



STORMWATER EDUCATION KIT

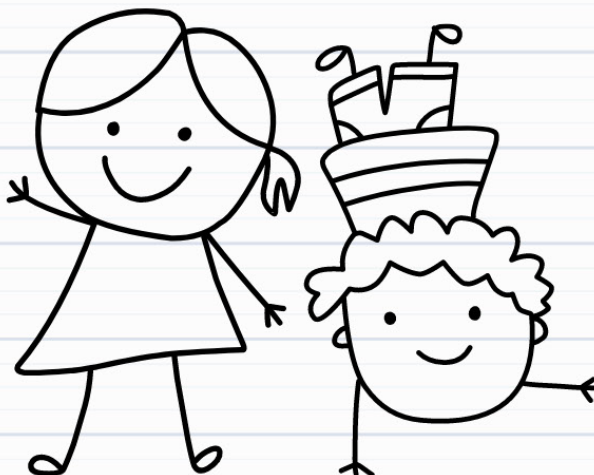


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About the Stormwater Education Kit

The askHRgreen.org Stormwater Education Kit is an educational program designed to help teachers meet SOL requirements while educating third grade students about important local water pollution issues. As you read through the guide, you will see that it incorporates visual aids, fun water-themed reading resources, interactive demonstrations, practical worksheets, and outdoor exploration activities.

This teacher's guide includes suggested resources, educational activities and recommended assignments and also identifies the SOLs met by each section. There is a detailed background to empower you, the teacher, to teach this unit to your students.

The askHRgreen.org Stormwater Education Kit is available for use by third grade teachers throughout Hampton Roads. It was created by askHRgreen.org, a public education and outreach program that encourages environmental stewardship among all residents in southeastern Virginia. askHRgreen.org is funded by the 17 cities and counties of Hampton Roads and administered through the Hampton Roads Planning District Commission (HRPDC).

Download a copy of this teacher's guide and all provided worksheets at www.askHRgreen.org/stormwater-kit.



About askHRgreen.org

Launched in 2011, askHRgreen.org is more than just a robust website; it is an award-winning comprehensive public outreach initiative. The program combines traditional and social media with grassroots outreach efforts to not only educate, but inspire residents of Hampton Roads to make changes that have a positive impact on the environment. By combining local expertise and leveraging economies of scale, the askHRgreen.org program is able to help local jurisdictions fulfill requirements of MS4 stormwater permits, groundwater withdrawal permits, and state consent orders to reduce sanitary sewer overflows. For citizens, it has become a "one-stop shop" to find answers, resources, and inspiration for a cleaner, greener Hampton Roads. From water-wise landscaping ideas and pointers for preventing water pollution to recycling tips and simple ways to prevent sewer overflows, all you have to do is askHRgreen.org.

Financial support for askHRgreen.org is made possible by the following member localities and agencies: the cities of Chesapeake, Franklin, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach and Williamsburg; the counties of Gloucester, Isle of Wight, James City, Southampton, Surry and York; the town of Smithfield and HRSD. Members of locality staff and HRSD comprise four askHRgreen.org committees who meet monthly to develop and implement the regional program.



Teacher Introduction

Whether we mean to or not, we all pollute water. Everyday activities like walking the dog, driving a car, or how we care for our lawn can contribute to big problems in our local rivers and streams. Stormwater runoff is a major source of water pollution today due to the urbanization of our communities. The good news is that we can all do our part to protect water quality. Everyone has a role to play!

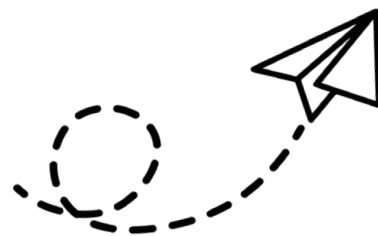
The purpose of the Stormwater Education Kit is to introduce teachers and students to some of the concepts of urban stormwater management and provide resources to be used in the classroom in accordance with current curriculum and appropriate SOLs. Stormwater runoff is created when rain falls onto hardened surfaces like roofs, sidewalks, and roadways. It is also created by melting snow. Because this precipitation cannot soak into hard surfaces, it “runs off” and flows across the ground seeking the lowest point. The stormwater runoff can pond and contribute to flooding or flow to storm drains and ditches designed by local governments to divert runoff away from urbanized areas. It is a common misconception that water entering the storm drain system receives additional treatment to remove pollution before the water drains to waterways. This is false. Anything that enters a storm drain will discharge directly into local waterways without additional treatment.

Uncontrolled stormwater runoff has many cumulative impacts on humans and the environment. It is a problem of both volume and quality. If not properly managed, the volume of stormwater can flood and damage homes and businesses and erode stream channels and shorelines. Stormwater also becomes polluted as it travels across the ground. Common pollutants found in stormwater include pet waste, lawn chemicals, eroded soil (sediment), yard waste, and litter. These pollutants drain into local rivers and streams and damage or destroy fish and wildlife habitat. In Hampton Roads, many of our rivers (and even small streams) drain directly to the Chesapeake Bay making our local water quality a state and national priority.

Pollution in waterways causes several problems. Soil dirt can cloud the water preventing sunlight from reaching underwater plants and causing declines in habitat. An overabundance of yard waste like leaves and grass clippings adds extra nutrients to the water which

fuels the growth of algae blooms. Algae blooms cloud the water and remove oxygen from the aquatic ecosystem resulting in “dead zones” where fish and shellfish cannot thrive. Chemical lawn fertilizers also fuel algal blooms. Litter, especially single use plastics, are a top cause of marine debris and microplastics in our Earth’s oceans. Toxic chemicals can make waterways unsafe for both humans and animals. And bacteria from pet waste and wastewater overflows, can result in beach closures and restrictions on eating locally caught seafood. It can be difficult to connect our on land behaviors with these serious impacts in local waterways.

Today’s youth are the next generation of professionals and decisionmakers who will wrestle with the difficult balance of urbanized communities and natural resources. Perhaps there is a budding environmental scientist in your classroom who will help engineer solutions for the future. But as a citizen of the community, we all have a roll to play no matter our occupation. Stormwater impacts city leaders who manage stormwater systems and the construction foreman who must control erosion at a construction site. It impacts small business owners who must get permits for stormwater discharges and even firefighters responding to hazardous chemical spills. Stormwater touches each of these industries and each of us personally as we enjoy the natural beauty Hampton Roads has to offer. Whether it’s swimming in the Chesapeake Bay or fishing in the James River, what we do on land has a direct impact on the health of our waterways. Together we can be good citizens by being good stewards of our local waterways. We hope these activities will inspire your teaching staff and students alike to adopt a stewardship mindset for years to come.



Virginia SOLs & Learning Objectives

The following SOLs can be addressed using the recommended activities in this kit:

English

- The student will use effective communication skills in group activities. (English 3.1)
- The student will present brief oral reports using visual media. (English 3.2)
- The student will read and demonstrate comprehension of fictional text. (English 3.5)
- The student will continue to read and demonstrate comprehension of nonfiction texts. (English 3.6)
- The student will write for a variety of purposes. (English 3.9)
- The student will edit writing for correct grammar, capitalization, punctuation, and spelling. (English 3.10)
- The student will write a short report. (English 3.11)

Science

- The student will demonstrate an understanding of scientific and engineering practices by a) asking questions and defining problems, b) planning and carrying out investigations, and c) interpreting, analyzing, and evaluating data. (Science 3.1)
- The student will investigate and understand how materials interact with water. (Science 3.3)
- The student will investigate and understand that adaptations allow organisms to satisfy life needs and respond to the environment. (Science 3.4)
- The student will investigate and understand that aquatic and terrestrial ecosystems support a diversity of organisms. (Science 3.5)
- The student will investigate and understand that soil is important in ecosystems. (Science 3.6)
- The student will investigate and understand that there is a water cycle and water is important to life on Earth. (Science 3.7)
- The student will investigate and understand that natural events and humans influence ecosystems. (Science 3.8)

History

- The student will explain the responsibilities of a good citizen, with emphasis on c) describing actions that can improve the school and community. (History 3.11)
- The student will recognize the importance of government in the community, Virginia, and the United States of America by a) explaining the purpose of laws; b) explaining that the basic purposes of government are to make laws, carry out laws, and decide if laws have been broken; and c) explaining that government protects the rights and property of individuals. (History 3.12)

Math

- The student will b) round whole numbers, 9,999 or less, to the nearest ten, hundred, and thousand; and c) compare and order whole numbers, each 9,999 or less. (Math 3.1)
- The student will a) estimate and determine the sum or difference of two whole numbers; and b) create and solve single-step and multistep practical problems involving sums or differences of two whole numbers, each 9,999 or less. (Math 3.3)
- The student will estimate and use U.S. Customary and metric units to measure a) length to the nearest 1/2 inch, inch, foot, yard, centimeter, and meter. (Math 3.7)
- The student will a) collect, organize, and represent data in pictographs or bar graphs; and b) read and interpret data represented in pictographs and bar graphs. Math (3.15)

Additional Resources

Using the resources and activities in this kit, students will learn:

- Stormwater is caused by precipitation (rainwater and snowmelt).
- When it rains, the rainwater flows across land and into storm drains and ditches which drain directly to local waterways without any additional treatment.
- Human activities and behaviors contribute to polluting stormwater.
- Polluted stormwater causes harm to local ecosystems and habitats.
- Hampton Roads is surrounded by water and is made up of different watersheds.
- Simple changes in the way we all do things can help improve local water quality.
- Solutions for reducing the quantity of and improving the quality of stormwater runoff.

Additional Resources

[Elementary School Green Learning Guide](#) – Travel through the different landscapes of Hampton Roads to discover the importance of our region’s natural resources and how we can all make a difference in protecting them. Written to meet third-grade SOLs but plenty of fun for all elementary-aged students. Download the [Third-Grade Teacher’s Guide](#) for more engaging resources, hands-on activities, and fun science experiments.

[Environmental Education Mini Grants](#) – Feeling inspired? askHRgreen.org provides grants of up to \$500 for environmental education projects involving K-12 youth in Hampton Roads. Water quality-related projects include outdoor classrooms, installing rain barrels, planting native plants, and much more! Applications are accepted year-round on a rolling basis as long as funding is available.

[Request an EnviroScape](#) – askHRgreen.org has two EnviroScape watershed models available for free rental. This interactive activity is perfect for use in your classroom or during community engagement events and school assemblies. The models illustrate residential, recreational, agricultural, industrial and transportation areas — and their potential impacts on water pollution. Children and adults see firsthand how their actions and those of others may affect our water quality and how best management practices can reduce negative outcomes.

[GreenBeats](#) is a WHRO-produced series of animated shorts that focuses on critical environmental issues and themes. The 10-part series promotes environmental education and stewardship and is targeted toward children grades 3 through 5. Relevant topics include Foam Free (produced in partnership with askHRgreen.org), Scoop the Poop, and Greenbeat on My Street.

[Green Classroom Pledge](#) - Hampton Roads teachers can bring additional value to students education by implementing green processes into your classroom and school. This pledge can remind your students of a few easy ways to make their classroom easier on the environment.

[Fundraiser Car Wash Kits](#) - For many clubs and teams, car washing is a fundraising ritual. However, most people don’t realize dirty wash water and cleaning chemicals can harm local waterways. Your school can check out a Fundraiser Car Wash Kit to make sure your next car wash is easy on our waterways.

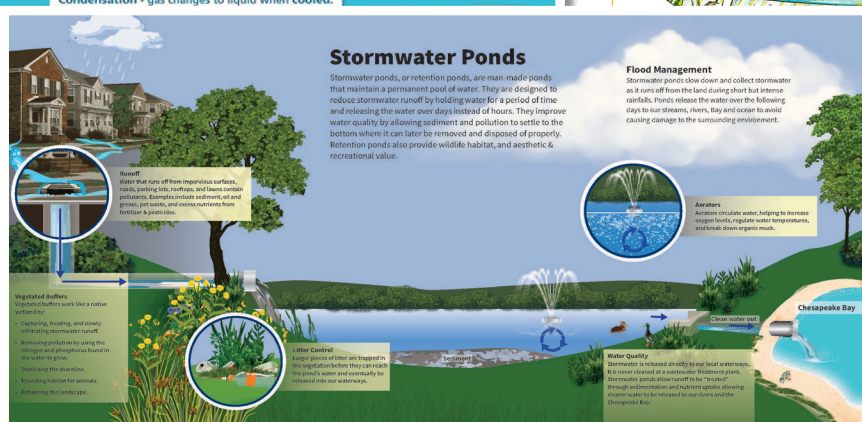
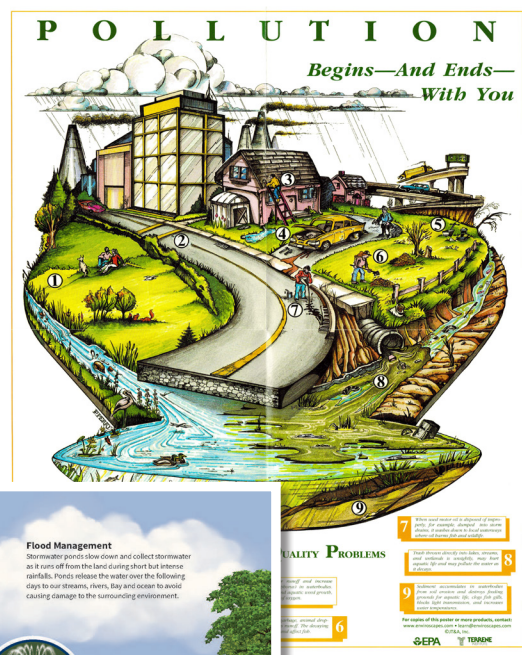
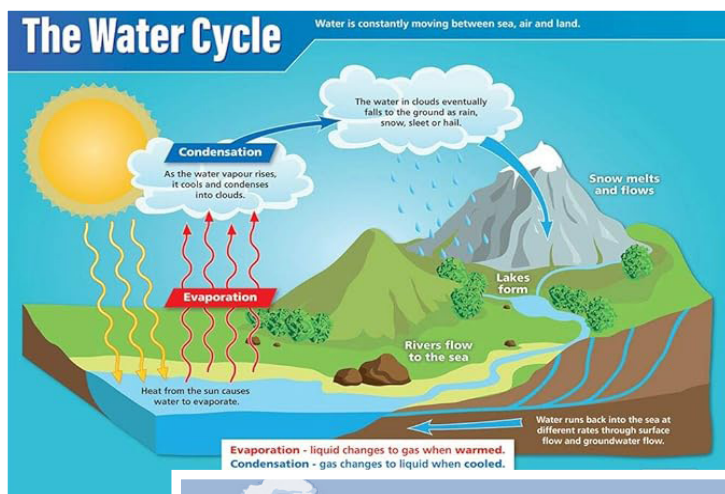
Visual Aids

SOLS: Science 3.7, 3.8 | Civics 3.11, 3.12

Objective: Students will review the water cycle, examples of stormwater pollution, and how local governments use stormwater ponds to manage stormwater runoff.

Posters included with kit:

1. The Water Cycle – students will identify and understand the steps of the water cycle including evaporation, condensation, precipitation, runoff, and groundwater.
2. Urban stormwater system – students will investigate how human activity affects the quality of air, water, and habitats and how good citizens can make choices to protect natural resources.
3. Understanding stormwater ponds – students will investigate how communities use stormwater ponds to collect and manage stormwater runoff to reduce flooding and prevent water pollution.



Green Readers Travelling Library

SOLS: English 3.1, 3.5, 3.6, 3.9, 3.10, 3.11 | Science 3.5, 3.7, 3.8 | Civics 3.11, 3.12

Objective: Students will read a diverse selection of fiction and nonfiction books on water. These books can be used in a variety of ways to address reading and science SOLs.

Activity Guide

Assignment #1: Assign provided books to small groups of students for group reading. Have the group work together to create a book report presentation for the class. Use the optional worksheet provided. May also be done in a read-aloud format.

Assignment #2: Have students write an original narrative inspired by one of the provided books that outlines what they learned about the water cycle, aquatic systems, and the role humans play in protecting the local environment from pollution.



Books provided in this kit:

Making a Difference: An Inspirational Book About Kids Changing the World – Stacy Bauer

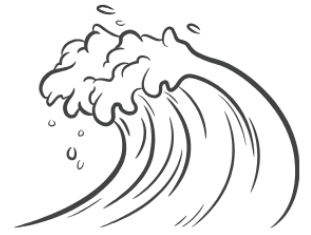
Awesome Chesapeake – David Owen Bell

Sadiq and the Clean Water Crew – Siman Nuurali

National Geographic Readers: Water – Melissa Stewart

The Day the River Caught Fire – Barry Wittenstein

Name _____



Green Readers Book Report

1. Book title:
2. Is the book fiction or nonfiction?
3. What was the setting of the book?
4. Who were some of the characters in the book?
5. What was the author's purpose in writing the book?
6. Was there a problem in the book? If so, what was the solution?
7. Explain one new concept you learned about water quality or aquatic ecosystems.
8. What is one thing you or your school could do to help prevent water pollution?

Fred the Fish Activity

SOLS: English 3.1| Science 3.3, 3.4, 3.5, 3.6, 3.7, 3.8 | Civics 3.11

Objective: Students will learn what stormwater runoff is, the common sources of stormwater pollution, and how polluted runoff harms local aquatic ecosystems.

Activity Guide

Instructions: Use the provided materials and the teacher prompt to walk your students through the Fred the Fish activity. You will introduce the topics of stormwater runoff and aquatic life then discuss the common pollution sources from human activity and the role government plays in protecting natural resources.

Provided materials:

Aquarium with storm drain photo
Fred the Fish sponge with fishing line
Story guide with pictures
Soapy water (car wash water)
Mini chocolate chips (dog poop)
Green food coloring (fertilizer)

Syrup (engine oil)
Table salt (road salt)
Confetti sprinkles (litter)
Brown sugar (sediment from construction site)
Red food coloring (hazardous waste)

Activity Instructions

1. Use the provided aquarium as Fred's river. Fill with water and secure the lid.
2. Place Fred in the tank so he is suspended in the water like he is swimming.
3. Secure Fred by attaching the wood stick to the top of the aquarium with a small piece of tape.
4. Place the storm drain photo on top of the aquarium lid and secure with magnets. You may also add tape for additional support.
5. Use the reading prompt and story guide pictures to walk through the journey of Fred the Fish from the mountains to the Chesapeake Bay. Add a small amount of "pollution" to the terrarium with each part of the story. **None of the pollutants supplied should be considered safe to eat. Please keep supplies out of reach of students and do not allow them to be eaten.**
6. When finished, empty the aquarium water into a sink or toilet and place any remaining solids in the trash. Rinse Fred and the aquarium with clean water and air dry.
7. Once dry, return all supplies to the kit.



Fred the Fish Teacher Prompt

Introduce the topic of stormwater runoff:

Stormwater is water produced by rainstorms or snowmelt. When rain falls and runs through our neighborhoods it washes anything it picks up from streets, parking lots and lawns and carries it into storm drains. (*Show storm drain picture*) This is called stormwater runoff. The water then goes through pipes maintained by local governments to carry the runoff away from our homes and businesses and out to local waterways.

Optional: Review the steps of the water cycle on the provided poster. Ask students to identify where in the cycle stormwater runoff would occur. Review the urban stormwater and stormwater pond posters. Ask students to compare and contrast the impact of human activity on stormwater runoff and how local governments are working to prevent stormwater pollution.

Introduce Fred the Fish:

Fred is a fish. How does a fish breathe? (*Show gill picture*) Anything in the water will go into Fred's mouth and through his body. Fred has lived in one stretch of beautiful river up in the mountains his whole life, but it is now time for him to migrate downstream to the Chesapeake Bay.

Steps to Fred's Journey:

1. As Fred begins his journey he swims past a large construction site. They have ripped up all the trees, plants and grass to build a new mall. There is a lot of loose soil now. During a rainstorm some of the soil washes away.

2. It flows into the street, and down the what? (*storm drain*) where it flows with the water downhill through the pipes and right out into where? Fred's river. (Add brown sugar - sediment - to Fred's tank) **HOW IS FRED?**

3. Fred nears a suburban housing development. Some people in the neighborhood had put fertilizer on their lawns to keep it green and in their gardens to help their vegetables grow nice and big. A little fertilizer is ok, but these people used way too much. *Briefly discuss how soil and nutrients are necessary for plant growth.*

4. So, when it started to rain all that extra fertilizer ran off their lawn, into the street and down the what? (*storm drain*) That fertilizer then flows through the pipes and into?? Fred's river. (Add two drops of green food coloring - fertilizer - to Fred's tank)

5. Something else the fertilizer can do once in the river is cause algae (a type of plant) to grow very fast and thick. Do you think this changed the river? Yes. (*Show algae covered river picture*) You can see how it changed.

6. Eventually the river couldn't give all that algae the nutrients they needed to live, so the plants died and started to decay. This used up some of Fred's oxygen. **HOW IS FRED?**

7. Fred swims by a highway. Some people didn't take very good care of their cars and are leaking oil. When it rains, the rain washes the oil off the street, into the? (*storm drain*) which carries it straight to? (*Fred's river*) (Add syrup - motor oil- to Fred's tank) **HOW IS FRED?**

Fred the Fish Teacher Prompt

8. As Fred is swimming it gets very cold one day and what happens to rain when it is really cold? It freezes and becomes snow! Is snow and ice safe for us to drive on? No, so there are trucks from the city or county that spread salt on the road to melt the ice, prevent accidents, and keep us safe. *(Show sample of road salt)*

9. When all that ice melts, it runs off the road, into the? *(storm drain)* and then all that salty, slush flows down through the pipes where? Straight to Fred's river! *(Add salt to Fred's tank)* **HOW IS FRED?**

10. Fred must keep swimming. He swims past a park where some people were having a picnic and what did they forget to do? *(They didn't throw their trash in the garbage can.)* The wind blows and what happens to the litter? *(It blows into Fred's river)* *(Add sprinkles - litter/trash - to Fred's tank)* What should they have done with this trash? *Briefly observe and discuss how solids and liquids mix with water in different ways.* **HOW IS FRED?**

11. As Fred nears another neighborhood, he sees soap bubbles floating in the water. Someone in the neighborhood is washing their car on the street. The soapy water is running right into what? Which goes where? Right into Fred's river! *(Add soapy water to Fred's tank)* **HOW IS FRED?**

12. Up ahead, a stream joins the river. Fred wants to swim fast through this stretch because he knows that the stream runs along a trail where people walk their dogs and let them poop everywhere!

13. When it rains, the rain washes the poop off the path, into the? *(storm drain)* and which goes where? Fred's river. *(Add chocolate chips - pet waste - to Fred's tank)* *Discuss responsible pet ownership as part of being a good citizen and the proper way to clean up after your pets (scoop it, bag it, trash it – even in your own backyard).* **HOW IS FRED?**

14. Finally, Fred swims past a trash pile where people have dumped everything from soda bottles to old electronics. Much of the trash is bad stuff from our houses like toxic chemicals kept under our sinks that you should never touch. Most of it should have gone to a special dump operated by the city or county that collects hazardous waste, but people made the wrong disposal choice.

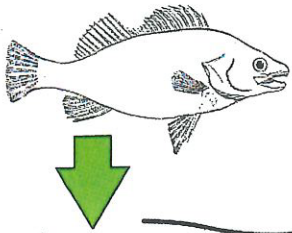
15. When it rains all the toxic chemicals flow down the what? Where it flows through the pipes and right out into where? Fred's river. *(Put three drops of red food coloring - toxic waste - into Fred's tank)* **HOW IS FRED?**

Conclusion:

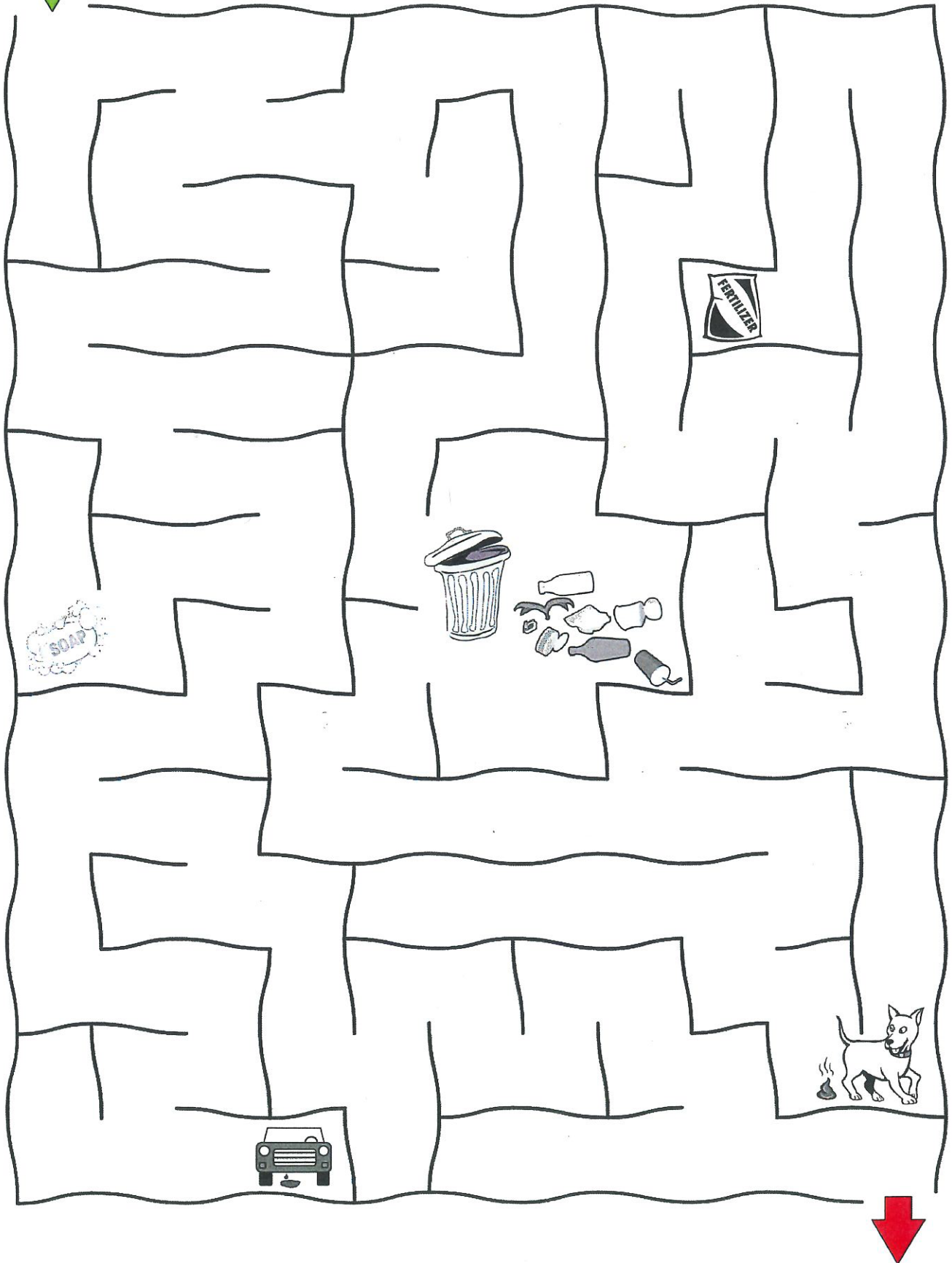
Fred had a tough journey to the Chesapeake Bay. What can we do to help the river, Fred and all his friends who live there? Review the sources of pollution. Discuss the role of government in managing water pollution. Discuss how individual choices we make every day can either contribute to or help prevent stormwater runoff.



Our slogan is "only rain down the storm drain." Can you remember that when you are outside? You can even teach it to all your family and friends so that they can help our environment and our friends like Fred.



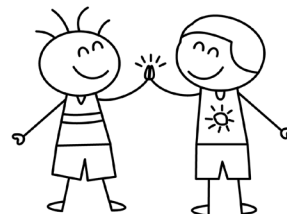
Help Fred Get to the Bay and Avoid the Pollution



Schoolyard Exploration

SOLS: Math 3.1, 3.3, 3.7, 3.15 | English 3.2, 3.9 | Civics 3.11 | Science 3.1, 3.7, 3.8

Objectives: Connect students with the nature surrounding their school building. Grow understanding of how their school community impacts the environment on their campus and beyond. Identify areas for environmental stewardship and future sustainability projects. Get kids outdoors and exploring nature!



Kit Supplies: clipboards, binoculars, magnifying glasses, rain gauge

Activity Guide

During a schoolyard exploration, students get to know the environment surrounding their school building. For some in Hampton Roads, that could be next to a major waterway or highway. It could be tucked into a farm field or nestled between tall office buildings. While the schoolyards in Hampton Roads are diverse, all students can benefit from time spent outdoors, engaging with nature, and learning how to be good stewards of natural resources.

Activity #1: Exploring Precipitation

Place a rain gauge (provided in your kit) in an open area of the schoolyard where it's unlikely to be disturbed. Notify any relevant staff members about the experiment. Check the gauge daily/weekly depending on student schedules and track measurements on the tracking rainfall worksheet. Use the measurements for other math exercises and to discuss precipitation as part of the water cycle. Examples: record measurements in decimals/fractions/whole numbers, round to the nearest inch of rain, add/subtract daily/weekly totals, etc.

Activity #2: Get a SENSE of your schoolyard

After completing the schoolyard exploration (or on a separate occasion as time allows), give students 10-15 minutes to explore the schoolyard with their senses. Return to the classroom and ask the students to write a descriptive narrative of their observations. What did they see, hear, feel, and smell?

Activity #3: Schoolyard Cleanup

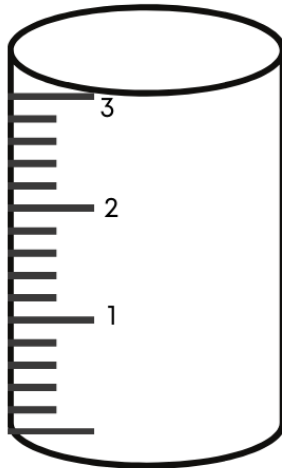
As you conducted your schoolyard exploration, did your students find litter? If they did, empower students to take action with a schoolyard cleanup. Free cleanup resources including safety vests, litter grabbers, buckets, and trash bags are available upon request from any city or county. You can schedule routine cleanups to "adopt" your schoolyard or offer it as a one-time experience during the environmental learning unit. For more information about requesting supplies, visit the [askHRgreen.org Team Up 2 Clean Up program](https://askHRgreen.org).

Name _____

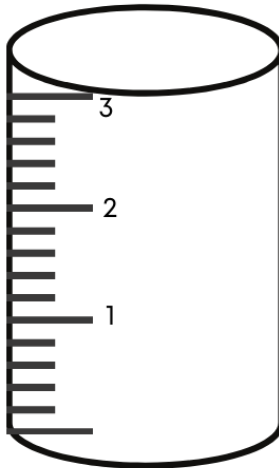
Tracking Rainfall Worksheet



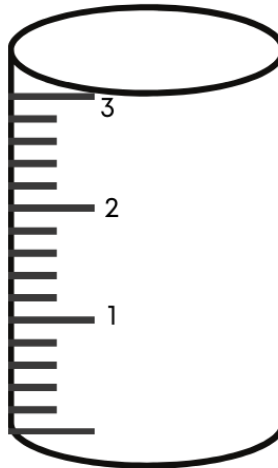
Instructions: Color in the inches of rain observed for each day.



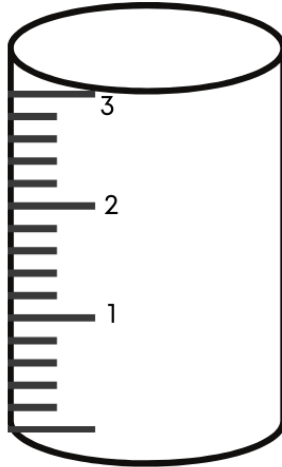
Monday



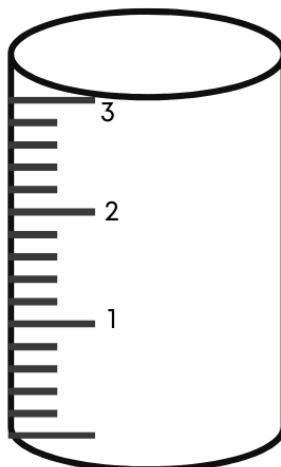
Tuesday



Wednesday



Thursday



Friday

1. Which day had the greatest amount of rainfall?
2. Which day had the least amount of rainfall?
3. What was the total amount of rainfall for the week?

Activity #4: Schoolyard Exploration

- Scan the QR code (or [click this link](#)) and use the map to find your watershed.
- Review the list of questions on the Schoolyard Audit form with the class. Ask students to be on the lookout for answers to these questions while outside in the schoolyard.
- Divide the class into groups of 3-5 students. Distribute provided supplies from the kit for each group of students to share (clipboards, magnifying glasses, binoculars). Encourage students to look UP with their binoculars and DOWN with their magnifying glasses. Students may take note of wildlife, habitat, insects, soil composition, plants/trees, etc.
- Allow students to spend 10-15 minutes of free time exploring a safe section of your schoolyard. Follow this with 10-15 minutes of guided instruction pointing out things like stormwater ponds, storm drains, any rain barrels or cisterns for collecting rainwater, trash receptacles, gardens, wildlife habitat, etc. Don't forget to read the rain gauge!
- Take students back to the classroom (or move to an outdoor learning space if you have one) and ask each group to discuss and answer the form questions.
- Once students have completed their form, ask each group to present their findings and ideas.



Name _____

Schoolyard Exploration



Stormwater Runoff & Erosion

1. Locate your school's downspouts. Where do they drain?
 - a. Rocks, vegetation, or mulch
 - b. On pavement or eroding ground
 - c. On ground near a waterway without a buffer
 - d. Other:
2. Walkways are covered with:
 - a. Pervious surfaces like grass, rock, or mulch
 - b. Impervious surfaces like pavement
 - c. Bare soil
3. Look for patches of bare soil and signs of erosion where rainwater has carved out small ditches or soil has splashed onto windows or walls. Our schoolyard has:
 - a. Very little erosion and bare patches
 - b. Several areas of erosion
 - c. Large bare patches and areas of erosion
4. Does your school have a stormwater pond? If so, describe it. For example, is the water high or low? Do you see wildlife around it? Is there algae or foul odors?
5. How many storm drains do you see? _____
 - a. Are they labeled to say "drains go to waterways"? _____

Vegetation

1. How much of the schoolyard is regularly mowed?
 - a. Less than 50%
 - b. 50-80%
 - c. Over 80%
2. The areas around storm drains and ditches are mostly:
 - a. Covered with trees and native plants
 - b. Covered with unmowed grass
 - c. Covered with mowed grass/leaves
 - d. Covered with bare soil or pavement
3. Estimate how many trees and bushes are in your schoolyard:
 - a. Many trees and bushes
 - b. Some trees and bushes
 - c. Very few or no trees and bushes

Sustainability

1. How much litter do you see in the schoolyard?

- a. None
- b. Some
- c. A lot

2. Does your schoolyard have trash cans or recycling bins?

- a. None
- b. Some
- c. A lot

3. Does your school have:

- a. Bike racks: _____
- b. Public bus stop: _____
- c. School buses: _____
- d. Individual cars: _____

4. Discuss the different ways your group gets to and from school each day (Ride bike, walk, parent pickup/drop off, carpooling, school bus)

Discussion: Let's Go Green!

1. In what watershed is your school located? Does it drain to the Chesapeake Bay?

2. What human activities in your schoolyard negatively affect the quality of water and habitats?

3. What evidence did you collect that supports your claim?

4. What could your school do (if anything) to address the issue?

5. Is there anything YOU could do to address the issue yourself? If so, what?

Soil Shake Up

SOLS: Science 3.3, 3.6

Objectives: Students will learn about the soil beneath their feet including the different types of soil and how it can become a source of water pollution. Erosion occurs when rain, stormwater runoff, or other sources of moving water loosen soil and carry it away. Soil can become a source of water pollution by clouding the water, preventing sunlight from reaching underwater vegetation, degrading the habitat and disrupting the food chain. Soil can also carry contaminants into waterways. Covering soil with grass and plants helps secure it and prevent erosion.

Kit Supplies: 32 ounce jar, hand shovel

Activity Guide

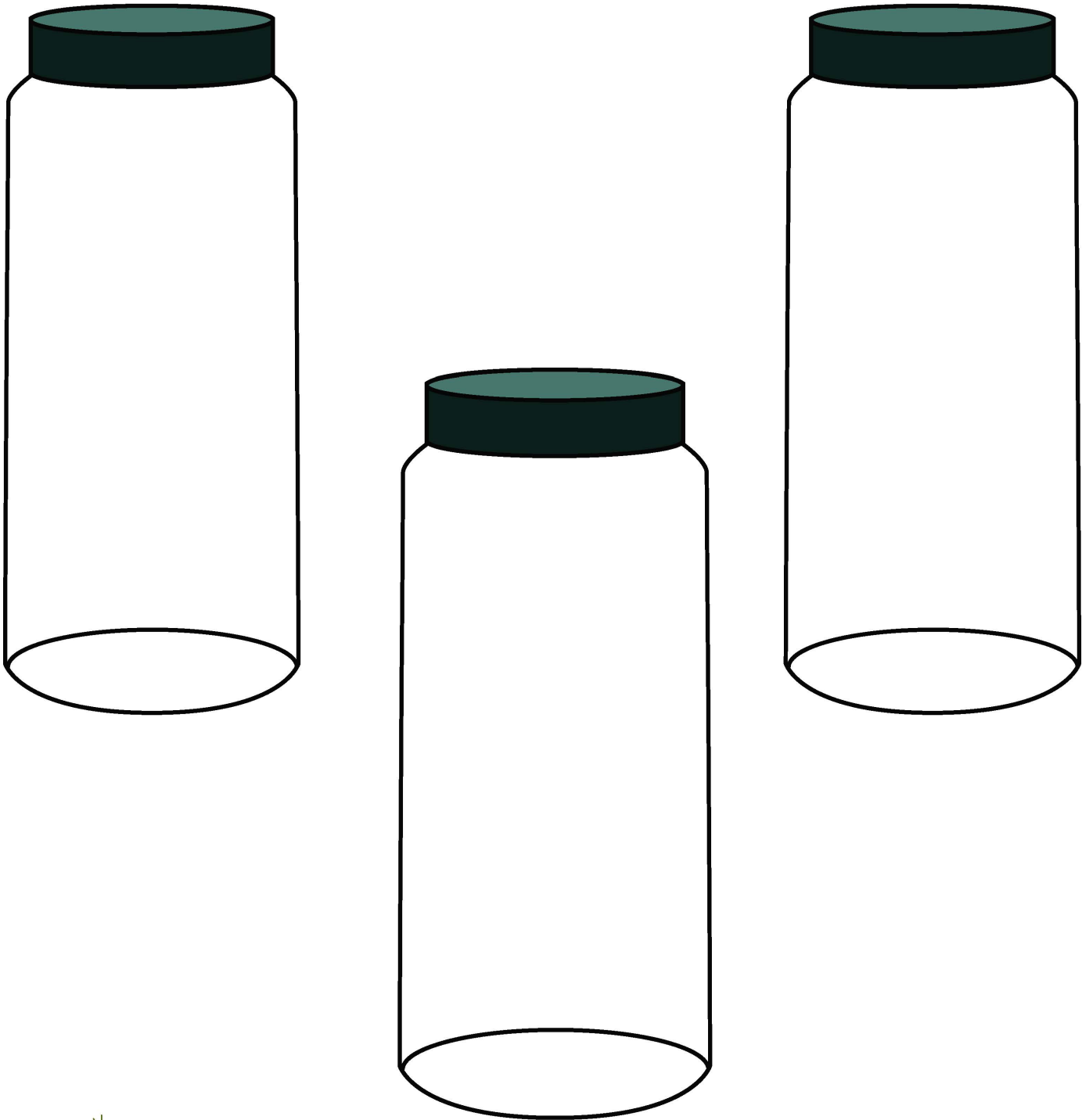
1. Use the hand shovel to dig down 6 inches into the ground.
2. Fill jar half full with dirt.
3. Fill the rest of the jar with water and secure lid tightly.
4. Shake jar for several minutes.
5. Set the jar down and observe the soil particles as they settle.
 - Have students observe how the soil mixes with the water.
 - Have students discuss how the dirty water differs from clean water and how that might impact ecosystems and aquatic organisms.
6. Sand will settle first on the bottom of the jar. Mark the top of this layer with a piece of tape.
7. Wait one hour. Return to the jar and look for the layer of smaller particles on top of the sand. Mark the top of the layer as silt.
8. Wait one day and return to the jar. Observe that the water should now be clear. Look for a layer of the smallest clay particles which should have settled on top of the silt. Mark the top of this layer.
9. Discuss the composition of the soil sample. Rank layers from least to greatest.
10. This experiment can be repeated with soil samples from different areas to illustrate that different areas have different soil composition.



Soil is important to organisms in an ecosystem. It provides support and nutrients to plants which in turn support a diverse array of insects, reptiles, and mammals.

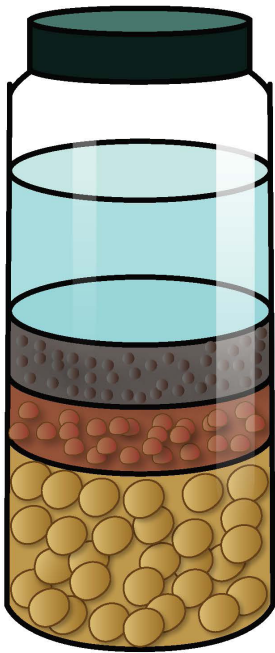
Soil Shake Up

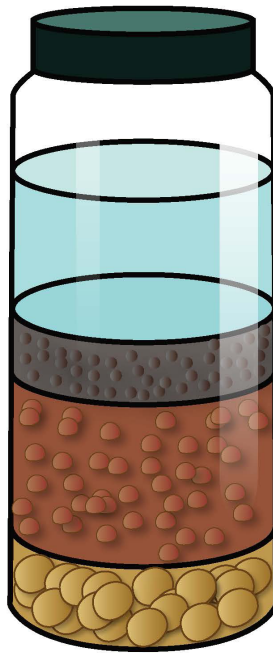
Here are some empty jars to draw your own soil layers.

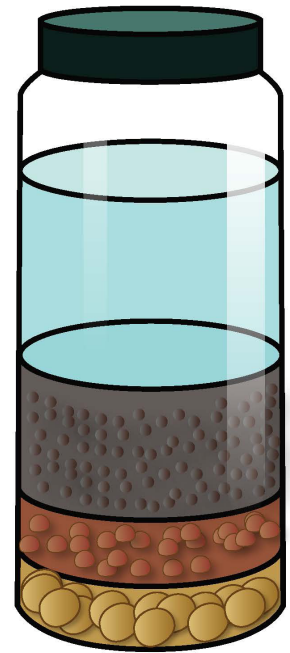


Soil Shake Up

Look at the three sample results below. For each jar, record whether the soil contains mostly **clay**, **silt**, or **sand**.







Loam

The best soil for growing is loam. It has equal parts clay, silt, and sand. Draw what the results of the shake test will look like if your soil is loamy.

