

Science & Environmental Education: Community Connections, Impacts & Actions

5th Grade Curriculum

*How Do Individual Communities
Use Science To Protect Water
Resources And The Environment?*



Environmental education is lifelong learning process that leads to an informed and involved citizenry having the creative problem-solving skills, scientific and social literacy, ethical awareness and sensitivity for the relationship between humans and the environment, and commitment to engage in responsible individual and cooperative actions.

By these actions, environmentally literate citizens will help ensure an ecologically and economically sustainable environment.



The following two week integrated unit is designed for teachers and students to engage in an interdisciplinary study of science and the environment through literacy and math lessons. The lessons and activities are not meant to be done in isolation, but in support of and during literacy and math time.

Each lesson has a suggested structure with room for teachers to infuse more interactive play, discussions, or videos as well as adjust pacing as makes sense for their class. The summative assessment is designed to assess the NGSS, with several formative checks along the way for CCSS, used as the teacher sees fit.

This unit connects to the specific literacy theme of “Relationships.” This mini unit is part of a larger Ecosystems Unit where students will learn about how the relationships amongst living things with each other and their environments have impacted the Earth by exploring the essential question: *What relationship do individual communities have with protecting the Earth’s resources and environment?*

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Students in Wisconsin will be able to:

- ELS.C1 - Develop and connect with their sense of place and well-being through observation, exploration and questioning.
- ELS.EX2 - Evaluate relationships and structures of natural and cultural systems and analyze their interdependence.
- ELS.EX3 - Assess how diversity influences health and resilience of natural and cultural systems.
- ELS.EX4 - Analyze the interactions and outcomes of cycles and flows in natural and cultural systems.
- ELS.EX5 - Investigate and analyze how change and adaptation impact natural and cultural systems.
- ELS.EN7 - Engage in experiences to develop stewardship for the sustainability of natural and cultural systems.

This integrated unit uses NGSS and CCSS as the backbone to planning and infusing environmental education standards into the curriculum.

NGSS PERFORMANCE EXPECTATION	DISCIPLINARY CORE IDEAS	SCIENCE AND ENGINEERING PRACTICES	CROSS CUTTING CONCEPTS	COMMON CORE ELA	COMMON CORE MATH
<p>5-ESS3-1 Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.</p>	<p>Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments.</p>	<p>Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design solution.</p>	<p>A system can be described in terms of its components and their interactions.</p>	<p>CCSS.ELA-LITERACY.RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. CCSS.ELA-LITERACY.W.5.7 Conduct short research projects that can use several sources to build knowledge through investigation of different aspects of a topic.</p>	<p>CCSS.MATH.CONTENT.5.MD.8.2 Make a line plot to display a data set of measurement in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$), Use operations on fractions for this grade to solve problems involving information presented in plots.</p>

Day 1: [Earth's Water](#)

Day 2: [What Is A Watershed?](#)

Day 3: [Runoff Pollution](#)

Day 4: [Where Does Water Come From?](#)

Day 5: [Careers in the Community](#)

Day 6: [Field Experience: Exploring Healthy Watersheds](#)

Day 7: [The Urban Water Cycle](#)

Day 8: [Water Meter Wrap-Up](#)

Day 9: [Today's Water Issues](#)

Day 10: [Call To Action](#)



Watch: [The Basics of Freshwater](#)

Activity: [Earth's Water Demonstration](#)

Use this activity to demonstrate the amount of water on Earth and the quantity of potable water on Earth. Use the video above as an introduction to or during this demonstration.

Discussion: **Human impacts on water quality**

Pose the question *The Earth is made up of 71% water, why is only a small part of the water available for us to drink?* Have students answer the question and discuss in groups how human activities affect the waterbodies around communities. The groups should present their findings to the class.

Science Journal Prompt:

Students should take notes on the group presentations and using their own research students should write a paragraph describing the causes and effects of the different human activities presented.

Get your [Project Wet](#) certification
for additional activities!

Activity: [Track Your Personal Water Use](#)

Using this activity have students track their personal water use for 5 days. This data will be used to examine how much water the class used on day 7. Students should also track how many bottles of water they drank- single use plastic and refillable. Make sure students differentiate between the two types of water bottles when they record their water use.

Science Journal Prompt:

Have students estimate how much water they expect to use and brainstorm possible water sources they might be missing, such as water used to grow food or process different everyday items.



Watch: [What's a Watershed?](#)

Activity: [Watershed Activity](#)

Use the University of Nebraska Lincoln's Stormwater Activity to help students understand what a watershed is by creating their own model.

Watch: [Watersheds!](#)

Discussion: Explore watersheds throughout [Wisconsin](#) and the [United States](#). Have students in groups or individually find what watershed they live in and how it connects to the ocean. The [Hydro Hierarchy Map](#) can be used to help students understand the connections between rivers. It displays the largest rivers in the continental United States. Use mouse movements over the map to display the upstream and downstream river network in green and red respectively. This will help students to explore the impact of pollution and water misuse upstream and how that can impact individuals, wildlife, and land downstream. Students should detail their water's journey from their house to the ocean in their science journals.

Science Journal Prompt:

Have students brainstorm about one pollutant that could be originating from household and what action they could take to prevent pollution.



**Discussion:** History of Environmental Issues and Legislation

Read the [Water Pollution](#) section, have students create a timeline of historical events that lead to the creation of environmental laws and regulations to prevent pollution. Students should work in groups and be assigned different eras to focus on. They should then present their timeline to the class. Make sure students include the details of focusing clean water legislation.

Science Journal Prompt:

Have students create a timeline of the major environmental events throughout history in their journals and write the effect of those events on history. Students should write a brief paragraph about which event they found most interesting.

Activity: [Effects of Nutrients In Water](#)

This experiment will require some pre-experiment set up. This set up could be done on this day and continued for the next few days or set up earlier and have students wrap-up the experiment on this day.

Science Journal Prompt:

Students should write hypotheses about what they think will happen in each jar. Have students record their measurements and observations in their science journals.

Watch: [Great Pacific Garbage Patch](#), [A Plastic Ocean](#), [Living Plastic Free](#)**Discussion:** Your actions matter

Explore how littering (even in Wisconsin) and improper waste disposal affect everyone. Discuss all the different ways that pollution can enter waterbodies. Have students brainstorm ways that they could educate their community about plastic pollution.

Science Journal Prompt: *I can prevent plastic pollution by...*

Have students finish the statement and create a plan to enact that statement in their lives.



Discussion: [Know Your H2O](#)

Discuss what happens to water before it comes out of a tap. These lessons from Into The Outdoors can be used to guide the discussion.

Activity: [Water1DER APP](#)

Using the Groundwater Foundation's free app have students explore what groundwater is and how it affects their daily lives.

Science Journal Prompt: What is groundwater?

Have students answer the question using what they learned from the app.

Discussion: The [Subcontinental Divide](#)

The subcontinental divide is the divide between the Mississippi River watershed and the great lakes watershed. The Mississippi River will deliver water to the Atlantic Ocean in the Gulf of Mexico while the great lakes will deliver water to the Atlantic Ocean through the St. Lawrence Seaway. How has this divide affected the City Waukesha's water supply?

Activity: Waukesha's Water Problem

Waukesha's water supply is once again the focus of international attention. Using the [Great Water Alliance](#) and [Water pressures divide a Great Lake State](#) as starting resources, have groups of students investigate what Waukesha's water problems are and how the community plans to solve them. Assign each group one section of the [graphic organizer](#) to complete. Students should prepare presentations on their findings and present them to the class.

Science Journal Prompt:

Students should fill in the rest of the sections on their graphic organizer with the information from the presentations.



Activity: [EPA Games](#) And [Activities](#)

Have students review the previous days. Students can complete games and activities from the Environmental Protection Agency. Have students prepare questions to ask the guest speaker from the previous day's content.

Scientist Spotlight: Learn about Rachel Carson

Interview an Expert: Have students learn about careers that include taking care of the environment. Choose one of the optional activities below.

- Waukesha County Land Resources staff may be able to give a classroom presentation. Discover the many aspects of water in this interactive classroom program. Learn where drinking water comes from and where it goes after we are done with it! Students will learn what actions they can take to preserve and protect our water resources.
- Invite a guest speaker to the classroom to discuss the importance of soil and the environmental impacts of housing, transportation, and industrial. Guests could include a land conservationist, horticulturalist, or an environmental planner.

Classroom Presentation
Water Resources
[Request this Program!](#)

Optional Activity: Have students find out where their water at home comes from: a well or from City Water supply? If they have a well, have them find their wellhead. If they have city water, have them find out what their monthly water bill is.

Science Journal Prompt:

Have students pictographically explain and summarize how water travels from its source to their taps at school and at home.



Field Experience: Choose between an experience with E.B. Shurts Learning Center or Prairie Springs Environmental Education Center.

At E.B. Shurts, students will engage in active learning as they explore our local water resources and apply their learning about Waukesha's watershed as well as test the quality of our local water sources using both chemical and biological tests. This is a full day field trip with students rotating between several different stations and laboratory investigations. At Prairie Springs, students will explore the beneficial functions of the disappearing wetlands in our watershed and how scientists determine the health of a creek. Students will also be able to explain the lifecycle of freshwater fish and what external factors can affect their survival. This can be booked as a full day or a half-day field trip.

SDW teachers: Please request the program at E.B. Shurts

E.B. Shurts Learning Center
Healthy Watersheds
[Request this Program!](#)

Prairie Springs Env. Ed. Center
Wetlands and Water
[Request this Program!](#)

Science Journal Prompt:

Have students summarize the data they collected during the field experience. How does this help us understand the health of a watershed?

Discussion: How does nature keep water clean?

Have groups of students discuss of how water is filtered and kept clean naturally. Students should use the water ecosystems observed in the field as starting places for their discussion. Have students examine and discuss their classmates lists. As a class, review **[clean water actions](#)** that students can implement in their lives to help **[keep water clean](#)**.

Science Journal Prompt:

Water is naturally filtered and kept clean by.....

Have students finish the sentence and add supporting details in paragraph form.



Discussion: Where does wastewater go?

Discuss how wastewater treatment plants work and where wastewater ends up.

Watch: [How Does A Wastewater Treatment Plant Work?](#)

Science Journal Prompt:

How do waste water treatments work?

Students can pictorially depict different aspects of waste water treatment plants while writing paragraphs on how the processes help clean water.

Activity: [Situation Cards](#)

In groups of three, have students apply what they learned during the water pollution and watershed days using these situation cards. Have students rotate between acting out the scenarios in ways that apply what they have learned about keeping our water clean and providing feedback and moderating the discussion for each situation card. As an extension, have students create their own situation cards, based on the topics they have learned so far and act them out/discuss them.

Science Journal Prompt:

Have students describe the different journeys of water that goes down a drain inside your house and the water that runs down a storm drain. They should compare and contrast the journeys, using supporting evidence.

**Science Journal Prompt:**

How much water did you use this week? How do you feel about that amount?

Do you think you could have used less?

Have students answer the questions before discussing the answers with their groups.

Discussion: How much water did we use?

In groups, have students discuss the amount of water they used. Discussion topics should include how much water they used in a day/ week, how they feel about the amount of water they used, and what could they do to use less water. Have the groups share a summary of what was discussed with the class.

Activity: Water Meter Wrap up

Have the class combine the results of how much water each student used. Students should graph the data* for a day, week, year, and for the entire school. Have students compare the amount of water they used with the average water use of the class, the state, the country, and other countries. Have students write their findings in their science journals. Students should also compare their water use to known quantities (such as a gallon) and calculate the amount of time it would take for their water use to fill volumes of known quantities (swimming pool).

Discussion: The issues with water bottles

Using the [Bottled Water Facts](#) webpage as a guide, discuss the issues associated with plastic water bottles and what students can do in their lives to prevent these issues.

Science Journal Prompt:

Have students research water conservation strategies and develop activities they can personally use to conserve water at home and at school. Students should set goal(s) to implement one or more strategies. [Water Sense for Kids](#) and [Water, Use it Wisely](#) can help students in their research and goal development.

Optional: Students could “go public” with their goals by sharing them with the class.





Discussion: Review urban water issues

Review the problems associated with untreated urban runoff entering rivers or other bodies of water. Have students recall the many actions people can take to limit the contaminants that enter urban runoff (pet waste, litter, discarding chemical and oil).

Discussion: Local and global water issues

Review local water issues, such as the [Waukesha water issue](#) and discuss other issues going on around the world- such as the [Flint water issue](#), droughts, oils spills, etc.

Science Journal Prompt:

Have students brainstorm and develop an [action plan](#) to help protect Earth's water in their local communities. Students could use various media outlets* to enact their action plans.

* [Storm drain stenciling](#), [Book Creator](#), posters, [audio recordings](#), Presenting during school announcements, letters to school officials/ community members, or [commercials](#).



Activity: Presenting action plans

Students should present their action plans to the class.

In this presentation students should include:

- What their action plan is, who it will be presented to, and what is the intended outcome
- The reason they chose the specific water issue
- How they will use the scientific method in their action plan
- How they think they could a difference in regards to educating the community about issues with water quality

Activity: Have students enact their action plans in the community.

NGSS Standard ESS3-1	4	3	2	1
ESS3-1 Obtain and combine information about the ways individual communities use science ideas to protect the Earth's resources and environment.	I can develop an action plan to help protect the Earth's water in my community.	I can obtain and combine information about ways individual communities use science to protect Earth's water.	I can obtain and combine information about ways individual communities protect Earth's water.	I can obtain information about ways to protect the Earth's water.



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Fact Sheets:

[Groundwater Fact Sheet](#)

[Chemicals in the Water](#)

[Watersheds of Waukesha County](#)

[Environmental History Timeline Cards](#)

Videos:

[How Can We Keep Plastics Out Of Our Ocean](#)

[Waukesha Great Lakes Water Application](#)

[What Happens After You Flush?](#)

Activities:

[Storm Drain Activity](#)

[Protecting our Water Resources](#)

[Clean and Conserve: Water Science Project Guide](#)

[What's Your Watershed Address?](#)

[How Much Is PPB?](#)

Websites:

[Great Lakes Compact and Diversions](#)

[City of Waukesha Water Diversion](#)

[Waukesha Clean Water Plant](#)

No endorsement of any business is intended.



Water Education for Teachers

Resources

PROJECT WET TRAINING

Project WET (Water Education for Teachers) is a collection of hands-on activities designed and tested by teachers to educate K-12 students about water. Training to receive and use the WET guidebook can be scheduled for your school or district at your convenience with a minimum of 6 participants.

- Learn how to use the hands-on activities, including water quality testing and macro-invertebrate sampling
- Share ideas and tips with other teachers
- Learn about local program resources

There is a \$30.00 fee for each guidebook ordered. Call 262.896.8300 or email water@waukeshacounty.gov to schedule a training.

Waukesha County, Waukesha School District, and Carroll University have collaborated to create a comprehensive, interdisciplinary K-12 science and environmental education curriculum fully integrated with NGSS Science and Literacy standards.

The goal of this curriculum is to create more scientifically and environmentally literate citizens with the ability to understand and critically assess current scientific and environmental issues, along with a desire and ability to engage in these issues. This project focuses on improving efficiencies through program coordination among partners as well as building comprehensive approaches.

