



pets in the
classroom

Cloaked in Color: Designing Animal Camouflage

Adapted from	Pets in the Classroom Animal Adaptations Lesson Plan
Pet: fish	Class: 3-5

<p>Brief Overview: Students will investigate and understand that adaptations allow animals to satisfy life needs and respond to the environment by designing their own pattern of animal coloration (e.g., countershading camouflage) that might help an animal survive in its habitat. They will observe the physical adaptations of their class pet (e.g., fish or other animals) and consider how those features benefit the animal.</p> <p><i>This lesson can be easily adapted for other grades or pets.</i></p>	<p>Lesson Breakdown Lesson 1: What is Hiding? Lesson 2: Design a Fish Lesson 3: Fashion Show</p>
<p>Essential Question How can animal coloration act as a super suit, aiding survival in the wilderness?</p>	

<p>Subjects</p> <ul style="list-style-type: none"><input checked="" type="checkbox"/> Science<input checked="" type="checkbox"/> ELA<input checked="" type="checkbox"/> Math<input checked="" type="checkbox"/> STEM<input checked="" type="checkbox"/> Art	<p>Stem Connections</p> <p>Science: adaptations, camouflage Technology: video of Fashion Show (optional) Engineering: creation of camouflage costumes Math: spatial relationships</p>
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Other

Performance Expectations/ Standards

NGSS Alignment:

LS4.B: Natural Selection: Understand that animals and plants with inherited traits that survive and reproduce in a particular environment pass those traits on to their offspring.

LS4.D: Biological Engineering: Construct a model to describe that animals are designed to solve problems that help them survive and thrive in their environment.

ETS1.A: Defining and Delimiting Engineering Problems: Define the criteria and constraints of a design problem that involves the function of animals other than humans.

CCSS Math Alignment:

5.G.A.2: Represent spatial relationships mathematically.

CCSS ELA Alignment:

RI.3.7: Use information from multiple print and digital sources.

W.3.2: Write informative texts to examine a topic.

SL.4.6: Adopt roles for specific purposes and tasks.

I CAN statements

- explain how animal adaptations help them survive in their environment.
- identify and describe different types of camouflage patterns.
- design my own animal with a specific camouflage pattern based on its habitat.
- explain how my animal's camouflage would help it blend into its surroundings.
- use observational drawing skills to communicate my animal's design effectively.

Materials

- [Can You Spot the Hidden Animal Presentation](#)
- [Cloaked in Color Student Worksheet](#)
- Butcher paper, colored markers, scissors, glue, tape, etc.
- Video camera (optional)

Teacher Background

In the underwater world, survival often hinges on the ability to blend seamlessly into the environment. Fish, facing a diverse array of predators and prey, have honed camouflage to a remarkable art form. Their strategies are as varied as the aquatic habitats they inhabit, utilizing a captivating mix of color, pattern, and even behavior to outsmart their rivals.

One of the most common tactics is **cryptic coloration**, where fish match the background of their surroundings. Coral reef dwellers, for example, often boast vibrant hues and intricate patterns that mimic the coral formations they inhabit. Similarly, sand-dwelling flatfish adopt dull, sandy tones, virtually disappearing from the watchful eyes of predators.

Beyond simple color matching, fish employ **disruptive patterns** to break up their outline. Zebra stripes on a clownfish, for instance, confuse predators by making it difficult to discern the fish's true shape and movement. Another strategy is countershading, where the fish's upper body is darker and the underside lighter, effectively camouflaging it against the contrasting light and dark zones of the water column.

Fish also take advantage of light itself. Some species possess reflective cells called **iridophores** that adjust their pigment based on the surrounding light, allowing them to blend seamlessly into changing underwater environments. Others utilize **bioluminescence**, producing their own light, to create dazzling displays that distract predators or lure prey.

The fascinating world of fish camouflage is not merely a passive strategy. Many species actively adjust their posture and movement to further enhance their invisibility. Flounders, for example, can even bury themselves in sand, leaving only their eyes exposed.

Understanding the diverse and ingenious camouflage strategies employed by fish offers valuable insights into evolutionary pressures and adaptation. It also highlights the intricate relationship between fish and their environment.

Lesson 1: What is Hiding?

Time	Materials	Activity
25 mins	Can You Spot the Hidden Animal Presentation Cloaked in Color	Show this slide presentation of various animals with camouflage patterns Ask students if they can guess why these animals have such markings. Discuss the concept of camouflage and how it helps animals blend into their surroundings.

	Student Worksheet	During the presentation, help the students to complete the graphic organizer in their Student Worksheet.
5 mins		Have the students turn to a partner and share examples of other animals they know of that use camouflage and discuss the different environments they live in.
15 mins	Cloaked in Color Student Worksheet	Have the students make observations of their class pet and add these observations to their Student Worksheet.

Lesson 2: Design a Fish		
Time	Materials	Activity
		<p>BEFORE CLASS PREPARATION: Create an artificial habitat that mimics the bay; for example, dark butcher paper placed on the classroom floor is the darker colored sea floor and light colored paper is the sky</p>
45 mins	Butcher paper, colored markers, scissors, glue, tape, etc. Cloaked in Color Student Worksheet	<p>Introduce the students to the “bay” and to their challenge: they will work together to brainstorm ideas about what kind of coloration adaptation would benefit a fish living in this habitat, taking into account predators.</p> <p>They will design their costume in their Student Workbooks and then construct the costume to be worn by a student in the group.</p> <p>Remind students of the different types of camouflage and encourage them to incorporate those principles into their animal's design. They can consider factors like the habitat's colors, predators, and prey. Encourage them to be creative and think about how their design would help the animal survive in its chosen environment.</p>

Lesson 3: Fashion Show

Time	Materials	Activity
5 mins	Cloaked in Color Student Worksheet	Give the students time to complete the presentation outline in their Student Worksheet.
30 mins		<p>After the coloration pattern costumes are designed, assembled, and put on, the students will work together to present their models orally. They will analyze and describe their adaptations, saying a few words about their unique features and how they help them survive in their habitats using key vocabulary.</p> <p>Optional: Create a video of the Fashion Show for students to watch later.</p>
10 mins		Conduct a classroom discussion about the costumes and how the classroom pet's adaptations and colorations compare and contrast with their own design

Differentiation

For students who need additional support:

- Complete the graphic organizer as a class on a whiteboard
- Provide students with a word bank or sentence frames to help them articulate their findings.
- Allow students to present their designs in different formats, such as drawings, paintings, or even digital creations.

For students who need additional challenges:

- Encourage students to write a story from the perspective of an animal, describing how their camouflage helps them survive in their environment.
- Create a mini-play where students act as camouflaged animals in their chosen habitats. Each animal must overcome challenges while remaining undetected, showcasing the benefits of their "natural disguise."

Assessment				
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Content	The description of the coloration design included a strong explanation for how it helps the animals survive in its habitat, providing at least 2 examples.	The description of the coloration design included an explanation for how it helps the animals survive in its habitat.	The description of the coloration design included a weak explanation for how it helps the animals survive in	The description of the coloration design did not include an explanation for how it helps the animals survive in its habitat
Vocabulary (adaptation, prey, predator, diet, camouflage, habitat)	The students used almost all the target vocabulary in their presentations.	The students used at least 2 target vocabulary words in their presentation.	The students used a target vocabulary word in their presentation.	The students used no target vocabulary words in their presentation.
Effort	All of the students' voices were heard and there was a fair distribution of work	Most of the students' voices were heard and there was a mostly fair distribution of work	Some of the students' voices were heard	The students did not describe or explain their projects

Extension

- Research specific animals and create presentations about their unique camouflage adaptations.
- Learn about the science behind camouflage, exploring topics like light refraction and animal vision.
- Design camouflage clothing or accessories for humans based on animal inspiration.