Bugs in Our Ecosystems

Pollution Prevention Lesson Series

Provided by:

REGIONAL WATER QUALITY CONTROL PLANT
Operated by the City of Palo Alto for the East Palo Alto Sanitary District, Los Altos, Los Altos Hills, Mountain View, Palo Alto and Stanford

GRASSROOTS ECOLOGY

Bugs in Our Ecosystems

Objectives

- Bugs play critical roles in our ecosystems, including plant pollination, seed dispersal, decomposing dead material, and serving a critical role in the food web.
- Bugs are a critical link in ecosystems. Predatory bugs eat smaller bugs; larger animals like birds, reptiles, amphibians, fish, bats, and squirrels rely on insects in their diet.
- Pesticides are chemicals that kill bugs indiscriminately. When they get into our creeks and waterways, they harm animals there.

Introduction

For an introduction to water in our environment, check out this starting resource, then meet us back here!

Introduction to Bugs

People can use the word “bug” to mean a lot of things, including certain small animals, but also germs that make us sick. The bugs we are talking about in this lesson are the animal kind: insects, spiders, crustaceans (like roly-polys) and other small animals without a backbone. Animals without backbones are called **invertebrates**. Instead of having a skeleton inside their bodies like many animals (birds, fish, snakes, and mammals, including us!), bugs have a skeleton on the outside of their bodies, which we call an **exoskeleton.**

Bugs like insects, spiders, and other invertebrates are an important part of our **ecosystems** - communities of animals, plants, and other living things in a physical environment. Some bugs are **pollinators** that move pollen between flowers to help plants reproduce and some help to disperse plant seeds, which allows new baby plants to grow. Other bugs are **predators** of other insects that eat plants, including food crops. Some bugs eat dead things like leaves and twigs and help to break them down into smaller materials, which helps plants to get nutrients to grow. These bugs are called **decomposers**. Additionally, bugs are food for many animals like birds, fish, reptiles, mammals and other bugs.

Pesticides are chemicals used to get rid of unwanted pests in homes and gardens. Pesticides come in the form of liquids, sprays, and powders. Although they are commonly used, most pesticides are poisonous and can harm bugs and other animals. There are many other ways to prevent pests that are safer and can help reduce poisonous chemicals in our natural ecosystems.

Activity

Materials

- Bugs worksheet (page 5)
- Printable cards
- Online access (optional)

Backyard bug hunt: Have students go outside and look for a real live bug. There is space for them to draw the bug and its surrounding environment on the worksheet. (A notebook or scrap paper works too.) If they need help, prompt them to look in and around pots, between densely packed plant stems, under fallen leaves, etc. If you have a tupperware or jar, encourage your student to (gently) collect the bug to observe it more closely before releasing it. Snails and pill bugs can be surprisingly charismatic!

Bug games: Students can build on and practice their knowledge of local bugs by playing one or both of the following games:

- Get to Know the Bugs - Memory Matching Game
    - Print the bug cards. Take a few minutes to familiarize yourselves with each bug and its corresponding facts. Cut the cards apart so that the pictures are separate from the facts. Arrange all of the cards randomly in a grid, face-down.
    - The object of the game is to find pairs of matching cards (the image of a bug and the facts that go with it). The player with the most pairs at the end wins.
    - Players take turns turning over two cards at a time. If the two cards are not a match, return the cards face-down to the same spots in the grid. Find two cards that match to win the cards.
- Get the Know the Bugs: Online Matching Game
    - Bug Fact Matching, Game 1 (link)
    - Bug Fact Matching, Game 2 (link)

Learning reflection: After playing one or both the bug games, have students fill out the remainder of the worksheet, thinking about the benefits of bugs in local ecosystems, ways we can help bugs in the environment, and, finally, creating their own bug.

Additional resources

- Types of pollinators: https://ucanr.edu/sites/PollenNation/Meet_The_Pollinators/
- Video on Safe Pest Control from Palo Alto Regional Water Quality Control Plant: https://www.youtube.com/watch?v=_fIm2o7wcqI
- This video is a little goofy, but provides great visuals of water flow, and clarifies how water in our homes and water in the streets go different places, and affect the environment differently.

NGSS Alignment

Disciplinary core ideas	**Science and engineering practices**	**Crosscutting concepts**
LS2.A. Plants depend on animals for pollination or to move their seeds around. (2-LS2-2)	**Obtaining, Evaluating and communicating information** Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2)	**Structure and Function** The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2)

Name:_____

Bugs in Our Ecosystems: worksheet

Let's go outside! See if you can find a bug in your backyard or on the sidewalk. Once you find one, draw it here. Be sure to include its surroundings in your drawing.

What are some ways that bugs help our ecosystems?	What are ways that you and your family can help bugs in nearby ecosystems?

Create your own bug! Think about the traits you observed on the bugs you learned about today. Draw your bug and its surroundings here. Write what the bug eats, what eats the bug, and its role in the ecosystem. Be sure to name your bug!