Lesson 1: Introduction to Environmental Science and Scientific Process

Delivery Time

This lesson contains approximately 3 hours of lecture and no lab work.

Course Outcomes Supported

This lesson supports the following course-level learning outcomes. For the complete list, see the NSC Electric Vehicle Data Acquisition, Sensors, and Control Systems Syllabus included in this Teaching Toolkit.

Following successful completion of this course, the student will be able to:

Environmental Systems
- Demonstrate knowledge of the basic function of the major biogeochemical cycles in the environment
- Appreciate the complexity of environmental systems
- Understand the explanatory power of science and the role of uncertainty in science

Scientific Process
- Recognize common features of pseudoscience

Effective Communication
- Hold a logical discussions on issues in environmental science
- Write fluently in brief, accurate technical style.

Human Interaction with Environmental Systems
- Identify major local and global environmental issues
- Propose solutions to environmental problems
- Weigh the needs of various stakeholders when considering environmental issues

Lesson Learning Outcomes

Following this lesson, the student will be able to:
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- Define sustainability and identify characteristics of a sustainable society.
- Explain the role science can play in environmental ethics and environmental policy.
- Explain why Environmental Science is interdisciplinary and how it functions as an applied science.
- Design an experiment to answer a question using the scientific method.
- Distinguish between science and pseudoscience.

Instructional Resources

Recommended Textbook(s)

None

Instructor Reference Materials

Online Examples of Pseudoscience:

Unstoppable Natural Cycles: http://www.youtube.com/watch?v=OP3bRZl8Xmk
Air Car: http://www.youtube.com/watch?v=ztFDqcu8oJ4

Facilities and Equipment

This lesson assumes your facility has at least one computer for viewing the video referenced in the pseudoscience assignment.

Materials and Supplies

None

Health, Safety, and Other Issues

None

Preparation and Setup

- Prepare lecture and syllabus.
- Prepare worksheet and scoring rubric for the worksheet.
- Prepare homework and a scoring rubric for the homework.
• Review the “sticking point” exercise titled “Understanding the Scientific Process,” which specifically supports this lesson, and decide whether to use it as a companion online module for this course. NSC online modules in Platform+ address common student “sticking points” to help the student master key concepts and better prepare for face-to-face instruction. For instructions on how to access and use online modules, see the Course Introduction (READ ME) document in this Teaching Toolkit.

Lesson Delivery

Topics Covered

1. Course Introduction and Syllabus Review
2. Lecture
   a. Sustainability
   b. Environmental Ethics
   c. Environmental Science as Interdisciplinary
   d. Scientific Method
3. Activity: Sustainability Worksheet
4. Homework: Pseudoscience

Lecture/Discussion

• Introduce yourself and hand out the syllabus for the course. Go over the points you want the students to remember, such as contact information, etc.
• Handout the class worksheet, describe the first section and give the students a time limit for completing it. As they are working on it walk around the classroom and give them suggestions and help. The intent of the worksheet is to give the students practice developing their own ideas, while covering the basic outcomes of the class. Detailed answers/instructions are given in the worksheet answer key.
• Collect the worksheet at the end of class in order to grade it.

Handouts/References

• ENV_IntroEnvSci_00_Syllabus
• ENV_IntroEnvSci_01_Worksheet
• ENV_IntroEnvSci_01_Homework
Lab Activities

- Not applicable

Online Component

- Discuss the companion online modules if you have chosen to use them. Platform+ works seamlessly with your college LMS to provide students with “single sign-on” capability. Show the student how to access Platform+ online modules in the course website. Contact your instructional technologist for assistance if needed.

Homework

Assign the student homework, for example:

- Complete homework on recognizing pseudoscience.
- Complete Sticking Point on understanding the scientific process.

Assessment

The student will be able to demonstrate achievement of lesson outcomes:

Learning Outcome 1

- **Outcome:** Define sustainability and identify characteristics of a sustainable society.
- **Assessment:** Worksheet
- **Evaluation:** Score using prepared rubric.
- **Standard:** Minimum score of 70% to pass quiz.

Learning Outcome 2

- **Outcome:** Explain the role science can play in environmental ethics and environmental policy.
- **Assessment:** Worksheet
- **Evaluation:** Score using prepared rubric.
- **Standard:** Minimum score of 70% to pass quiz.
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Learning Outcome 3

- **Outcome:** Explain why Environmental Science is interdisciplinary and how it functions as an applied science.
- **Assessment:** Worksheet
- **Evaluation:** Score using prepared rubric.
- **Standard:** Minimum score of 70% to pass quiz.

Learning Outcome 4

- **Outcome:** Design an experiment to answer a question using the scientific method.
- **Assessment:** Quiz
- **Evaluation:** Score using prepared rubric.
- **Standard:** Minimum score of 70% to pass quiz.

Learning Outcome 5

- **Outcome:** Distinguish between science and pseudoscience.
- **Assessment:** Pseudoscience homework
- **Evaluation:** Score using prepared rubric.
- **Standard:** Minimum score of 70% to pass quiz.

About These Materials

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