BioEd℠

Mimicry and Camoflage

by

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Mimicry and Camouflage

Students explore the differences between mimicry and camouflage, and identify adaptations found in different organisms that illustrate specific survival strategies.

Organisms use many different strategies to avoid predators or to deceive potential prey animals. Some organisms have evolved outer appearances and behaviors that allow them to blend in or match with part of their surroundings. This strategy, known as camouflage, is employed, by many species. The familiar walking stick, for example, has an angular, twig-like appearance and can remain stationary for long periods of time to escape detection by possible predators. Some organisms even change colors to match their environments. The snowshoe hare develops a seasonal white coat in winter to blend in with snow and reverts to a brown coat each spring. The green anole, a tree-dwelling lizard native to the southeastern United States, changes colors from green to yellow to brown depending on its immediate surroundings. Anoles eat small insects, so their coloration makes them almost invisible to their prey and protects them from predators. Other examples of camouflage can be found among beetles, caterpillars, snakes, moths, frogs and grasshoppers.

Another tactic is to mimic or appear similar to another organism or part of an organism. For example, the viceroy butterfly, which is very tasty to birds, protects itself by mimicking the appearance of the foul-tasting monarch butterfly. This type of mimicry, where one species mimics another that is distasteful or armed with spines, stingers or toxic chemicals (such as snake venom), was first described by the English naturalist, Henry Walter Bates. Bates studied butterflies in the Amazon during the nineteenth century. Another kind of mimicry involves having one body part that imitates another body part in order to increase survival. Many butterfly and fish species have large eye spots that can be flashed rapidly to surprise a predator. This type of mimicry, sometimes referred to as self-mimicry, also can be used to lure prey. For example, the alligator snapping turtle has a worm-like appendage on its tongue that tempts passing fish to come a little closer.

SETUP

Search the Internet for photos listed in "Materials."

For each group of four students, prepare one set of photos of a monarch butterfly and a Viceroy butterfly (see http://www.forestryimages.org/, enter "butterfly" in search field). Make copies of the student pages.

ENGAGE

1. Give each group of four students a pair of photographs (one each of a viceroy and monarch butterfly, see http://www.naturalplanet.org/lessons/monarch-viceroy.htm).
2. Have student groups discuss how the butterflies in the photographs are alike, and how they are different.
3. As a class, create a T-chart of similarities and differences between the two butterflies. Or distribute copies of the page, "Are They Different?" for use with student groups or individual students.

NATIONAL SCIENCE EDUCATION STANDARDS

Characteristics of organisms

- Each plant and animal has different structures that serve different functions in growth, survival, and reproduction.

Organisms and their environment

- An organism's patterns of behavior are related to the nature of that organism's environment.

TIME

Class: Two 45-minutes sessions

MATERIALS (see Setup)

- Photos of the following
  Animals that use mimicry
  - Hawk moth caterpillar and snakes
  - Drone fly and wasp
  - Coral snake and Red Milk snake
  - Coral snake and King snake
  - Hawk moth caterpillar and snakes
  - Longhorn beetle and ants
  - Monarch butterfly and Viceroy butterfly (see Setup)
  - Owl butterfly and eyes of a predator, such as an owl
  - Pacific gopher snake and Rattlesnake

  Animals that use camouflage
  - Polar bear in snow
  - Copperhead snake on fall leaves
  - Lion in yellowish grasslands

  Animals that use counter-shading
  - Fish image showing its dark back and light underbelly
- *Nature News* article, "Jellyfish capture prey with crimson bait," http://www.bioedonline.org/news/nature-news/jellyfish-capture-prey-with-crimson-bait/
- Copy of "Are They Different?" and "Is It Mimicry or Camouflage" pages

4. Discuss the meaning of mimicry. Explain to students that butterflies are often eaten by birds. The Monarch is foul-tasting or poisonous to birds, while the Viceroy is not poisonous or foul-tasting. Ask students, *Which butterfly is mimicking the other? Why?*

EXPLORE

1. Give each group of students photographs of animals that mimic another organism in order to gain some type of advantage, or special help to survive in its environment.
2. Instruct each group to examine the photographs, Ask students, *Is the animal mimicking another organism? If so, what organism? What is the advantage? Does the animal possess a structure, coloration, or pattern that mimics another type of organism or part of an organism? If so, what is it? Why is it an advantage to the organism?*

EXPLAIN

1. Each group will share their group's findings about one of the photographs they received. Discuss each as a class and reach consensus on all the organisms in the photographs.
2. Read or summarize the *Nature News* article, "Jellyfish capture prey with crimson bait," (http://www.bioedonline.org/news/nature-news/jellyfish-capture-prey-with-crimson-bait/). Ask students, I*s this article is describing a form of mimicry?* (The article describes a jellyfish with a tentacle that "mimics" a type of food for deep sea fish. The tentacle is used is to lure the fish close to the jellyfish so that it can capture the fish as its own food.) After discussing it, ask students, *Can you think of similar examples?*

ELABORATE

1. Review the meaning of mimicry with the class, and introduce or review the term, camouflage.
2. Discuss how camouflage and mimicry are different, and how they are alike. For example, both camouflage and mimicry provide an advantage for an organism, and both involve the organism copying either another organism or part of its environment. The primary difference is that, with mimicry, an organism copies another organism or part of an organism, while camouflage involves the copying of some part of the environment.
3. Distribute (or have students locate and bring to class) pictures of animals that mimic other organisms and animals that use camouflage in their environments. Have students create a T-chart showing which animals exhibit mimicry and which employ camouflage.
4. Ask groups to share the information on their T-charts with the class and explain how they decided which animals to put into each category.

EXTENSION

Based on students' prior knowledge of animals, have them each create their own animal that relies on either camouflage or mimicry to ensure survival. Then have students present their animals to the class.

What is Countershading?

As a predator looks down into the water, with the light behind them, the water appears dark and the fish blends. Conversely, if the predator is looking up toward the surface, the water is lighter and the belly of the fish blends with the surroundings.)

ADDITIONAL RESOURCES

- "The Arts of Deception: Mimicry and Camouflage," by Rhett Butler (http://rainforests.mongabay.com/0306.htm).
- "Hid in Plain Sight," by Thomas Beard Trocco. (http://www.thirteen.org/edonline/ntti/resources/lessons/s_hide/index.html).
- "Deceptive Coloration," by NatureWorks (http://www.nhptv.org/natureworks/nwep2a.htm).
- "Critter Camouflage," by Mackie Rhodes (http://www.scholastic.com/teachers/lesson-plan/critter-camouflage).

Are They Different?

Monarch Butterfly	Viceroy Butterfly

Is It Mimicry or Camouflage?

Mimicry	Camouflage