Cicada

Life Science | Lesson Guide

2nd Grade

Photo Description

A large insect with clear wings sits on a tree branch. The insect has big eyes and a thick body with yellow and brown colors. Its wings are see-through and have dark lines running through them.

Scientific Phenomena

This image shows a cicada emergence phenomenon - when adult cicadas emerge from underground after spending years as nymphs feeding on tree roots. The cicada has recently molted (shed its old skin) to reveal its adult form with fully developed wings. This represents a complete life cycle transformation where the insect changes from a ground-dwelling nymph to a flying adult whose primary purpose is reproduction. The timing of this emergence is often synchronized across large populations, creating periodic mass emergences that can occur every 13-17 years depending on the species.

Core Science Concepts

1. Life Cycles: Cicadas demonstrate incomplete metamorphosis, changing from egg to nymph to adult without a pupal stage
2. Animal Structures and Functions: The cicada's large eyes help it see, strong legs help it grip branches, and clear wings enable flight
3. Habitats and Survival: Cicadas spend most of their lives underground, then emerge to mate and lay eggs in trees
4. Animal Behaviors: Mass emergence is a survival strategy that overwhelms predators through sheer numbers

Pedagogical Tip:

Use hand motions and body movements to help students remember the three stages of cicada development - curled up like an egg, crawling like a nymph, and spreading arms like wings for the adult stage.

UDL Suggestions:

Provide tactile experiences by bringing in cicada shells (exoskeletons) for students to safely examine, and offer both verbal descriptions and visual diagrams to accommodate different learning preferences.

Zoom In / Zoom Out

1. Zoom In: At the cellular level, special hormones trigger the molting process, causing the old exoskeleton to split and the soft new adult form to emerge and harden
2. Zoom Out: Cicada emergences affect entire forest ecosystems by providing massive food sources for birds, mammals, and other insects, while adult cicadas help pollinate plants and their tunneling aerates soil

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Discussion Questions

1. What body parts help this cicada survive in its environment? (Bloom's: Analyze | DOK: 2)
2. How do you think spending years underground helps cicadas stay safe? (Bloom's: Evaluate | DOK: 3)
3. What patterns do you notice about when and where cicadas appear? (Bloom's: Apply | DOK: 2)
4. Why might it be helpful for many cicadas to emerge at the same time? (Bloom's: Synthesize | DOK: 3)

Potential Student Misconceptions

1. Misconception: "Cicadas are harmful or dangerous insects"
   Clarification: Cicadas are completely harmless to humans - they don't bite, sting, or damage crops

2. Misconception: "All insects go through the same life cycle stages"
   Clarification: Different insects have different life cycles - cicadas skip the pupa stage that butterflies have

3. Misconception: "Cicadas appear randomly each year"
   Clarification: Many cicadas follow predictable cycles, emerging in large numbers every few years

Cross-Curricular Ideas

1. Math - Counting and Patterns: Have students count the legs, wings, and eyes on a cicada, then create simple bar graphs comparing body parts of different insects. Students can also explore the pattern of emergence years (every 13 or 17 years) by making a number line showing when cicadas will emerge.

2. ELA - Descriptive Writing: Ask students to write or dictate sentences describing what they see in the photo using sensory words (bumpy, clear, shiny, smooth). Create a class "Cicada Cinquain" poem together, or have students write a simple story about a cicada's journey from underground to the tree branch.

3. Art - Nature Collage and Wing Design: Students can create cicadas using torn paper, collage materials, or paint, focusing on the beautiful patterns in the wings. They might trace their own wings or design imaginary insect wings using watercolors or colored pencils to explore how transparent wings can show different patterns.

4. Social Studies - Community Observation: Connect to local community science by having students look for cicada shells or listen for cicada sounds in their neighborhood. Create a class map showing where cicadas were found, introducing basic map skills and local environmental awareness.

STEM Career Connection

1. Entomologist - An entomologist is a scientist who studies insects like cicadas. They learn about how insects live, what they eat, and how they change as they grow. Entomologists work outdoors in nature and in laboratories to help us understand and protect insects. Average Annual Salary: $65,000

2. Wildlife Biologist - A wildlife biologist studies animals in their natural homes and ecosystems. Someone in this job might track cicada populations, count how many emerge each year, and learn how they help other animals survive. They work in forests and parks to keep nature healthy. Average Annual Salary: $68,000

3. Environmental Educator - An environmental educator teaches people about nature and insects like cicadas. They work at nature centers, zoos, or schools, helping visitors learn why insects are important and how to observe them safely. This job combines teaching with a love of the outdoors. Average Annual Salary: $42,000

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NGSS Connections

- Performance Expectation: 2-LS4-1 - Observe plants and animals to compare the diversity of life in different habitats
- Disciplinary Core Ideas: 2-LS4.A - 1-LS1.A
- Crosscutting Concepts: Patterns - Structure and Function

Science Vocabulary

* Cicada: An insect that lives underground for years before emerging as a flying adult
* Emerge: To come out or appear from a hidden place
* Nymph: A young insect that looks similar to the adult but cannot fly yet
* Molt: When an animal sheds its old skin or outer covering to grow bigger
* Life cycle: The stages an animal goes through as it grows from birth to adult
* Exoskeleton: The hard outer covering that protects an insect's body

External Resources

Children's Books:
- Cicadas! Strange and Wonderful by Laurence Pringle
- Waiting for Wings by Lois Ehlert
- The Very Quiet Cricket by Eric Carle

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