Objective: For your final exam, you will be asked to develop a 10- (individually) to 15-hour (as a pair) teaching unit on an Earth Science theme and grade level of your choosing. Assume that you are to teach a class of 18 to 20 students. Ideally, this will be something you can actually use if you were required to teach a two-week Earth Science unit. You can use some of the lesson plans and activity ideas presented or handed out in class or you can find lots of other ideas on the web (e.g., Google "Earth Science Lesson Plans" other good sites include the USGS: www.usgs.gov/education/ and U of Colorado Earthworks site: cires.colorado.edu/~k12/earthworks

You should compile your teaching module into a portfolio that includes the following components:

General Unit Plan

1) Theme - Choose from the following, or suggest another (check this out with me first)
   Plate Tectonics  Minnesota's Geology  The Ice Age  Earth Resources

2) Grade Level - Design your lesson plan for one of three grade levels
   Elementary (4-6), Middle (7-9), Secondary (10-12)

3) MN Science Standards - Identify the strand, substrand, standard, and code in the Minnesota K-12 Academic Standards in Science that your lesson plan addresses. Identify as many as are appropriate.

4) Define two or three Enduring Understandings that you want your unit to cover. These should be overarching concepts or core processes that are at the heart of the theme you have chosen. This should not be the details of what you want to teach your student, but rather the big ideas that you want them to discover and retain.

5) List a series of Daily Topical Questions that you will use to launch each day’s lesson and that you want your students to be able to answer at the end of each lesson. These should be provocative questions designed to engage student interest and to be a guide for developing each of your daily lesson plans.

6) List what Prior Knowledge of fundamental concepts, facts, and skills related to your theme that your students should already be familiar with to be successful with this unit. Be sure that your expectations are appropriate for the level you are teaching.

7) List the Expected Outcomes - general concepts, facts, and skills related to this theme that you expect your students to be familiar with after completion of this unit.

8) Define your Assessment Plan - explain what methods you will use to assess their knowledge of these concepts, facts and skills, and with the broader big ideas that you have identified. Specify, when over the two or three week period you will conduct these assessment (homework assignments and grading do not count toward the 10 hour unit duration). Decide whether you are looking to assess groups or individuals. Include in your assessment portfolio at least one 10-minute quiz that you would present at the end of the first week.

Daily Lesson Plans

For each one-hour lesson period, compile a separate section in your portfolio that includes the following information. Recognize that you can use more than one time period to address a particular lesson idea.

1) Today's Lesson Theme - if this is a follow-up or continuation of a previous days lesson theme, indicate this with a title like "Earthquakes Part 2")

2) Topical Question of the Day - state the topical question that will be addressed today)
3) **Goals and Objectives of Today's Lesson**
   “My goal(s) for today’s lesson is(are) to...”; what are your expectations for this lesson?
   “After this lesson, the student will be able to...”; what concepts, facts and skills do you want your students to master?

4) **Material for today's lesson** – include informational (handouts, figures, overheads, websites, textbook citations; include as much of this material in your portfolio as possible) and activity-related material (maps, colored pencils, beakers, rocks, etc.) needed for today's lesson. Make sure that you cite the sources of the informational material not generated on your own. Stress quality over quantity.

5) **Lesson Plan Design** - clearly state the components of today's lesson plan and the time duration estimated for each. **BE AS SPECIFIC AND REALISTIC AS POSSIBLE.** A lesson plan should include some or all three of these elements:
   1) Lecture 2) Demonstration/Activity 3) Assessment

   If part of the lesson involves a lecture, give a robust outline of that lecture that identifies talking points and includes at least 5 figures you would use as illustrations of concepts (you are welcome to use figures from the class Powerpoint lectures). If you intend to use an invited speaker to give a lecture, clearly state what topics you expect the speaker to cover and how they fit into your lesson plan. If part of the lesson involves a demonstration for the group or an in-class student activity, clearly explain the procedures for that demonstration/activity, how it pertains to the topical question of the day, and cite the source for the idea if not your own. (NOTE: strive to include activities that are inquiry-based, engaging, and clearly address the goals and objectives of the lesson). If part of the lesson involves assessment, identify what topical questions and expected outcomes this assessment will evaluate. Remember to include a short quiz as at least one assessment element. Include an answer key and a point breakdown.

6) **Closure** - explain how you intend to end the lesson and prepare for the next. Discuss how the day's topical question has been addressed. Is there homework to be assigned and when is it due? Is there reading to be done in advance of the next class?

**ADVICE** - **ALTHOUGH YOU HAVE A MONTH – DON’T PUT THIS OFF.** Developing a general unit plan and daily lesson plans is best done as an iterative process. Sketch out some general themes and topical questions and get ideas for daily lesson exercises. After your 10 day schedule is roughed out go back and refine your topical questions, prior knowledge list, and expected outcomes to make sure they match what you intend to accomplish each day. Then refine and give more detail to your lesson plan design to make sure it matches what you set out as your objectives with your topical questions and expected outcomes.

**Other Components**
Also include in your portfolio:
- A **Table of Contents**
- A **Bibliography** of text sources or websites where you have used ideas or material for your lesson plans.

**Grading Rubric.** This final report will count for 30% of your grade. It will be assessed using the grading rubric given on the next page.

**Deadlines** - The final report will be due by the end of the day on **WEDNESDAY, May 15th.**
   You can drop off your report at my office (HH211) or in my mailbox in the Geology department office (Rm 230). Your report and final grades can be picked up in the Geology office after Monday, May 20.

**IF QUESTIONS** - **If you have any questions any time, email me (mille066@umn.edu) or call my cell (218-391-5320).**