

## Photo Description



This image shows a blue water valve (fire hydrant) and an orange traffic cone next to a sidewalk beside a body of water. Water is visible pooling on the grass and seeping into the ground. The scene demonstrates how water moves and changes in our environment, with some water appearing as a liquid flowing from the valve and other water visible in the canal or drainage area.

## Scientific Phenomena

Anchoring Phenomenon: Water leaking from an underground infrastructure system and pooling on the surface.

Why This Happens: Water flows through pipes underground to deliver or drain water. When pipes crack, leak, or valves open, water escapes and moves downward due to gravity. The water pools on the surface because the ground cannot absorb it fast enough, or it flows toward lower areas. This demonstrates that liquids flow and take the shape of their containers—in this case, the ground and grass act as a container for the escaping water.

## Core Science Concepts

\* Gravity and Liquids: Water always flows downward and toward lower areas because of gravity pulling it down. Liquids cannot hold their own shape and will spread out and flow to fill available spaces.

\* Water as a Liquid: Water in its liquid state is wet, flows freely, and can soak into materials like soil and grass. Unlike solids (the concrete, the cone), liquids don't have a fixed shape.

Observable Evidence of Change: The wet grass, pooling water, and need for the warning cone show that water is moving and changing the environment around it. We can see and feel\* evidence of water's movement.

\* Human Infrastructure and Nature: People build pipes and valves to control water, but when they leak, water behaves according to natural laws (gravity, absorption) and spreads across the landscape.

### Pedagogical Tip:

Second graders are concrete learners who benefit from direct observation. Rather than explaining water states abstractly, invite students to observe real water in your classroom—pouring it, watching it pool, and feeling it wet their hands. Connect these tactile experiences to the "leaking pipe" phenomenon in the photo. Ask: "If we poured water on a plate, where would it go? Why does it go there?"

### UDL Suggestions:

Representation: Use videos, photographs, and real water demonstrations to show water in action. Some students may benefit from tactile models (sponges, towels) to feel how water is absorbed. Action & Expression: Allow students to show understanding through drawing water movement, acting out gravity's effect, or building models with containers.

Engagement: Connect to students' real-world experience—many have seen puddles, wet grass, or water leaks at home. Invite them to share observations, validating their curiosity.

## Zoom In / Zoom Out

### Zoom In – The Invisible Traveler:

When water soaks into the soil, we can't see where it goes, but it's traveling through tiny spaces between soil particles and sand grains—like water taking a secret path underground. Even though we can't watch it happen, the water is still moving downward through the ground, eventually reaching underground water storage areas called aquifers. Some water also gets absorbed by plant roots deep in the soil, traveling up into the grass and trees to help them grow!

### Zoom Out – The Big Water Cycle:

This leaking pipe is part of Earth's much bigger water cycle. The water that escapes here will eventually travel underground, seep into rivers and lakes, evaporate back into clouds, fall as rain, and flow through pipes again. The canal visible in the photo is connected to the neighborhood's water management system, which is part of the town's or city's larger network of waterways that connect to rivers and eventually oceans. When we see a small leak on a sidewalk, we're actually watching a tiny piece of how water continuously moves around our entire planet!

## Discussion Questions

1. What do you observe happening to the water coming from the pipe? (Bloom's: Remember | DOK: 1)
2. Why do you think the water is spreading across the grass instead of staying in one spot? (Bloom's: Analyze | DOK: 2)
3. How is the water in this picture different from the water in a cup you drink from? (Bloom's: Compare | DOK: 2)
4. What do you think will happen to all this water over time—where might it go? (Bloom's: Predict | DOK: 3)

## Potential Student Misconceptions

Misconception 1: "Water disappears when it soaks into the ground."

Clarification: The water doesn't vanish—it just moves to places we can't easily see. It travels down into the soil, where it fills tiny spaces between dirt particles and rocks. Plants drink this water through their roots, and some of it flows underground to streams, wells, and aquifers. Help students understand that water is never truly gone; it just changes location.

Misconception 2: "Only pipes leak—the ground doesn't lose water."

Clarification: Water leaks can happen anywhere! While this photo shows a pipe leak, water also naturally escapes from lakes, puddles, and soil through a process called evaporation (turning into invisible water vapor that floats into the air, especially on sunny days). Students should recognize that water is always on the move in nature, with or without human pipes.

Misconception 3: "All water that pools will stay there forever."

Clarification: Pooled water won't stay in one place for long. It will soak into soil, flow downhill toward lower areas, or evaporate into the air on sunny days. Encourage students to observe puddles over time to see that water is constantly moving and changing location.

## Extension Activities

1. Water Flow Experiment: Set up a shallow tray with soil, sand, and grass. Pour water at the top and observe where it flows, where it pools, and where it gets absorbed. Have students draw or describe the path the water takes. Discuss how this is similar to the leaking pipe in the photo.

2. Solid, Liquid, Gas Sort: Bring in pictures or real objects (ice cube, water in a cup, a sponge, a balloon with air, a rock). Have students sort items into categories: things that keep their shape (solids) and things that flow and change shape (liquids). Connect this to the water in the photo.

3. Puddle Observation Walk: (Weather permitting) Take students outside after rain to observe puddles. Have them predict which puddles will disappear first (sunny vs. shady spots), then check back later. Discuss where the water went (evaporation, absorption, drainage)—connecting to the phenomenon in the photo.

### Cross-Curricular Ideas

Math Connection – Measuring and Predicting Flow:

Have students use containers of different sizes to measure how much water flows from a faucet in 10 seconds, 20 seconds, and 30 seconds. Create a simple chart showing: Time (seconds) | Water Amount (cups). Introduce the idea that a leaking pipe wastes water at a measurable rate. Ask: "If our pipe leaked 1 cup per hour, how many cups would leak in 24 hours?" This connects to early multiplication and real-world measurement.

ELA Connection – Storytelling and Observation Journals:

Ask students to write or dictate a short story from the perspective of a water droplet: "I came out of this pipe. Where did I go? What did I see?" Students can draw pictures showing the water's journey and write captions for each step. This combines narrative writing with scientific observation and vocabulary practice (words like flow, soak, seep, gravity).

Social Studies Connection – Community Infrastructure and Responsibility:

Discuss why the orange traffic cone is there—someone put it there to warn people and keep them safe while workers fix the leak. Talk about who in the community takes care of pipes and water systems (water department workers, engineers, maintenance crews). Connect this to students' understanding of community helpers and how people work together to maintain the systems we depend on, like clean water and safe sidewalks.

Art Connection – Water Movement Sculptures and Diagrams:

Have students create a visual representation of water movement using blue paint, watercolor, or blue ribbon/string on large paper. They can show arrows indicating how water flows downward due to gravity, spreads across surfaces, and soaks into soil. Alternatively, students can build 3D models using sand, soil, containers, and water to create their own miniature "leaking pipe" scenario and paint or label where the water goes. Display these as visual learning tools for the classroom.

### STEM Career Connection

#### 1. Water Systems Engineer

These workers design, build, and fix the pipes and valves that bring clean water to our homes and neighborhoods. When a pipe leaks (like in this photo!), water engineers figure out what's wrong and repair it. They make sure water flows where it should go and doesn't get wasted. This job helps keep communities healthy and safe.

Average Annual Salary: \$85,000–\$110,000 USD

#### 2. Environmental Scientist

Environmental scientists study how water moves through soil, plants, and our communities. They investigate water leaks, track where water goes underground, and help protect our waterways and aquifers. They care about keeping our environment clean and making sure we don't waste precious water resources.

Average Annual Salary: \$65,000–\$95,000 USD

#### 3. Plumber

Plumbers install, maintain, and repair the pipes, valves, and water systems in buildings and neighborhoods. When you see a leaking hydrant like in this photo, a plumber (or water department technician) is often the person who comes out to fix it. They use special tools and knowledge to solve water problems and keep water flowing safely.  
Average Annual Salary: \$55,000–\$85,000 USD

### NGSS Connections

Performance Expectation: 2-PS1-1 – Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Disciplinary Core Ideas:

- 2-PS1.A – Different kinds of matter exist (solids, liquids, gases) and have observable properties
- 2-ESS2.A – Water is found in different places and can be solid or liquid

Crosscutting Concepts:

- Patterns – Water follows predictable patterns (flows downward, spreads across surfaces)
- Cause and Effect – The leak (cause) results in wet grass and pooling water (effects)

### Science Vocabulary

- \* Liquid: A form of matter that is wet, flows freely, and takes the shape of whatever container it's in (like water or milk).
- \* Gravity: An invisible force that pulls things downward toward the Earth, making water flow down and fall to the ground.
- \* Absorb: When a material soaks up liquid, like how a sponge or soil takes in water.
- \* Leak: When liquid escapes from a pipe or container where it's not supposed to go.
- \* Property: A characteristic or quality of something that you can observe, like how wet something feels or what color it is.

### External Resources

Children's Books:

- Rain by Manya Stojic (explores water movement and weather)
- A Drop of Water: A Book of Science and Wonder by Walter Wick (stunning photography of water states and properties)
- Water is Water by Miranda Paul (shows water in different forms and places)