



Overview of Earth Balloon/U.S. Satellite Lesson Sequence *Earth Explorations in 3D Program*

Lesson 1 (1–2 class periods): The Spheres of the Earth

Overview:

Earth is a complex system composed of four major spheres: Atmosphere, Biosphere, Hydrosphere, and Lithosphere. Students will identify and describe the components of each sphere, and then classify objects (i.e. rocks, lakes, plants) based on the sphere with which they are most closely associated. Students will look for evidence of interactions between Earth's spheres through images and (optional) 3D stereophotographs and animations.

Objectives:

Students will be able to:

- ✓ Define lithosphere, hydrosphere, atmosphere, and biosphere.
- ✓ Classify objects according to which sphere they associate.
- ✓ Illustrate interactions between Earth's spheres.

Student Activities:

Students will:

- Engage by discussing a quote by Neil Armstrong, former NASA astronaut, on his view of the Earth from space.
- Explore Earth's spheres by reading a passage and organizing information in a table.
- Explain by diagramming examples of components of each sphere.
- Elaborate by creating an illustration showing the interactions between the spheres
- Evaluate by classifying examples of Earth's spheres and the interactions between the spheres.

Lesson 2 (1 class period): The Shape of the Land

Overview:

Earth has varied topography, both on land and on the seafloor. It is easy to understand topographic differences, as well as the interaction between the lithosphere and hydrosphere, using topographic maps. Using a special printable 3D map, students will learn the true meaning of contour lines as identify patterns and places at specific elevations.

Objectives:

Students will be able to:

- ✓ Explain the relationship between the hydrosphere and lithosphere in a watershed.
- ✓ Identify simple topographic features on topographic maps.
- ✓ Visualize topographic features using 3D imagery.

Student Activities:

Students will:

- Engage by working with a simple model of a watershed.
- Explore by comparing their model to a typical watershed.

- Explain by identifying features on a contour map.
- Elaborate by using a 3D image to understand contours.
- Evaluate by relating contour maps to their local area.

Lesson 3 (2 class periods): Earth’s Material Cycles – The Water Cycle

Overview:

Earth is almost a closed system to matter—very little material moves in and out of the Earth system. Therefore, the planet’s matter must be recycled. The water cycle is one example of how matter is cycled through each of Earth’s spheres. Students will use 3D animations to learn about different processes within the water cycle and the importance of these processes, as well as water itself, to our planet’s functioning.

Objectives:

Students will be able to:

- ✓ Explain that Earth is a closed system for matter, therefore matter must be cycled through Earth’s spheres.
- ✓ Give examples of processes by which matter within the Earth System is transformed in the water cycle.
- ✓ Relate the water cycle to each of Earth’s spheres (lithosphere, hydrosphere, atmosphere, and biosphere).

Student Activities:

Students will:

- Engage by working with a model of a closed system.
- Explore by exploring 3D animations of water cycle processes.
- Explain by recording notes on the water cycle.
- Elaborate by creating a diagram of the water cycle.
- Evaluate by explaining why atoms and molecules must cycle within the Earth System.

Lesson 4 (1 class period): Onsite Earth Balloon Experience

Overview:

An Earth Adventure instructor will lead individual classes on a journey around and into the earth in a 45 minute reinforcement session. This session will highlight and reinforce lessons learned in the classroom portion of the program. 3D glasses are not used for the Earth Balloon.

Objectives:

- To reinforce Lessons 1–3.

