Final Project

Overview of Project:
The final project will consist of the development of a unit that is aligned with one of the topics listed later in this document. Details of this unit are described below under “requirements.”

The results of your final project are intended for communication to a wide audience beyond that of the instructor or fellow students.

The final project consists of two parts:

1. **Partial implementation** at Mtn. Campus Science Day (Oct. 1, 2011, 1:00—4:00 pm, Wettaw Bldg lobby).
   - Participation fulfills your practicum requirement, as well. If you do not participate in the Mountain Campus Science Day, you must do another practicum.

2. **Product** – you will communicate the results of this project in one of the following ways:
   - Web page(s) developed on the Exploring Science Wiki.
   - Written unit in finished form as a booklet for the Exploring Science Room library.

Participants:
This project should be done as a group of 2 to 4 people.
- A single person could do this, but it is not recommended due to the dynamics of the implementation during Exploring Your World Day and the depth and extent of the information required for the unit.
- A larger group is possible, if the size (depth and extent) of your proposed project warrants additional people.

It is recommended that each group assign different tasks, such as focusing on developing a particular conceptual area or on a section of the final project (e.g., conceptual explanations, inquiry activities, etc.)

Requirements:
The unit should **NOT** include lesson plans, testing approaches to assessment, objectives, and other “banned word” concepts.

This unit should demonstrate your understandings of (a) the approaches to teaching and learning science described in the teaching methods textbook (Creating a Classroom Community of Young Scientists), other readings, and our course activities and discussions and (b) the fundamental science concepts of your unit (from the Really Useful Elementary Science Book and other science content sources).

Structure of Final Product
Each unit project should consist of the following parts (whether in print or on the web site):

1. **Introduction**
   - Introduce the topic or theme
   - Describe your rationale for this unit
   - Describe your overall goals for children
   - Discuss anything else you think will help others grasp the intent of your unit

2. **Unit Map or Description**
   - Use Inspiration or another “mapping” tool to describe the extent of your unit
   - OR provide an outline of the extent of your unit

3. **Conceptual Explanations**
   - List and describe in detail each concept that will be addressed in this unit (the concepts are what you are expecting your children to learn)

4. **Engagement, Inquiry, and End Product**
   - Describe one or more approaches that teachers can use to engage children in this unit.
   - Describe one or more approaches that teachers can use to engage children in each subunit strand.
   - Describe the approaches you will take to inquiry. To what degree are inquiries student-directed and to what degree are they teacher-directed? What types of inquiry are included (e.g., experimental, observational, theoretical, etc.)?
   - What end-product(s) will be used as one or more goals for students to work towards for this unit? Will students be producing a video, book, dramatic performance, website, and/or other type of product? You may have one big goal and several smaller ones for each sub-unit.
5. **Sub-Unit Activities, Inquiries, Inquiry Questions, and Data Analyses**
   - For each sub-unit (or for the entire unit, if there are no sub-units), provide the following information in outline form or in another easy to see and understand format:
     - **Concept(s)**
     - **Activities aligned with each concept** (these are the activities that will help children develop understandings of each concept)
     - **Questions or problems that are aligned with each concept and with each activity.** These questions or problems are intended to engage children in pursuing each activity. The questions or problems should be as relevant and meaningful as possible and should truly pique children’s interests, stimulate their curiosity, and provide real challenges.
     - Provide a list and description of the **types of techniques** that students could use to **analyze the data** they collect.
     - Be sure to use **multiple activities to address each concept** (not just one activity for each concept).
     - Be sure to **indicate which activities require being presented in a specific sequence** and which ones can be **clustered together** and done in any order.
     - **Use illustrations, tables, and other graphics** where relevant and helpful to teachers.

6. **Transdisciplinary (Integrative) and Patterns Opportunities**
   - Describe how specific concepts and/or patterns in your unit can be used to explore other disciplines, such as social studies, mathematics, visual and dramatic arts, language arts (e.g., reading and understanding literature, writing poetry and fiction, etc.), athletics, and so forth.
   - Describe where in each subunit or other areas of your unit, you can engage children in exploring, inquiring into, and developing skills in other disciplines. Where can history be included as a natural piece of your unit? Where can social action take place? Where can art, writing, and mathematics be used as natural parts of this unit.
   - What metapatterns and other large patterns or concepts can be included throughout this unit and how can they be used?

7. **Assessment**
   - Describe the specific approaches, strategies, and tools you can use to assess children’s conceptual learning and other dimensions of the unit goals.
   - Describe in detail how and what you can assess before, during, and at the end of the unit.

8. **Implementation**
   a. **Description**
      - Describe what you did during the implementation.
      - Include photos, video, audio recordings, and/or notes on children’s engagement and talk from the implementation.
   b. **Reflections and Critical Analyses**
      - Discuss how your activities were effective in engaging children in inquiry and in learning.
      - Discuss how you could do things differently to be more effective.
      - Discuss any other insights you have from this experience.
   c. **Recommendations for Future Implementation**
      - Discuss what can be done to effectively implement your unit in the classroom.
      - How would you change your unit to address the needs of different populations of students (ages, regional differences, cultural differences, etc.)?

9. **References, Resources, and Other Information**
   - List the sources you referenced for this unit.
   - List other potential resources and information.

**Assessment of Final Product**
Your implementation and your final product should demonstrate the depth and extent (and internalization of) your understandings of the following:

- **Inquiry** – as described in *Creating a Classroom Community of Young Scientists*
- **Alternative Authentic Assessment** – as described in *Creating a Classroom Community of Young Scientists* and other readings
- **Children’s Science Learning and Discourse** – as described in *Creating a Classroom Community of Young Scientists* and other readings
• **Effective Planning** – as described in *Creating a Classroom Community of Young Scientists*

• **The Nature of Science** – as described in *Creating a Classroom Community of Young Scientists*

• **Systems Thinking, Pattern Thinking, and Complex Learning** – as described in *Creating a Classroom Community of Young Scientists* and other readings

• **The Science Conceptual Content Relevant to Your Unit Topic** – as described in *The Really Useful Elementary Science Book* and other readings

**List of Possible Topics** (each group must select topic from this list)

- Adaptation, Structures, Functions
- Basic Needs of Living Things
- Boats, Floating, and Sinking
- Body Systems
- Borders, Pores, and Regulation
- Cars and Mechanical Systems
- Change and Transformation (Breaks)
- Communication – Biological & Technological
- Communities – Ecological, Social, etc.
- Cycles and Recursion
- Ecological Cycles
- Ecosystems – Time, Space, Gradients, Zonation, Niches
- Electrical Phenomena
- Flight: Planes, Birds, etc.
- Force, Momentum, and Motion
- Gases, Liquids, Solids
- Light, Lenses, Mirrors, Prisms, & Color
- Locomotion and Movement (Arrows, Cycles, etc.)
- Machines, Work, Power, and Dynamic Systems
- Magnetism
- Organization (Layers, Centers, etc.)
- Pendulums, Spinners, and Motion
- Physics of Sports
- Relationships (Binaries, Tubes, etc.)
- Sequences and Time (Calendars, Cycles, Arrows)
- Soil and Rocks
- Sound and Music
- Space, Astronomy, and Exploration
- Spheres, Tubes, Sheets, and more
- Structures, Forces, and Dynamics
- Survival and Continuity of Life
- Sustainability: Energy, Thermodynamics, & Ecology
- Sustainability: Gardens, Plants, & Ecology
- Sustainability: Water, Water Chemistry, & Ecology
- Weather, Climate, and Global Warming
- Webs and Networks
- Worms and Other Invertebrates

**Alternatives**

Alternative implementations, project topics, or projects must be written up as a proposal and approved by the instructor.

**DUE**

- **Implementation**: October 1
- **Final Product**: December 7

**Submissions**

- Make sure all names appear at front of web pages or printed booklet.
- Web pages should be done on the Exploring Science Wiki

**Grading**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Implementation (20%)</th>
<th>Project Product (80%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Engaging inquiry activities; exceptional thoughtful facilitation of inquiry and discourse; energetic and enthusiastic work with children and parents.</td>
<td>Exceptionally thorough and creative work in all aspects of the final project; exceptionally insightful and thoughtful reflections and critical analyses.</td>
</tr>
<tr>
<td>B</td>
<td>Very good work in all dimensions of presenting the activities and working with children.</td>
<td>Very well done work in most or all aspects of the final project; good insights, reflections, and critical analyses.</td>
</tr>
<tr>
<td>C</td>
<td>Adequately done activities and work with children.</td>
<td>Adequately done work in most aspects of the final project.</td>
</tr>
<tr>
<td>D</td>
<td>Less than adequate work.</td>
<td>Less than adequate work.</td>
</tr>
<tr>
<td>F</td>
<td>Poor work.</td>
<td>Poor work.</td>
</tr>
</tbody>
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*** If you do not participate in the Exploring Your World Day or Mountain Campus Science Day, you must submit an evaluation from your supervising teacher.