Grasshopper Eating Hibiscus Bud

4th Grade

Life Science | Lesson Guide

Photo Description

A green grasshopper is eating a red flower bud on a plant. The grasshopper has long back legs and is using its mouth to bite into the dark red bud. Green leaves and stems surround the grasshopper as it feeds on the plant.

Scientific Phenomena

This image shows herbivory - the feeding relationship between a plant-eating animal (herbivore) and a plant. The grasshopper is consuming plant tissue to obtain energy and nutrients it needs to survive, grow, and reproduce. This feeding behavior demonstrates how energy flows through ecosystems from producers (plants) to primary consumers (herbivores). The grasshopper's specialized mouthparts allow it to chew and process plant material efficiently.

Core Science Concepts

1. Food Webs and Energy Transfer: Grasshoppers are primary consumers that obtain energy by eating plants (producers), demonstrating the flow of energy through ecosystems.

2. Animal Adaptations: Grasshoppers have specialized body parts including strong mandibles for chewing, powerful hind legs for jumping, and camouflage coloring for protection.

3. Interdependence in Ecosystems: Plants and animals depend on each other - grasshoppers need plants for food, while their waste provides nutrients back to the soil.

4. Life Cycles and Growth: Animals need food to fuel their growth, development, and reproduction throughout their life cycles.

Pedagogical Tip:

Use this image to help students make the connection between structure and function by having them identify the grasshopper's body parts and predict how each part helps it survive.

UDL Suggestions:

Provide multiple ways for students to demonstrate understanding by offering options like drawing food webs, acting out predator-prey relationships, or creating digital presentations about herbivore adaptations.

Zoom In / Zoom Out

1. Zoom In: At the cellular level, the grasshopper's digestive system breaks down plant cellulose using special enzymes and bacteria in its gut to extract nutrients and energy from the plant material.

2. Zoom Out: This feeding relationship is part of a larger ecosystem where grasshoppers serve as food for birds, spiders, and other predators, creating interconnected food webs that maintain ecological balance.

Discussion Questions

1. What body parts help this grasshopper successfully eat plants, and how does each part help? (Bloom's: Analyze | DOK: 2)

2. How might the plant be affected if too many grasshoppers lived in this area? (Bloom's: Evaluate | DOK: 3)

3. What do you think would happen to grasshoppers if all the plants in their habitat disappeared? (Bloom's: Apply | DOK: 2)

4. How does this grasshopper's feeding behavior connect it to other animals in the ecosystem? (Bloom's: Synthesize | DOK: 3)

Potential Student Misconceptions

1. Misconception: "All insects are harmful to plants and should be eliminated."
   Clarification: Many insects play important roles in ecosystems, including pollination, decomposition, and serving as food for other animals.

2. Misconception: "Grasshoppers only eat grass."
   Clarification: Grasshoppers are generalist herbivores that eat many different types of plants including flowers, leaves, and stems.

3. Misconception: "Animals take energy from plants, but plants don't get anything back."
   Clarification: When animals die and decompose, their bodies return nutrients to the soil that plants need to grow.

Cross-Curricular Ideas

1. Math - Data Collection and Graphing: Have students conduct a survey of insects found in a school garden or local park over several weeks. Students can create bar graphs or pictographs to show how many grasshoppers, beetles, butterflies, and other insects they observe. They can then calculate which insects appear most frequently and discuss why certain insects might be more common.

2. ELA - Descriptive Writing and Poetry: Ask students to write detailed descriptions of the grasshopper in the photo using sensory words (what they see, imagine hearing, touching). Students could also write acrostic poems using the word "GRASSHOPPER" or create short fictional stories from the perspective of either the grasshopper or the plant being eaten.

3. Art - Nature Illustration and Camouflage Design: Have students create detailed drawings or paintings of grasshoppers in their natural habitats, focusing on how their green coloring helps them blend in with plants. Students could then design their own imaginary insects with camouflage patterns suited to different environments (desert, forest, snow) using colored pencils, watercolors, or digital tools.

4. Social Studies - Local Ecosystems and Agriculture: Connect this image to farming and agriculture by discussing how farmers deal with grasshoppers and other herbivorous insects that eat crops. Students can research sustainable farming practices that balance protecting crops while maintaining healthy ecosystems and wildlife populations.

STEM Career Connection

1. Entomologist - An entomologist is a scientist who studies insects like grasshoppers. They observe how insects live, what they eat, how they grow, and how they affect plants and other animals. Entomologists work in universities, nature centers, farms, and research labs to help us understand and protect insects. Average Annual Salary: $65,000

2. Agricultural Scientist - Agricultural scientists study how to grow healthy crops while managing pest insects like grasshoppers. They develop ways to protect plants from being eaten by too many insects without harming the environment or helpful insects. They work on farms, in laboratories, and for government agencies. Average Annual Salary: $68,000

3. Wildlife Biologist - A wildlife biologist studies how animals like grasshoppers live in their natural environments and how they interact with plants and other animals. They work to protect ecosystems and animal populations, sometimes in outdoor settings like forests, grasslands, and wetlands. Average Annual Salary: $66,000

NGSS Connections

- Performance Expectation: 5-LS2-1 - Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment
- Disciplinary Core Ideas: 5-LS2.A 5-LS1.C LS1.C
- Crosscutting Concepts: Energy and Matter Systems and System Models

Science Vocabulary

* Herbivore: An animal that eats only plants for food and energy.
* Primary consumer: The first animal in a food chain that eats plants.
* Adaptation: A special body part or behavior that helps an animal survive in its environment.
* Ecosystem: All the living and non-living things in an area that interact with each other.
* Energy transfer: The movement of energy from one living thing to another through feeding relationships.
* Mandibles: The strong jaw parts that insects use to bite and chew their food.

External Resources

Children's Books:
- Who Eats What? Food Chains and Food Webs by Patricia Lauber
- What Is a Food Chain? by Bobbie Kalman
- Grasshoppers by Gail Gibbons