesson, what their skill levels are, etc. The peer group should attempt to role play the student audience and ask appropriate questions, as much as possible.

Your lesson should be between 15 - 20 minutes of teaching. Ask a peer to time you; less than 15 minutes indicates inadequate preparation. If your session runs longer than 20 minutes, you will need to stop.

You will have 5 - 10 minutes for follow-up discussion of the lesson with your peers; their input will be valuable. Members of the group should provide constructive criticism, in a positive tactful manner. However, do not hesitate to identify areas of needed improvement; this is a necessary and valuable component of MicroTeaching.

Evaluation: (10 points)
Write a 1- to 2-page analysis of your lesson planning and classroom instruction. Identify strengths of the lesson, areas for improvement, changes you might/will make when you teach it again, feedback from the group, etc. Most important, provide personal reflection: what did you learn while teaching/planning this lesson? What did you learn about teaching, about science or math, about students, about yourself?

The Lesson Plans and Evaluation (stapled together) should be handed in during class the week following your presentation.

G. Finding Science and Math Teaching Resources (20 points)
Purpose: To investigate resources for supplying materials, equipment, manipulatives, software and teaching strategies.

Part One: Distant Colleagues
You are not alone (as a science and math teacher). You are surrounded by not only your school colleagues and your professors, but by distant colleagues, novice and expert teachers who have already walked some part of the journey you are facing. Whether you need encouragement, theory, or concrete idea to "use in class tomorrow," there is no shortage of help. Go online—see NSTA (science) and NCTM (math) and start getting in touch with your distant colleagues.

Here are a few library journals/magazines that distant colleagues write in--
- For elementary (preschool/primary/intermediate):

Teaching Children Mathematics (formerly The Arithmetic Teacher) | Science and Children

- For middle school/junior high school:

Mathematics Teaching in the Middle School | Science Scope

- For high school:

The Mathematics Teacher | The Science Teacher

Choose one mathematics *and* one science periodical from above; study the entire issue. Then answer the following questions for *each* of the two periodicals.
1) Name and date of the issue you have studied.
2) Who publishes this periodical?
3) What is the annual cost of a subscription? (Careful—note membership requirement and note the *student* price.)
4) Who is the target audience?
5) List any five advertisers, and the type of product they market.
6) List any six Departments or regular sections which are included in essentially every issue; describe the type of material to be found in this category or Department.
7) Summarize the most interesting feature article.
8) After skimming the entire periodical, what are your impressions?

Part Two: Nuts and Bolts
Science and math, like any other curriculum area, requires supplies, hardware, and even specialized equipment. The good news is that much of the "equipment" can be found at home and in local stores like Fred Meyer and Walmart. You will find yourself accumulating science and math "stuff" over the years until you have a good stash of "kitchen sink" supplies. Be sure to ask your principal if there is a small budget for obtaining such items; you may have to submit receipts for small purchases so be sure to save those; don't be surprised if you are "on your own" for small expendable items like aluminum foil, batteries, etc.

That's said, most teachers have a small supply budget, and with a little fundraising (ask parents to help), or through professional development and grants (we'll discuss these in class) you may have quite a bit more, who knows? Suppose you have a (fictional) budget of $500 to spend in your classroom.

You will be provided with a variety of catalogs from educational suppliers. Skim through them to become familiar with the materials available to educators. You may also wish to consult the following websites and find others on your own:

You can also review online catalogs at:
National Science Teachers Association" http://store.nsta.org
National Council of Teachers of Mathematics Buyer's Guide Online:
http://www.nctm.org/buyersguide/
Nasco: http://www.enasco.com
Delta Education:http://www.delta-education.com/
Science Kit and Boreal Labs: http://www.sciencekit.com
Cuisenaire: http://www.etacuisenaire.com/

1) Make a list of what assumptions you are making. (For example: grade level, whether your room is currently well- or poorly-equipped, student special needs, if any.) You may want to connect your purchases to the lessons or unit you have been working on.
2) Indicate how you will spend the $500. (Itemize equipment, supplier and $ amounts)
3) Explain your rationale. Why did you make the selections you did? In the process, provide evidence that you have studied and reviewed a number of resource suppliers.

Later we'll discuss ways of generating the $500 other than from your own savings account ☺.

H. Conference Report (10 points)
Purpose: To share in focused discussions with practicing professionals.
Attend a professional conference; while you are encouraged to attend one sponsored by a professional organization focused on mathematics, science or health education, any professional conference is satisfactory. See the course website for specific links.

Write a brief report (1 – 2 pages) which includes the following:
1) A summary of the conference, including a sample of the workshops or presentations in which you participated;
2) A reflection on what you learned as a result of your participation. (What was valuable or surprising or disappointing?)

J. Portfolio (30 points)
Purpose: A culminating project that provides evidence of progress on course goals.
A purposeful collection of student work that will demonstrate your progress toward achieving the goals of the course. This assignment will be explained further in a handout distributed near the end of the course. **Make certain you keep all your work from the course in a 3 ring binder** to facilitate the portfolio preparation process.

K. Math/Science/Health Integration Group Project (25 points)
Purpose: A culminating project that uses a multimedia tool to demonstrate understanding of important science and math concepts in the course.
As part of a group, create an iMovie that illustrates an important concept that you learned in science or mathematics in this course. Present it to us at the final session. See the course webpage at http://fg.ed.pacificu.edu/charlesm/mathsci/ for more details.

L. Midterm examination (approximately 90 points)
Purpose: An opportunity to demonstrate understanding of important mathemetics and science concepts from the first part of the course.
Near the middle of the course, there will be a written assessment of both content and pedagogical knowledge addressed thus far. There will be a review session prior to the exam. Students are encouraged to review in groups. Question formats include completion, short answer, and essay.