

Topic: Adaptations: Toothpicks in Hiding

Alabama Science Standard(s)

7: Ecosystems: Interactions, Energy, and Dynamics: Population Dynamics 6: Analyze and interpret data to predict how environmental conditions, genetic factors, and resource availability will impact the growth of individual organisms and populations of organisms in an ecosystem.

7: Unity and Diversity: Natural Selection 17: frequency of specific traits to enhance survival and reproduction of a population.

- MS-LS4-2: Use a model to describe how variations in traits among organisms affect survival and reproduction in a specific environment.
- MS-LS4-4: Construct explanations, based on evidence, for how natural selection leads to adaptations that help organisms survive in particular habitats.

Lesson Objective:

Students will be able to:

- Explain how an animal's color can help it survive in a specific habitat.
- Describe camouflage as a physical adaptation that reduces the chance of being eaten.
- Use data from an investigation to explain why some traits are more successful than others.
- Predict how populations might change over time based on survival advantages.

Background:

In the state of Alabama, many organisms rely on camouflage to survive in diverse environments such as forests, grasslands, wetlands, and agricultural areas. A grasshopper, a snowshoe rabbit, and even a military vehicle all demonstrate the use of camouflage, or the ability to blend in with surrounding conditions.

In Alabama's fields and grassy areas, grasshoppers blend into green plants to avoid predators like birds and reptiles. While snowshoe rabbits are not native to Alabama, their seasonal color change provides a clear example of how animals adapt to different environments, similar to how Alabama species adjust to seasonal changes in vegetation. Military vehicles are painted to match natural landscapes much like Alabama's wooded and rural terrain. Camouflage is a type of adaptation that helps organisms survive by reducing visibility, making them less likely to be eaten by predators or more successful when hunting prey.

Vocabulary:

- Camouflage:** A coloring or pattern that helps an organism blend into its surroundings
- Adaptation:** A physical or behavioral trait that helps an organism survive
- Predator:** An organism that hunts others for food
- Prey:** An organism that is hunted by others

Academic Language:

Grade 6-8 (can be aligned to other grades/subjects)	Length of Lesson: 1 hour	Materials: Toothpicks Timer
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ADVANCED PREPARATION:

1. Divide students into groups of 5–7.
2. Assign one student per group as timekeeper.
3. Each group receives:
 - 250 toothpicks total
 - 50 toothpicks, each of five different colors
 - One color should closely match the grass or ground color.
4. Mark a 10 m × 10 m grassy area for each group.
5. Randomly scatter the toothpicks throughout the area.

SETTING THE STAGE:

Explain that:

- Toothpicks represent prey animals.
- Students represent predators.
- The goal is to investigate how color affects survival.

Have each group:

- Observe and describe the environment
- Record observations (grass color, height, visible soil)

INSTRUCTIONS:

1. The timekeeper signals the start.
2. Predators hunt for toothpicks for 1 minute.
3. At the stop signal, all students freeze.
4. Groups:
 - Count toothpicks by color
 - Record totals on the data chart
 - Calculate the percentages of each color collected

EVALUATION:

Students should answer in complete sentences using evidence:

1. Was there variation in how many toothpicks each predator collected? Why?
2. Which toothpick color was best camouflaged? Worst? Explain using data.
3. If toothpicks were living organisms, how would the population change over many generations?
4. How would results change in:
 - A parking lot
 - A sandy beach
 - A red carpetExplain your reasoning.

EXTENSION:

1. Engineering Challenge:

Design a new hunting method that results in equal numbers of each color being collected. Explain how and why it works.

2. Critical Thinking Scenario:

Brightly colored butterflies survive better than dull ones even though dull colors blend in.

- What might explain this?
- (Possible concepts: warning coloration, toxicity, predator learning)

ALABAMA in 5: Turtles

Turtles provide a clear example of how camouflage helps organisms survive in Alabama's natural environments. Like grasshoppers and other animals, many turtles use camouflage to avoid predators and hunt for food. In Alabama's rivers, ponds, wetlands, and forests, turtles often have shells and skin colored in shades of brown, green, or olive that match mud, leaves, and vegetation. This coloring helps them remain hidden from predators such as birds, raccoons, and larger fish. Some turtles also use patterns on their shells that break up their outline, making them harder to see. Camouflage is a type of adaptation, or trait, that increases a turtle's chance of survival in its habitat. By blending into their environment, turtles are less likely to be eaten and can more easily approach food, demonstrating how adaptations help organisms survive in Alabama's ecosystems.

REFERENCES:

U.S. Fish and Wildlife Service. (n.d.). *Adaptations of animals*. <https://www.fws.gov>

Alabama in 5: Turtles (Box Turtle)