



## **Classroom Teacher Preparation**

### **Earth Science 4: The Rain Shadow Effect**

**Please use the following to prepare for the next SfS lesson.**

#### **Description:**

This lesson provides an introduction to the rain shadow phenomenon. Students read a story that describes a rain shadow and use key terms to build a model of the described environment. They next ask questions about the rain shadow phenomenon and participate in a demonstration of how they are created. The students then redesign their models, adding labels to identify the biosphere, atmosphere, hydrosphere, geosphere, and the necessary ingredients of a rain shadow. The lesson concludes with a gallery walk and a presentation by all groups.

#### **Lesson Objectives – SWBAT (“Students Will Be Able To...”):**

**3<sup>rd</sup>–5<sup>th</sup>**

- Identify the 3 “ingredients” required for a rain shadow to occur
- Develop a model of a rain shadow’s effects and explain how the geosphere, hydrosphere, atmosphere and biosphere are represented in the model

#### **Disciplinary Core Idea (DCI)**

**ESS2 Earth’s Systems – ESS2.A Earth’s materials and systems**

- (3<sup>rd</sup>–5<sup>th</sup>) Four major Earth systems interact. Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, organisms, and gravity break rocks, soils, and sediments into smaller pieces and move them around.

#### **Science & Engineering Practice (SEP)**

**Developing and Using Models**

- (3<sup>rd</sup>–5<sup>th</sup>) Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.

#### **Crosscutting Concept (CCC)**

**Systems and System Models**

- (3<sup>rd</sup>–5<sup>th</sup>) A system can be described in terms of its components and their interactions.

#### **Preparation:**

This lesson is an introduction to the phenomenon of rain shadows. It can be taught prior to student familiarity with the four spheres of the earth, but it is recommended that students are already familiar with the biosphere, atmosphere, geosphere and hydrosphere. Students will be able to explore deeper into the subject matter during the lesson with this prior knowledge.

#### **Room Set Up for Activities:**



The activity is set up for students to work in groups of 3-4 at a desk or a table. For the rain shadow lesson demonstration, there should be a table or two desks pushed together to set two chairs on top. If possible, please designate a spot for this in the classroom prior to the beginning of the lesson.

### **Safety:**

There are no safety concerns for this lesson.

### **Related Modules:**

This lesson may be taught as part of a sequence or group of related modules that cover the earth's four major spheres in more detail. Modules include:

*Earth Science 5: Topographic Maps* – Students create a 3D model of a landform and use it to create a 2D topographic map. Students will then evaluate their understanding of contour lines by interpreting another group's map.

*Earth Science 9: The Rock Cycle* – Students will examine rock samples, note similarities, classify them by rock type (igneous, metamorphic, sedimentary), and identify them.

*Earth Science 12: The Water Cycle* – This module presents a game (where students act as water molecules) that explains how water cycles through different forms and storage types on Earth and in Earth's atmosphere.

*Earth Science 16: Weather Basics: Rising air and Falling Rain* – Using a series of demonstrations and activities, students will learn about how clouds form and the role that air temperature and moisture have in this phenomenon. They will also see how these factors allow clouds to ultimately produce rain or other forms of precipitation.

*Life Science 5: Food Webs* – This module teaches the basics of food webs. Students first construct a food web model for a simplified Yellowstone ecosystem. They then consider what would happen to the ecosystem if the food web were disrupted by the removal of a native species and/or the introduction of an invasive species.

For other module sequences and groups, look here: [www.sciencefromscientists.org/sequences](http://www.sciencefromscientists.org/sequences)

### **Standards Covered:**

Please click the following link to our website to review the standards covered by this lesson, listed by state: [www.sciencefromscientists.org/standards/](http://www.sciencefromscientists.org/standards/). Lessons are matched to both national NGSS and local state standards.

### **After Our Visit:**

Students can extend connect their experience with earth's four spheres by creating an Ecosystem in a Bottle!: <https://sciencing.com/make-ecosystem-bottle-5164713.html>

Access this Extension activity by visiting the Classroom Post found on our website at [sciencefromscientists.org/cohorts](http://sciencefromscientists.org/cohorts). Use the name of your school/cohort and password to log in.

To help Evaluate, check out our Open Response questions online at [sciencefromscientists.org/open-response-questions](http://sciencefromscientists.org/open-response-questions). They are freely available for all of our lessons for current teachers. Use the password supplied by your instructor to log in.

### **Additional Resources:**

Students can get a review on what a rain shadow is (do not show the video until after the lesson!), and a refresher on earth's four spheres using the videos below.

- Two Minute Geology: Rain Shadow Effect (4:46): <https://www.youtube.com/watch?v=DoKTTTd-XEQ&t=1s>
- Crash Course Kids: Four Spheres Part 1 (Geo and Bio, 4:00): <https://www.youtube.com/watch?v=VMxjzWHbyFM>
- Crash Course Kids: Four Spheres Part 2 (Hydro and Atmo, 3:31): [https://www.youtube.com/watch?v=UXh\\_7wbnS3A](https://www.youtube.com/watch?v=UXh_7wbnS3A)

