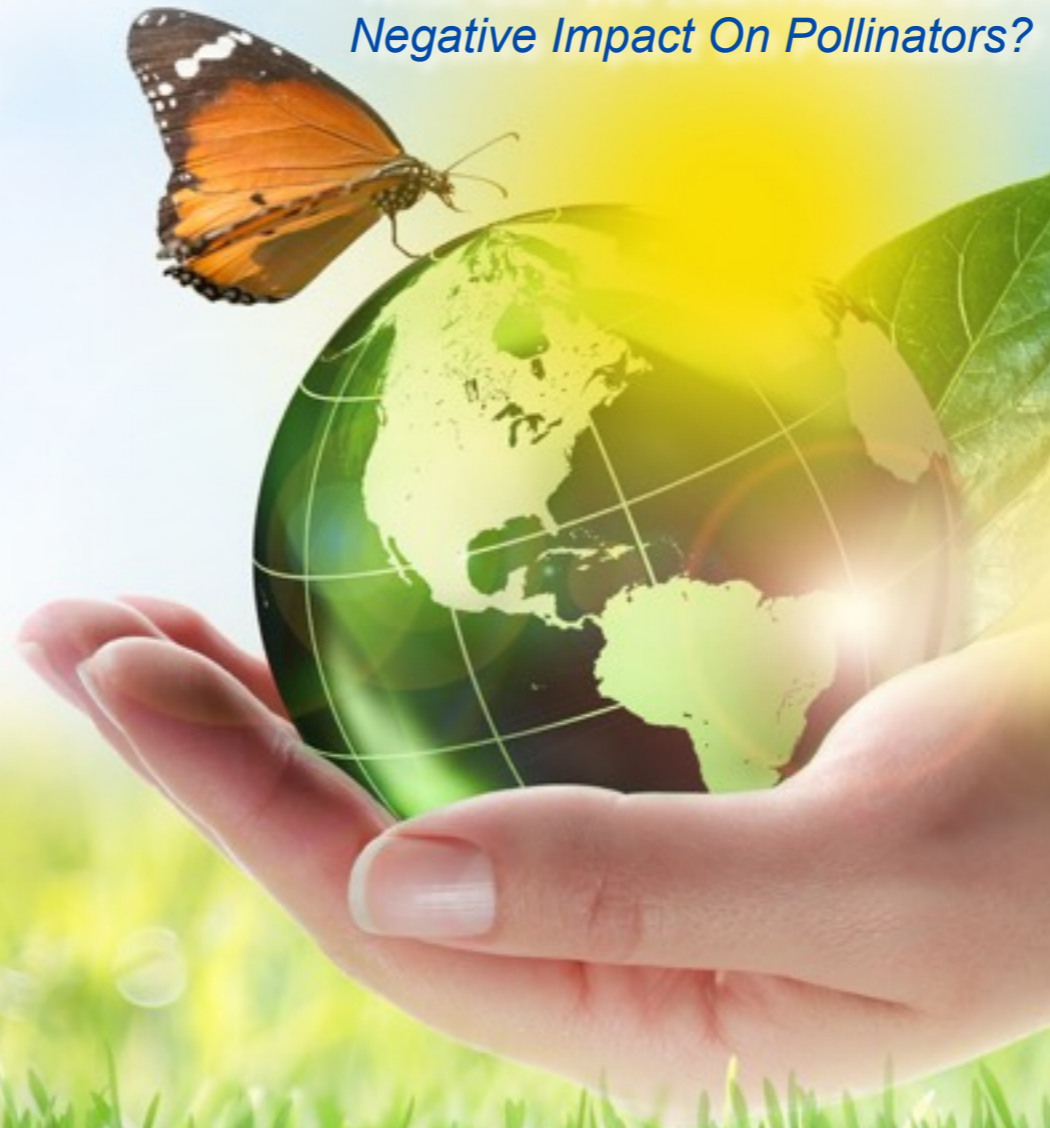


Science & Environmental Education: Community Connections, Impacts & Actions

2nd Grade Curriculum

*What Can We Learn About Our
Negative Impact On Pollinators?*



Purpose of

ENVIRONMENTAL EDUCATION

Environmental education is a 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.

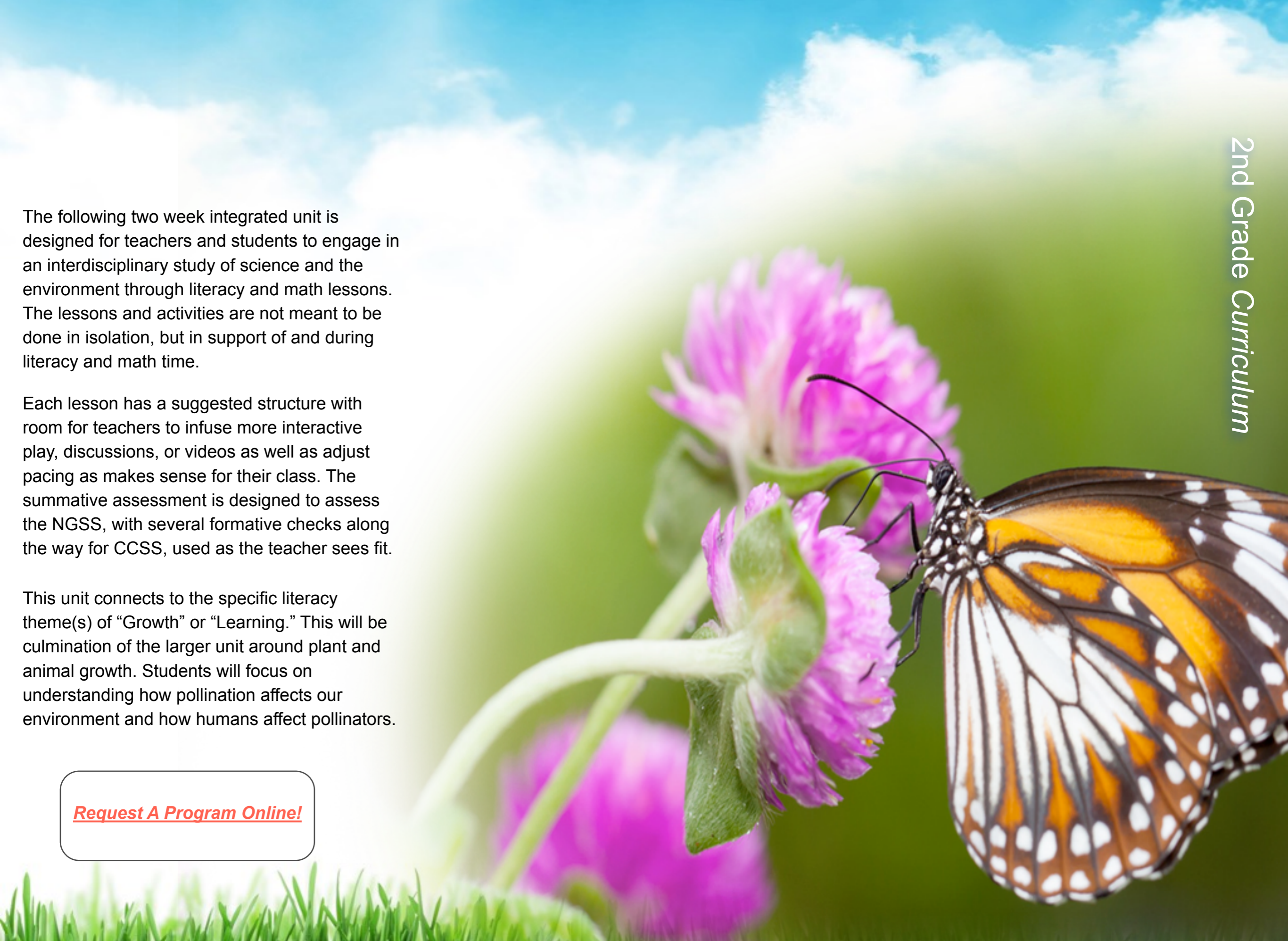


The following two week integrated unit is designed for teachers and students to engage in an interdisciplinary study of science and the environment through literacy and math lessons. The lessons and activities are not meant to be done in isolation, but in support of and during literacy and math time.

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(s) of “Growth” or “Learning.” This will be culmination of the larger unit around plant and animal growth. Students will focus on understanding how pollination affects our environment and how humans affect pollinators.

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Students in Wisconsin will be able:

- 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.EX5 - Students investigate and analyze how change and adaptation impact natural and cultural systems.
- ELS.EN7 - Students 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.

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>2-LS2-2 Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.</p>	<p>Plants depend on animals for pollination or to move their seeds around.</p>	<p>Develop a simple model based on evidence to represent a proposed object or tool.</p>	<p>The shape and stability of structures of natural and designed objects are related to their function(s).</p>	<p>CCSS.ELA-LITERACY.RI.2.3. Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. CCSS.ELA-LITERACY.RI.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).</p>	<p>CCSS.MATH.CONTENT.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems 1 using information presented in a bar graph.</p>



Day 1: [Plants and Pollination](#)

Day 2: [Types of Pollinators](#)

Day 3: [Insects](#)

Day 4: [In the Beehive](#)

Day 5: [Bee Communication](#)

Day 6: [What if There Were No Bees?](#)

Day 7: [Human Impacts on Pollinators](#)

Day 8: [Pollinators Field Experience](#)

Day 9: [Call to Action](#)

Day 10: [Summative Assessment](#)





Read: [Seeds, Bees, and Pollen](#) by Julie K Lundgren

Watch: [Pollination](#) or [Flight of the Pollinators](#)

Movement Activity: [Pollen Here, Pollen There](#)

Students “pollinate” each other’s flowers using Cheetos dust (pollen) and paper bags (flowers).

Discussion: Plant structures

Using the [Flower Parts Coloring Page](#) discuss how the different parts of a flower are used in pollination.

Science Journal Prompt:

Pollen is sticky because.....

Students should finish the sentence and use evidence to explain why pollen is sticky.

Optional: [Create a Flower](#)

This flower could be used instead of a paper bag for the movement activity.



Watch: [Hummingbirds Ultra Slow Motion - Amazing Facts](#)

Read: [Flowers are Calling](#) by: Rita Gray

Discussion: Pollinators and non-pollinators
As a class, use the animals introduced in the book, *Flowers are Calling*, to create a T-chart graphic organizer for pollinators and non-pollinators. Pollinators such as hummingbirds, bumble bees, beetles, butterflies would be in the “Pollinator Column” and non-pollinators such as bears, frogs, moose, snakes, deer would be in the “Non-Pollinator Column”.

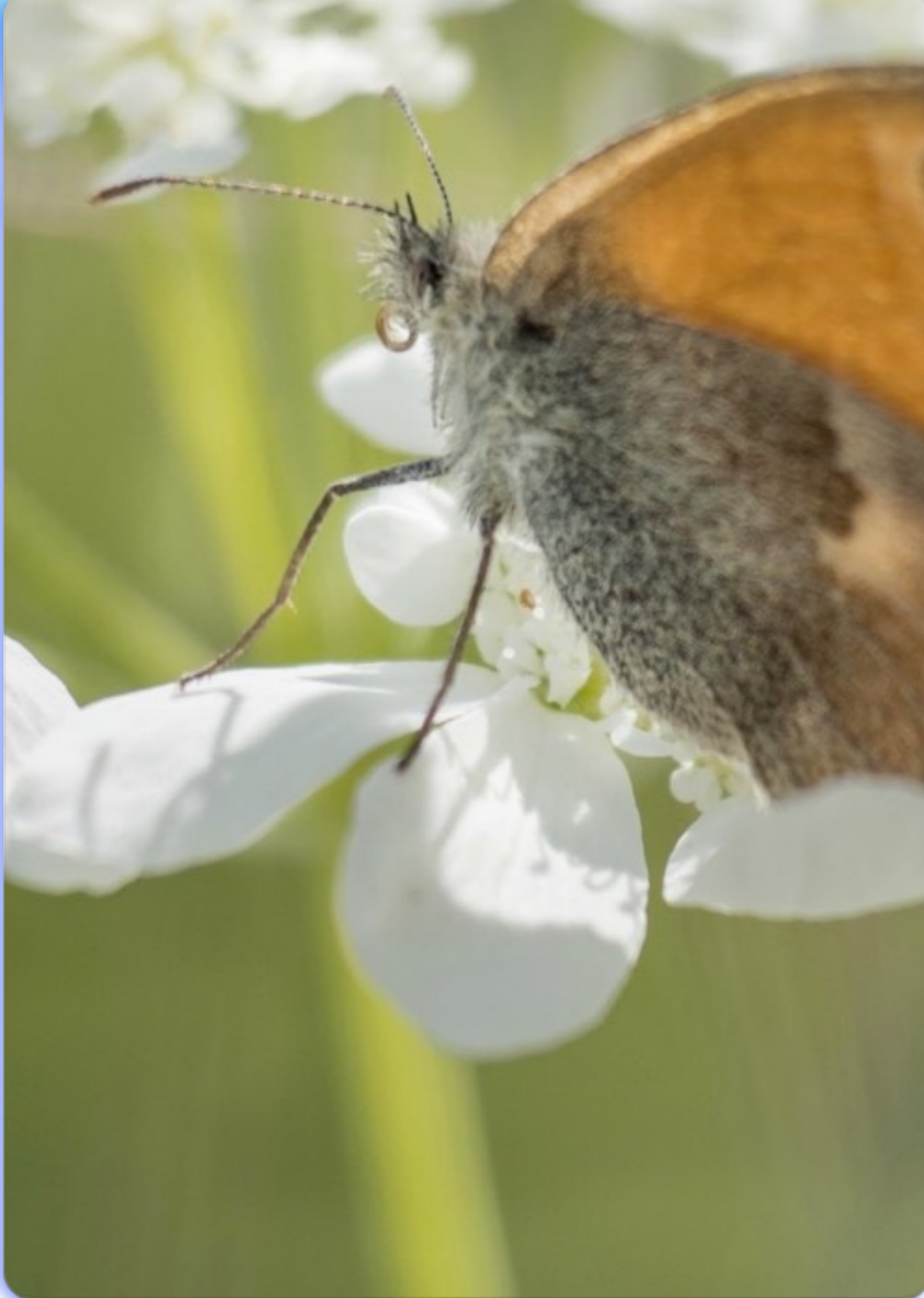
Activity: Pollinator Research

Assign groups of 3-4 students a pollinator to research. Groups should fill in the [pollinator information sheet](#) or use [pollination power](#). Have students present their findings to the whole class. Students will collect information about the other types of pollinators in their [pollinator notebook sheet](#) during the presentations.

Science Journal Prompt:

How do animals help pollination occur?

Students should reflect on the different types of pollinators and how each helps in the process of pollination.



Read: [*A Butterfly is Patient*](#) by Dianna Hutts Aston

Activity: Pollinator Book Creation

Students should use [*Book Creator*](#) to describe different aspects of a pollinating insect's life. Topics should include anatomy, habitat, food, and the life cycle of their insect. *This could be an ongoing research project or as a group activity.*

Discussion: Evolution of insect pollination

Pose the question: *Why do pollinators visit specific types of flowers?* Discuss how plants and pollinators evolved together over time in order to survive.

Science Journal Prompt:

Using the books their classmates have created, have students compare the different anatomical structures used by insects to collect pollen.

Optional Scientist Spotlight: Learn about botanist [*George Washington Carver*](#)

Interview an Expert: Invite a guest speaker to the classroom to discuss the importance of pollinators and their career as a botanist, beekeeper, Master Gardener, or UW-extension employee.



Read: [*Jump into Science: Honeybees*](#) by Deborah Heiligman

Watch: [*How a Bee Becomes a Queen*](#)

Activity: [*It's All About the Bees*](#)

Using the activity sheet from the *Wisconsin Agricultural Educators Guide* (WAE Guide), complete the worksheet on the different jobs in the hive.

Discussion: The best pollinators
Pose and discuss the questions: *Why are bees good pollinators? What are the specific jobs for bees?*

Science Journal Prompt:

Queen bees are important because....

Students should finish the sentence and use evidence to explain why queen bees are important to a hive.

Optional Read: [*The Beeman*](#) By Laurie Krebs

Optional Activity: [*Get the Buzz on Beekeeping*](#)

Using the worksheet from the WAE Guide, label the parts of a hive and beekeeping equipment. *If possible, have a [beekeeper](#) come in and discuss the different aspects of beekeeping.*

Optional Discussion: The importance of a bee
Pose and discuss the question: *Why are beekeepers important? Why are bees and pollinators vital to human existence?*



Read: [*Bee Dance*](#) by: Rick Chrustkowski

Watch: [*Why Do Honey Bees Dance?*](#)

Movement Activity: [*Waggle Dance Game*](#)

Use pages 22 and 23 to play this game*. *The WAE Guide also has a good fact sheet about the waggle dance, which could be used as an introduction to this activity.*

Science Journal Prompt:

Honey bees use waggle dancing for.....

Students should finish the sentence and explain how waggle dancing communicates the location of food sources to other bees.

**This is a good resource for other activities related to pollination, but because the information is based out of the UK, the species of bees and plants listed as native do not always apply to Wisconsin.*



**Activity:** [The Food We Eat Needs Pollinators](#)

Have students write down or discuss what is their favorite meal, snack, or what they had to eat the previous day. Many of the foods we like to eat depend on pollinators. Using the Beeman Educator's Guide, *The Food We Eat Needs Pollinators* ([page 10](#)), have students circle or discuss the foods that would not be around if there were no pollinators to pollinate our crops.

Read: [What If There Were No Bees?](#) by: Suzanne Slade and [The Buzz on Bees](#) by Shelly Rotner

Discussion: Food and pollination

Using *What's all the Buzz About Pollinators - How can We Help Pollinators?* ([page 7](#)), discuss the reasons why pollinators are disappearing. Show some or most of the different types of foods that come from the act of pollination. Discuss what would happen if there were no more pollinators.

Science Journal Prompt:

I can help pollinators by.....

Have students list the ways they can help pollinators through everyday actions.



Discussion: Importance of Pollinators

Pose the question: *Are pollinators important?* In table groups, have students create a list of reasons they believe pollinators are important. As a class, share their lists.

Activity: Graphing Pollinator Population Data

Present each table group with the 3 data sets showing the trends of the bumble bee, monarch butterfly, and honey bee. (Note: These are sample data sets; feel free to adjust or use different data for your class)

Using the data reflection sheet, have students work to identify trends in the data.

Once the groups have identified that the populations are decreasing, brainstorm possible causes (sickness, draught, human impact, etc.). Have them record their thoughts on an anchor chart to reference during their *Call to Action Project* on Day 9.

Science Journal Prompt:

Using the activity, have students create graphs to demonstrate the trends from the data sets.





Read: [Mason Meets a Bee](#) by Dawn Pape

Field Experience: Pollinators Program

Learn about pollination while visiting a native area. Through indoor and outdoor activities, students will discover the relationship between plants and the animals that pollinate them. Book a program at either E.B. Shurts Environmental Learning Center or Retzer Nature Center.

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

E.B. Shurts
The Importance of Pollinators
[Request this Program!](#)

Retzer Nature Center
Plants and Pollinators
[Request this Program!](#)

Discussion: Wasp vs. bee

Discuss the differences between wasps and bees, pointing out that wasps are more likely to sting than bees. This is because bees will die after stinging and only use it as a last resort, where as wasps can sting multiple times and tend to be more aggressive. Lesson 1 from [An Introduction to Honeybees](#) can help students visualize the difference in stingers.

Science Journal Prompt:

Bees and wasps are different because.....

Students should compare and contrast the anatomical and behavioral differences between wasps and bees.





Discussion: What can we do?

Pose the question: *What can be done to preserve and support pollinators?* Discuss how individual actions can help support native pollinator populations.

Activity: Call to Action

Individually or in groups, have students create a PSA to encourage the public about supporting a native pollinator of their choice. *This should be done through a collaborative medium* of their choice and should aim to persuade the school and/or community to take action on preserving our native pollinators.*

Optional: Enact a Call to Action

As a class, decide on and plan a project (plant a pollinator garden, plant milkweed, build bee house, or plant native plants) to preserve the native pollinators.

The [National Wildlife Federation](#) and the [Wisconsin DNR](#) has ideas that could be easily implemented.

** Book Creator, posters, [audio recordings](#), letters to school officials/community members, or [commercials](#).*



Day 10

SUMMATIVE ASSESSMENT

Assessment: Students will create an individual model demonstrating the process of pollination. Students will work individually to create a diagram with pictures and written descriptions explaining the process of pollination, using any of the pollinators learned about in class.

Extension Opportunity: Students who are interested may build physical representations of their models to be displayed in the school and/or community, demonstrating pollination and its impact on humans.

	4	3	2	1
2-LS-2.2 Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.	I can develop a simple model that mimics the function of an animal in pollinating plants and demonstrate its impact on humans.	I can develop a simple model that mimics the function of an animal in pollinating plants.	I can identify the parts of the pollination cycle.	I can identify a pollinator.



[Request A Program Online!](#)

Books:

- [What's it Like to Be a Bee](#)
- [UnBEElievables](#)
- [The Case of the Vanishing Honeybees](#)

Activities:

Graphing:

- [California Academy of Sciences](#)
- [Bee Informed](#)

Poetry Creation:

- [Celebrate Wildflowers](#)

Animal Facts and Games:

- [The Buzz About Bees](#)
- [Pollination Relay Race](#)
- [Explore Honey Bees!](#)
- [Pollination and Seed Dispersal](#)

Pollinator Information Sheets:

Flowers:

- [Pebble Go](#)

Hummingbirds:

- [Pebble Go](#)
- [Hummers](#)

Insects:

- [Pebble Go](#)
- [Like a Moth to a Flower](#)
- [Honeybees](#)
- [Caterpillars to Butterflies](#)
- [Bumblebee Survival](#)
- [Monarch Population Numbers](#)
- [Monarch Butterflies](#)

General:

- [Encyclopedia Britannica](#)
- [Pollinators](#)

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.

