



# LESSON PLAN

## INTERACTION OF EARTH'S SPHERES GRADES 3-5

### SUMMARY

The Earth is constantly changing. To better understand the processes that change it we can visualize Earth as four interacting systems—the geosphere, biosphere, hydrosphere, and atmosphere. Humans are part of the biosphere, but have the ability to impact all of Earth's spheres in both positive and negative ways.



**5-ESS2-1** Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

Science & Engineering Practices	Connections to Classroom Activity
<p><b>Developing and Using Models</b></p>	<ul style="list-style-type: none"> <li>• Students create labeled sketches (models) in their science notebooks to explain interaction of one or more of Earth's spheres.</li> <li>• Students view a variety of models of showing interaction of Earth's spheres in the Generation Genius video.</li> </ul>
Disciplinary Core Ideas	Connections to Classroom Activity
<p><b>ESS2.A: Earth Materials and Systems</b></p> <ul style="list-style-type: none"> <li>• Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's</li> </ul>	<ul style="list-style-type: none"> <li>• Students explore various materials to be able to describe and define each sphere. Students think about different ways two or more spheres interact through Earth's systems and processes.</li> </ul>

surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.

Additional DCI's addressed by this lesson:

**ESS3.C: Human Impacts on Earth Systems**

- Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments.

- Students think about the humans in the biosphere and how our actions impact all of Earth's spheres.
- Students focus on recycling as a method for reducing human impact on Earth's spheres.

**Crosscutting Concepts**

**Systems and System Models**

**Connections to Classroom Activity**

- Students develop simple models (labeled sketches) in which they identify all components involved in interactions between two or more of Earth's spheres.

**DURATION**

One to two 45-minute classroom periods.

**PRE-ASSESSMENT QUESTIONS**

Please see Discussion Questions located under the video. These can be discussed as a group or answered individually in student science notebooks.



**ENGAGE**

Bring in rounded rocks from a local stream or river, or sand from a local beach. Pass these around the class. Students should record any questions these materials inspire. Facilitate a discussion about their observations and questions. Gently lead students towards questions related to how these rocks became rounded or how the particles of sand came to be. Explain that students will be exploring interactions between the geosphere, biosphere, hydrosphere and atmosphere (or land, life, water and air) in this lesson.

**MATERIALS**

- Rounded rocks
- Earth's Sphere labels—printed and cut apart
- Scissors
- Rocks
- Sand
- Mud
- Silt
- Water
- Photos of streams, ocean, lakes, etc.
- Photos of snow, ice, glaciers
- Photos of clouds, fog, etc.
- Classroom plants
- Classroom pets
- Photos of plants and animals (including humans)
- Science notebooks
- Pencils

**DIY Activity materials**

- Piece of cardboard
- Wooden skewer
- Scissors
- Tape
- Two washers
- Two CDs
- Poster putty
- Rubber band





## EXPLORE

Set up four activity centers around the room. Use Earth's Sphere labels to label each area:

**GEOSPHERE: GEO = EARTH**

**HYDROSPHERE: HYDRO = WATER**

**BIOSPHERE: BIO = LIFE**

**ATMOSPHERE: ATMOS = AIR**

Populate each area with a few items from the list below (don't need all of them). For example,

<b>GEOSPHERE</b>	Rocks Sand Mud Silt Soil
<b>HYDROSPHERE</b>	Water Photos of streams, ocean, lakes, etc. Photos of snow, ice, glaciers Photos of clouds, fog, etc.
<b>BIOSPHERE</b>	Classroom plants (or photos of plants) Classroom pets (or photos of pets) Photos of plants and animals (including humans)
<b>ATMOSPHERE</b>	Photos of atmospheric layers Photos of clouds

Give students time to rotate around the activity centers. Ask them to take their science notebooks with them and to come up with a personal definition of what they think geosphere, atmosphere, biosphere and atmosphere mean. Discuss these definitions to come up with class definitions for each, explicitly discussing each sphere as a system with components. Then ask students, do these "spheres" influence each other? How?





## EXPLAIN



**WATCH THE *GENERATION GENIUS INTERACTIONS OF EARTH'S SPHERES* VIDEO AS A GROUP. THEN FACILITATE A CONVERSATION USING THE DISCUSSION QUESTIONS.**



## ELABORATE

Return class focus to the activity centers. Allow each student to choose an interaction between two spheres that they come up with to write about in their science notebook. Ask them to create a labeled sketch explaining their interaction in addition to explaining it using written words. As part of this, they should also list all the components of the system they are modeling. For example, they might choose to show how rocks are rounded as they are tumbled by water in a river as an interaction between the geosphere and hydrosphere. Components of the system they are modeling might include angular rocks, rounded rocks, flowing water, and the riverbed. The goal here is for students to identify different interactions between two of Earth's spheres.



## EVALUATE

Provide students with one or more scenarios involving interaction between Earth's spheres. Ask students to explain which spheres are interacting and how. You may also ask students to draw a model of the system. Example scenarios include:

- Formation of beach sand
- A landscape with different kinds of plants on opposite sides of a mountain.
- Glacial striations on rocks.
- Glacial erratic boulders (huge rocks that were carried and deposited by glaciers).
- Freeze-thaw weathering.
- Avalanche paths on mountainsides.



## EXTENSIONS

As part of the video students learn about recycling as a positive action humans can take to lessen our impact on Earth's spheres. Students can use the DIY Activity to create a race car just like Zoë's from the video. Or they can explore other products made from recycled materials.

