

NASA NICE WORKSHOP – IMPLEMENTATION PLANS
University of New Hampshire 2013

Sheryl Bradford, Research Operations Manager
Department of Natural Sciences
Elizabeth City State University, Elizabeth City, NC 27909

1. **Which course(s) you will include workshop tools and materials.**
 - BIO101: General Biology for Majors
 - GE155: Principles of Biology for Non-Majors

2. **When will this most likely be implemented?**
 - We are in the process of making modifications to our current laboratory protocols to make the biology experience more engaging for our students. Our plan is to implement the new material during the Spring 2014 semester.

3. **Describe the type of students that typically take the course, and be sure to include the approximate number of students that are pre-service teachers.**
 - BIO101: Approximately 130 students are enrolled in this class each semester. Most of the students are freshmen and are required to complete this core requirement if majoring in Biology, Biology Education and or any of the Pre-Health professions. There are generally 20-30 pre-service teachers that will enroll in this class per semester.
 - GE155: Approximately 160 students are enrolled in this class each semester. Most of the students are non-science majors. This course is a part of the teacher education curriculum. There are generally 40-60 pre-service teachers that will enroll in this class each semester.

4. **Describe the overall learning objectives for the lesson plan or unit that will include the workshop tools and datasets.**
 - Learning Objectives for BIO101:
 - Relate the metabolic processes of photosynthesis and cellular respiration work to the survival of life on earth.
 - Retrieve, evaluate, and use synthesize relevant biological information from scientific and non-scientific sources.
 - Acquire basic laboratory skills in the biology lab.
 - Apply the principles of the scientific method to the gathering and analysis of data.

- Learning Objectives for GE155:
 - Demonstrate a general knowledge of the basic principles and concepts of life, physical and earth/environmental sciences and their interrelations.
 - Apply instructional models of inquiry which reflect current learning theory to the learning of science
 - Recognize and understand that technology is the application of science.
 - Infuse current and emerging technologies into instruction for the collection, exploration, and analysis of data; information acquisition and management; communication, presentations, and scientific modeling; and decision making.

5. **Describe any learning objectives as they specifically relate to climate education (you must have at least one climate education learning objective)**

- BIO101:
 - Students will be able to explain the process of photosynthesis, measure chlorophyll *a* and compare analytical results with satellite images
 - Students will be able to create graphs and charts based on correlations between water turbidity and biomass indicators (algae).
 - Students will be able to describe and explain the role of phytoplankton marine environments.
- GE155:
 - Students will be able to use GIOVANNI to determine changes in seasonal climate cycles in Northeastern North Carolina.
 - Students will be able to discuss the relationship between human activities and climate change

6. **Identify what specific climate education module(s) from this workshop you intend to use, and whether you plan to use the total module or customize it for your specific needs.**

- BIO101: Customize the UNH water sampling module to include phytoplankton identification and chlorophyll *a* analysis
- GE155: Students will utilize Greenness Index modules and Changes in Seasonal NDVI as presented in the workshop. Students will also use the tree biomass data and graphs to explore and identify trees in a designated area.

7. **In no more than one page, share you current thoughts on what you will use and how.**

- I am anticipating that the BIO101 students will perform phytoplankton identification and chlorophyll *a* analysis by spectrophotometer. We have

several streams and water sources on campus and this will be an easy and inexpensive way to give the students some practical laboratory experience. They can collect their own samples, identify organisms and use the GPS devices to record the exact coordinates. The data collected can then be compiled and compared to other semesters to find out if any correlations exist between positions and seasonal changes. Students can also utilize information we received from the Climate Data website: <http://studentclimatedata.unh.edu> to look at the Greenness Index and other parameters that may be pertinent to their specific project. Since BIO101 is a major's class, they will have the semester to collect and produce final data for each site. Each student will be required to keep a field science journal detailing their observations and analysis to be turned in at the end of the course.

- For the GE155 Non-Majors class, students will collect tree biomass data and use the websites to compile final data. Students will also be required to produce a final report on how human actions, emissions and deforestation ultimately exert pressures on our climate system. Students will be provided with a resource of information from <http://studentclimatedata.unh.edu> to support their findings.

8. Identify any big challenges or obstacles that immediately come to mind in your implementation?

- Acquiring funding for additional sampling and analytical equipment
- Need upgrades for computer systems in the classroom.

10. Describe how you plan to determine (assess) if the climate education module(s) you use was effective at reaching the overall learning objectives, and specific climate education objectives.

- Pre and Post Assessments
- Project Oriented Assessments that allow students to create scientific models
- Reflective Journal Writing