

Science & Environmental Education: Community Connections, Impacts & Actions

4th Grade Curriculum

*How Do Humans Impact Erosion Rates
Caused By Water, Wind, Ice, Or Vegetation?*



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 Earth and Human Activity Unit where students will learn about how human activity has impacted the Earth by exploring the essential question: *What relationship do individual communities have with protecting the Earth’s resources and environment?*

[Request A Program Online!](#)



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.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.EN6 - Analyze the dynamic balance between natural and cultural systems.

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

Wisconsin Standards for Environmental Literacy and Sustainability

NGSS PERFORMANCE EXPECTATION	DISCIPLINARY CORE IDEAS	SCIENCE AND ENGINEERING PRACTICES	CROSS CUTTING CONCEPTS	COMMON CORE ELA	COMMON CORE MATH
<p>4-ESS2-1 Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.</p>	<p>Rainfall helps to shape the land and affects the types of living things found in the region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.</p>	<p>Make observations and/or measurements to produce data to serve as a basis for evidence for an explanation of a phenomenon.</p>	<p>Cause and effect relationships are routinely identified, tested, and used to explain change.</p>	<p>CSS.ELA-LITERACY.RI.4.7 Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on web pages) and explain how the information contributes to an understanding of the text in which it appears.</p> <p>CCSS.ELA-LITERACY.W4.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information.</p>	<p>CCSS.MATH.CONTENT.4.MD.A.1 Know the relative sizes of measurement units within one system of units including km, cm, kg, g, lb, oz., l, ml; hr, min, sec. Within a single system of measurement, express measurements in larger unit in terms of smaller unit. Record measurement equivalents in a two-column table.</p>



Day 1: [What is Soil?](#)

Day 2: [What is Soil Made of?](#)

Day 3: [Careers in the Community](#)

Day 4: [Weathering and Erosion](#)

Day 5: [Weathering and Erosion](#)

Day 6: [What Changes the Land? Field Experience](#)

Day 7: [What Happens to Eroded Soil?](#)

Day 8: [Pollution Caused by Erosion](#)

Day 9: [Solutions to Human Caused Erosion](#)



Discussion: How do we use soil?

Pose the question *How do you use soil?*

Discuss how humans use soil in everyday life, using the resources below as examples.

Watch: [*The Importance of Soil*](#)

Read: [*A Handful of Dirt*](#) by Raymond Bial

Activity: [*Starting With Soil*](#) - download this free app to introduce soils to your students.

Discussion: [*Apple Investigation*](#)

Do the apple activity as a teacher demonstration to model the amount of farmable land on Earth. Then break the students into groups for the discussion questions that follow the activity.

Science Journal Prompt:

Have students write a short paragraph about what they learned from the apple investigation.

Activity: Soil Horizons

Using [*Legos*](#) or [*Dirt Pudding*](#), have students explore the different soil horizons and what their functions are.

Science Journal Prompt:

Have students create an anchor chart using the [*RAN Strategy*](#) to examine the essential question: *How do humans impact erosion rates caused by water, wind, ice, or vegetation?*

At the end of each day, have students update their anchor chart, add what they have learned, and connect back to the essential question. Students should use the discussions from today's lesson to chart how people use soil.





Activity: [Soil Texture Analysis](#)

Discussion: Different types of soils

Introduce and discuss the different types of soil and how soil is classified. Use the texture triangle to describe different samples of soils based on their properties.

Optional Extended Activity: [Investigating Compost](#)

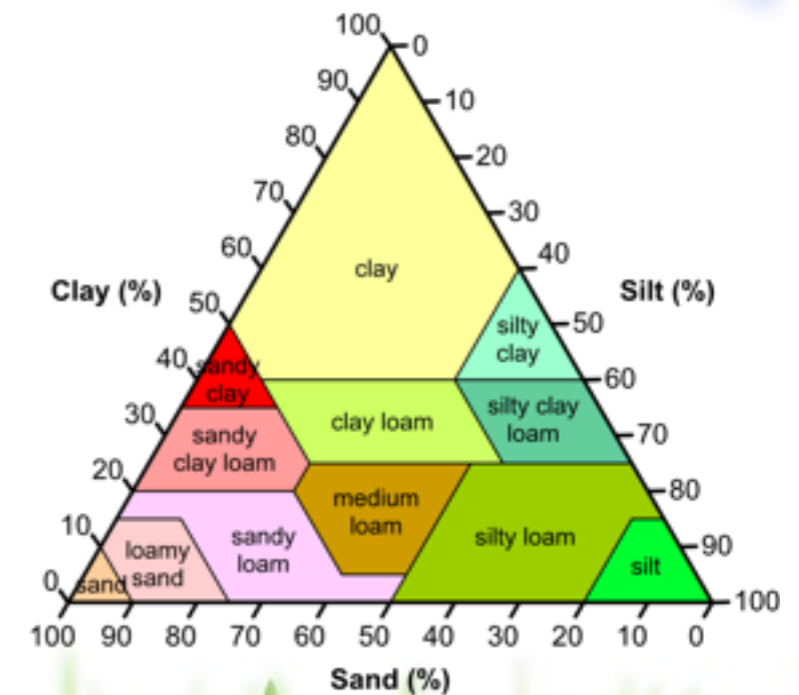
Science Journal Prompt:

What are the benefits of composting?

Have students answer the question and give supporting details.

Activity: [Planting with compost](#)

Use the Wake County Environmental Services Compost Lesson 4: *Planting with Compost* to demonstrate how compost benefits soil quality.





Scientist Spotlight: Learn about geologist [Florence Bascom](#)

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. Join us to explore the importance of healthy soil. View a real soil profile, understand how soil is formed, and discover the important role of organic matter. Conduct an erosion experiment and observe live compost microorganisms. Learn how to put your food waste to use through the simple act of composting and improve soil health.

Classroom Presentation
Healthy Soils Through Composting
[***Request this Program!***](#)

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.

Science Journal Prompt:

During the presentations have students summarize what they have learned about careers.





Activity: BrainPOP [Erosion](#) and [Weathering](#)

Discussion: The rock cycle

Explain what the rock cycle is and discuss how different rocks are formed. As a class, use the Mineralogy4kids graphic, [Rock Cycle](#), to go over different types of rocks and how they are formed.

Science Journal Prompt:

How do weathered rock pieces move from one place to another?

Have students relate their answers back to the essential question anchor chart the students created on the first day and if necessary, modify their chart. If you decide to use the [notebook templates](#), deposition will be discussed later on.





Activity: [Weathering and Erosion](#)

Use this lab as whole group to explore the processes and effects of weathering and erosion.

Discussion: Weathering and erosion presentations

Using the weathering and erosion activity, create student groups to prepare a presentation on their findings. This presentation should include: their hypothesis about what would happen, their findings from the experiment(s), and where in real life could they see the weathering that took place.

Science Journal Prompt:

Where have you seen examples of erosion in the community?

Have students answer the questions and give supporting evidence. Have students relate their answers back to the essential question anchor chart the students created on the first day and if necessary, modify their chart. If you decide to use the [notebook templates](#), deposition will be discussed later on.



Day 6

WHAT CHANGES THE LAND? FIELD EXPERIENCE

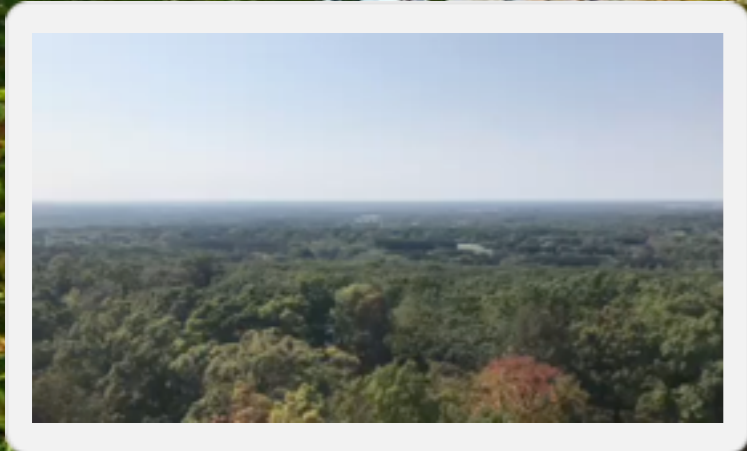
Field Experience: What Changes the Land?
Students will participate in activities to discuss different glacial landforms and how they were created.

Choose between an experience with E.B Shurts Learning Center that includes a visit to Lapham Peak to study weathering and erosion of landforms in Waukesha County. Students will cycle through activities such as a nature hike, soil investigation, glacier experiments and more. Or, select the experience at Retzer Nature Center that includes an investigation of different glacial landforms and a comparison of ice age flora and fauna to that of today's world.

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

E.B. Shurts
What Changes The Land?
[Request This Program!](#)

Retzer Nature Center
Understanding the Glacial Landscape
[Request This Program!](#)





Discussion: What is deposition?

In groups, have students review their findings from their visit to Lapham Peak. Have students discuss what happens to soil when it is eroded and where it goes. Discuss with students potential issues for areas where deposition occurs.

Activity: Stream Table

Using the Rivers [Stream Table Lab](#), have students work in groups to discover how erosion, weathering, and deposition occur. Have students modify their stream tables in attempts to increase or decrease the amount of erosion that occurs. The stream table lab has options for the adjustment of water flow and other modifications such as: fake trees/shrubs, pavement simulators (blocks of non-porous materials), and buildings. Students should make predictions in their science journals before beginning each trial run including: if erosion will occur, how fast it will occur, and what modifications will cause the most/least erosion. During each trial, students should draw the results of their experiment, they will use this information to compare the trials during their presentations. *Note: Foil baking trays work great for this.*

Science Journal Prompt:

Have students summarize their findings from the stream table experiment and present their findings to the class.



Read: [Soil Erosion and How to Prevent It](#) by Natalie Hyde

Discussion: How does weathering and erosion affect me? Through out the days, students should have been filling out the anchor chart relating to the essential question from Day 1. Using this chart, ask students to add a section based on what they have learned to the anchor charts and to move the sticky notes to create a more cohesive chart.

Discussion: What are the effects of erosions on human populations?

As a class, read [California City's Cliffs Crumbling Into Sea, Leaving People Homeless](#). Have students search for other stories where the erosion of soil has affected populations. Have students prepare a summary what happened, why erosion occurred, and the solutions used to curb the erosion.

Activity: Explore the Discovery Education animations and games focused on erosion:

[Erosion Animation](#), [In-Depth Erosion Animation](#), and [River Rafting and Erosion](#)

Science Journal Prompt:

Using the their anchor charts and their science journals, have students answer the following questions and back their claims with supporting evidence:

What causes erosion?

How do humans impact erosion?

How can we help prevent erosion?



Day 9

SOLUTIONS TO HUMAN CAUSED EROSION

Discussion: How can we prevent erosion?

Have students research the different techniques used to mitigate erosion. Have students present their findings to others in individual groups or to the class.

Activity *Chalk Talk*

In groups, have students describe different aspects of erosion. Pose questions such as: *What is soil? What is Weathering? What are the different types of weathering? What is erosion? How is erosion and weathering different/similar? Where have we seen weathering/erosion? What problems can erosion cause? What are can people do to prevent erosion?* Have student use their anchor charts and science journals as supporting evidence for the claims they make during this chalk talk.

Science Journal Prompt:

Students should summarize the claims their group agreed upon during the chalk talk.

Discussion: Chalk talk check in

After the chalk talk, have students summarize the claims and answers for each group. Have students discuss with the class how the group decided on the answers to the posed questions.

Science Journal Prompt:

How can you help with the effects humans have on erosion? Have students answer the question and use supporting evidence to back up their claim.





Activity: Using examples of erosion, such as these [slides](#), have students work in groups to:

- Identify the cause(s) of erosion in each picture and describe what methods should be implemented to prevent the erosion.
- Chose one of the slides and design an action plan on how best to mitigate the amount of erosion occurring in the picture.
- Chose a different example of weathering and erosion that the students have seen in this unit, write the causes of that example, and an action plan to prevent the erosion from occurring.

The groups should prepare and present their finding to the class. During this presentation, students should demonstrate that they understand the relationship between humans and erosion.

Science Journal Prompt:

As an individual assessment, have students write a reflection on the relationship between weathering and erosion and their causes. This should include how people can affect weathering and erosion and answer the following questions: *How can people reduce their impact on erosion? What can people do to prevent erosion from happening around home or in the community?*

	4	3	2	1
4-ESS2-1: Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.	I can design an action plan to help solve the effects of different types of erosion.	I can make observations to provide evidence of the effects of erosion by water, ice, wind, or vegetation and what caused the erosion.	I can make observations to provide evidence of the effects of erosion by water, ice, wind, or vegetation.	I can make observations of the effects of erosion by, water, ice, wind or vegetation.

[Request A Program Online!](#)

Books:

[Magic School Bus Meets the Rot Squad](#)
[Erosion Books](#)

Videos:

[How Compost Is Made](#)

Activities:

[Soda Bottle Worm Farm](#)
[Compost: A Scientific Investigation](#)
[Macroinvertebrate Manor](#)
[Soils in a Cup](#)

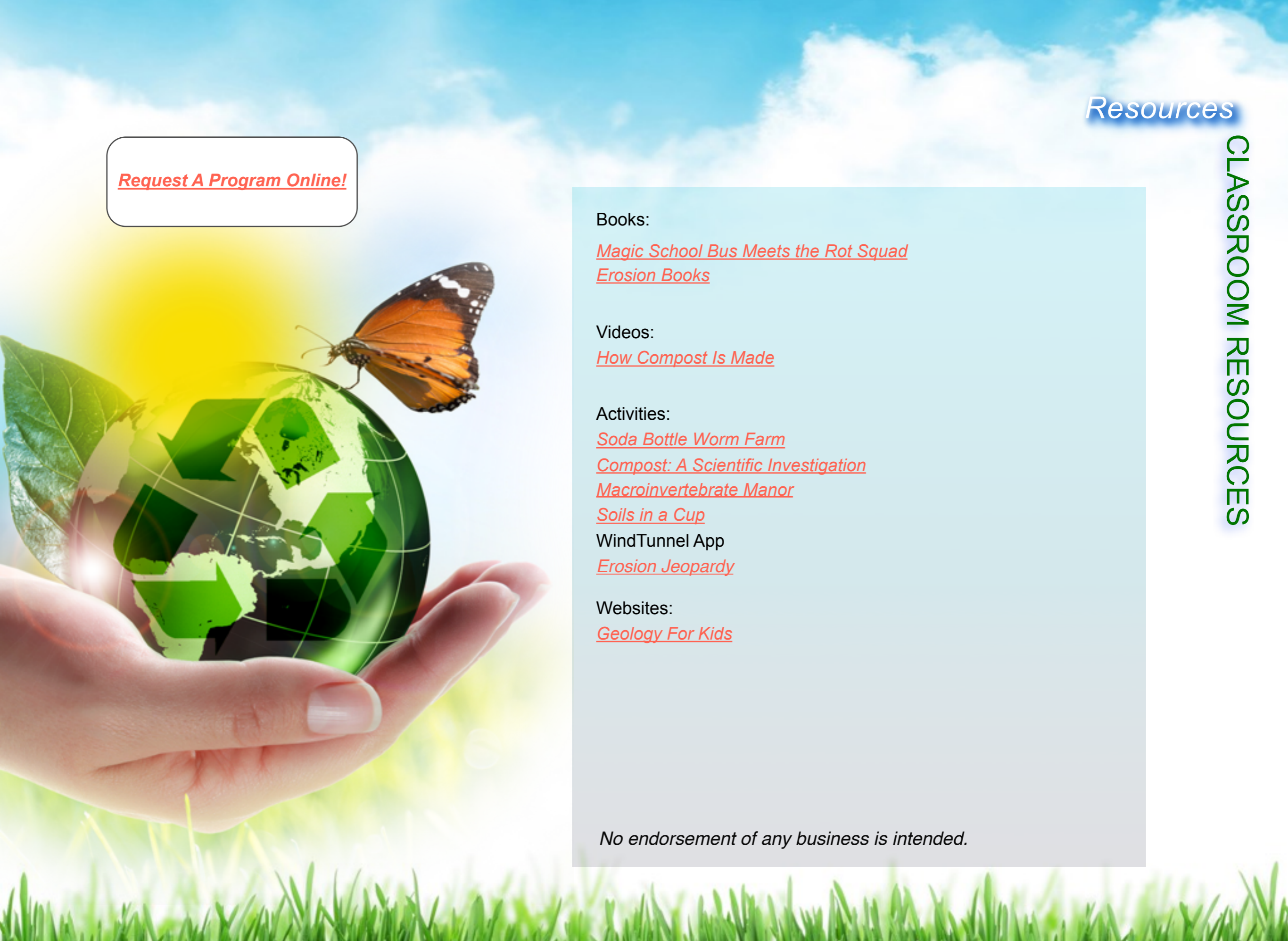
WindTunnel App

[Erosion Jeopardy](#)

Websites:

[Geology For Kids](#)

No endorsement of any business is intended.



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.

