Final Project Guidelines

Option One: Application in the Classroom

This option is for learners who would appreciate the opportunity to develop an application that could be taught to students or to other educators based on one aspect of the content covered in this course. The final form of your instructional material would be a lesson or workshop plan for a full curriculum unit. Select a topic that you might use in your own classroom or educational setting. Exemplary material would focus on fostering inquiry and/or technology integration. Regardless of the intended audience, this final project should have the following elements:

Plan Title

Introduction
The introduction will frame your sequence of lessons by briefly describing the topics in the unit, their connection to the course content, and your reason for choosing them. The Introduction is an opportunity to demonstrate your understanding of course content that may be referred to but not explained fully in the lessons that follow.

Define Learners

- **Grade Level**: Elementary, junior high, high school, college, adult learners, high school science teachers or museum educators.
- **Population Characteristics**: describe the characteristics of the learners.
- **Lesson Groupings**: choose individual, pairs, small groups, or whole class.

Standards
Which National Science Education content or teaching standards apply?

Topic
Define the main Science concept from the course that will be your focus and give details about the specific subject covered in the lesson.

Curriculum Links
Describe how this lesson might fit with the rest of the units and/or curriculum, what goes before it, how you will connect this lesson to this prior knowledge, what comes after this lesson, and how will you link it to what follows.

Objectives
What are the main concepts, skill, behaviors, values, attitudes, etc. you want students to get from the lesson; objectives should be stated in terms of what students will be able to do ***after*** completing the lesson, ***do not*** tell what students will do ***during*** instruction (that's scope & sequence).

Materials

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What will you need to teach this lesson, which supplies, technologies, tools and resources will you need to access or create?

Time
The duration of this lesson plan should be one week — the amount of time needed to cover one curricular unit.

Scope and Sequence
Outline of the lessons itself; what will you teach and in what order; include the major points you want to make, any interactives or multi-media materials you may need and their function; all the activities students will undertake, and the products they will deliver at the lesson's end.

Supplementary Materials
Describe any off-line worksheets and/or activities you will design.

Assessment of Students
How will you grade or otherwise evaluate students' participation in this lesson?

Evaluation of the Lesson
How will you judge whether or not the lesson was successful? (This should relate back to the objectives.)

Conclusion
What are your final thoughts about the project? What potential challenges will you face in teaching these lessons? How well will this unit fit into what you currently teach (or anticipate teaching in the future)?

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Option Two: Application in the Field

This option is for learners who would like to deepen their understanding of the research process and further explore a topic presented in this course. Select a researchable question that you would be interested in pursuing and describe a possible plan for examining that question. A proposal should elaborate on how your research plan addresses your specific question. Proposals vary but a typical project should include the following sections. The kind of question should be carefully considered. A proposal should be between six and ten pages long (not including references). This final project should have the following elements:

Introduction
In general, what is the research about? Why would this project be important or interesting? What are the broad research questions your project is setting out to answer?

Literature Review
This should be a substantial part of the proposal as it locates your proposed research in its theoretical and empirical context. What other research has been conducted which has directly or indirectly attempted to address your research questions? What is the theoretical basis of this research? How sound is this theoretical basis? How has this field developed? Where is it heading? What methods have been used? What are the limitations of these methods? What are the unanswered questions in this area?

Clear statement of research questions or objectives
What is the question you wish to address? Why is it important and interesting? How do they relate to the published literature discussed above? Are your questions answerable?

Methods
Which data collection methods might be used? What types of data should be collected? How will this be done? What problems might come up in the collection of the data? What kind of design will be use? In what ways might the methods and the design work to answer your question?

Analysis
In general terms, what will you do with the data you collect? What kinds of tools or techniques might you use and what are the limitations? How will these analyses help to address and answer the research questions?

Work Plan
While this is difficult to specify, in a proposal it is helpful to indicate how you see your work developing and the timescales or any budgetary needs involved.

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Research Training
What research training might you need in order to carry out this plan effectively? What aspects of your research skills would you like to improve? What is the relationship between your education or interests and the proposed research plan? Describe how the research might enhance your educational program or goals.

Conclusions
What are your final thoughts?