

## Photo Description



This image shows a brown, empty shell of a cicada stuck to tree bark surrounded by green and white lichen. The shell looks like a hollow bug that has been left behind. The cicada crawled out of this shell and flew away as a grown-up insect!

## Scientific Phenomena

Anchoring Phenomenon: Exoskeleton Shedding (Ecdysis)

Cicadas experience incomplete metamorphosis. Young cicadas, called nymphs, live underground for several years drinking juice from plant roots. When they are ready to become adults, they crawl up a tree and their hard outer skin (exoskeleton) splits open. The adult cicada wriggles out, leaving behind this papery brown shell. This shell-shedding is called molting or ecdysis. The cicada must shed its exoskeleton to grow because the hard shell doesn't stretch like skin does—it's like outgrowing a suit of armor and needing a bigger one!

## Core Science Concepts

- \* Life Cycles: All living things go through different stages of life. Cicadas change from underground nymphs into flying insects. This big change is part of their life cycle.
- \* Growth and Change: Insects have hard outer shells called exoskeletons that don't grow with them. When an insect gets too big, it must shed its old shell to grow into a larger one.
- \* Adaptation and Survival: Cicadas hide underground as nymphs to stay safe from predators and find food. When they become adults, they move above ground and can fly to find mates and lay eggs.
- \* Habitats and Organisms: Cicadas live in trees where they find shelter and food. The lichen and bark in this photo show that the tree supports many different living things.

### Pedagogical Tip:

To build schema before this lesson, bring in photos of other exoskeletons (butterfly chrysalis, snake shed skin, hermit crab shells). Ask: "What do these have in common?" This primes students to recognize that many creatures shed or outgrow their coverings—it's not just cicadas! This connects to their prior knowledge about growth.

### UDL Suggestions:

Multiple Means of Representation: Provide three ways to experience this content: (1) Visual—show this image and video of cicadas emerging; (2) Tactile—let students carefully handle a real shed cicada shell (if available) or a cast-off toy exoskeleton model; (3) Kinesthetic—have students physically act out the molting process by "wriggling out" of a paper bag or tube. This supports diverse learners and multiple intelligences.

## Discussion Questions

1. Why do you think the cicada had to leave its shell behind? (Bloom's: Analyze | DOK: 2)
2. What do you think happened to the cicada after it crawled out of this shell? (Bloom's: Synthesize | DOK: 3)
3. Look at the lichen on the bark. What other living things might use this tree as a home? (Bloom's: Apply | DOK: 2)
4. How is a cicada shell like a coat that doesn't fit anymore? (Bloom's: Evaluate | DOK: 3)

## Extension Activities

1. Cicada Life Cycle Drawing: Give students a large piece of paper divided into four boxes. Have them draw and label the cicada's life cycle: (1) Egg underground, (2) Nymph drinking from roots, (3) Nymph crawling up tree, (4) Adult cicada flying. Students can color, add labels with your help, and dictate or write one sentence per stage.
2. Shell Hunt Scavenger Hunt: Take students outside (weather permitting) to look for other shed skins or shells: snake skins, spider webs, bird feathers, or insect shells. Create a classroom display labeled "Things Animals Leave Behind" and discuss why creatures shed or outgrow their coverings.
3. Sound Investigation: Play a 10-15 second audio clip of cicada sounds (see resources below). Ask: "What do you hear? Why do you think cicadas make this sound?" Discuss that adult cicadas use sound to find mates. This connects the visible shell to the adult cicada's behavior and function.

## NGSS Connections

Performance Expectation: 2-LS2-1 Plan and conduct investigations to provide evidence that plants get the materials they need for growth chiefly from air and water

Relevant DCIs:

- 2-LS1.B Growth and development of organisms
- 2-LS2.A Interdependent relationships in ecosystems

Relevant CCCs:

- Patterns (Patterns of change in life cycles)
- Scale, Proportion, and Quantity (How big things start small and grow)

## Science Vocabulary

- \* Exoskeleton: A hard shell on the outside of an insect's body that protects it, like a suit of armor.
- \* Molt (or Molting): When an animal sheds or leaves behind its old skin or shell so it can grow bigger.
- \* Nymph: A young insect that looks different from its parents and hasn't grown up yet.
- \* Life Cycle: All the stages an animal goes through from birth to growing up to having babies.
- \* Lichen: Tiny living things that grow on rocks and tree bark and often look like green, gray, or white patches.

## External Resources

Children's Books:

The Very Hungry Caterpillar\* by Eric Carle (Great for understanding metamorphosis and life cycles—use this as a comparison to cicadas)

Insects\* by Gail Gibbons (Clear illustrations of insect life cycles, including cicadas)

From Tadpole to Frog\* by Wendy Pfeffer (Life cycles of other animals; compare to cicadas)

YouTube Videos:

\* "Cicada Emerging From Shell" (National Geographic Kids)

A 2-3 minute clip showing a real cicada crawling out of its exoskeleton in real-time. Perfect for Second Grade attention spans.

<https://www.youtube.com/watch?v=GyZ0woCUc96>

\* "The Cicada Life Cycle" (Crash Course Kids)

A 4-minute animated explanation of how cicadas spend years underground as nymphs, then emerge as adults. Age-appropriate narration and visuals.

[https://www.youtube.com/watch?v=hLvZenT\\_eP4](https://www.youtube.com/watch?v=hLvZenT_eP4)

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Teacher Note: This lesson works beautifully in spring or summer when cicada shells are most visible outdoors. Pair it with outdoor exploration to make the learning authentic and memorable!