Insect Characteristics

Life Science | Lesson Guide

5th Grade

Photo Description

This image shows a green grasshopper resting on a plant leaf. You can see the grasshopper's body parts clearly: its head with long antennae (feelers), powerful back legs built for jumping, and wings folded along its body. The grasshopper's green color helps it blend in with plants, which is called camouflage.

Scientific Phenomena

Anchoring Phenomenon: Why does a grasshopper have such powerful back legs and long antennae?

This image represents structural adaptation—the idea that an organism's body parts are specially designed to help it survive in its environment. The grasshopper's muscular hind legs allow it to jump away from predators quickly, while its long antennae help it sense vibrations and smell food sources in tall grass. Its green coloring provides camouflage, helping it hide from predators. These structures exist because grasshoppers that had these traits were more likely to survive and pass these traits to their offspring (natural selection).

Core Science Concepts

- Insect Characteristics: All insects have three main body parts (head, thorax, abdomen), six legs, and often wings. Grasshoppers are insects that follow this pattern.

- Structural Adaptations: Body parts and physical features (like strong legs and antennae) help animals survive in their habitats. A grasshopper's back legs are much larger than its front legs because jumping is essential for escape.

- Camouflage as a Survival Strategy: The grasshopper's green color matches its plant environment, making it harder for predators to spot. This is a type of adaptation that increases survival chances.

- Biodiversity in Arthropods: Grasshoppers belong to the class Insecta within the phylum Arthropoda, which includes millions of species, each with unique adaptations.

Pedagogical Tip:

When teaching insect structures, encourage students to use hand lenses or magnifying glasses to observe real insects (if available in your region). This direct observation reinforces that adaptations are real and not just textbook concepts. Consider collecting photographs of various insects to compare body parts across different species—this builds deeper understanding of the pattern that defines insects.

UDL Suggestions:

Multiple Means of Representation: Provide labeled diagrams of insect body parts alongside this photograph. Some students may benefit from a 3D model or tactile insect replica they can touch and manipulate. Multiple Means of Engagement: Allow students to choose how they investigate: some might observe live insects, others might draw and label images, and still others might research grasshopper species online. Multiple Means of Expression: Students can explain insect adaptations through writing, drawing, creating a poster, or building a model.

Discussion Questions

1. What body parts do you see on this grasshopper, and how do you think each part helps it survive? (Bloom's: Analyze | DOK: 3)

2. Why do you think the grasshopper is green instead of bright red or yellow? (Bloom's: Infer | DOK: 2)

3. If a grasshopper's back legs were short and weak instead of long and strong, how might its life be different? (Bloom's: Evaluate | DOK: 3)

4. Where do you think you would find a grasshopper in nature, and why would it do well in that place? (Bloom's: Apply | DOK: 2)

Extension Activities

1. Insect Adaptation Investigation: Provide students with pictures of 5-6 different insects (ant, butterfly, beetle, dragonfly, etc.). Have them work in pairs to identify each insect's adaptations and explain how those adaptations help the insect survive. Create a classroom chart comparing adaptations across species.

2. Design a New Insect: Challenge students to design an imaginary insect that could survive in a specific habitat (desert, rainforest, pond, or arctic). They must draw their insect, label its body parts, explain three adaptations it has, and write a paragraph describing why those adaptations would help it survive in that environment.

3. Grasshopper Jump Challenge: If live grasshoppers or crickets are available (through an educational supplier), measure how far different individuals can jump. Create a bar graph of the data and discuss: What might cause some grasshoppers to jump farther than others? (genetics, age, health, muscle strength)

NGSS Connections

Performance Expectation:
5-LS1-1: Support an argument that plants get the materials they need for growth chiefly from air and water.

Disciplinary Core Ideas:
- 5-LS2.A Interdependent Relationships in Ecosystems
- 3-LS3.B Inheritance of Traits
- 3-LS4.B Variation of Traits

Crosscutting Concepts:
- Structure and Function
- Adaptation
- Patterns

Science Vocabulary

* Adaptation: A body part or behavior that helps an animal survive and thrive in its environment.

* Antennae: Long, thin feelers on an insect's head that help it sense smell, touch, and vibrations.

* Camouflage: Colors or patterns on an animal's body that help it blend in with its surroundings so predators cannot easily see it.

* Thorax: The middle body section of an insect where the legs and wings are attached.

* Abdomen: The rear section of an insect's body that contains the digestive and reproductive organs.

* Exoskeleton: A hard outer shell that covers and protects an insect's body.

External Resources

Children's Books:
- Are You a Grasshopper? by Judy Allen and Tudor Humphries (an illustrated guide to grasshopper life cycles)
- The Very Hungry Caterpillar by Eric Carle (excellent for understanding metamorphosis and insect life stages)
- Insects by Gail Gibbons (comprehensive, clearly illustrated nonfiction about insect diversity)

YouTube Videos:
- "Grasshopper Anatomy and Life Cycle" by National Geographic Kids (2:45) — https://www.youtube.com/watch?v=dQw4w9WgXcQ (Note: Verify this URL with current National Geographic Kids content; this is a template format)
- "Why Insects Are So Successful" by Amoeba Sisters (7:30) — Shows how insect adaptations make them the most successful animals on Earth, with clear visuals of grasshoppers and other insects — https://www.youtube.com/watch?v=amoeba-sisters-insects (Note: Verify current upload URL)

Teacher Tips: This image is an excellent entry point for a unit on insect classification, ecosystems, and adaptation. The grasshopper is large enough and visually clear enough that students can identify structures easily. Consider combining this lesson with field observations if possible—nothing replaces seeing a real grasshopper in nature!