

Watershed Protection



Grades: 3-5

Subjects: Science, Social Studies, Health, Language Arts

Time: 60-90 minutes

***Standards:** Students will...

Technology Standard 3: Understand the relationship among science, technology, society and the individual.

Benchmark # 5: Understand that technology may affect the environment both negatively and positively (e.g., fertilizers used to help plants to grow may end up in a water supply as a non-point source of water pollution).

Geography Standard 14: Understand how human actions modify the physical environment.

Benchmark # 1: Know the ways people alter the physical environment (e.g., clearing the land to make rooms for houses and shopping centers, building roads, planting crops).

Benchmark # 2: Know the ways in which the physical environment is stressed by human activity (e.g., water and air pollution, expanding human development).

Geography Standard 16: Understand the changes that occur in the meaning, use, distribution and importance of resources.

Benchmark # 2: Know how settlement patterns are influenced by the discovery and uses of resources (e.g., the growth of industry and cities along major waterways).

Geography Standard 18: Understand global development and environmental issues.

Benchmark # 2: Know ways in which resources can be managed and why it is important to do so (e.g., identifying and eliminating point sources of water pollution, identifying potential non-point sources of water pollution and taking steps to minimize their impact).

Health Standard 2: Know environmental and external factors that affect individual and community health.

Benchmark # 1: Know how the physical environment can impact personal health (e.g., the effects of exposure to water pollution).

Language Arts Standard 1: Use the general skills and strategies of the writing process.

Benchmark # 7: Write expository compositions (e.g., develop the topic with simple facts, details, examples, and explanations, use structures such as cause-and-effect, chronology, similarities and differences).

Objectives: Students will be able to ...

- Identify and describe the ways humans have an impact on water quality.
- Explain the effects of water pollution as it relates to the environment and our personal health.
- Identify possible causes of water pollution.
- Differentiate between the two types of water pollution: point and non-point source pollution.

Materials:

- Paper
- Writing implements
- Property handouts provided
- Chalk
- Random item from desk
- Copy of Chief Seattle's "Brother Eagle, Sister Sky"

Overview: How do rivers and lakes get polluted? In most cases, the pollution of a river or lake occurs when its watershed (the land area that drains into a lake or river) gets polluted. The pollution of a watershed is the first sign that the connecting lake or river is polluted too. For this reason, people constantly study individual watersheds in search of the best method to protect rivers and lakes from pollutants. There are two types of pollutants: point and non point. Point pollutants can be traced back to a source, such as a factory or a sewage pipe. Non point pollutants can't be traced back to an individual culprit; they could have come from anywhere.

Kid's Speak: The land around a river or lake is called a watershed. When a watershed is polluted, no longer clean, the river or lake it surrounds also becomes polluted. A river or lake can contain two kinds of pollution: point-source and non point source. If you can tell where the pollution came from, it's a point source. If you can't find where the pollution came from, it's a non point source.

Eco-Fact: 1.2 billion people around the world do not have access to clean water.

Procedures:

Before Designing Properties:

- Read aloud Chief Seattle's "Brother Eagle, Sister Sky."
- After the reading, ask students to explain Chief Seattle's message in their own words.
- As a class, discuss the story's important message to care for and preserve the environment.
- Discuss how the story's message relates to the pollution of a watershed in modern society.

Designing Properties:

1. Introduce the activity by showing students an example of how land can be used in various ways.

2. Distribute the property sheet handouts to the class.

3. Explain to students the blue shaded areas indicate water and blank green space represents land. Tell students they can do anything they want with their property: add a home, a resort, a park, grow a forest,... (by cutting and pasting on the provided property worksheet or drawing their own property). Allow approximately 20 minutes for this part of the activity.

4. Once students have completed the design phase of the project create a class river. Have students place their handouts on the floor laying them end to end. Have students sit next to their designs and describe their properties and how they used the river in their illustration.

Point and Non-point Source Pollution Activity:

- Each student will represent their contributions to the river with an item from their desk: a book, piece of paper, pen or pencil. Each item will represent one of the two kinds of pollution: point or non point source pollution.

- Have students identify their pollutants as point source or non-point source; items hard to pin to an owner, like paper and pens, represent non-point pollutants, and items easily traced back to their owners represent point source pollutants.

- To show students how pollutants travel downstream, have each student pass their pollutants to the student south of them. Stop after all the items reach the students at the end of the river.

- Sample follow-up discussion questions:

Where did all the pollutants (items from desks) end up?

How did you feel while the pollutants were being passed downstream and after the pollutants piled on the students at the end of the river?

What source were the items point or non point source pollution?

How the actions of upstream water users can affect the water quality of downstream users?

Which polluter culprits are more difficult to track: point or non point source? Why?

After Designing Properties:

In their journals have students respond to the watershed protection story and activities. Below are sample writing prompts:

- Discuss how the message of Chief Seattle's "Brother Eagle, Sister Sky" relates to the pollution of a watershed in modern society.

- How did you feel while the pollutants were being passed downstream and after the pollutants piled on the students at the end of the river? How the actions of upstream water users can affect the water quality of downstream users? Apply this results of this activity to real life situations.

- Students can include a diagram with labels to show the points of pollution and movement of pollution downstream.

Adaptations:

- To add an advanced element of geography, select a real river such as the Mississippi or Nile, and make student properties different locations along this river.

- Older students may wish to draw their own properties rather than using provided property handouts .

- Create a class river using large paper. Each student can contribute one piece of property or natural item such as a tree or park. Either use provided property cut outs or draw original property designs.

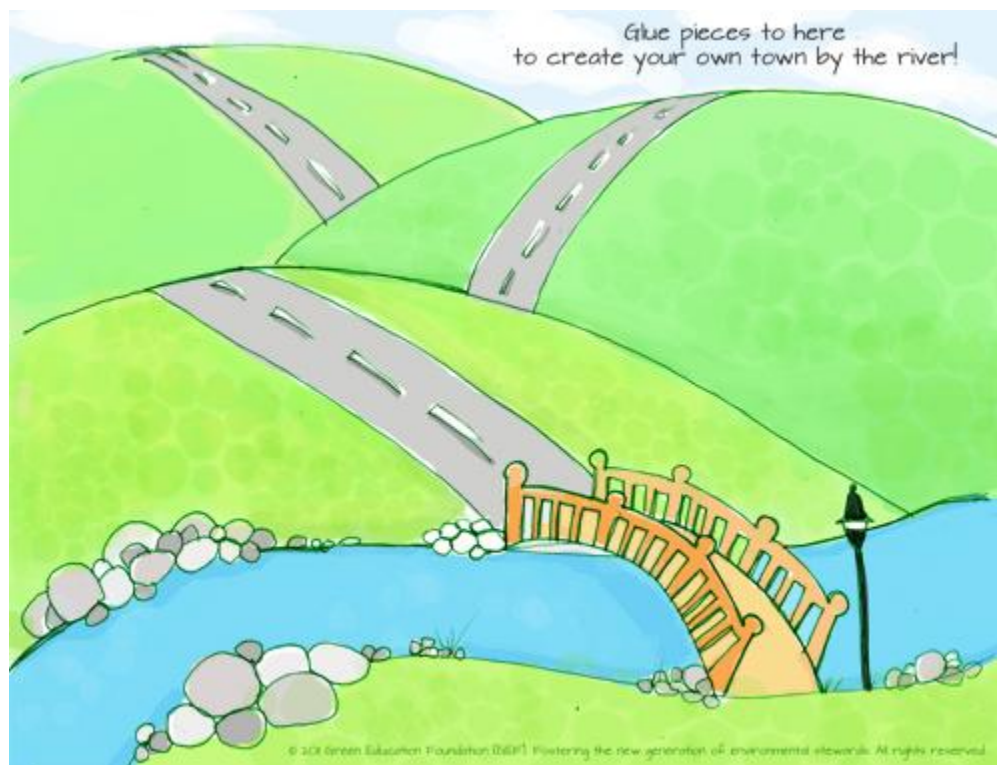
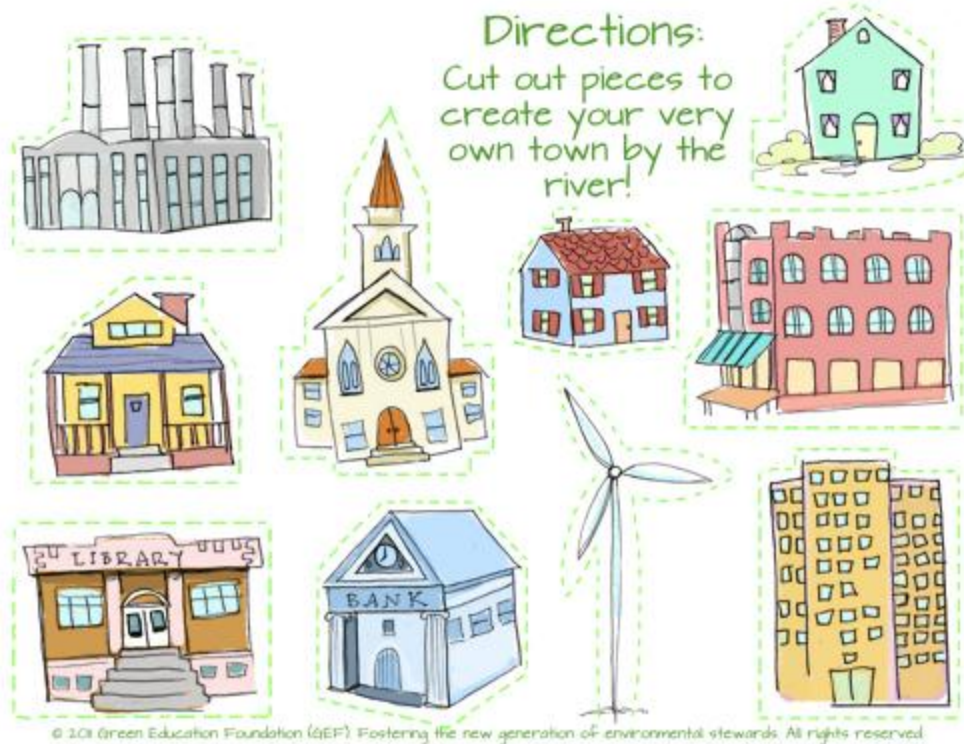
Extensions:

- Locate a river near your school and have students analyze to see if it's polluted and if so, have them try to guess the type of source.

- Go online and search for rivers and have students analyze them for pollutants.

- Have each student research ways to protect rivers. Using the protection methods they researched, have students redesign their properties or design a new property based on a local watershed they know.

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