

## **Final Project:**

### *Genetics, Genomics, Genethics - Molecular Biology*

#### **You have two options for the Final Project.**

The first option is to define an application in ethics related to a course topic you find particularly interesting and develop and investigate the ethical issues raised by the dilemma you select. The second option is to create an application in the classroom related to this seminar's content that you might incorporate into your own teaching practice. Details on both of these options are linked below.

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### **Project Milestones:**

- *Milestone 1 - Week 3:* Select the type of project and the topic you are most interested in pursuing. Post your first thoughts to the Final Project Discussion.
- *Milestone 2 - Week 5:* Submit an outline for your developing final project to the Final Project Outline Dropbox. Review what other participants' outlines. Do you have any additional ideas, resources or comments to share?
- *Milestone 3 - Week 6:* Review the comments posted to the Final Project Discussion and your individual Dropbox area. Share any ideas or reflections you may have about the developing projects. Revise your work for submission.
- *Week 7 Dropbox:* Submit your work to the Final Project Dropbox.

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### ***Application in Ethics:***

The focus of this project is on your interest in learning to define and respond to ethical questions in support of inquiry-based scientific practice. This Final Project should have the following elements:

- An introduction
- An ethical problem
- Distinguish stakeholders
- Conflict discussion
- Ethical conflict management plan
- Resolution plan
- Possible criticism and response to criticism
- Conclusions

#### *Ethics Guidelines:*

This option is for learners who would like an opportunity to further explore the ethical issues related to the Science content presented in this course. The task is to choose one of the ethical questions raised and examine various viewpoints or perspectives. Use the following guidelines to develop and investigate the ethical issues raised by the dilemma you select. This final project should have the following elements:

#### **1. Describe the ethical problem.**

An ethical problem involves at least two contrasting positions. State the problem, the conflicting perspectives, and be sure to include information on how and why you selected this problem.

#### **2. Describe the major stakeholders or viewpoints.**

Define the stakeholders who have an interest, or claim in the issue at hand. Stakeholders include, among others, individuals, families, communities, institutions, and societies.

#### **3. Detail the position of each stakeholder or viewpoint.**

The position of each stakeholder is expressed as an argument, or a series of reasons that support the position that is advanced. The reasons are to be detailed and backed by evidence.

#### **4. State and explain the major ethical conflict between or among stakeholders in the problem.**

A major ethical conflict occurs when two or more interests or values compete. Neither of the interests nor values are achievable without giving up one or offering a compromise.

**5. State and explain at least two ways one might manage the ethical conflict.**

Managing an ethical conflict involves considering options for its resolution. The point here is that there are usually “two sides” of the same story.

**6. State and explain your resolution to the ethical conflict.**

Identify the position that you support to manage the major ethical conflict. Give reasons to justify why you take the position that you choose.

**7. State and develop the most serious criticism of your view.**

A resolution of ethical conflicts is never “perfect.” Acknowledge your position’s major weakness.

**8. State and develop your response to the criticism.**

Respond to the critic in order to show that you indeed support the position that you advance.

In short, set forth the "geography" of an ethical problem (steps 1-3), clarify an ethical conflict and its possible resolutions (steps 4-5), and develop an ethical position (steps 6-8).

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### ***Application in the Classroom:***

The focus of this project is on the selection, adaptation and design of instructional materials that might foster research and inquiry in the classroom. This Final Project should have the following elements:

- Project title
- Intended audience
- Related standards
- Topic
- Curriculum links
- Learning objectives
- Materials needed
- Scope and sequence
- Assessment criteria (how will you assess the students?)
- Evaluation Plan (how will you evaluate the success of the lesson?)

#### *Lesson Plan Guidelines:*

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:

**1. Lesson Plan Title**

**2. 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.

**3. Standards**

Which National Science Education content or teaching standards apply?

#### **4. 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.

#### **5. Curriculum Links**

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

#### **6. 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).

#### **7. Materials**

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

#### **8. Time**

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

#### **9. Scope and Sequence**

Outline of the lesson itself; what will you teach and in what order; include the major points you want to make, any interactive 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.

#### **10. Supplementary Materials**

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

#### **11. Assessment of Students**

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

#### **12. Evaluation of the Lesson**

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

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### ***Recommended Links:***

#### **National Science Education Standards (NSES)**

An interactive table of contents for the National Science Education Standards.

[www.nap.edu/readingroom/books/nses/](http://www.nap.edu/readingroom/books/nses/)