Title: ***Do You Find Me Attractive: A Prey & Predator Approach***
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Background Information

Sometimes, scientists must standardize their approaches or methods to ensure their experiments are not biased. Some marine biologists and ecologists, within the Coast Waters Consortium, are assessing fish response to the BP oil spill and they standardized their approach with the help of fish traps. They are releasing fish traps and evaluating if certain organisms, that enter the trap first, affect any additional organisms from entering these traps as well. The main fish they are observing is the salt marsh killifish because it has a high ecological value that could lead to surprising results about the effects of the BP oil spill. Naturally, this fish has predators and it preys upon certain organisms, so we may be able to guess which animals would like to get into those fish traps alongside the killifish, and which would want to stay away. If it is established that their approach is not biased, scientists can continue with the remainder of their experiments.

Louisiana State Standards (Grade-Level Expectations)

SI GLE: Pose questions that can be answered by using students' own observations and scientific knowledge (SI-E-A1)
Generate testable questions about objects, organisms, and events that can be answered through scientific investigations (SI-M-A1)
SI GLE: Predict and anticipate possible outcomes (SI-E-A2)
Design, predict outcomes, and conduct experiments to answer guiding questions (SI-M-A2)
Identify independent variables, dependent variables, and variables that should be controlled in designing an experiment (SI-M-A2)
SI GLE: Use consistency and precision in data collection, analysis, and reporting (SI-M-A3)
SI GLE: Develop models to illustrate or explain conclusions reached through investigation (SI-M-A5)
Identify and explain the limitations of models used to represent the natural world (SI-M-A5)
PS GLE: Determine whether objects are magnetic or nonmagnetic (PS-E-A1)
PS GLE: Identify forces acting on all objects (PS-M-B3)

Ocean Literacy Principles

Principle 5a: Ocean life ranges in size from the smallest virus to the largest animal that has lived on Earth, the blue whale.

Principle 5d: Ocean biology provides many unique examples of life cycles, adaptations and important relationships among organisms (such as symbiosis, predator-prey dynamics and energy transfer) that do not occur on land.

Principle 5i: Estuaries provide important and productive nursery areas for many marine and aquatic species.

Time Requirement

This activity will require minimal teacher preparation. The main focus for the teacher would be cutting out the images and laminating them. The students can take a short amount of time to cut the 2 liter bottle and tape the two portions together (5 min). Students will also need about 5-10 minutes to tape the magnet to the killifish trap opening and tape magnets to the laminated images.

Materials

Self-adhesive laminating sheets
2 liter soda bottle
Tape
Scissors
Prey & Predator cut-outs (below)
Magnets (i.e., 'Magnetic Buttons' at Walmart)

Lesson Description

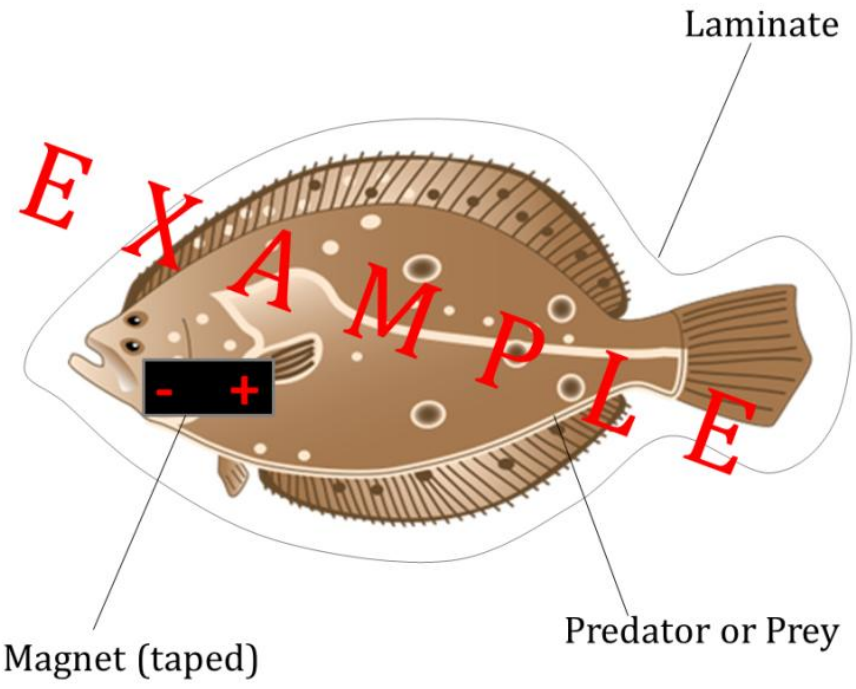
Creating the Do You Find Me Attractive: A Prey & Predator Approach Project

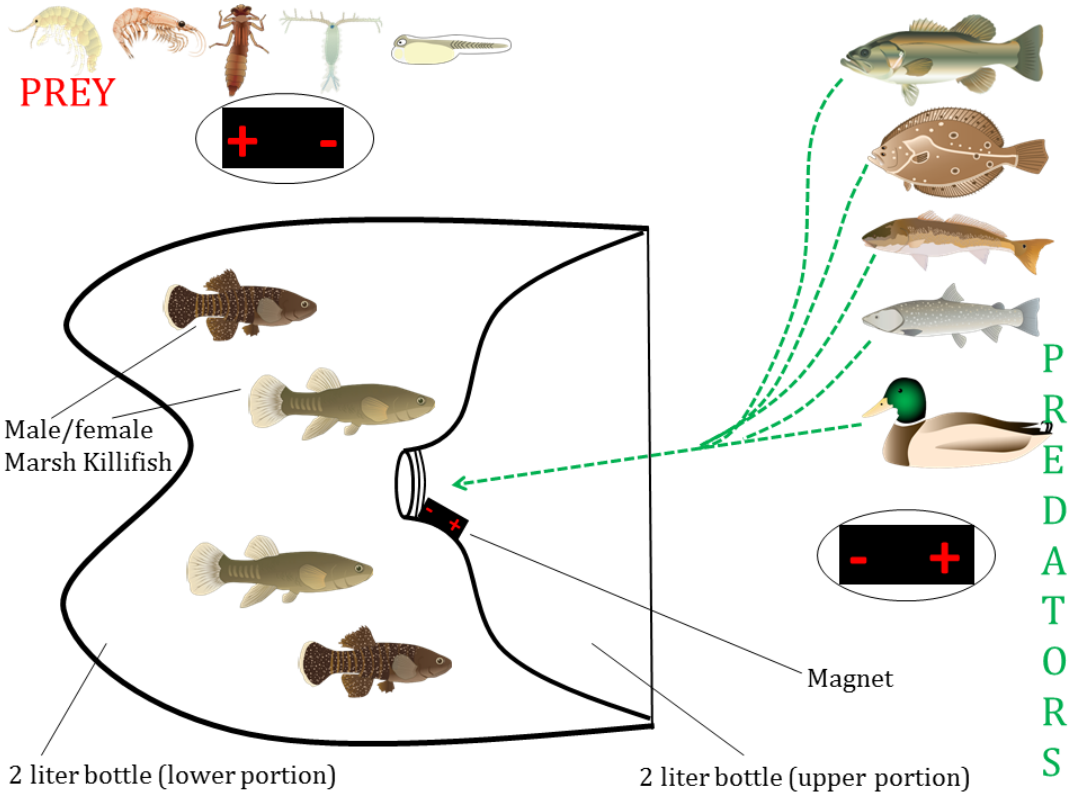
1. Use self-adhesive laminating sheets to laminate the predator and prey images below.
2. Use adhesive (i.e, tape) to attach magnets to laminated images. Make sure all the magnets for the predators are on the same side and same pole (e.g., positive or negative poles). Make sure all the magnets for the prey are opposite sides and poles from the predators (e.g., negative or positive).
3. Cut a 2 liter bottle in half about $^{2}/_{3}$ the length of the bottle (vertically; the cut should be along the start of tapering inward for the upper portion of the bottle).
4. Attach (via tape) the upper $^{1}/_{3}$ of the bottle inside the bottom $^{2}/_{3}$ of the bottle with the pouring site (opening; where you put your mouth on to consume liquid) facing the bottom portion of the bottle.

5. Tape a magnet inside the upper $^1/_3$ portion of the bottle; the magnet should be placed near the pouring site. Emulate the magnet positioning of the predator images. Make sure the magnet is the same side and pole as the predators that way the opposites can attract. Magnets should attract the predators, but repel the prey (predators: opposite poles attract; prey: same poles repel).

Methodology

Students will be creating self-made fish traps for this exercise. They main goal of this activity is to see which organisms will "enter" the fish traps because the killifish (i.e., prey) is there and which organisms will stay away from the fish traps due to the killifish (i.e., predator). The students will use the properties of magnetism to dictate which animal enters or flees the fish trap. A magnet will be placed next to the entrance of the fish trap and the opposite pole of that magnet will be attached to all the predators (opposites attract and predators want to eat prey). All the prey will have the same magnetic pole, as the one attached to the entrance of the fish trap, so that the prey will be repelled form the entrance (symbolizing prey trying to survive by fleeing from predators). Any prey or predators that react differently means that the approach is not standardized (it is biased; magnetic poles are on the wrong side or in wrong direction).

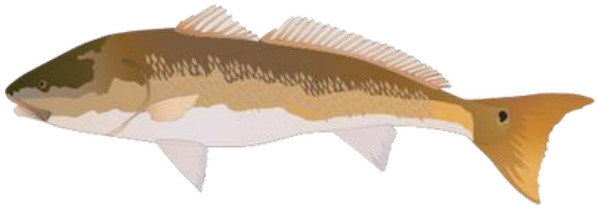



PREY
+ -
Male/female
Marsh Killifish
- +
Magnet
2 liter bottle (lower portion)
2 liter bottle (upper portion)
- +
PREDATORS

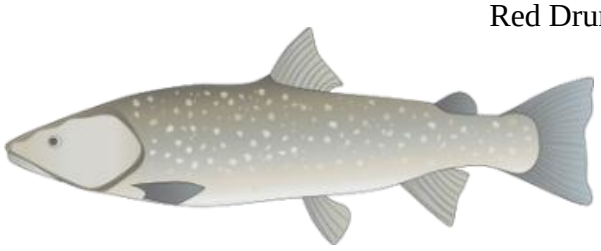
Predators

Bass

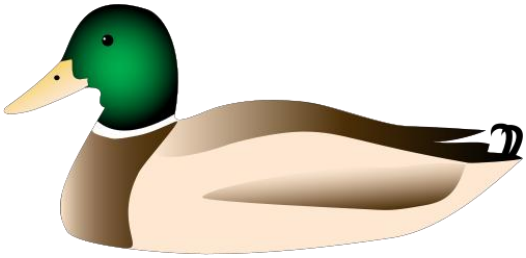
Flounder



Red Drum

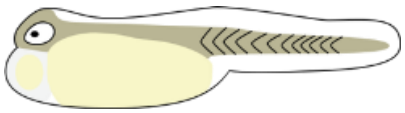


Trout

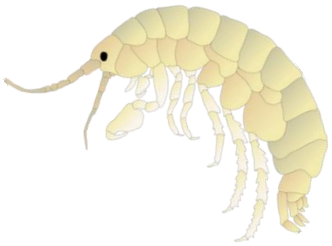


Water Fowl

Prey

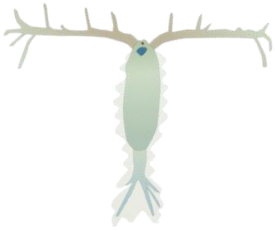


Juvenile fish



Amphipods

Small crustaceans



Copepods

Aquatic Insects

Standard Evaluation (Student Deductions)

1. Was your approach standardized (or consistent)? How do you know this?
2. Give some examples how this activity could be biased (wrong) or not standardized.
3. What are some ways that the prey and/or predators of the killifish may know they are inside the fish traps.
4. Would the killifish be classified as an herbivore, omnivore, or carnivore? Explain.
5. Would the predators of the killifish be classified as? Explain.
6. The scientists using this approach (who or who does not enter killifish traps) are actually studying effects of the BP oil spill in the Gulf of Mexico. What may be a connection between standardizing fish traps and effects of an oil spill?

The evaluation can be in the form of a test, essay, questions and answers worksheet, or any other mode of measuring retainment or comprehension of material.