

LESSON

Exploring: Water in Our Lives

Introduce how salt moves into waterways by looking at where our water comes from and how runoff impacts the environment.

What We Are Hoping For: Learning Goals

- Runoff
- Human Impact
 - A, B, C

Learning Goals:

- How students interact with water in their daily lives
- Water picks up materials as it moves across surfaces
- Comparison of NYC Water Story to Baltimore

CHECKLIST**Exploring: Water in Our Lives**

In this lesson, students will:

- Discuss various forms of water in their lives. **(5 min)**
- Watch the NYC Water Story Interactive. **(20 min)**
 - Connect water in their homes to natural sources (how NYC gets its water)
 - Learn about how water reaches NYC.
 - Learn how runoff can move chemicals into waterways.
- Use slides to connect water in NYC to water in Baltimore. **(20 min)**
- Write about how water gets to their home in the *Exploring: Water in our Lives* section of the Investigation Booklet. **(10 min)**

(Times indicated are approximate.)

Message to the Teacher

The following lesson addresses New York City's drinking water. You may want to explore the drinking water source in your local area. If you would like to adapt this lesson to include your city or town's water story, do a quick search on the web to find the "source of water" in your town. Most cities/counties have websites that describe the water supply. You can create a lesson on this information, or ask students to do their own research and present it to the class as a poster or brochure.

1. Introduce where water comes from and how runoff impacts the environment. (5 minute)

Introduction

"Yesterday we discussed how added salt affects living things. Today we are going to discuss how salt moves into waterways by looking at where our water comes from and how runoff impacts the environment."

Where Water Comes From

Water in our homes originates in nature.

Discussion

Key Idea: Water in our homes originates in nature.

Question: In what ways do you use water in your home?

Answers: Shower, toilet, dishes, drinking

Question: Where and when do you see water outside?

Answers: Everything in New York City is surrounded by water – rivers, ponds, bays, as well as rain and snow.

Question: What are the differences between outdoor and indoor water sources?

Answers: Students should point out that although water indoors is brought in by man-made means, the water source was originally out of doors (precipitation, lakes, streams, etc.).

Question: Where does the water in your home come from and how does it get to your home?

Answers: From reservoirs, pipes, lakes, streams, wells

Question: What happens to all the rain and snow? Where does it go after it falls or melts?

Answers: The water goes into larger bodies of water like rivers, canals and the bay; under the ground; into drainage pipes; into larger bodies of water; etc.

Misconception

Many students believe that water originates from pipes or the faucet, when it most immediately originates from natural sources like reservoirs, wells, or springs.

2. How water moves: New York City Water Story Interactive. (20 minutes)

How Water Moves

Pollutants reach water sources through runoff.

Distribute NYC Water Story Worksheet and play the NYC Water Story interactive as a whole group or if individual computers are available in partners or small groups.

Stop the NYC Water Story after the “Storm Water” section in “Down the Drain” and ask the following questions.

Discussion

Key Idea: Pollutants reach water sources through runoff.

The *NYC Water Story* asserts that storms wash oil, pesticides, litter, etc. into sewers, thereby polluting rivers and beaches.

Question: Why do storms contribute to pollution?

Answer: The water picks up chemicals from land and brings the chemicals to individual waterways.

Question: How can we reduce the amount of pollutants that reach the waterways?

Answer: Reduce litter; maintain vehicles to prevent leaking oil or antifreeze; minimize the use of fertilizers and pesticides; clean up pet waste; avoid using salt to de-ice in the winter.

Historical New York City Water Story

Did you know that before Europeans settled on the island of Manhattan that:

- Two freshwater streams came together in Times Square before emptying out into the Hudson?
- A stream used to run down 5th Avenue through Washington Square Park?
- The Manhattan shores of the East River were filled with marshes?
- The Flying Squirrel and the Snapping Turtle used to make their home in the area that is now the approach to the Brooklyn Bridge?
- Canal Street got its name from a creek that used to stretch across the bottom tip of Manhattan?
- On 31st and 32nd streets between Lexington and Park Avenues there used to be a small pond teeming with life?
- There used to be a huge tulip tree forest that included a meandering stream at Columbus Circle?

Find Your Own Water Story:

If you would like to adapt this lesson to include your city or town's water story, do a quick search on the web to find the "source of water" in your town. Most cities/counties have websites that describe the water supply. You can create a lesson on this information, or ask students to do their own research and present it to the class as a poster or brochure.

NYC's Combined Sewer System

New York City has a combined sewer system. This means that sewage and storm water runoff (i.e. rain and snowmelt) empties into a single pipe system. On dry days, this combination is not a problem. The sewage runs normally to the sewage plant to be treated. On wet days, trouble occurs. The storm runoff enters the sewage system adding substantial liquid to the pipes. To prevent the pipes from overflowing and backing up, the contents empty directly into the surrounding water bodies without being cleaned. This process is called Combined Sewer Overflow and it leads to high levels of bacteria and nitrogen waste (human feces) in area water bodies on the days it rains. To prevent this problem, newer cities now build two sets of pipes—one for sewage and one for runoff. Old cities, like ours, are stuck with the dirty system.

Surface Water and Groundwater

All of New York City's drinking water comes from surface water, but 21% of the freshwater used in the United States comes from the ground. Some water seeps underground when it falls as rain, snow or sleet. The gravel or sand underground act like a sponge to absorb and hold the water, just like when you are digging at the beach and discover water when you dig down deep. In order to access stored underground water, people use well pumps to bring stored water to the surface. An area that holds a lot of water, which can be pumped up with a well, is called an aquifer. Wells pump groundwater from the aquifer and then pipes deliver the water to cities, houses in the country, or to crops.

3. Show a slide of a map of NYC's drinking water supply and Baltimore's drinking water supply and lead the following discussion to connect Baltimore's water with NYC's water. (20 minutes)

Water Tale of Two Cities

Each city has its own water supply, but different water supplies can be affected by the same factors.

Discussion

Key Idea: Each city has its own water supply, but different water supplies can be affected by the same factors.

Question: How is the Baltimore water story similar to the NYC water story?

Answers: Baltimore also receives its water from freshwater supplies that are outside its city limit. Baltimore reservoirs like the Croton Reservoir for New York City are also located where people live.

Key Idea: Salt may be naturally found in water sources, but it is the dose that makes it harmful.

Question: Think back to the lesson on Salt in Our Lives. Is there salt in your drinking water?

Answers: I don't know. Maybe. We know that salt doesn't exceed the New York City drinking water standard of 100 mg/L of salt, but we do not know exact figures. The New York City Department of Environmental Conservation does not allow anyone access to those records, which is one reason that we need to look at the Baltimore data to understand New York.

Question: If salt enters the water, how might it get there?

Answer: Through mineral deposits or runoff that picks up road salt.

4. Complete the *Exploring Water in Our Lives* section of the Investigation Booklet. (5 minutes)