

Down the Drain

Grade Levels: 3-8

Duration: 90 min

Design a robust learning experience by selecting resources from this guide that fit the needs of your students. Reinforce learning before, after, and even during your visit by diving deeper into some of the science and engineering concepts.



Table of Contents	Page
Vocabulary	2
Related Texts	3
Exhibit Connections	3
Lab-Related Activities	4
Writing Prompts	5
Standards Connections	5

When to implement

The following icons indicate when resources should be implemented for the greatest benefit to your students' experience in the lab.

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Concepts/Skills

Gravity, watershed, pollution, cause and effect, importance of water, engineering design process

Objectives

Students will:

- Describe a watershed and explain the importance of keeping trash out of the watershed.
- Design and build a storm drain prototype to combat pollution from a specific source.

Vocabulary

These are words and concepts that we will discuss in the lab. Your students' experience will be enhanced if they are familiar with these terms prior to your visit. If you need inspiration for vocabulary activities, please see our Vocabulary Choice Board activity.

Term	Definition
Budget	The amount of money reserved to spend on materials to complete a project.
Filter	Something that separates solids from liquids, eliminates impurities, or allows only certain things to pass through.
Flooding	The covering or submerging of normally dry land with a large amount of water.
Gravity	A force that pulls objects toward the center of the Earth.
Hypothesis	An educated guess as to what will happen in an experiment.
Landfill	A system of garbage and trash disposal in which waste is buried between layers of earth.
Natural resource	Something that is not created by humans that is usually a finite material like clean water or forests.
Pollution	A substance or thing whose presence, when it enters an environment, has a harmful effect.
Precipitation	Water released from clouds in the form of rain, freezing rain, sleet, snow, or hail; an important part of the water cycle delivering atmospheric water to the Earth.
Recreational area	An area used by people for fun leisure activities, such as camping, hiking, horse riding, dog walking, swimming, boating, or cycling. Usually a national or state park or beach.
Run-Off	Precipitation that did not evaporate or get absorbed into the soil and therefore collects uncontrolled on the ground surface in areas such as rivers, streams, drains or sewers. Run-off can collect things in its path, such as pollution, trash, vegetation, pebbles, and deposit them when the water slows down.
Saturation	The state or process that occurs when no more of something can be absorbed, combined with, or added.
Storm drain	A device that allows water to flow away from human developments and back into the watershed to prevent flooding of human communities.
Sustainability	To keep something at a certain level. For example, minimizing the use of a natural resource so it can be kept or conserved to be used in the future.
Topography	Physical features and shape of an area of land. These features typically include natural formations such as mountains, rivers, lakes, and valleys as well as human-made features such as roads, dams and cities.
Watershed	The highest point where water can start to the lowest point where it collects. For example, from a mountain top to a lake or ocean.
Advanced Vocabulary	These terms may come up in your lab depending on time constraints:
Biological accumulation	The build-up of toxic substances within living organisms from the environment.
Interdependence	Two things or organisms that are reliant on one another. Often seen in larger systems like the carbon or nitrogen cycles.
Harmful algal bloom	Rapid increase of algae in freshwater that can lead to the death of fish or to water becoming dangerous to humans in the area.

Related Texts

The following titles may provide students with a greater contextual understanding of the field of environmental science and engineering and give additional opportunities to incorporate science and engineering into Language Arts lessons. We are not endorsing the following authors but feel that the information presented in these texts may benefit your students and enhance their learning experience.

Age Range	Title and author	Text Type	Description
Grades 3-7	“One Well: The Story of Water on Earth” (CitizenKid) by Rochelle Strauss.	Reference	Explains where water comes from, how it is a finite resource and how students can help conserve water.
Grades 4-8	“Plastic, Ahoy!: Investigating the Great Pacific Garbage Patch” by Patricia Newman.	Reference	A nonfiction book that details a research scientist’s work in studying the impact of the Great Pacific Garbage Patch on sea life.
Grades 7 and up	“Going Blue: A Teen Guide to Saving Our Oceans, Lakes, Rivers, & Wetlands” by Cathryn Berger Kaye M.A.	Reference	This book provides information on waterways with concepts of service learning to help students be informed and take action to protect this natural resource.

Exhibit Connections

Make connections between learning from the lab and exhibits and programs found in The Tech Interactive’s galleries.



Solve for Earth

(Lower Level)

Solve for Earth creates a space where we can discuss as a community how to live sustainably and reduce the impacts of climate change. Solve for Earth looks at the whole picture: where we live, what we eat, how we move and more. Through this exhibition, we hope to inspire positive action at a community level.

The H₂O Show

In The H₂O Show quiz, students can compete to gain points based on their water knowledge and walk away with an ocean of water knowledge — and bragging rights!

Sea Level Rise and Sea Level Rise Future Solutions

An in-depth look at future sea level rise and how it will impact different areas around the world. Then move to the interactive Future Solutions exhibit area, where students can imagine and draw ways to help protect areas from sea level rise.



Lab-Related Activities



The following activities can be implemented either before or after the lab and are meant to bridge the learning from the lab to the classroom.

Activity	Description	Time
Connecting with Climate 	Students will explore how to problem-solve when approaching large-scale, multidimensional issues like climate change.	90 minutes
Drain or Dispose? 	Review these tips for what can and cannot go down the drain. Play a quick game: Pick something on the list. Should you drain or dispose?	15 + minutes
Irrigation Situation 	Students will use the design process to create a hillside garden irrigation system that maximizes water efficiency.	90-150 minutes
#PlanetProtector 	Students work together to create a Public Service Announcement (PSA) which educates others about protecting our planet.	120 minutes



Looking for other hands-on activities and resources to use in your classroom? Check out our [education resources](#) page!



Visit thetech.org/fieldtrips for more information on field trip offerings, booking information, and more!



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Writing Prompts

The following writing prompts and questions are just a few examples of journal topics you can use to incorporate writing into your students' lab experience. These prompts can be used in conjunction with any classroom writing journal.

Pre-visit prompts

- We will be attending the Down the Drain lab at The Tech Interactive; what are you most looking forward to in this lab? Why?
- A new student at your school has never heard the word “watershed” before. Explain to your classmate what a watershed is and why protecting water in them is important.
- Imagine an animal that lives near your home. Which one is it and where does it live? How do you think pollution would impact its life?

Post-visit prompts

- The principal is very excited to hear about your lab experience! Explain what you did and learned about in the lab since they were unable to attend the lab.
- You and your team created an amazing storm drain. If your storm drain prototype was made into an actual storm drain, what materials would it be made out of? Why?
- Write a story describing the adventure of a raindrop traveling from a hilltop out to the Pacific Ocean through your storm drain.

Next Generation Science Standards

Down the Drain supports the following NGSS

Grades	Engineering Design	Earth & Space Sciences	Disciplinary Core Ideas	Crosscutting Concepts	Science and Engineering Practices
Grade 3	3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	3-ESS-3-1	ETS1.A ETS1.B ETS1.C	Influence of Engineering, Technology, and Science on Society and the Natural World	1, 2, 3, 6, 7, 8
Grade 4	3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3		ETS1.A ETS1.B ETS1.C	Influence of Engineering, Technology, and Science on Society and the Natural World	1, 2, 3, 6, 7, 8
Grade 5	3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	5-ESS3-1	ESS2.A ESS2.C ESS3.C	Systems and System Models Influence of Engineering, Technology, and Science on Society and the Natural World	1, 2, 3, 6, 7, 8
Grades 6-8	MS-ETS1-1	MS-ESS3-3 MS-ESS3-4	ESS3.C ESS3.D ETS1.A ETS1.B ETS1.C	Structure and Function	1, 2, 3, 6, 7, 8