Hummingbird

Life Science | Lesson Guide

5th Grade

Photo Description

This image shows a tiny hummingbird hovering in mid-air between colorful pink flowers. The hummingbird has a long, needle-like beak pointed toward the flowers, and its wings are moving so fast they appear blurry. Two pink flowers with multiple petals are visible on green stems in the background.

Scientific Phenomena

Anchoring Phenomenon: Why can a hummingbird hover in place while feeding from flowers, and why is it attracted to this particular color?

Scientific Explanation: Hummingbirds can hover because their wings beat extremely fast—up to 80 times per second—allowing them to create lift in any direction, unlike other birds. They are attracted to the bright pink and red flowers because these colors signal a rich food source (nectar, which is high in sugar). The hummingbird uses its long beak to reach deep into the flower to drink the nectar, which provides the enormous amount of energy its rapid metabolism requires. This is an example of adaptation—the hummingbird's body structure and behavior are perfectly suited to its ecological role as a nectar feeder.

Core Science Concepts

* Adaptation and Survival: Hummingbirds have special physical features (long beak, fast wing speed, light body weight) that help them survive by obtaining food from flowers that other birds cannot reach.

* Energy Transfer in Ecosystems: Hummingbirds obtain energy from nectar (produced by flowers through photosynthesis), demonstrating how energy flows from plants to animals in a food chain.

* Animal Behavior and Instinct: Hummingbirds are attracted to bright colors because this behavior helps them find food sources efficiently; this is an inherited instinct, not learned behavior.

* Structural and Functional Relationships: The hummingbird's body parts (wings, beak, heart rate, metabolism) work together as a system to enable hovering flight and rapid energy consumption.

Pedagogical Tip:

When teaching about hummingbirds, use slow-motion video to help students actually see wing movement—their brains cannot process such rapid motion at normal speed. This concrete visual support transforms an abstract concept into observable evidence, significantly improving comprehension and retention for all learners, especially visual learners.

UDL Suggestions:

To support multiple means of engagement and representation: (1) Provide video clips showing hummingbird flight at various speeds; (2) Allow students to choose between drawing, writing, or creating a physical model to demonstrate how hummingbird wings work; (3) Connect to student interests by asking them to research hummingbird species from their own region or a region they choose; (4) Offer audiobook versions of hummingbird texts for struggling readers.

Discussion Questions

1. What do you observe about the hummingbird's wings in this photo, and what does that tell us about how fast they must be moving? (Bloom's: Observe/Analyze | DOK: 2)

2. Why do you think hummingbirds are attracted to pink and red flowers instead of blue or yellow flowers? What evidence can we look for? (Bloom's: Infer/Hypothesize | DOK: 3)

3. If a hummingbird needs to eat nectar from flowers to survive, what would happen to hummingbirds in a place where there were no flowers? Explain your thinking. (Bloom's: Evaluate | DOK: 3)

4. How is the hummingbird's beak shaped differently from a robin's beak, and why does this difference matter for what each bird eats? (Bloom's: Compare/Analyze | DOK: 2)

Extension Activities

Activity 1: Hummingbird Wing Speed Experiment
Students create a paper model of a hummingbird wing and use a metronome or drum beat to simulate wing speeds (start at 40 beats per minute, then increase to 80 BPM). Students observe how the wing motion changes and discuss why such speed is necessary. This kinesthetic activity helps students internalize the concept of rapid movement.

Activity 2: Flower Color Preference Investigation
Set up a simple experiment using paper flowers in different colors (red, pink, yellow, blue, white) with sugar water in the center. Place the flowers outside or in a garden area and record which colors attract the most hummingbirds or insects over several days. Students create a data chart and draw conclusions about animal color preference. This connects observation to data collection and the scientific method.

Activity 3: Hummingbird Habitat Design Challenge
In small groups, students design an ideal garden or habitat for hummingbirds. They must include specific flowers (researched), water sources, shelter, and explain how each element meets a hummingbird's need. Groups present their designs and explain their reasoning. This synthesizes multiple concepts (adaptation, energy, ecosystems) into a creative, real-world application.

NGSS Connections

Performance Expectation:
5-LS1-1: Support an argument that plants get the energy they need to grow chiefly from water and air.

Disciplinary Core Ideas:
* 5-LS1.A Structure and Function: The hummingbird's beak and wing structure are specifically adapted to access flowers and extract nectar.
* 5-LS1.C Organization for Matter and Energy Flow in Organisms: Hummingbirds consume high-energy nectar to fuel their rapid metabolism.
* 3-LS3.B Inheritance of Traits: A hummingbird's attraction to bright colors is an inherited behavior.
* 3-LS4.C Adaptation: The hummingbird's physical and behavioral traits are adaptations that help it survive in its niche.

Crosscutting Concepts:
* Structure and Function The hummingbird's body design enables hovering and rapid feeding.
* Energy and Matter Energy from flowers (nectar) is consumed by hummingbirds to power movement and survival.
* Systems and System Models The flower-hummingbird interaction is a system where both organisms benefit.

Science Vocabulary

* Nectar: A sweet liquid produced inside flowers that hummingbirds and other animals drink for energy.

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

* Hover: To stay in one place in the air without moving forward or backward.

* Metabolism: How fast an animal's body uses energy to stay alive and move around.

* Pollination: The movement of pollen from one flower to another, which helps plants make seeds (hummingbirds pollinate flowers as they feed).

* Beak (or Bill): The hard, pointed mouth part of a bird that helps it catch or eat food.

External Resources

Children's Books:
Hummingbirds* by Patricia Corrigan (National Geographic Little Kids)
The Hummingbird's Gift* by Brenda Z. Guiberson
Rufous Hummingbird* by Rebecca E. Hirsch (National Geographic Kids)

YouTube Videos:
* "Hummingbird in Slow Motion" by BBC Earth – Shows hummingbird wing movement at slow speed so students can see individual wing beats; approximately 3 minutes. https://www.youtube.com/results?search_query=BBC+hummingbird+slow+motion

* "How Do Hummingbirds Hover?" by National Geographic Kids – Explains the science of hovering flight using clear visuals and kid-friendly language; approximately 4 minutes. https://www.youtube.com/results?search_query=National+Geographic+Kids+hummingbird+hover