



Floods K-2

Flood Science

LESSON PLAN 2

What Are Floods?

Understanding the relationship between precipitation and soil types will help young children understand why floods may or may not occur.

Key Terms and Concepts

absorb	saturate	water cycle
flash flood	soil	
flood	terrain	

Purpose

To help the students understand the relationship of floods to the water cycle, the terrain and the soil

Objectives

The students will—

- Use *You're the Scientist: Soil Science* to demonstrate how water is absorbed by the soil, and what happens when soil is saturated with water.
- Hypothesize and then demonstrate, following *You're the Scientist: Soil Science*, how wet soil becomes saturated more quickly than dry soil; find out how different soils absorb more or less water. (Linking Across the Curriculum)
- Write their observations of soil absorption as “greater than” and “less than” mathematical statements and illustrate their results in a graph.
- Build and use a stream table to illustrate the relationships among rain, soil, terrain and floods.
- Work with their families to draw bodies of water within their neighborhoods and discuss the possibility of flood. (Home Connection)
- Draw maps that illustrate local bodies of water and discuss the possibility of flood. (Linking Across the Curriculum)
- Create ways to make water sound effects. (Linking Across the Curriculum)

Activities

- “Soil Science”
- “Stream Table”



Visit the American Red Cross Web site
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What Are Floods?

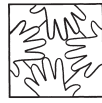
Materials

For each group or for a whole-class demonstration:

- *You're the Scientist: Soil Science*
- Clean soup can without a top or bottom
- Tight mesh screen, cheese-cloth or muslin
- Rubber band
- Aluminum pie plate
- Soil and bucket
- Measuring cup
- 2 cups (500 ml) water
- Funnel



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"Soil Science"

SET UP 30 minutes CONDUCT 30 minutes

Science: Earth Science and Physical Science

1. Distribute *You're the Scientist: Soil Science* to the students. Depending on the time available and the abilities of your students, complete the activity sheet as a small-group activity or a whole-class demonstration.
2. After completing the experiment, have the students discuss their observations. What happened to the water that did not collect in the pie plate? (It was held within the soil [absorbed].) What happened when there was more water than the soil could take in? (It ran through the soil into the pie plate.)



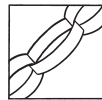
Wrap-Up

Have the students apply their observations to what happens outside when there is more rain than the soil can absorb.

(Puddles form; streams rise and move faster; and water overflows and runs down the pavement.)



Have the students consider how starting with wet soil might change the amount of new water the soil can hold. (Wet soil will become saturated more quickly, and more water will run through the soil into the pie plate.) What does this mean if there is a lot of rain? (If the soil is already wet and more rain falls, there is a greater chance of flood because the soil is saturated and cannot absorb more water.)



Linking Across the Curriculum

Science: Physical Science and Earth Science; Social Studies: Geography

For this activity, you will need magnifying glasses.

Have the students bring in soil from different areas in the community and compare the types of soil: texture, color and moisture content. Use magnifying glasses to compare the compositions of the soil. Which soil is likely to hold more water? Water might travel most quickly through which soil?

Have the students test their assumptions as they use the different soils in their activity sheet *You're the Scientist: Soil Science*. Help the students to measure and compare how the soils absorb water. Are certain soils more likely to increase the possibility of flood? Explain. Based on their observations, which soil would have the greatest tendency to cause a flash flood? Why?

Mathematics: Comparison and Graphing

After the students have measured and compared soil absorption, have them write their observations as "greater than" and "less than" mathematical statements. Guide the class in drawing a graph that illustrates their results.



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What Are Floods?

Materials

- Very large pan or plastic box
- Soil
- Toy houses, buildings and cars (game-piece size)
- 2 or 3 spray bottles
- Water



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"Stream Table"

SET UP 30 minutes CONDUCT 30 minutes

Science: Physical Science and Earth Science; Social Studies: Geography

1. Work with the class to build a stream table to help students discover how water moves in our environment.
 - (a) Fill the pan or box with slightly moist soil. Mold the soil into hills, valleys and streambeds.
 - (b) Place the toy buildings and cars into the stream table landscape to create a town.
 - (c) Fill the spray bottles with water.
 - (d) Have the students spray the water onto the stream table to simulate steady rain.

Discuss what happens when the water hits the ground. (The water begins to soak into the soil.)

2. After a minute or so of steady "light rain," tell the students to open up the nozzles of the spray bottles and let a larger amount of water pour onto the landscape, simulating a heavy rainstorm. Discuss what happens now. Is the water still absorbed by the soil? Where does the runoff go? (Once the soil is saturated, the water that can no longer be held by the soil begins to run down the hills, flow into the streams and gather in the low-lying places.)



Wrap-Up

Have the students discuss how the "Soil Science" experiment and the "Stream Table" demonstration show what happens in the real world.



Why do floods occur? (When there is a greater amount of rain than the soil can hold, the runoff begins to flow quickly into low-lying areas and into streams and rivers. Too much water too quickly will overflow the banks of these bodies of water and fill low-lying areas.) What might make floods happen with little warning? (Unexpected rains when soil is already saturated, and large rainstorms where too much rain falls in too short a period of time.)



Home Connection

Have the students work with their families to draw bodies of water within their neighborhoods: streams, ponds, lakes and rivers. Are these areas subject to flooding? Why or why not?

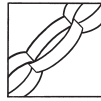


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Linking Across the Curriculum

Social Studies: Geography

Have the students draw maps that illustrate local streams, creeks, rivers and other places where water accumulates. Would these areas be likely to flood? Why or why not? Have they flooded before? Discuss.

Fine Arts: Music

Have the students create ways to make water sound effects: drips, small raindrops, large raindrops, downpours, water in brooks, water in rivers and water in oceans. Use the sound effects when demonstrating water falling and flowing in the stream table demonstration. Have the students intensify the rhythm or volume of their sound effects when the flood waters rise.



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You're the Scientist: Soil Science

Page 1 of 3

Name _____

Directions: Soil plays a big role in floods. You are the scientist. Follow the steps below to demonstrate how water and soil mix. What happens outdoors after many days of rain?

What you need—

- Clean soup can without a top or bottom
- Tight mesh screen, muslin, or cheesecloth
- Rubber band
- Aluminum pie plate
- Soil
- Measuring cup
- 2 cups (500 ml) of water
- Bucket
- Funnel



What you do—

1. Wrap the mesh screen around one end of the open can. Use the rubber band to keep it on tightly.
2. Put soil into the can, to 1 inch (2.5 centimeters) from the top.
3. Place the can in the pie plate.
4. Pour the water into the can.





You're the Scientist: Soil Science

Page 2 of 3

5. Draw a picture of your experiment.

6. Wait about 5 minutes and remove the can from the pie plate.





You're the Scientist: Soil Science

Page 3 of 3

7. Use the funnel to carefully pour the water from the pie plate into the measuring cup.

- How much water went through the soil?

- How much water stayed in the soil?

8. Pour the water through the soil again. Wait 5 minutes.

- How much water went through the soil?

- How much water stayed in the soil?

