

Name _____ Period _____ Date _____

Who's Afraid of the Big Bad Predator? Designing an Experiment to Measure Prey Response

Objective

Students will design and conduct an experiment to determine which simulated predator fish will cause the strongest escape response in GloFish® fluorescent fish.

Introduction

GloFish fluorescent fish can live in harmony with any other community fish. As omnivores, GloFish have a varied diet and will eat a variety of foods. GloFish are also a prey species to larger predatory fish such as cichlids. In nature, prey responses to the presence of a predator are key to the survival of the prey species. Rapid recognition of predator size, shape and even odor help prey fish survive in a highly competitive environment. Prey fish reactions may vary depending on the type and location of the predator. In this investigation, you will create a simulated predator from a sheet of plastic and design an experiment to answer the following question: Which type of simulated predator fish causes the strongest prey response in a population of GloFish?

National Standards Addressed

Science as Inquiry A—Abilities necessary to do scientific inquiry

Materials Per Group

Aquarium filled with dechlorinated (treated) water
3 to 6 GloFish®
Two pieces of vinyl or plastic
Scissors
Two long drink straws
Stapler
Permanent marker

Safety Precautions

Make sure the students understand that the fish should not be harmed in any way during the experimentation. Poking, prodding, or pushing the GloFish with the simulated predator should not be allowed.

Procedures

Part A: Designing Your Experiment

1. GloFish® are genetically modified Zebra danios. Conduct research in the library and/or on the internet to gather background information that you will need to formulate your hypothesis.
2. Design two simulated predators. You may want to use one of the patterns found on the last page of this activity. As you design your two predators, you should consider body size, body shape, stripes and markings as these may impact your results.
3. Once you have the simulated predators' bodies cut out and marked as desired, staple them to the end of a long plastic drinking straw. The straw will serve as a handle as you place the predator into the GloFish's environment.
4. Formulate your hypothesis as to which of the two simulated predators will cause the strongest response.
5. Design an experiment to test your hypothesis. Record the steps that you will follow in the space provided on the student answer sheet. As you design your experiment make sure that you avoid any procedures that could possibly cause any harm to the GloFish. Be sure to include a control in your experiment.
6. Once your design is complete, request approval of the design from your teacher.

Part B: Conduct the Experiment

1. Secure the necessary supplies for your experiment.
2. Design a data table for your experiment in the space provided on the student answer sheet.
3. Conduct your experiment and record the data collected in your data table.
4. Prepare a labeled graph of your data.
5. Write a conclusion paragraph based on the data you have collected. Your conclusion paragraph should include the following: a) Explain whether or not the data supports your hypothesis. b) Identify any sources of error in your experiment. c) Explain how the errors could be eliminated. d) Explain what further investigations could be conducted based on the data collected.
6. Be prepared to share your conclusion statement as well as a brief description of your experiment to the class.

Purpose of the Experiment:

Hypothesis:

Materials Used:

Procedure:

Data Table:

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Graph of Results:

Graph Title: _____



Conclusion Statement:

Discussion Questions:

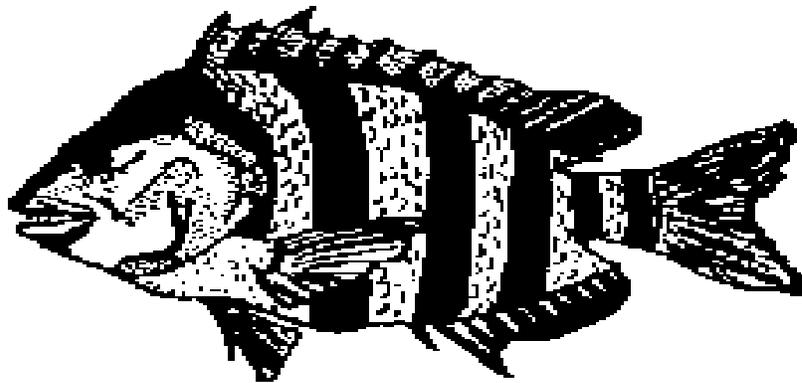
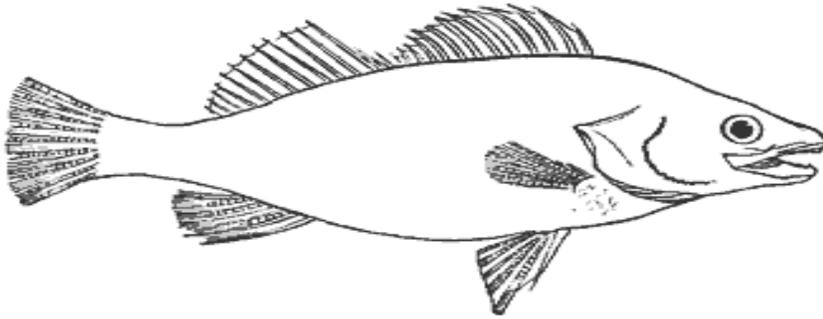
1. List the variables that you held constant during your experiment.
2. Describe the control used in your experimental design.
3. How do your results compare with the results obtained by other groups?
4. Does your data support your hypothesis? Explain your answer.
5. Name two specific changes that you would make if you were to perform the experiment again.

Elaborations and Extensions

This activity could be extended by having the students design another experiment to explore questions that result from their original experiment.

Have students trade their lab designs and conduct the other groups experiment while providing feedback and critiquing the procedural instructions.

Simulated Predator Patterns



Lesson plan for GloFish® fluorescent fish; Starfire Red®, Sunburst Orange®, and Electric Green®. For additional FREE lesson plans, please visit the **GloFish.com** Classroom page at <http://www.glofish.com/classroom.asp>.

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Who's Afraid of the Big Bad Predator?

Designing an Experiment to Measure Prey Response

Intended Grade Level

9th, 10th, and 11th

Teacher Information

Vinyl folders found in school supply sections of retailers are an excellent source of vinyl to use for the predators. The vinyl needs to be thin enough to cut with normal scissors but thick enough to hold its shape when placed in the water.

Markers used during predator design must be water proof since the predator will be placed in the aquarium with the GloFish®.

Inquiries using experimental design activities can be challenging to students during the initial stages. However, these types of labs have a profound impact on the students understanding of concepts as well as in the development of scientific process skills making them well worth the effort. Students will benefit from structured, guiding questions during the planning stages of their experimental design.

Set aside time to have each group share their results with the entire class. Knowledge of this accountability will encourage them to carefully design their experiments and present their conclusions and data in a way that is simple for others to comprehend.

Discussion Questions and Possible Answers

1. List the variables that you held constant during your experiment.

The exact list of variables will depend on the experimental design proposed by the students. The teacher should expect the students to use the same aquarium, the same fish, introduce the predator in the same manner, etc. in the experimental designs.

2. Describe the control used in your experimental design.

Actual controls may vary. A possible control is to have a "simulated predator" that is of the same size and appearance as a GloFish.

3. How do your results compare with the results obtained by other groups?

The student data will likely vary a great deal due to the variation in experimental design. Although each group is answering the same basic question, some groups may have chosen to compare the presence and absence of stripes on the same size and shape of body while other groups may be comparing the reactions to the predator with the thin body to that of the thicker bodied predator.

4. Does your data support your hypothesis? Explain your answer.

Student responses should clearly indicate whether or not the data provides clear evidence to support or refute their hypothesis. They may also consider their data inconclusive.

5. Name two specific changes that you would make if you were to perform the experiment again.

A wide range of changes may be offered. Changes such as body markings on predators, number of simulated predators used, placement of predator, color of predator, number of GloFish® in the sample populations and other adjustments may be proposed.