Katydid Camouflage

Life Science | Lesson Guide

5th Grade

Photo Description

This image shows a katydid (a green insect similar to a grasshopper) resting on grass and plant stems in its natural environment. The katydid's body color closely matches the green leaves and grass surrounding it, making it difficult to spot among the vegetation. This blending in with the environment is an example of how animals have special features that help them survive in nature.

Scientific Phenomena

Anchoring Phenomenon: Camouflage as an Adaptation for Survival

This image illustrates camouflage, a protective adaptation where an organism's appearance blends in with its surroundings. The katydid's green coloring matches its environment (grass and leaves) because of natural selection—over many generations, katydids with coloring that matched plants were more likely to survive predators and pass on their genes to offspring. This is WHY the katydid is green: its color provides protection by making it harder for predators like birds and lizards to find and eat it. The katydid didn't choose this color; it evolved this trait because it helped its ancestors survive.

Core Science Concepts

* Adaptation: A trait or characteristic that helps an organism survive and reproduce in its environment. The katydid's green color is an adaptation.

* Natural Selection: Over time, organisms with traits that help them survive are more likely to have offspring, passing those helpful traits to the next generation.

* Camouflage (Protective Coloration): An adaptation where an animal's color, pattern, or shape helps it blend into its environment to avoid being seen by predators or prey.

* Variation in Populations: Individuals within a species have different traits. Some katydids might be lighter or darker green, and those that match their environment best have a better chance of survival.

Pedagogical Tip:

When teaching camouflage, encourage students to physically search for the katydid in the photo before you point it out. This "struggle to find it" creates cognitive engagement and makes the concept of camouflage personally meaningful. Students will understand why camouflage matters when they experience the difficulty of spotting the animal themselves.

UDL Suggestions:

Provide multiple means of representation: show videos of katydids in motion (they're easier to spot when moving), display side-by-side comparison images (katydid isolated vs. katydid in grass), and use tactile materials (green fabric scraps on grass) so students can physically experience how color matching creates invisibility. This supports learners who are visual, kinesthetic, or need concrete examples.

Zoom In / Zoom Out

Zoom In: Cellular & Pigment Level
At the microscopic level, the katydid's green color comes from special molecules called pigments (particularly chlorophyll-like compounds) and structural features in its exoskeleton (outer skin). These pigments absorb certain colors of light and reflect green light back to our eyes. Under a microscope, you could see how the katydid's skin cells are packed with these color-producing structures. The genes (instructions in the katydid's cells) tell the body to make these green pigments during development. Natural selection favors katydids whose genes produce just the right shade of green to match the grass and leaves around them.

Zoom Out: Ecosystem & Food Web Level
At the ecosystem level, the katydid is part of a complex food web. The katydid eats grass and leaves (it's a consumer), and birds, snakes, and lizards eat the katydid (making them secondary consumers). The katydid's camouflage adaptation affects the entire ecosystem: when katydids are harder to see, fewer get eaten, so their population grows. This means more food for predators, but also more katydids eating plants. The green coloring of both the katydid and its plant environment is connected to how energy flows through the ecosystem—plants use sunlight to make food, katydids eat the plants, and predators eat the katydids. If the environment changed (like if plants turned brown in autumn), the katydid's camouflage would become less effective, changing survival rates and population numbers throughout the entire community.

Discussion Questions

1. Why do you think the katydid is green instead of red or blue? (Bloom's: Analyze | DOK: 2)

2. If a katydid lived on tree bark instead of grass, what color do you predict it might be, and why? (Bloom's: Synthesize | DOK: 3)

3. What would happen to a population of bright pink katydids if they lived in a grassy field? Explain your thinking. (Bloom's: Evaluate | DOK: 3)

4. Can you think of other animals that use camouflage? How does their coloring or pattern help them survive? (Bloom's: Apply | DOK: 2)

Potential Student Misconceptions

Misconception 1: "The katydid turned green on purpose to hide from predators."
Clarification: The katydid didn't choose its color or decide to hide. Instead, over many, many generations, katydids that were naturally born green (because of their genes) were more likely to survive and have babies. Those babies inherited the green color genes and also survived better. This happened slowly over thousands of years through natural selection—it's not something the katydid does during its lifetime.

Misconception 2: "Camouflage is the same as invisibility—the katydid completely disappears."
Clarification: Camouflage doesn't make an animal invisible; it just makes it harder to see. If you look carefully enough or if the katydid moves, you can still spot it. The green color simply helps it blend in so a hungry bird flying overhead or a lizard hunting in the grass has trouble noticing it at first glance.

Misconception 3: "All katydids are the same shade of green, so they're all equally camouflaged."

Clarification: Just like people have different heights and hair colors, katydids have variation in their green coloring. Some are darker green, some lighter, and some might have yellow or brown tinges. The ones that match their specific environment best (like a katydid that's the exact shade of summer grass) have the best chance of surviving because they're the hardest to spot.

Extension Activities

1. Camouflage Hunt Activity: Create a classroom "habitat" using green poster board, real grass, and paper cutouts of katydids in various colors (green, yellow, red, blue). Have students search for each colored katydid and record how long it takes to find each one. Chart the results to show that green katydids are hardest to find—connecting the data to survival advantage.

2. Design Your Own Adaptation: Provide students with images of different habitats (desert, snow, forest, ocean). Ask them to design and draw an imaginary creature that would be well-camouflaged in each habitat, explaining how its color and pattern match the environment. Students can share their designs and defend why their adaptations would help the creature survive.

3. Adaptation Research Project: Assign students to research another animal that uses camouflage (stick insect, leaf-tailed gecko, Arctic fox, etc.). Students create a poster or digital presentation comparing their animal's camouflage to the katydid's, identifying similarities and differences in how each adaptation works.

Cross-Curricular Ideas

Mathematics: Data Collection & Graphing
Have students conduct the Camouflage Hunt Activity described in the extension section, then create bar graphs or pictographs showing how many seconds it took to find katydids of different colors (green, yellow, red, blue). Students can calculate averages, compare data, and draw conclusions: "Which color was found fastest?" and "What does this tell us about survival?" This connects data analysis skills to the biological concept of adaptation.

English Language Arts: Animal Adaptation Writing
Students can write an imaginative "day in the life" narrative from the perspective of a katydid, describing how its green color helps it survive a day in the grass while avoiding predators. Alternatively, students can read and discuss picture books like The Mixed-Up Chameleon by Eric Carle, then write their own adaptation fable explaining why a particular animal has its specific coloring. This builds comprehension and creative expression while reinforcing science concepts.

Art: Camouflage Artwork & Environmental Design
Students can create mixed-media art projects by cutting out katydid shapes from green paper and hiding them in a collage of grass, leaves, and plant stems. They can also paint or draw their own imaginary creatures camouflaged in different habitats (desert, forest, snow, ocean), choosing colors and patterns that match the environment. Display student artwork to create a gallery showing the connection between art, design, and survival.

Social Studies: Human Adaptation & Indigenous Knowledge
Connect the katydid's camouflage to how humans have adapted their clothing and building designs to blend into or work with their environments. For example, discuss how people in snowy regions wear white clothing, forest dwellers use green and brown colors, and desert cultures wear light-colored, loose clothing for cooling. Students can research how Indigenous peoples around the world have adapted to their local environments through clothing, shelter, and tool design—showing that adaptation is not just a biological concept but a human one too.

STEM Career Connection

Wildlife Biologist / Animal Ecologist
Wildlife biologists study animals in nature and learn how they survive in their habitats. They observe creatures like katydids, snakes, and birds to understand how camouflage and other adaptations help animals stay safe and find food. Some wildlife biologists work in forests, grasslands, or wetlands; others work in museums or universities studying specimens and photos. They help protect endangered animals and their habitats. Average Salary: ~$68,000–$85,000 per year

Entomologist (Insect Scientist)
Entomologists are scientists who specialize in studying insects like katydids, beetles, butterflies, and ants. They learn about insect behavior, how insects adapt to their environments, what insects eat, and how insects interact with plants and other animals. Some entomologists work outdoors catching and observing insects, while others work in labs examining insects under microscopes. They help farmers protect crops and scientists understand how nature works. Average Salary: ~$70,000–$90,000 per year

Conservation Scientist / Environmental Manager
Conservation scientists protect forests, grasslands, and wetlands where animals like katydids live. They manage habitats to keep them healthy so plants and animals can thrive. They might help restore a meadow so it has the right plants for katydids to eat and hide in, or they might stop pollution from damaging animal homes. These professionals combine fieldwork with computer work and often work with communities to protect nature. Average Salary: ~$65,000–$85,000 per year

NGSS Connections

Performance Expectation:
5-LS3-1: Analyze and interpret data to provide evidence that plants get the materials they need for growth chiefly from air and water. [Note: While this PE focuses on plants, your lesson should emphasize 5-LS4-1 below]

Primary PE for This Lesson:
5-LS4-1: Develop a model to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

Disciplinary Core Ideas:
- 3-LS3.B Variation of traits in a species
- 3-LS4.B Natural selection and adaptation
- 3-LS4.C Adaptation by natural selection over time

Crosscutting Concepts:
- Patterns (The pattern of matching coloration between organism and environment)
- Structure and Function (How the katydid's green color functions to protect it)
- Cause and Effect (Predation pressure causes evolution of camouflage over generations)

Science Vocabulary

* Camouflage: When an animal's color or pattern helps it blend in with its surroundings so predators can't see it easily.

* Adaptation: A special body part or behavior that helps an organism survive and do well in its environment.

* Predator: An animal that hunts and eats other animals for food.

* Natural Selection: The process where organisms with traits that help them survive are more likely to have offspring and pass those traits to the next generation.

* Coloration: The color or pattern of an animal's body or skin.

* Variation: Differences in traits among individual organisms of the same species.

External Resources

Children's Books:
- Animals in Disguise by Joyce Milton (Random House) – Simple explanations of camouflage with colorful illustrations
- The Mixed-Up Chameleon by Eric Carle (Thomas Y. Crowell) – A picture book about adaptation and color change
- Hiding and Camouflage by Deborah Underwood (Lerner Publications) – Explores why animals need camouflage with photographs
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Teacher Notes: This lesson uses an observable phenomenon (the katydid's invisibility in grass) as the "hook" to teach abstract concepts like natural selection and adaptation over time. Fifth graders are cognitively ready to think about cause-and-effect relationships across generations, making this an ideal grade level for connecting camouflage to evolutionary processes. Use the discussion questions to scaffold thinking from concrete observations ("Why is it green?") to more complex reasoning ("What happens to populations over time?").