

Hold the Load

GRADES 4-6

SUBJECTS

Science, Earth
Science

SKILLS

communication,
comparison,
discussion,
inference

DURATION

1 hour

GROUP SIZE

at least 20 students

SETTING

outdoors

OBJECTIVES

The student will be able to:

- Describe typical pollutants of waterways
- Describe how wetlands remove these pollutants
- Explain why wetlands are essential for clean water

METHOD

Students will simulate the movement of pollutants into and through a wetland

MATERIALS

1. large outdoor area
2. paper grocery bags, 6-7; cut them to one-half their normal height
3. dozens of objects about the size of a tennis ball (balls of any kind, half-pint milk cartons, individual yogurt containers, sponges, wads of paper), enough to fill each bag to overflowing
4. Rules for the 3 roles: Water, Soil, Plants (page 3)

BACKGROUND

As water moves through agricultural and urban land, it picks up many contaminants. Examples include excess phosphorus and nitrogen, which are components of fertilizers used on croplands and on lawns, and sediment. When a stream is cloudy due to extra sediment, it is said to be carrying a "heavy sediment load." These contaminants wash into waterways during storm events, floods, and through normal irrigation and other types of watering. Wetlands play an important role in reducing the load of contaminants in water. As a stream or river flows into a wetland, the dense vegetation slows the water. As water slows, sediment and contaminants settle out. Wetland plants absorb some of these contaminants and wetland soils neutralize others. Water that flows out of a wetland is cleaner than when it came in. But as it continues through its cycle, it will undoubtedly pick up more contaminants and carry those contaminants until it flows through another wetland.

PROCEDURE

1. Discuss types of pollutants- nutrients, metals, etc.-that might occur in a stream or lake. (Do not discuss wetlands; this is part of the last step of this activity.)

2. Explain the term "load," which is a term used to describe the amount of pollutants in water. (See background for an explanation of this and other terms.)
3. Explain that each of the dozens of objects in the paper bags represent a type of load.
4. Make sure the bags are overflowing with "loads."
5. Mark an area at least 30' x 60' outdoors. Tell the students that the area within the boundary is a lowland. The area outside the boundary is an upland.
6. Ask 6-7 students to be water; 2 to be soil. The rest will be plants.
7. Post the rules for each position (see page 3), and make sure the students understand the rules for each position, not just their own. (One way to do this is to have each group of players explain their rules to the entire group.)
8. Conduct the activity:
 - A. **ROUND ONE:** Ask the plant players to observe this round. Ask the two soil players to enter the lowland. Position the water players in the upland and instruct them to run through the lowland three times. (Make sure the students run! Their loads should spill out.) When all the water players have completed their runs, assemble the students and record the amount and locations of the loads.
 - B. **ROUND TWO:** Ask half of the plant players to position themselves in the lowland. Return the soil players to the lowland. This time, instruct the water players to walk through the lowland three times. Repeat the evaluation at the end of the round.
 - C. **ROUND THREE:** As per Round Two, but with all the plants in the lowland.
9. List two or three questions about this activity so that all students can see them (see page 4). The questions provided can also help guide the discussion in the last step.
10. Ask the students to divide themselves into three groups and discuss the questions you have listed and to list five more questions of their own about what happened in this activity.
11. Regroup and discuss the questions. Introduce the concept of wetlands.

EVALUATION

Give the students 15 minutes in their small groups to devise a way of explaining what happened in this activity. They can sketch out a poster, outline a narrative, record a mock interview, etc.

EXTENSIONS

1. Apply the principles of this activity to a wetland in your area.
2. Have students apply the principles of this activity to one of the major types of wetlands.

Load Role Rules: Rules for the 3 Roles

WATER

1. Your objective is to carry your bag through the lowland without losing any of your "load."
2. If a "load" falls on the ground, you must leave it there.
3. If you are tagged by "soil" or "plant," you must give a "load" to that player.
4. When you get to one edge of the playing field, you must step outside the boundary and walk through the upland and back to the starting line.
5. As you walk through the upland area, refill your bag.
6. You can run if no "plants" are present.
7. You must walk if "plants" are present.

SOIL

1. Your objective is to collect "load" from the water players.
2. Because "soil" is everywhere, you are free to walk or run all around the lowland area.
3. When you tag a water player, you will receive one piece of "load" from that player.
4. You cannot immediately retag that player; you must pursue another water player.
5. You must hold all of your "load" any way you can as you continue pursuing water players. If you drop a piece, you must pick it up. You can use your pockets, etc., to hold the pieces.

PLANTS

1. Your objective is to collect "load" from the water players.
2. You must pick one place to stand and remain rooted there. You cannot move your feet, but you can bend and lean and reach with your arms.
3. When you tag a water player or a "water " bumps into you, you will receive one piece of "load" from that player.
4. Every other piece of "load" that you receive you must throw away. Try to aim for the upland, but don't worry if some fall within the lowland boundary

Hold the Load Sample Questions

1. Why would water move faster when the lowland is just soil?
2. Why does water get a chance to return to the upland to collect more load?
(This should lead to a discussion about the water cycle.)
3. When the plants threw the load pieces, some landed within the lowland.
What might these represent?
4. How much load does water have if it moves through just soil?
5. Why would water move more slowly when plants are present?
6. How much load does water lose when it moves through an area with a few plants? With more plants?