

Designer Colors: Investigating the Relationship of Body Color and Habitat Selection

Objective

The learner will determine if a GloFish® fluorescent fish is more attracted to a home that shares its same color.

The learner will design a coloration pattern that allows a fish to be camouflaged in its environment.

Introduction

Fish possess a variety of adaptations that allow them to blend in with their environment to avoid detection by other animals. Bright colors, odd shaped fins, body markings and counter shading are just a few of the adaptations used by fish to help them be less visible to other animals. In nature, brightly colored fish often hide in a brightly colored habitat in order to help them avoid predators. Camouflage is an adaptation employed by a variety of animals concealing them from other organisms by making them appear to be part of the surrounding environment.

In this activity, you will determine if GloFish will select a surrounding environment that is similar to their body color and design a fish body color pattern that allows it to be camouflaged in a specific environment.

National Standards Addressed

Science as Inquiry A—Abilities necessary to do scientific inquiry

Life Science B—Populations and ecosystems

Life Science B—Diversity and adaptations on organisms

Materials Per Group

3 to 6 Starfire Red® GloFish®

Clear shoebox (or small critter container) filled with aquarium water

1 strip of red cellophane 5 cm x 50 cm

Permanent marker

Ruler

Timer or watch with a second hand

20cm x 20cm squares of brightly colored wallpaper (or other fabric)

Map pencils

Scissors

3 x 5 note card

Procedures

Part A: Habitat Selection

1. Use the ruler and marker to draw a vertical line dividing the clear plastic shoe box into two equal halves.
2. Tape the strip of red cellophane to the outside of the left half of the clear plastic shoe box. The cellophane should cover the entire outer edge of the left half of the shoe box. As shown in the sketch below.



3. Fill the shoe box $\frac{2}{3}$ full with aquarium water.
4. Place the Starfire Red® GloFish® into the shoe box aquarium and observe their location.
5. Record the number of fish found on each side of the box every 30 seconds for the next 10 minutes. Record your data in *Data Table 11.1*.
6. Calculate the average number of fish found on each side of the shoe box aquarium using the data you collected.
7. Prepare a bar graph depicting the average number of fish found on each side of the shoe box aquarium. Be sure to provide a title and label each axis.
8. Answer the discussion questions.

Part B: Creating a Camouflaged Fish

1. Obtain a paper fish pattern and a 20cm x 20cm habitat sample from your teacher.
2. Use map pencils to color your paper fish using any pattern you chose that would help your fish be camouflaged when placed on the habitat sample.
3. Cut out your paper fish and tape it in place on the habitat sample.
4. On the 3x5 note card provided, write a paragraph explaining camouflage and its usefulness to fish.
5. Write your name on the upper left side of the habitat sample and display your work in the location assigned by your teacher.

Data Table 11.1 - Numbers of Fish in each Side of Habitat

Time/Seconds	Left Side/Red	Right Side/Clear
30 seconds		
1 minute		
1 minute 30 seconds		
2 minutes		
2 minute 30 seconds		
3 minutes		
3 minute 30 seconds		
4 minutes		
4 minute 30 seconds		
5 minutes		
5 minute 30 seconds		
6 minutes		
6 minute 30 seconds		
7 minutes		
7 minute 30 seconds		
8 minutes		
8 minute 30 seconds		
9 minutes		
9 minute 30 seconds		
10 minutes		
Average		

Graph Title _____



Discussion Questions:

1. Why do fish in the wild need to blend into their surroundings?
2. Did the Starfire Red® GloFish® spend more time on the red side or the clear side of your shoe box aquarium? Explain your answer using data.
3. List at least 3 other examples of organisms you have seen that blend into their surroundings.
4. List at least 2 other ways an organism can protect itself from predation.
5. A predator /prey relationship is just one type of relationship that occurs in an ecosystem. Look on the Internet or in reference books and give names and examples of other types of relationships that organisms will share in the wild, such as commensalism, parasitism, and mutualism.

Elaborations and Extensions

Have students design an experiment to determine whether or not other breeds of fish exhibit environmental preferences.

Designer Colors: Investigating the Relationship of Body Color and Habitat Selection *Answer Sheet*

Intended Grade Level

6th, 7th, 8th

Teacher Information

If your aquarium doesn't contain sufficient numbers of Starfire Red® GloFish®, you can conduct the experiment using cellophane to match the color of the fish being used. Red, green, and yellow cellophane can be purchased at local hobby store. If cellophane is unavailable, use colored paper or construction paper to color the left end of the shoe box aquaria. Plastic shoe boxes may be replaced by any similar sized, transparent container that can serve as individual aquaria for the student groups.

You will need to prepare copies of the fish patterns for Part B in advance of the activity.

Colorful wrapping paper, wall paper or sections of fabric will make excellent "habitats" for the fish in Part B. Using a wide variety of patterns among the students will encourage creativity. Display student work in the classroom or hallway. Bar graphs and data tables could be included in the display of student work.

Discussion Questions and Possible Answers

1. Why do fish in the wild need to blend into their surroundings?

Fish blend into their surroundings so they won't be easily seen by predators.

2. Did the Starfire Red GloFish spend more time on the red side or the clear side of your shoe box aquarium? Explain your answer using data.

Student answers should be based on the data collected during the experiment. The fish may not exhibit a clear trend due to the many external influences that will impact the experiment such as student movement and noise levels that tend to stimulate the fish.

3. List at least 3 other examples of organisms you have seen that blend into their surroundings.

Examples could include deer in a forest, lizards changing colors to blend in to different surroundings, certain snakes, turtles, moths, walking stick insect, etc.

4. List at least 2 other ways an organism can protect itself from predation.

Some organisms can have big teeth, thorns, stingers, nasty smells, and quills or spikes to help protect themselves from predators. Other organisms can have bright colors that warn predators that the organism is poisonous. Some organisms mimic other deadly or poisonous organisms to fake out the predators.

6. A predator /prey relationship is just one type of relationship that occurs in an ecosystem. Look on the Internet or in reference books and give names and examples of other types of relationships that organisms will share in the wild, such as commensalism, parasitism, and mutualism.

Commensalism – relationship where one organism is benefited but the other organism is neither helped nor harmed, ex. – seeds with hooks dispersing to another area by hooking onto a mammal’s fur, a clown fish is protected from predators by hiding in the sea anemone stinging tentacles

Parasitism – relationship where one of the organisms benefits and the other is harmed, ex. - tick on a dog, tapeworms in a cat, heartworms in a dog

Mutualism – relationship where both of the organisms benefit from one another, ex. – bacteria in the digestive system of humans helps break down food for the human while at the same time they use the human food for energy, some types of fish will clean the parasites off larger fish – the cleaner fish get their food when they eat the parasites and they clean the harmful parasites off the larger fish

Part B: Fish Patterns

