

## Proposal Information

Lead Developer: Ann J. Murkowski  
College: North Seattle Community College  
Division: Math Science  
Telephone: 206.934.4511  
Dean: TGriffith  
Title Of Proposal: Cross-Program Themed Lab Enhancement  
Type of Proposal: Course Revision  
Individual/Group: Individual  
Amount Requested: \$ 1518.00

## Project Description

Describe the curriculum issue or need that you plan to address.

Please be specific and complete.

(15 pts.)

Biology Faculty at North have long been interested in deliberately scaffolding skills for majors such that they can continue to expand and develop their abilities as scientists as they move through the three-quarter program (Biol 211, 212, and 213). For example, many instructors will have students begin to search for primary literature in the first quarter, read and analyze scientific papers in the second, and then write up a paper in the appropriate style during their third quarter. Unfortunately, inclusion of these activities, and the skills they develop, are sporadic due to the wide range of faculty that teach in the program. Our lab exercises, however, are always shared across all sections of our major's biology. This provides a tempting opportunity to deliberately embed some of these core skills into our lab curriculum with an engaging, theme-based approach.

Describe how you plan to address the curriculum issue or need.

Please be specific and complete.

(15 pts.)

This project proposes to develop a set of three new laboratory exercises, one designed for each of the three courses in the biology major's series. All three lab exercises will utilize the common model organism, *C. elegans*, a small, easy to grow worm. Students in their first quarter will explore the genetics of the worm in lab and be exposed to the primary literature as part of their postlab. In their second quarter, students will use this now-familiar model organism to explore basic diversity and physiology in lab, and expand their skills in the primary literature by conducting a brief scientific review or journal club. In their third quarter, students will apply their knowledge of this model organism to a new question, using it as an indicator of soil health in various ecosystems. This third-quarter experience will be more open-ended and research-based, engaging the students in developing their own experiment and taking a more active role in the experimental design. Students will again advance their essential skills as scientists by writing up their results in a style appropriate for the discipline. Extensive support materials for faculty will help ensure easy adoption.

Explain how the proposed curriculum changes affect the existing curriculum.

Please be specific and complete.

(10 pts.)

These three new laboratory exercises, along with their support materials, are our first attempt at deliberately embedding a theme-based, threaded set of outcomes into our lab curriculum. Creating these new labs will both invigorate our lab offerings in all three courses, as well as allow our students to better understand how all the disparate topics they study over the course of a year help inform each other and contribute to a deeper understanding of the world. Doing this in the lab, rather than the classroom, has the added advantage of ensuring that every student who goes through our program has this experience, and the chance to build the essential skills associated with it.

The proposed changes do not affect the core content taught in our labs (genetics, diversity, ecology, etc.) but do dramatically change how we teach these core concepts.

Explain how the changes will improve student learning (provide specific examples) and identify how many students will be affected.

Please be specific and complete.

(15 pts.)

This proposal has two primary goals:

1- Help our biology majors develop some of the core skills they need to be successful scientists. These core skills include finding and accessing scientific literature, developing strong hypotheses and appropriate methods, analyzing scientific data to draw appropriate conclusions, and communicating data and conclusions in an effective manner.

2- Help our biology majors better understand the connections between the often overwhelming and disparate topics they encounter in the biology majors program. Students will have a chance to apply their learning in three very different courses (Biology 211, 212, and 213) to a common model organism, *C. elegans*.

At North, we offer Biology 211 every quarter (1-4 sections of 32 students each) and thus have a core of students entering our program continuously.

Describe how the proposed project aligns with program (or degree) learning outcomes and explain how you will assess the project outcomes. (15 pts.)

*(Please be complete. List all relevant program or degree outcomes as well as your specific plan to assess the project).*

**Note:** *If you are doing a program revision, identify and address the degree outcomes associated with your program.*

This proposal aligns well with a core outcome for our Biology program:

2. Demonstrate the process of scientific inquiry, including that scientists use varied methods; scientists test ideas using appropriate instrumentation as necessary; scientists use creativity, critical thinking, and current knowledge; and investigations commonly lead to additional questions.

This project allows students to actively practice all these key components in a deliberate, scaffolded manner as they progress through the redesigned labs.

Impacts of the revised curriculum will be assessed through student and faculty self-reports. In addition, final projects from the biology major's before the changes and after the changes may be compared to look for evidence of improved scientific reasoning skills.

## Product Description

List and describe the products you will create using quantifiable and measurable terms (how many? what scope?). All products listed must be submitted to receive compensation.

(15 pts.)

Products produced will include:

- 1- Written lab exercises (3) for students.
- 2- Preparation and ordering guide for lab techs for each of the three labs.
- 3- Faculty guides and ancillary resources (relevant primary papers and suggested post lab rubrics) for each of the three new labs.

## Budget

Expenses (15 pts.)

- a. List estimated hours for each product listed in "Product Description" section. *Grant funds may not be used for equipment, travel, training, or research (time spent gathering background information).*
- b. Provide total budget to complete project.
- c. List any funds from other source(s) and indicate if funds have been received or are pending. *Examples of other funding sources are: division, college or external grants.*
- d. Provide total amount of curriculum grant funds requested to complete project. *If applicable, indicate how the budget will be split among participating faculty.*

A. Explore possible methods for each lab exercise; contact suppliers and North's technicians to determine most cost-effective approach. 3 hours X 3 labs = 9 hours

B. Write student handout. 2.5 hours X 3 labs = 7.5 hours

C. Conduct trial run. Revise with lab technicians and relevant faculty to ensure readability and reliability of procedures. 4 hours X 3 labs = 12 hours

D. Create faculty support materials (collection of relevant primary papers; rubrics for each assignment.) 2.5 hours X 3 labs = 7.5 hours

E. Create ordering and preparation guides for lab staff. 1.5 hours X 3 labs = 4.5 hours

F. Prepare and offer two, one-hour workshops for North faculty on how to implement the new labs = 4 hours total

G. Assemble materials into Canvas and distribute to appropriate faculty and Curriculum Development Committee. = 1.5 hours

Total Hours= 46 x \$33/hr = \$1518

### Additional Comments

Include any supporting materials for consideration.

### Supporting Documentation

No supporting documents submitted

### Unit Administrator Approval

I really like this idea on the lab themes that connect the 3 quarters of major's biology - 211, 212, 213. This allows ongoing students to connect with an experiment they have previous experience with and, as such, be better able to see the cross connections and scientific relationships in their science classes. The selection of *C. elegans* is spot on in terms being easy to use and as an organism used widely in many areas of cutting edge research.

I have read the attached proposal and consider it to be consistent with the goals of this administrative unit. If the project is successfully completed, there is a high likelihood that its products will be in our curriculum.

Dean: TGriffith

Approval Date: Tuesday, April 15, 2014

### VP For Instruction Approval

I support this strong proposal.

I have reviewed the attached proposal and consider it to be consistent with the mission and goals of this college.

VP:

Approval Date: Tuesday, April 15, 2014