

# K-12 IYS Activity



## Materials Needed

- Background material on biomes and associated soils. Information on soil properties and the soil profile is available at <http://soils4teachers.org/soil-horizons>. Information on biomes and associated soils is available at <http://www.soils4teachers.org/around-the-world>. This website includes downloadable PowerPoint slides on each of the major biomes and the soils that are found there. The NASA website <http://earthobservatory.nasa.gov/Experiments/Biome/> is another excellent reference on the biomes of the world and their properties. This website includes many teacher resources and on-line exercises.
- Base map of North America on which students can draw the boundaries of the various biomes. An example of a suitable map is available at [http://biologycorner.com/worksheets/biome\\_map\\_key.html](http://biologycorner.com/worksheets/biome_map_key.html)
- Poster paper on which students can draw and color the plants, animals and soil present in one selected biome.
- Pencils, crayons, color markers.

## Soils Sustain Life in Terrestrial Biomes

### Ages

Elementary, Middle School

### Where could you offer this?

Local school

### What type of room do you need?

Classroom

### Type of Lesson

Indoor activity with demonstration by teacher or outside scientist or professional followed by hands-on participation by students. May also be a computer website based lesson.

### Time Needed

1 to 2 hours including time to review major biomes and soils and time for students to draw and color a poster of one biome.

## Summary

Soils sustain life! Soils provide the water and nutrients needed for plants to grow, which in turn supports the animals that live there. Biomes are large geographic areas with a similar climate that creates a characteristic plant and animal community. In North America, there are seven major terrestrial biomes that differ greatly in the temperature and rainfall patterns:

1. Tropical Rainforest
2. Temperate Rainforest
3. Deciduous Forest
4. Coniferous Forest
5. Grassland
6. Desert
7. Tundra

There are also aquatic biomes in North America:

1. Wetlands
2. Lakes
3. Rivers
4. Estuaries
5. Oceans

Soils and biomes are closely linked. Because climate and vegetation are two major factors that determine how soils form, specific soil types are also commonly associated with each biome. For example, dry, rocky soils are often found in desert biomes while deep, moist soils are found in tropical rainforest biomes. In this exercise students will learn about the major biomes and the associated soils that are found in each biome. Students will learn about the biomes in the United States: where they are located; their climate; and the plant and animals communities that commonly exist. They will also learn about the soils commonly found in each biome and how their major properties differ. Students will draw a map of the biomes in the United States and then select one biome and draw and color a poster that shows the plants, animals, and the typical soil found in that biome.

*Celebrating the*



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International  
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## Soils Sustain Life in Terrestrial Biomes

### Learning Objectives/Outcomes

1. To identify and describe the major biomes in North America, the plant and animal community that exists in each, where they are located, their climate.
2. To investigate the soils that commonly exist in each biome and compare the properties of soils in various biomes to learn how soils provide the water and nutrients needed by the vegetation present in each biome.
3. To map the location of the major biomes in the United States and determine which types of soils are located in each biome.
4. To investigate why different biomes exist in the United States and determine how that is related to differences in soils and climate.
5. To draw and color a poster that illustrates the characteristics of one specific biome, showing the soils, vegetation and animals present in that biome.

### Method

1. Discuss the basic properties of soils and the soil profile. Review the major terrestrial (and aquatic) biomes in North America, including the climate and associated plants and animals present.
2. Review the soils found in each biome and their properties.
3. Have students draw a map indicating the location and boundaries of the major biomes in North America.
4. Assign each student (or allow students to pick) one of the biomes in North America.
5. Students will study the plants, animals and soils present in their biome and how the climate (temperature and rainfall) determines which biome is present.
6. Students can be asked to compare graphs of the annual temperature and rainfall patterns in the various biomes. Data and graphs of rainfall and temperature can be obtained from the NASA website <http://earthobservatory.nasa.gov/Experiments/Biome/>
7. Each student will draw a picture of their biome. This should include the plants and animals and the soil profile for a soil characteristic of that biome.

### Discussion Questions

- How does the temperature and rainfall affect the vegetation present in a location? How does it affect the soil properties as well?
- Do you think rainfall or temperature is more important in determining the vegetation and soils in a biome? Why?
- Climate change is an important issue facing society. Because of increasing greenhouse gases in the atmosphere, the temperature is predicted to increase in some parts of the world and rainfall will decrease. What would happen to a deciduous forest biome if the rainfall were to decrease? What would happen to a tundra biome if the temperature were to increase?
- How do the activities of people affect biomes? What happens when a grassland is plowed and used for farming? What happens when a forest is cut and houses are built for people to live in?

### Additional Resources

- Biomes and Soils in the World: USDA Natural Resources Conservation Service [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/?cid=nrcs142p2\\_054002](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/?cid=nrcs142p2_054002)
- Aquatic Biomes <http://www.kidzworld.com/article/1951-biomes-of-the-world-aquatic>
- Biomes of the world <http://www.ucmp.berkeley.edu/glossary/gloss5/biome/index.html>
- The Discovery Education website includes videos on the major terrestrial biomes. <http://www.discoveryeducation.com/teachers/free-lesson-plans/elements-of-biology-biomes.cfm>



Deciduous forest biome and associated soil profile of a forest soil (photo courtesy of T.R. Fox and NRCS).



Desert biome and associated soil profile of a desert soil (photos courtesy of SSSA and NRCS).



Tundra biome and associate soil profile of a tundra soil (photos courtesy of SSSA and NRCS).

### Additional Resources

[www.soils4teachers.org](http://www.soils4teachers.org)