

# The Academy of Natural Sciences – Bicentennial in Google Earth

## Day 5: Plan Your Own Expedition

The activity for day 5 is a group project in which students will plan their own scientific expedition. Students will agree on a specific discipline and topic within that discipline. They will need to find a location that adequately suits their research needs, and will then solidify a detailed plan for their expedition.

### ABCD Objective Summary:

Using the previous activities as a knowledge base, students will work together in teams of three or four to plan a detailed trip abroad for scientific research purposes. Students will select a discipline, topic within the discipline, and a logical location for their research and proceed to research details related to their fictional trip.

### Earth Science Literacy Initiative “Big Ideas”

1. Earth scientists use repeatable observations and testable ideas to understand and explain our planet.
3. Earth is a complex system of interacting rock, water, air, and life.
4. Earth is continuously changing.
6. Life evolves on a dynamic Earth and continuously modifies Earth.
7. Humans depend on Earth for resources.
9. Humans significantly alter the Earth.

### Materials needed:

- Computer lab with 1 computer per student (each computer must have Google Earth already downloaded)
- Google Earth file: “Bicentennial”
- Student instructions

Put students into teams of 3-4 and go over the guidelines for the “Plan Your Own Expedition” assignment as a class, found in the worksheet.

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## Pennsylvania State Education Standards

**Standard Area - 3.1: Biological Sciences**  
**Organizing Category - 3.1.A: Organisms and Cells**

### Grade Level - 3.1.8.A: Grade 8

- Standard - 3.1.8.A9: Compare and contrast scientific theories. Know that both direct and indirect observations are used by scientists to study the natural world and universe. Identify

questions and concepts that guide scientific investigations. Formulate and revise explanations and models using logic and evidence. Recognize and analyze alternative explanations and models. Explain the importance of accuracy and precision in making valid measurements.

- Assessment Anchor - S8.A.2: Processes, Procedures, and Tools of Scientific Investigations
  - Anchor Descriptor - S8.A.2.2.: Apply appropriate instruments for a specific purpose and describe the information the instrument can provide.
- Assessment Anchor - S8.A.3: Systems, Models, and Patterns
  - Anchor Descriptor - S8.A.3.2: Apply knowledge of models to make predictions, draw inferences, or explain technological concepts.
- Assessment Anchor - S8.B.3: Ecological Behavior and Systems
  - Anchor Descriptor - S8.B.3.2: Identify evidence of change to infer and explain the ways different variables may affect change in natural or human-made systems.

### **Standard Area - 3.3: Earth & Space Sciences**

#### **Organizing Category - 3.3.A: Earth Structure, Processes and Cycles**

##### **Grade Level - 3.3.6.A: Grade 6**

- Standard - 3.3.6.A1: Recognize and interpret various mapping representations of Earth's common features
  - Assessment Anchor - S6.A.3: Systems, Models, and Patterns
    - Anchor Descriptor - S6.A.3.2: Apply knowledge of models to make predictions, draw inferences, or explain technological concepts.
- Standard - 3.3.6.A6: MODELS/SCALES Describe the scales involved in characterizing the Earth and its atmosphere. MODELS/SCALES Create models of Earth's common physical features.
  - Assessment Anchor - S6.A.3: Systems, Models, and Patterns
    - Anchor Descriptor - S6.A.3.2: Apply knowledge of models to make predictions, draw inferences, or explain technological concepts.

##### **Grade Level - 3.3.7.A: Grade 7**

- Standard - 3.3.7.A3: Explain and give examples of how physical evidence, such as fossils and surface features of glaciation support theories that the Earth has evolved over geologic time. Compare geologic processes over time.
  - Assessment Anchor - S7.D.1: Earth Features and Processes that Change Earth and Its Resources
    - Anchor Descriptor - S7.D.1.1: Describe Earth structures and processes that characterize different biomes on Earth.
- Standard - 3.3.7.A7: Understand how theories are developed. Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions. Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations. Describe relationships using inference and prediction. Use appropriate tools and technologies to gather, analyze, and interpret data and

understand that it enhances accuracy and allows scientists to analyze quantity results of investigations. Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories. Analyze alternative explanations and understanding that science advances through legitimate skepticism. Use mathematics in all aspects of scientific inquiry. Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collections.

- Assessment Anchor - S7.D.1: Earth Features and Processes that Change Earth and Its Resources
  - Anchor Descriptor - S7.D.1.1: Describe Earth structures and processes that characterize different biomes on Earth.

### **Grade Level - 3.3.8.A: Grade 8**

- Standard - 3.3.8.A2: Describe renewable and nonrenewable energy sources
  - Assessment Anchor - S8.B.3: Ecological Behavior and Systems
    - Anchor Descriptor - S8.B.3.2: Identify evidence of change to infer and explain the ways different variables may affect change in natural or human-made systems
  - Assessment Anchor - S8.D.1: Earth Features and Processes that Change Earth and Its Resources
    - Anchor Descriptor - S8.D.1.2: Describe the potential impact of humanmade processes on changes to Earth's resources and how they affect everyday life.

### **Grade Level - 3.3.8.A: Grade 8**

- Standard - 3.3.8.A6: CHANGES Explain changes in earth systems in terms of energy transformation and transport. MODELS Explain how satellite images, models, and maps are used to identify Earth's resources.
  - Assessment Anchor - S8.A.3: Systems, Models, and Patterns
    - Anchor Descriptor – S8.A.3.2: Apply knowledge of models to make predictions, draw inferences, or explain technological concepts