

Subject: Elementary Science

Grade: 3rd-5th

Date:

LESSON TITLE: The Water Cycle

Overview: This is the first lesson plan in the water resources recovery curriculum. It familiarizes students with the water cycle, and the importance of water as a natural resource. This lesson educates students on different water bodies, the differences between the natural and urban water cycles, and discusses water pollution.

Targeted Common Core Standards		Objectives
<ul style="list-style-type: none">✓ RI2: Determine two or more main ideas from various forms of educational media.✓ RI3: Describe the relationship between a series of scientific ideas or concept in an experimental design. Using language that pertains to time, sequence, cause/effect.✓ SL1: Engage effectively in collaborative group discussions with diverse partners on grade specific topics, and building on ideas.✓ W9: Recall information from experience or gather information from print and digital sources. Take brief notes on sources and sort evidence into provided categories	<p>Advanced Learners (5th grade)</p> <ul style="list-style-type: none">✓ RI3: Explain the relationships or interactions between two or more concepts in scientific text based on specific information.✓ SL7: Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.	<ul style="list-style-type: none">• Understand the difference between surface water and ground water.• Identify & define the five categories of surface water.• Know the difference between the natural water cycle and urban water cycle.• Understand the difference between point source and non-point source pollution.• Understand how pollution effects natural habitats and water bodies.• Compare and contrast how nature handles pollution to how humans treat wastewater.

Materials for Lesson

The Water Cycle PowerPoint
The Returning Drop (Worksheet/experimental design)
What's wrong with this picture? (Worksheet)

Definitions

The Natural Water Cycle

Condensation: Condensation is when water vapor (gas) gathers in clouds, and changes to a liquid.

Precipitation: Precipitation is when water falls to the earth due to gravity. This could be in the form of rain, snow, sleet, or hail.

Surface Runoff: Surface runoff is when water fills up or the soil is saturated, after rain or snowmelt. That water then begins to run over.

Infiltration: Infiltration or percolation is when water soaks into the ground and is stored.

Discharge: Water that emerges back to the surface of the earth and flows into streams, rivers, lakes or the ocean.

Evaporation: The process of changing into a vapor.

Water Vapor: Gaseous state of water

The Urban Water Cycle/Human-created Water Cycle

Water Treatment: To be suitable for distribution and human use, raw water is treated to remove contaminants and pathogens.

Water Distribution: Water is distributed through a gravity fed system or a pressurized system of pipes, pumps, valves, and storage reservoirs.

Wastewater Treatment: After water is used, it travels through sewer systems to undergo wastewater treatment at a water resources recovery facility (WWRF).

Pollution

Pollution: Pollution is when harmful materials (pollutants) enter into an environment that can cause damage to air, water, and land.

Point-Source Pollution: Point source pollution is pollution that comes from one single point or site, and discharges into a water body.

Non-Point Source Pollution: Nonpoint source pollution is pollution that does not enter water at any particular spot.

Biological breakdown: Bacteria breaks down the inorganic materials into a more organic material that can then be used by aquatic life.

Deposition: Deposition is a process that occurs naturally when water in a stream or river flows over rocks. Particles fall out of the water and settle in the bottom of a waterbody

Dilution: When the concentration of a soluble in water decreases.

Background

Water is valuable resource that is all around us, which is why it's so important that it's protected. The water cycle is earth's water supply from the atmosphere to earth and back that includes the processes of precipitation, evaporation, runoff, infiltration, and storage in water bodies and groundwater. The earth's surface is made up of 80% water, 97% of the total amount of water is saltwater. This means that only 3% of all water is freshwater.

Of the 3% of freshwater, 2% of that water is ground water. Groundwater is water we can't see because, it's under the Earth's surface so we can't use it. However, in areas where access to surface water is limited wells maybe used to extract groundwater. This can cause environmental issues like groundwater depletion or cause the groundwater to have a high salinity and become unusable. Therefore, that leaves only 1% of water to be used for survival.

Essential Questions

Before going through the PowerPoint, ask students the following questions to gauge their knowledge on the subject:

- How much of the earth is made up of water (percentage)? How much of that water is accessible?
- If they can identify different types of water bodies
- What they know about the earth's water cycle
- Why they believe clean water is important?

PowerPoint & Activities

Use *The Water Cycle* PowerPoint to introduce and explain the natural water cycle, urban water cycle, the different categories of surface water, and the different types of pollution. If possible, give everyday examples of each term in the water cycle (refer to The Returning Rain drop worksheet).

After going through the lesson, set students up into groups of 3 to work on The Returning Raindrop Design, This hands-on activity by the Water Environment Federation, shows students the process of the water cycle by building a mini terrarium using 2-liter clear plastic bottles.

A supplemental activity is the What's Wrong with This picture? Worksheet which asks students to identify the different sources of pollution.

Teacher Notes

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