UNIT 7 | PEOPLE AND WASTE

WHO POLLUTED THE RIVER?

METHOD

Through an interactive story, K-2 students experience the pollution of a local river over time and propose methods to protect the river from current and future pollution.

MATERIALS

- 1 clear gallon jar or bowl of water
- 1 plastic film canister for each student (canisters are often available for free at film processing stores—if you can’t find film canisters, any small condiment container with a lid will work)
- Canister labels (provided)
- Character nametags (provided)
- Story: Who Polluted the River? (provided)
- Canister ingredients
- Plastic fish toy (optional)

INTRODUCTION

Rivers have always been an important resource. They provide water for drinking, a means of transportation, a home for wildlife, and more. As human populations have increased, so has our impact on the water system and many rivers have changed as a result. In this activity, students participate in an interactive story about the changes humans have made to a river over time and learn how many of our rivers have become polluted. This example demonstrates that just as we each contribute to the problem, we can also each be part of the solution.

PROCEDURE

1. Prepare and label the film canisters using the provided Canister Labels and the items in the chart below. Prepare enough canisters for each student to have at least one. There are 10 canisters, so unless your class is very small, you will need to double some characters. (Some students will have identical canisters.)

   Note: Don’t have more than one barnyard canister (coffee), as two doses of it will make the water too dark to notice the progression of pollution afterwards.
### CHARACTER INGREDIENTS

<table>
<thead>
<tr>
<th>CHARACTER</th>
<th>INGREDIENTS</th>
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<tbody>
<tr>
<td>Trees</td>
<td>Dry leaves</td>
</tr>
<tr>
<td>Building sites</td>
<td>Soil (dry)</td>
</tr>
<tr>
<td>Farmers</td>
<td>Baking soda</td>
</tr>
<tr>
<td>Family picnics</td>
<td>Litter, assorted (shreds of paper, pieces of plastic, etc.)</td>
</tr>
<tr>
<td>Person fishing</td>
<td>Tangle of fishing line or dental floss</td>
</tr>
<tr>
<td>Barnyards</td>
<td>Water + instant coffee</td>
</tr>
<tr>
<td>Factories</td>
<td>Water + one drop red food coloring</td>
</tr>
<tr>
<td>Drivers</td>
<td>Vegetable oil + one drop red and green food coloring</td>
</tr>
<tr>
<td>Washing the car</td>
<td>Soapy water</td>
</tr>
<tr>
<td>Motorboats</td>
<td>Vegetable oil + one drop red and green food coloring</td>
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</tbody>
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2. Cut out the Character Nametags. Make sure that there is a Character Nametag for each canister you’ve made (ex. if there are two “Driver” canisters, there should be two “Driver” character cards).

3. Fill a clear jar or bowl with water. Place the container in a location that can be seen by all students. If using a fish toy, put it in the water now and when asking the questions within the story, point to the fish and include the question “How do you think the fish feels?”

4. Distribute one Character Nametag to each student. To activate background knowledge, ask students to share one thing they already know about the Character they are given (the sound it makes, what color it is, etc.).

5. Set up the labeled canisters within easy reach of where you’ll be facilitating the activity, lined up in the order they are to go into the water.

6. Explain that you will tell a story about the river, (insert the name of a river in your area, if you wish) and that each of the students will play a part in the story. The jar of water represents the river. When they hear the name of the item pictured on the Character Nametag you’ve given them, they should come up to you and get the matching canister, open it, and empty its contents into the container.

   Note: If you feel the students will have trouble opening the canisters without spilling the contents, remove the lids for them, or leave the lids off altogether.

7. Read the story *Who Polluted the River?* aloud. Add emphasis as you read each bolded character name and pause after each question to give the students time to think and respond.
DISCUSSION QUESTIONS

1. Who polluted the river?

   Everyone played a role.

2. What effect did the increasing population have on the health of the river? What are some examples?

   In this situation, population growth led to increases in pollution. Examples include: factories that make things for people leaking paint and chemicals, cars leaking oil, families leaving trash on the beach, etc.

3. Think about the pollution contained in your canister. What could each of us do to keep the river clean by making sure these kinds of pollution don’t get into it in the first place?

   Answers will vary but may include: biking or walking instead of driving, using water carefully, picking up litter so it doesn’t end up in our fresh water supply, etc.

4. Challenge students to come up with ways to clean up the water in the bowl—after all, everything has to go somewhere. Can water be cleaned up in the real world?

   Solids can be strained using a kitchen strainer or netting. Students may also find coffee filters or absorbent cotton helpful. In reality, people clean up rivers in many ways – using nets to pull out large items, treating the water with chemicals, etc.

5. Is it easier to prevent pollution, or to clean it up later? Have students explain their ideas.

   Preventing pollution is known to be a more effective approach for ensuring clean waterways.

MEASURING LEARNING

Ask students to pick a pollutant from the story and illustrate:

1. an action that would cause that pollutant to go into the river.
2. an action that would prevent that pollutant from entering the river.

FOLLOW-UP ACTIVITY

Arrange a class field trip to your local waste water treatment plant. Prior to your visit, have each student write down one question they have about polluted water and/or the cleaning process. At the plant, ask that an employee provide a tour of the facility and provide information such as how the water is cleaned, how much water goes through the plant, and why the plant is an important part of the local community. Be sure to leave time for student questions!
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<thead>
<tr>
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<tr>
<td>Washing the Car</td>
<td>Motorboats</td>
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<tr>
<td>Farmers</td>
<td>Barnyards</td>
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Activity: Who Polluted the River?, Page 4
WHO POLLUTED THE RIVER?
CHARACTER NAMETAGS

Trees
Building sites
Farmers
Person fishing
Family picnics
WHO POLLUTED THE RIVER?
CHARACTER NAMETAGS

- Barnyards
- Factories
- Drivers
- Washing the car
- Motorboats
STORY: WHO POLLUTED THE RIVER

There was a time many years ago when our land was very wild. This was a time before roads and cars. Only a small number of people lived here then. These native people depended on nature for many of the things they needed to survive, but they lived simply and didn’t change the natural surroundings too much. The people hunted in the forests, found food in the swamps, and caught fish in the river. [Insert the name of a local river.]

The beautiful and sparkling river was home to fish and other wildlife. Imagine that the container of water in front of you was taken from the river a long, long time ago.

- Describe how the water looks to you. Would you drink this water? Eat fish that came from it? Swim in it?

Eventually, more people traveled to this land from across the ocean. They found rich soil for farming, forests full of wildlife, and a river that provided plenty of food and water. It was a perfect place to live.

- How do you think the new people used the river? (Answers will vary but may include: for water to drink, cook with, bathe and wash clothes in; to catch fish from; to go boating on; to move supplies from place to place)
- Do we use the river the same way today? (Answers will vary.)

The river has changed a lot since that time long ago. This is the story of those changes. Listen for the name of what’s pictured on your Character Nametag. When you hear your picture named, walk up to the teacher, get the matching container, and dump what's inside into the river. Be sure to stand to the side, so the whole class can see the bowl.

Years went by, and once in a while there were big storms. Strong winds whipped through the TREES and blew leaves into the water. More and more people moved to the area. Gradually, a city grew up around the river. People drained swamps and cut down forests to build houses, schools, churches, stores, roads, hospitals and many other buildings. Rains washed loose soil from these BUILDING SITES into the river.

- Is this water safe to drink? (If the response is “no,” ask if the river had leaves or soil in it when people long ago drank from it.)
- Would you swim in it? Is it safe for animals to drink and fish to swim in?

At first, the city was small. Upstream, FARMERS planted crops to feed all the people as the city grew. They used chemicals called fertilizers to make their crops grow faster. Some farmers kept pigs and other animals in BARNYARDS. As rainwater drained out of the fields and barnyard, it carried some of the fertilizers and manure into a little creek behind the farm. The creek flows into the river.

- Would you drink this water now? Would you swim in it? Go boating on it?
- Is it safe for fish and animals?
Now, the city along the river has grown to be one of the largest cities in the country. Many people live and work in and around the city. Many businesses provide services for the people. Several FACTORIES make things that people want, like cars and furniture, but the factories leak paint and other chemicals into the river. These pollutants cause the fish to become sick. As people move about their busy days, they often drive from place to place. Traffic jams are a big problem for DRIVERS who take their cars to and from work. If a car is not taken good care of, it might also leak oil or other fluids, which will be washed off the roads and into the river with the next rain.

A boy in the city is out WASHING THE CAR. The soapy water rushes down the driveway into the storm drain by the curb; the storm drain empties into the river. The grease and grime on a car contains tar from the roads, very tiny bits of rubber from the wearing of the tires, and rust. If the boy had gone to a local car wash instead, the water would have been cleaned before it went back into the river or was recycled.

On nice days, many people head down to the river. Some zoom up and down the river in MOTORBOATS and don’t notice that a little engine oil leaks into the water. The oil will not mix with the river water, but will float on the surface. It will coat the feathers of ducks or other birds that paddle around on the water looking for food, making it harder for them to stay afloat or fly. Lots of people are having FAMILY PICNICS in the parks along the river, too. Some of these people have left trash on the shore. With the next storm, that trash will wash into the river. On the shore a PERSON FISHING snags a hook on a log. Instead of untangling it, the person fishing simply breaks off the snagged piece of the nylon fishing line and lets it fall into the river. The land is no longer wild, and the river has changed a lot over the years.