

The Good, The Bad, and the Bugly

Grade Level

Kindergarten - 2nd grade
3rd grade - 6th Grade

Lesson Length

5 min intro. 20 min activity. 2-5 min summarize.

STEM Careers

- Entomologist
- Teacher
- Zoologist
- Conservation Biologist

Topic Focus

Educate students on the importance of beneficial insects and the ecosystem services that they provide.



This lesson is part of the Biodiversity Curriculum. These lessons can be adapted for use with a variety of ages.



Learning Objectives

By the end of the lesson, students should be able to:

- Identify 3 roles that different insects play in the ecosystem
- Discuss how greater biodiversity allows an ecosystem to thrive
- Explore the roles **beneficial insects** play and identify ways to promote beneficial insects, such as providing flowers and shelter or habitat all season long.

Educational Standards Supported

(Nebraska Early Learning Guidelines)

- SC.2.7.2.C Make observations of plants and animals to compare the diversity of life in different habitats.
- SC.3.9.3.A Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

Materials List

- example insect flash cards
- posters or large papers for students to draw on and organize their insects
- markers
- variety of small toy insects and arthropods if available



Lesson

Introduction

Insects are small creatures that we don't normally think about in our day-to-day lives. However there are over 1,000,000 named insects in the world - 80% of the entire species known to man. There are also many more individual insects than there are people - 200 million insects for every human on the earth. With all these small creatures in the world you have to stop and wonder, What are they doing for the environment and for us?

Opening Questions

- *What kinds of roles do insects play in the environment? Where do they get their food?*
- *How do insects play different roles as different stages in their life cycle? (ex butterfly vs. caterpillar)*
- *Why do we need insect biodiversity?*

Activity #1: Bugs on the Brain

~ 20 minutes

1. Break students into groups of 2-4 students
2. Give each student a large piece of paper to create category labels "the good", "the bad", and "the bugly" (uncertain) or provide the student worksheet in the supporting documents folder.
3. Give each group of students a set of the example insect cards (see supporting materials folder in the lesson plan file)
4. Provide groups 5-10 minutes to sort the example insect cards or toy insects, whichever is available, into the following categories: "good" insects, "bad" insects, or "bugly" (uncertain if good or bad) and write down the traits or reasons why they were categorized as such.

Glossary words:

Beneficial - an organism that contributes a positive impact to the environment, wildlife, and/or humans

Biodiversity - the amount of different organisms that live in a specific environment

Biological indicator species – animals that only thrive in a healthy environment. Typically a sign that water and soil quality are high as these species are sensitive to pollution

Decomposer - an animal that breaks down dead plant and animal matter

Food source - a source of vital nutrients and energy that an organism needs to survive

Herbivore - an animal that eats plants

Insect - a small animal that has six legs and a body formed of three parts and an exoskeleton

5. Ask each group to take turns explaining the listed traits and why they put specific insects in each of the three categories.
6. Discuss with students their choices, and explain some of the key ecological roles of insects that are placed in each category (e.g. pollinators, predators, nutrient cyclers).
7. (round 2) Ask groups to reorganize insects into the same groups but have them think about the role insects play without including human interactions. (ex. Students might put spiders in the bad category because they bite humans. Instead look at them as a predator in the ecosystem not as a potential harm to people).
8. Reconvene as a classroom, and ask students to share if their category groups changed or not and why.

Life cycle - different stages that insects go through to reach adulthood (ex. egg, larva, caterpillar, and adult for butterflies)

Pest - an organism that causes harm or destruction of plants, structures, or human health

Pollinator – animals that help pollinate flowers and plants

Predator - an animal that hunts other animals for food

Knowing the role of insects

Insect pollinators like bees, are well known as beneficial to securing our food system. When a bee visits one flower and then flies to another, they are moving pollen around and doing us a great service. One out of every three bites of food comes from the pollination of bees including our most nutritious foods (fruits, vegetables, and nut crops). However, insects also play other important and beneficial roles to our ecosystem. **Decomposers** like fly maggots and nutrient cyclers like roly polys break down feces, dead animals, and decaying plant material so that it doesn't remain where it lays. As annoying as they are, even mosquitos are important as they are **food** for hundreds of different species of animals that need to eat them to survive. Other beneficial insects include **predators** like wasps, dragonflies, and assassin bugs that eat **pest** insects that feed on our vegetable plants, field crops, and orchard trees. Many other insects are biological **indicator species** (also known as bioindicators) of our environment's health. For example, the immature stages of many insects like dragonflies, flies, mayflies, and stoneflies are aquatic (live in the water) and are highly sensitive to pollutants. The absence of these species can indicate poor water quality or the presence of pollutants. Some insects have different roles at different stages of their **life cycle**. For example, some butterflies like the black swallowtail are garden pests of herbs when they are caterpillars because they eat the leaves of parsley and fennel (**herbivore**), while as an adult butterfly they pollinate flowering plants.

Post Activity Discussion

1. Review the different roles beneficial insects play and highlight the many different ways insects may impact our food systems and natural landscapes
2. The labeling of insects as “Good” vs “Bad” is too broad and may change during an insects’ life cycle.
3. Most insects that are considered “bad” are those that may pose a risk or disturbance to humans.
4. Encourage students to reevaluate their fears and prejudices that they may have formed based on looks or other preconceived notions.
5. Encourage students to look more closely at the interesting world of insects and how they interact with their environments.

What you can do to help

1. Plant more flowers and provide diverse habitat all season long to encourage higher insect biodiversity.
2. Avoid or reduce the use of chemicals (insecticide, fungicides or herbicides) unless absolutely necessary.
3. Share information with others on how insects that look scary might still play important roles in the ecosystem.



Elaborate/Extend

Ask students to observe insects outside of class. Have them photograph or draw pictures of insects and what they are doing. Ask students to guess what the insect is doing and what parts of the insect are specifically designed for that role. (ex. raptorial legs for catching prey, hairy bodies for pollen collection, etc.)



Evaluate/Reflect

- *Why do we need different species of insects?*
- *What special body parts do insects have to perform their jobs in the ecosystem?*

- *Why do we species such as mosquitoes and cockroaches when they are inconvenient to humans?*
- *What is the connection between bioindicators and ecosystem health?*

We want to hear from you!

Let us know what you thought of the lesson or send us a picture of youth participating in the lesson. Please send to **unlbeelab1@gmail.com!**



Supporting Resources

- <https://drive.google.com/drive/folders/1YESw94uq0nBpFBunwXPqaRwwfdQrCZMP?usp=sharing>
 - o View only - Make a copy of the folder and then print as necessary

References/Resources:

- www.fws.gov/pollinators
- Learner's Dictionary - <http://learnersdictionary.com/>
- <https://www.npwrc.usgs.gov/pollinator/home>
- Xerces Society - <https://xerces.org/>
- Nebraska Science Standards Guideline
https://www.education.ne.gov/wp-content/uploads/2017/07/Nebraska_Science_Standards_Final_9-8-17.pdf

Suggested Children's Books:

- Gibbons, Gail. (1997). *The Honey Makers*. Singapore: Tien Wah Press.
- Allen, J. (2000). *Are you a bee?* Boston, MA: Kingfisher.
- Barton, B. (2017). *Give bees a chance*. New York, NY: Viking.
- Milner, C. (2018). *The bee book*. New York, NY: DK Publishing.
- Slade, S. (2010). *What if there were no bees*. Mankato, MN: Picture Window Books.

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