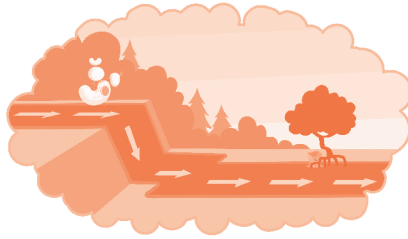


H₂O on the Go



What Is This Activity?

Where does water flow—and not flow—in a city?

Kids model surfaces that absorb water and those that don't, and investigate structures that control water flow in cities and towns.

Learning Goals

Big Science Idea:

- When rain falls and snow melts, some surfaces let water soak into the ground, and some don't.

Skills kids will use to investigate the ideas:

- Model, observe, and compare how water flows over non-porous surfaces (pavement) and absorbs into porous ones (grass, soil, some fabrics)
- Observe and discuss how a drainage system moves flowing water out of a city or town and how this water loss affects plant and animal survival
- Communicate and summarize new ideas and information about the importance of controlling the flow of water in a city or town, and its effects on animals and plants

How Do You Get Ready?

- Read the activity and gather the materials.
- Print out one copy per kid of the "Where Does Water Go in a City?" handout.
- Scout out a walking route that allows kids to see rain gutters, downspouts, street gutters, storm drains, and (for the hands-on activity) a green space such as your program's yard, a park, or a playground. A green space with a running water source, such as a drinking fountain or hose, is ideal since you can bring empty cups or bottles and fill them on site. If water is not available on site, have kids carry their own full water bottles to the green space.
- Troubleshoot safety concerns (traffic, poison ivy, sharp objects, etc.).
- If you don't plan to show "The Hidden Alligator Mystery" video that is paired with this activity on the website, watch it ahead of time and note key concepts to share with kids during the activity.

pbskids.org/plumlanding/educators

Curriculum Topics

water, water cycle, human impact

Activity Type

outdoor, ideally after or during a rain shower but sunny, cold, and snowy days work too

Group Size

whole group

Activity Time

40–60 minutes

Materials

- Pencils or pens
- Bottles of water (one per kid), or see "How Do You Get Ready?"
- "Where Does Water Go in a City?" handout
- Optional: "Explore Water Around You" handout
- Optional: Video or phone camera
- Optional: "Explorer's Notebook" template

Next Generation Science Standards

Disciplinary Core Ideas

PS2.A: Forces and Motion

ESS2.C: The Roles of Water in Earth's Surface Processes

ESS3.C: Human Impacts on Earth Systems

Science and Engineering Practices

Asking Questions and Defining Problems

Planning and Carrying Out Investigations

Obtaining, Evaluating, and Communicating Information

Analyzing and Interpreting Data

Constructing Explanations and Designing Solutions

Crosscutting Concepts

Patterns

Cause and Effect: Mechanism and Prediction

Scale, Proportion, and Quantity

Energy and Matter: Flows, Cycles, and Conservation

Warm-up (8-10 minutes)

Ready, Set, Go with the Flow!

(Science Skills: Model how paved surfaces block rainwater and soil lets water pass through)

This Red Rover-type game models how water behaves on asphalt or concrete versus grass, sand, and soil.

1. In an open space outdoors, **divide the group into two teams**, the “Raindrops” and the “Ground.”
2. **Position the teams** about 20 yards apart.
3. **The Ground kids stand in a line**, shoulder to shoulder. Explain that they are like a paved surface (e.g., asphalt) with no openings.
4. On your signal, **the Raindrops “fall” by running toward the Ground team**. Each Raindrop tries to pass through “the asphalt” without touching it. Impossible! They have to stop (“puddle”) or divert (“stream” right or left around either end of the line).
5. **Repeat the game**, but this time the Ground kids model grass. They open holes by placing their right arm on the shoulder of the person next to them. The Raindrops can now slip through those spaces.
6. **Discuss:** *How does this game remind you of raindrops falling to the ground?* (On hard, non-porous surfaces such as streets, sidewalks, and parking lots, rain can’t pass through, so it either forms a puddle or streams away. On porous surfaces such as grass or dirt, rain is absorbed through small holes in the ground.)

Activity

Water Watchers (10-15 minutes)

(Science Skills: Observe and compare how water flows over non-porous surfaces and absorbs into porous surfaces)

1. **Gather on a paved surface** (e.g., basketball court, sidewalk) and make sure everyone has a full water bottle.
2. Have each person pick a spot and **pour half their water onto the surface**, paying close attention to where and how the water moves.
3. **Repeat the activity over grass or dirt.**
4. Ask kids to **describe and compare results**. **Ask:** *Any surprises?*
 - (On paved surfaces, water generally stays on the surface unless there’s a crack; it spreads in all directions on a level surface but flows downhill on a tilted surface.)
 - (On grass or dirt, water sinks in, or is absorbed into the ground. If it moves at all, it flows slowly before sinking in.)
5. **Ask:** *Why does grass absorb water but asphalt doesn’t?* (Grassy surfaces have tiny holes in the ground that let water in. Asphalt is solid.)

6. **Have kids look at what they're wearing** and think about which fabrics let water through or keep water out. *How could they prove it?* The easy answer: Try it!

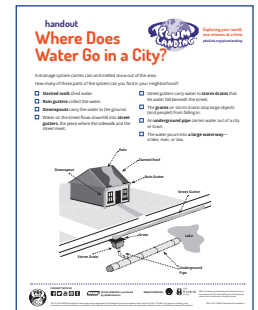
Ask older or more mature kids to describe how they could create a science experiment to determine which fabrics let water through and which don't (e.g., stretching various fabrics over clear cups, pouring half a cup of water onto each swatch, and measuring the water that drips through into the cups).

7. **Ask:** *Does skin let water through?* (Yes! Sweat flows out of your skin.)

Find the Water (20–25 minutes)

(Science Skills: Observe and discuss how a drainage system moves flowing water out of a city or town and how this water loss affects plant and animal survival)

1. **Give kids the “Where Does City Water Go?” handout** and review the path of water from rooftops to beyond city limits.
2. Lead the group on a 15-minute **scavenger hunt around the neighborhood** to find and check off the parts of a drainage system. Can anyone find parts that are not on the list? **Optional:** Have kids take photos of the parts of the system they find to discuss later.
3. **Discuss briefly:** *Why is it important to think about water flow in a city?* (Lots of water collects on paved surfaces when it rains or snows because it can't soak into the ground. This water could cause a flood unless people build structures to take it out of the area. Grass and soil absorb water, keeping it in a city or town and available for animals and plants to use. Plants “drink” the water; animals eat the plants.)
4. **Ask:** *What are some types of surfaces in cities and towns that don't absorb water?* (Streets, sidewalks, stoops, parking lots, roofs, and buildings, etc.) *How much of your neighborhood is paved versus not paved?* (Kids will have general answers like “lots.” Encourage them to explain their responses.)
5. Remind them that a **storm drainage system carries rainwater and melted snow out of a city or town.** (Note: Sewer systems are different; they carry wastewater from kitchens and bathrooms to a water-treatment plant.) *What if there were no storm drains? Or the drains become full or blocked?* (Water would pool or flood streets and sidewalks.)



Wrap-up (5–10 minutes)

(Science Skills: Communicate and summarize new ideas and information about the importance of controlling the flow of water in a city or town, and its effects on animals and plants)

- **Ask kids to share** their favorite part of the activity.
- **Ask:** *How many parts of the drainage system did you find?* If they took pictures, have them share and briefly discuss their pictures. *What part of the system is it? What does it do?*
- **Discuss:** *Why is water loss through drainage a problem in a city or town? Why are parks and other green spaces important?* (Many reasons, such as absorbing rainwater and providing places for plants and animals to grow and be healthy.)

- If you haven't already, **send home the "Explore Water Around You" handout** to provide families with ideas on how to continue investigating water together

Explore Some More

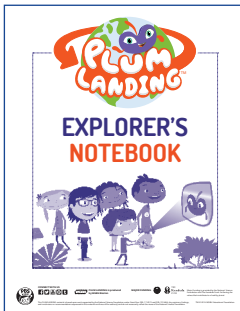
Where Does the Snow Go?

Watch this video in which Plum sings a song about what happens to snow in the city after a storm. Ask kids why the snow can't soak through concrete, and what happens to it instead. (pbskids.plumlanding)

Where Will the Water Go?

Using Google Earth, enter a local address in the search box and then drag the "street view" icon onto the map. Note the elevation readout at the bottom of the screen. Enter other addresses and use the elevation readings to locate high and low points in your area. Ask: *Which spots are most likely to flood?*

Explorer's Notebook



Use the template provided: Have kids draw a simple diagram of a city's drainage system. If they took photos of the parts (optional), they can use them for reference.

Guide them by having them picture a raindrop as it moves from high to low: from the sky, onto a roof, through the gutter, down the downspout, onto the street, along a street gutter, into a storm drain, out of the city or town.



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handout

Where Does Water Go in a City?

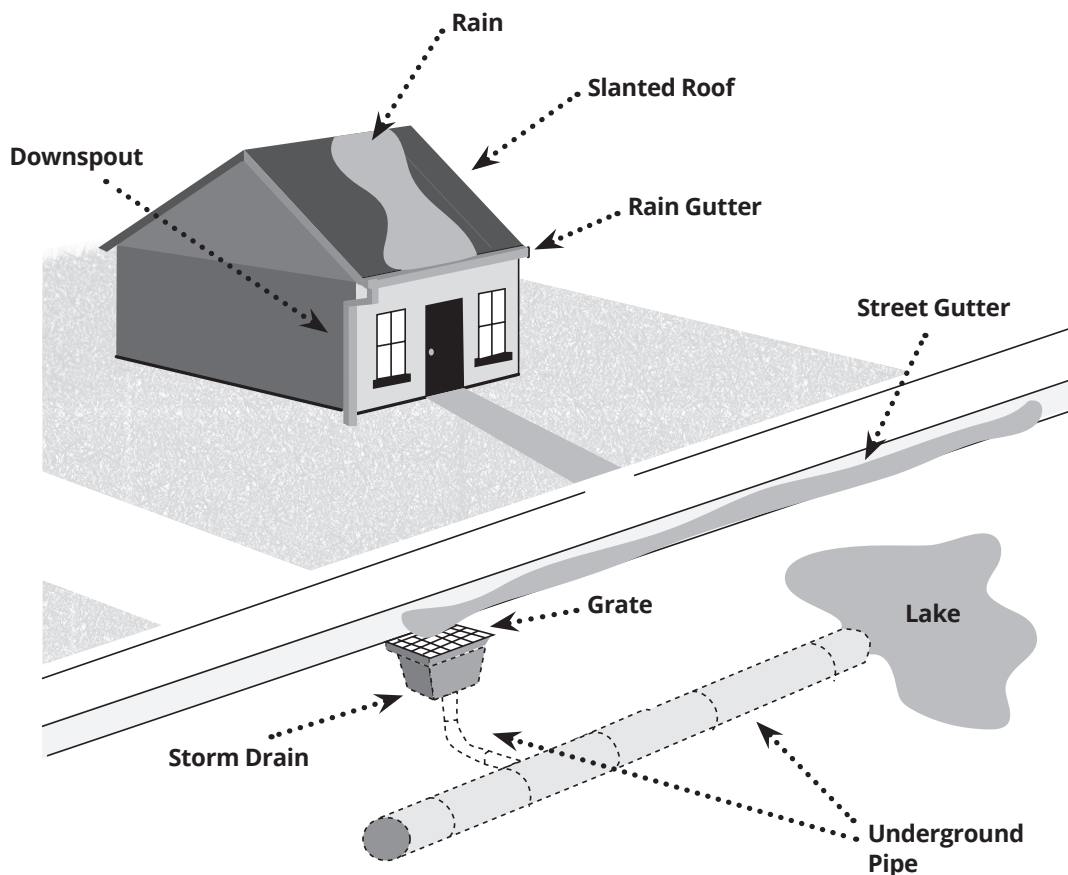


Exploring your world,
one mission at a time
pbskids.org/plumlanding

A drainage system carries rain and melted snow out of the area.

How many of these parts of the system can you find in your neighborhood?

- Slanted roofs** shed water.
- Rain gutters** collect the water.
- Downspouts** carry the water to the ground.
- Water on the street flows downhill into **street gutters**, the place where the sidewalk and the street meet.
- Street gutters carry water to **storm drains** that let water fall beneath the street.
- The **grates** on storm drains stop large objects (and people!) from falling in.
- An **underground pipe** carries water out of a city or town.
- The water pours into a **large waterway**—a lake, river, or sea.



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This PLUM LANDING material is based upon work supported by the National Science Foundation under Grant No. DRL-1516466. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

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hoja para repartir

¿Adónde va el agua en una ciudad?

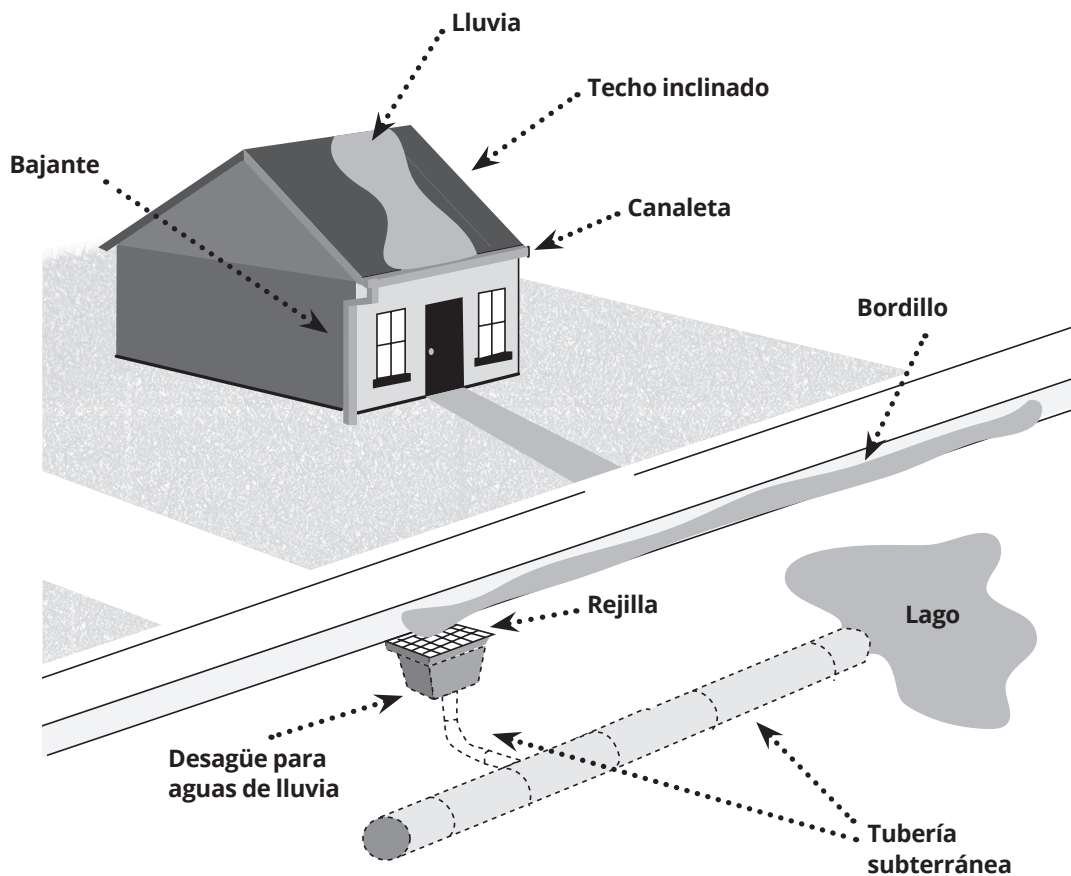


Exploramos tu mundo,
una misión a la vez
pbskids.org/plumlanding

Un sistema de canalización y desagües transporta el agua de lluvia y la nieve derretida para sacarla del área.

¿Cuántas de estas partes del sistema puedes encontrar en tu vecindario?

- Tejados inclinados** que dejan correr el agua.
- Canaletas** que recogen las aguas de lluvia.
- Bajantes** que transportan el agua hasta el suelo.
- El agua en las calles fluye cuesta abajo hacia los **bordillos de las aceras**, o sea el sitio donde se encuentran la acera y la calle.
- Los bordillos de las aceras transportan el agua a los **desagües para aguas de lluvia** que posibilitan que el agua caiga a niveles debajo de la calle.
- Las **rejillas** en los desagües detienen los objetos grandes (inclusive a las personas) para que no caigan en el alcantarillado.
- Tubería subterránea** que se lleva el agua y la saca de la ciudad o pueblo.
- El agua se vierte en una **masa de agua de gran tamaño**: un lago, un río o un mar.



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