

NASA NICE Workshop – Wrap up Activity
2012 Elizabeth City State University

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Produce 1 to 2 page document that describes your initial plan for using the workshop tools and datasets you have experienced over the last week.

Include in your plan ...

1. Which course(s) you will include workshop tools and materials.

We plan to incorporate the workshop tools and materials in BIOL 427 Science Process Skills and ELED 328 Curriculum and Instruction in Elementary Grades.

2. When will this most likely be implemented Fall 2012, Spring 2013, Summer 2013.

BIOL 427 and ELED 328 courses will be offered in the Fall 2012 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.

The students taking BIOL 427 and ELED 328 are preservice teachers in their junior or senior year. Approximately 12 – 25 students are enrolled each fall semester. These preservice teachers are majoring in interdisciplinary studies and minoring in elementary education.

4. Describe the overall learning objectives for the lesson plan or unit that will include the workshop tools and datasets

These courses are designed to foster the development and understanding of the principles and major concepts and processes of science and instruction as they relate to the elementary and/or middle school. The Bio 427 course emphasizes understanding the content, processes, and skills of the earth sciences, biology, chemistry, and physics supporting the teaching of elementary school science, as defined by the Virginia Science Standards of Learning (SOL). ELED 328 focuses on designing, planning and implementing effective instruction strategies that reflect the SOL objectives and provide a sound foundation for teaching content in the elementary grades. The overall learning objective for the preservice teachers will be to (1) construct an instructional lesson plan utilizing the inquiry methods of instruction of climate change, (2) conduct a field research in a safe manner, and (3) demonstrate the science skills of data analysis and prediction using the NASA data.

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

The preservice teacher climate change lesson plans will align to the following VA SOLs:

4.4 Life Processes The student will investigate and understand basic plant anatomy and life processes. Key concepts include:

- a) the structures of typical plants and the function of each structure;
- b) processes and structures involved with plant reproduction;
- c) photosynthesis; and
- d) adaptations allow plants to satisfy life needs and respond to the environment.

In order to meet this standard, the knowledge, skills, and processes students should:

- compare and contrast different ways plants are pollinated.
- explain that ferns and mosses reproduce with spores rather than seeds.
- explain the process of photosynthesis, using the following terminology: sunlight, chlorophyll, water, carbon dioxide, oxygen, and sugar.
- explain the role of adaptations of common plants to include dormancy, response to light, and response to moisture.

5.1 Scientific Investigation, Reasoning, and Logic The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which

- a) items such as rocks, minerals, and organisms are identified using various classification keys;
- b) estimates are made and accurate measurements of length, mass, volume, and temperature are made in metric units using proper tools;
- c) estimates are made and accurate measurements of elapsed time are made using proper tools;
- d) hypotheses are formed from testable questions;
- e) independent and dependent variables are identified;
- f) constants in an experimental situation are identified;
- g) data are collected, recorded, analyzed, and communicated using proper graphical representations and metric measurements;
- h) predictions are made using patterns from data collected, and simple graphical data are generated;
- i) inferences are made and conclusions are drawn;
- j) models are constructed to clarify explanations, demonstrate relationships, and solve needs; and
- k) current applications are used to reinforce science concepts.

The key understand of this standard of learning includes the nature of science, i.e., the foundational concepts that govern the way scientists formulate explanations about the natural world. The nature of science includes the following concepts:

- a) the natural world is understandable;
- b) science is based on evidence, both observational and experimental;
- c) science is a blend of logic and innovation;
- d) scientific ideas are durable yet subject to change as new data are collected;

- e) science is a complex social endeavor; and
 - f) scientists try to remain objective and engage in peer review to help avoid bias.
- Note: In grade five, an emphasis should be placed on concepts a, b, c, d, and e.

5.6 Interrelationships in Earth/Space Systems The student will investigate and understand characteristics of the ocean environment. Key concepts include

- a) geological characteristics;
- b) physical characteristics; and
- c) ecological characteristics.

The key understand of this standard of learning includes

- a) Ocean water is a complex mixture of gases (air) and dissolved solids (salts, especially sodium chloride). Marine organisms are dependent on dissolved gases for survival. The salinity of ocean water varies in some places depending on rates of evaporation and amount of runoff from nearby land.
- b) The basic motions of ocean water are the waves, currents, and tides.
- c) Ocean currents, including the Gulf Stream, are caused by wind patterns and the differences in water densities (due to salinity and temperature differences). Ocean currents affect the mixing of ocean waters. This can affect plant and animal populations. Currents also affect navigation routes.
- d) As the depth of ocean water increases, the temperature decreases, the pressure increases, and the amount of light decreases. These factors influence the type of life forms that are present at a given depth.
- e) Plankton are tiny free-floating organisms that live in water. Plankton may be animal-like or plant-like. Animal-like plankton are called zooplankton. Plant-like plankton (phytoplankton) carry out most of the photosynthesis on Earth. Therefore, they provide much of Earth's oxygen. Phytoplankton form the base of the ocean food web. Plankton flourish in areas where nutrient-rich water upwells from the deep.

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.

We intend to use the Seasonal Cycles: the North Atlantic Phytoplankton Bloom and the modified, simpler version for 4 – 6 grades found at MyNASAData:

(https://mynasadata.larc.nasa.gov/preview_lesson.php?&passid=110)

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

Module will be implemented in the BIOL 427 and ELED 328 method courses for elementary education preservice teachers. These courses discuss the VA standards of learning and one of the course textbooks discusses each of the scientific strands. The module will be introduced when the course discusses the interrelationships in earth/space systems strand. Because the same strategies for discovery and inquiry apply across disciplines, this module will help inform preservice teachers on integrating standards for language arts, history, social studies, mathematics and science. These content areas require the basic skills of predicting, inferring,

organizing, and communicating. Using an area of strength for most elementary education preservice teachers, such as language arts, provides a level of comfort when undertaking a perceived more difficult subject, such as science. Therefore, we hope to have our preservice teachers think of language arts as a tool for exploring other subjects, especially science, and recognize that skills in language arts can increase competence in science teaching.

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

Anticipated challenges include (1) learning how to download the data, and (2) teaching the preservice teachers how to use this technology effectively at the elementary school level. The NASA data is a very valuable tool. However, the websites are not user friendly and/or easy to navigate for children.

9. 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.

A writing prompt will be used to assess preservice teachers learning of this topic. Essay responses must address: (1) notable outcomes of the investigation, (2) why or why not the hypothesis was supported by the data, (3) a description of a new research investigation the student would undertake as a result of the experiment, and (4) what new data would be needed in order to address the new research question. A reflective writing assignment will be used to determine how preservice teachers anticipate incorporating inquiry learning and climate change education in their classrooms. An rubric will which evaluates standards, objectives, introductory activities, and learning activities be used to assess the climate change lesson plans.