

IFCN- Investment Fund for Core Needs - Entry #127 2018-2019

PROPOSAL SUMMARY

Title: Principles of Biology (BIO111) Laboratory Equipment and Anatomy Model Improvement

Project Lead Name: Dawn Newman

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Project Lead Department: Biology

Project Lead School/Division: School of Arts & Sciences

Total Amount Requested: \$9,683.00

Name of Sponsor 1: Jose Maliekal

Name of Sponsor 2: James Haynes

A. PROPOSAL DESCRIPTION & IMPACT

A-1. Description of the Initiative.

This proposal is for the purchase of models and lab equipment for a high-enrollment service course BIO111 Principles of Biology. This service course is required for Nursing majors, and is a prerequisite for courses required by majors such as Exercise Science, Athletic Training, and others. It also fulfills the general education requirement of a natural science course with a lab. BIO111 is taken by approximately 340 students per academic year. Improved instruction of this laboratory course requires models and lab equipment. Currently, this lab is poorly equipped for proper instruction a course of this importance.

The models and equipment proposed are used by BIO111 Principles of Biology labs which is a high-enrollment service course required for Nursing majors, and is a prerequisite for courses required by majors such as Exercise Science, Athletic Training, and others BIO111 also fulfills the general education requirement of a natural science course with a lab. The following weighed heavily in our decision to pursue this proposal:

- First, the lack of proper models and equipment limit the lab exercises we can do to simple ones that are on par with high school biology labs. One lab experience we have offered in the past when possible, was the analysis of plant pigments through chromatography, and spectrophotometric analysis. Students enjoyed this experiment because it was using equipment they had never used to analyze plant pigments, something they thought was “cool”. It has been difficult to do this experiment every semester because we have to “borrow” a spectrophotometer from another lab and they are not always available.
- Second, there is only one lab instructor assigned to teach each lab, and as a rule, all BIO111 lab sections are full. This means there is only one instructor per 24 lab students. Laboratory exercises are hands-on experiences requiring a significant amount of assistance from the lab instructor. For example, one of the labs the students enjoy the most is the “Dissection of the Fetal Pig” lab. That is something very few students taking BIO111 have done in the past. The fetal pig models I am asking for directly support this lab exercise which spans two separate lab periods. This is also a very relevant lab experience for the students since many of them are Nursing, health, or athletic majors. Having models

available to the students allows them a possibility to find answers themselves if the instructor is assisting another student. This proposal allows them to have one model per table. Having enough equipment to allow the lab run smoothly without students getting frustrated waiting their turn also helps the instructor teach a better lab.

- Finally, the increase in Nursing student admissions has increased the demand for this course.

A-2. Impact Statement: What change will this project deliver in the short term? What are the expected longer-term impacts?

Short Term Impact

- Curricular Improvement – The availability of models and equipment would allow the instruction of BIO111 labs to improve by providing a higher quality, more relevant biology lab learning experience for the Nursing, Exercise Science, Athletic Training, and other majors, as well as the students taking it to fulfill the natural science course with a lab general education requirement. Lab experiences provide invaluable, practical laboratory skills, that can't be replaced by images on a page, or digital images. The images presented via media products are the "best" outcomes of an experiment, this is many times very different from what happens during an actual experiment, or lab experience. Biology labs are supposed to be "hands-on" learning experience which requires the resources to do so.
- Proper Instruction – BIO111 is a high-enrollment service course. This results in full laboratory sections; the ratio of lab instructor to students is 1:24. Due to the nature of biological lab exercises and experiments, the instructor's help is required much more than in lecture type classes. They have direct individual contact with each student and it can be difficult for the lab instructor to keep up with the demand for their attention. Having the models proposed provides the students with an alternative to waiting their turn for the lab instructor's help. Many times, they can answer their own questions if provided the right resources.
- Student Satisfaction - Students have very little patience with waiting their turn for the lab instructor to help them, or wait to use a piece of lab equipment. The availability of models, and proper lab equipment would at least take some of the pressure off the lab instructor allowing for better, less frustrating learning experience for the student.

Long Term Impact

- Economic Impact – The models and equipment proposed can be used for many years to come. BIO111 is offered both Fall and Spring semesters, so the proposed items are used year-round. The models are durable, and the equipment I have chosen is "student friendly" in the sense that it is easily maintained, and repaired.
- Institutional Reputation – The lack of models and equipment in the BIO111 lab limits the lab exercises we can do to simple ones that are on par with high school biology labs. I have heard students comment that they are boring. In order to retain the interest of students, an instructor needs the proper "tools". In the lab environment, this means models and equipment that allow a higher level of lab experience. If a student already did a similar lab in high school, of course they are "bored". As an institution of higher education, we compete with other institutions for students. Having the proper models and equipment in the BIO111 lab can be a reflection of our commitment to a modern science education.

- Student Success – The ability to offer a more interesting laboratory experience directly leads to student success. An interested student is more often a successful student.

B. STRATEGIC ALIGNMENT

B-1. Outline the ways in which the proposed investment will contribute to the College Strategic Plan Goals, and if appropriate, their Measures of Success.

Strategic Goal #1: To Be a Great College at which to Learn

The purpose of this proposal is to improve the quality of the instruction provided by the BIO111 Principles of Biology lab. The purchase of the proposed biological models and lab equipment will allow the instruction of higher level, and more relevant lab experiments. It will also allow the lab instructor to teach a better lab, by having other resources available to the students. The BIO111 lab is taken by approximately 340 students per academic year; therefore, the quality of the BIO111 lab experience affects a significant number of students in a variety of majors.

Teaching the sciences is, and probably always will be one of the more difficult challenges. Most students either don't like science, don't understand science, or don't care. This presents a problem for science lab instructors, especially those teaching an introductory level biology lab. Thankfully, most students enjoy labs because they actually get to do "cool" stuff like dissect fetal pigs. I have been a lab instructor at Brockport for over 13 years, and it still feels great to have a student say "I didn't think I'd like this class, but this lab is really interesting". Engaging students is difficult, but the actual hands-on approach of lab allows for more individual instruction. Students respond positively to individual attention. Many colleges have forgotten this. There are less and less biology lab courses offered that have the individual, hands-on instruction that Brockport still offers.

C. SUSTAINABILITY

C-1. How will this initiative become self-sustaining beyond the initial funding period?

The proposed biological models and lab equipment has been chosen on the basis of being "student friendly" meaning that is both easy to use, and easy for our department to maintain over the next several years. The proposed items will go through the hands of approximately 340 students per academic year so the models chosen are durable and appropriate. The lab equipment can be maintained and repaired if necessary with the Biology department funds. The initial funding to purchase the items is all that is required,

D. IMPLEMENTATION PLAN

D-1. Identify the specific activities to be funded from the Investment Fund. Provide an estimated timeline for implementation and for activities anticipated to be ongoing.

The specific activities that will be funded from this investment are the BIO111 Principles of Biology lab experiments that are done by the approximately 340 students that take BIO111 each academic year. Many of the students are in majors such as Nursing that require BIO111. Many other students either need BIO111 as a prerequisite for a required class, or choose to take it to fulfill the general education requirement of a natural science course with a lab. The fetal pig anatomical models will be used specifically during the two labs in which the students dissect fetal pigs. The eye and ear models will be

used during the lab in which students learn about the five senses and the anatomy of the eye and ear. The spectrophotometer will be used in a lab experiment in which the students analyze plant pigments, and may also allow the development of a lab in which the students can determine protein content in different types of food. The waterbath and balances are used in several labs such as the osmosis and diffusion lab, the plant pigment lab and nutrition lab.

The proposed anatomical models and lab equipment would go into use this next Fall semester (Fall 2018), and would be used every semester from that point on.

E. CONSULTATION

E-1. For requests involving technology. Has the Chief Information Officer (Bob Cushman or his designee) reviewed this proposal and verified potential costs as it relates to technology: Not Applicable

E-2. For requests involving facilities. Has the Director of Facilities & Planning (John Osowski or his designee) reviewed this proposal and verified potential costs as it relates to facilities: Not Applicable

E-3. The Project Lead has confirmed other required resources with the appropriate supervisor: Not Applicable

F. BUDGET & OTHER FUNDING SOURCES

F-1. Itemized Budget (Excel format ONLY): [On file]

F-2. Total Amount Requested: \$9,683.00

F-3. This proposal includes: Not applicable.

F-4. Other funding sources* for this proposal? Not applicable.

F-5. Is the success of the project contingent on receipt of funds from any additional funding source(s)? No

G. ASSESSMENT PLAN

G-1. How will you assess/measure the effectiveness of this initiative? Provide anticipated outcomes and specific measurements for success.

- Objective #1 – Students have access to models and equipment to improve their laboratory learning experience. Principles of Biology (BIO111) consistently has full sections of lab, 24 students each. During the current academic year there has been 14 sections of BIO111 (approximately 340 students). This objective will be assessed by tracking the actual availability of models and equipment per student.
- Objective #2 – Student satisfaction with laboratory instruction improves. Students get very frustrated waiting for the lab instructor's help. The proposed models and equipment would allow the students to

answer some of their questions on their own. A survey will be given at the end of the semester to assess student satisfaction of their lab experience.

- Objective #3 – Offer higher level, more relevant biology lab experience instead of one that is on par with a high school biology lab. This will be assessed by providing an area for comments on the evaluations given at the end of each semester by the lab instructor.

H. ADDITIONAL INFORMATION

H-1. Please provide any additional information to assist in the review of the proposal, including why the initiative cannot be funded from divisional resources.

First, the Biology department offers several high-enrollment service courses such as BIO111 Principles of Biology, BIO323 Microbiology, BIO221 Survey of Anatomy and Physiology, BIO321 Anatomy and Physiology I, and BIO321 Anatomy and Physiology II. The lab fee the students pay doesn't even cover the cost of the consumables they use in these labs. The models and equipment used in these labs goes through a few thousand student's hands per academic year. The operating budget of the Biology department has to be used to maintain and repair the existing models and equipment, so none is left to purchase new models and equipment.

Second, the equipment replacement allowance for the School of Arts and Sciences funds are spread across the needs of many departments.

Lastly, there are, as yet, no external funding opportunities for a non-research, small equipment educational purchase such as this. Due to these financial issues, our department hasn't been able purchase the items.

Upload up to three supplemental files here (not required): [On file]

Signature of Project Lead: [on file]

Project Lead Email: dnewman@brockport.edu

Signatures of sponsors are on file in the Administration and Finance Division.