

## Activity #4 - Schooling Behavior: Bonito & Swordfish

### Objective:

Students investigate the schooling behavior of fishes in a simulation activity that considers feeding and survival.

### Materials:

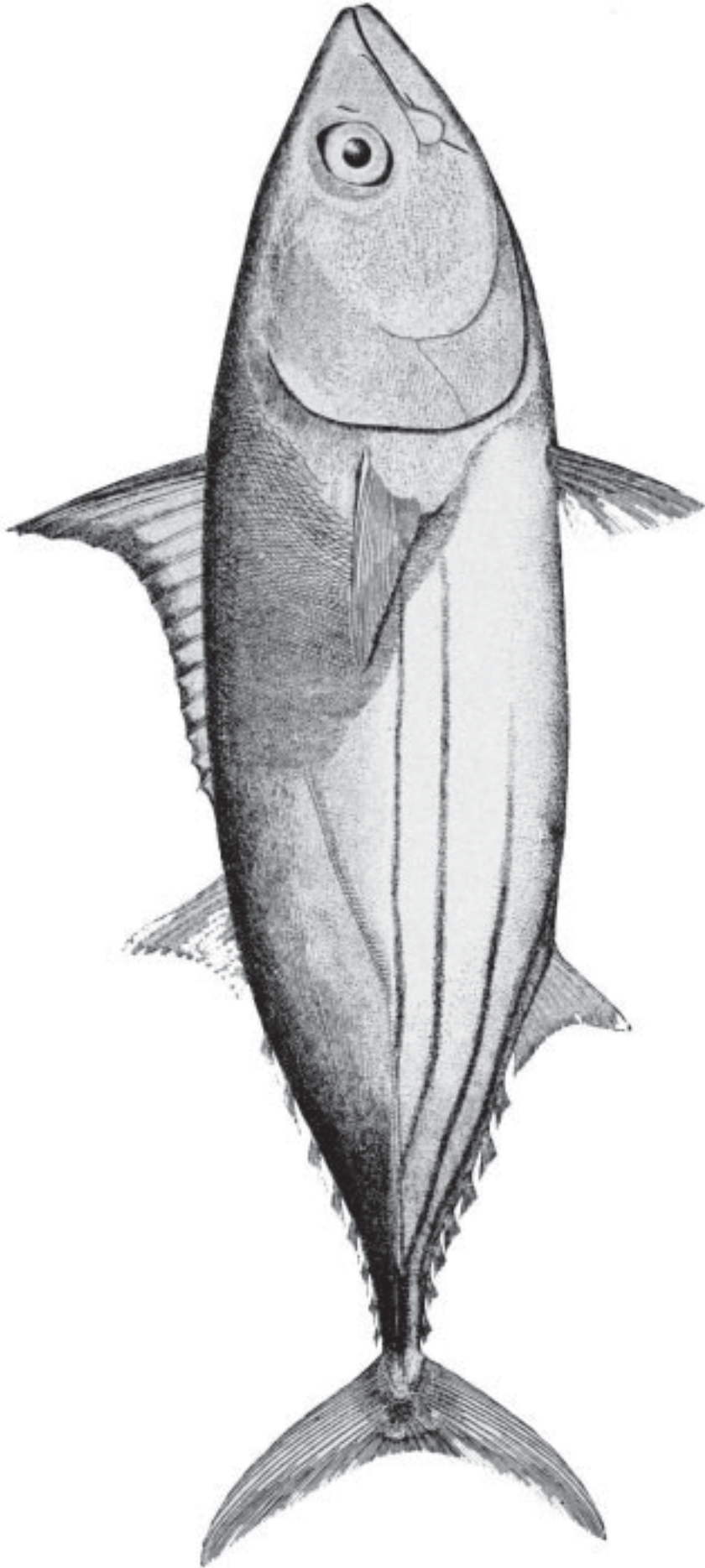
- pictures of a bonito for each student
- 1 picture of a swordfish (for one student)
- small sticks or rods (chopsticks or strips of heavy cardboard boxes will work)
- glue
- card stock
- scissors
- 1 or 2 bags of dried beans (food units)
- small plastic sandwich bags (one for each student - stomachs)

### Procedures:

1. Locate a large, open space for the students to run around during this activity.
2. Ask one student to be the swordfish. This student will glue the swordfish to card stock, cut it out then mount the picture on a stick.
3. Have the majority students glue the bonito pictures to card stock and cut them out. Glue a chopstick in place and let dry. You can staple the paper to the chopstick with a little effort.
4. Spread out the dried beans (food units) on the ground, in the middle of the open space.
5. Explain that each student is a bonito, and each bonito must fill its plastic bag (stomach) with food (dried beans) in order to survive.
6. Take the students outside to the space and conduct the simulation.
  - i. Each student has a bonito picture on a stick in front of them, except the swordfish person.
  - ii. The students are to keep together as a group. A leader is chosen who holds the bonito in the air so others can follow. The main objective is to gather as much food as possible without getting “tagged” by the swordfish. If a bonito is “tagged,” they must hand their plastic bag stomach and all its contents to the swordfish person.
  - iii. The leader-bonito begins the schooling behavior by walking to the feeding grounds and begins the feeding process, the rest of the bonito follow
  - iv. The swordfish waits for a signal from the teacher then moves swiftly toward the schooling bonito. The objective of the swordfish predator is to simply (and gently) “tag” one of the schooling bonito if they can. The bonito school reacts to the predator by scattering in all directions momentarily, then coming back together to follow the leader again. After only a few seconds the teacher tells the swordfish to stop feeding, (The feeding process may be repeated, at the discretion of the teacher, especially if no bonito have been tagged).

### Discussion:

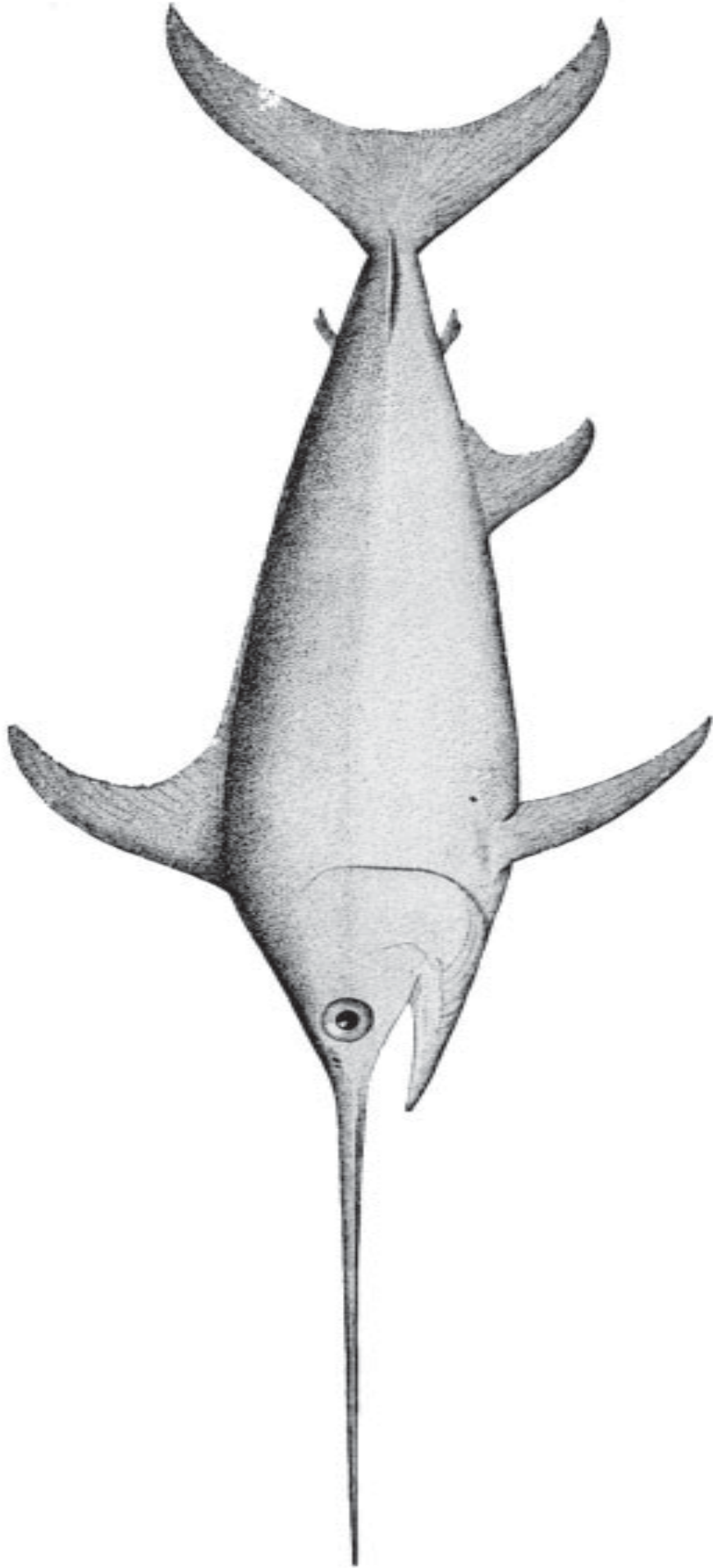
- A. How did you feel as a fish in a school? How did it feel being threatened in a school by a predator?
- B. Count and record the total number of beans (food units) for the entire \_\_\_\_ population. Do the same for the shark. Count the number of \_\_\_\_ individuals in the population. Calculate the number of food units per fish by dividing the total number of beans by the number of individuals in the population. Make a simple bar graph with two bars, one bar for the food per \_\_\_\_ and another for the food per shark.
- C. Which species had the most food per individual, the \_\_\_\_ or the shark? Why?
- D. What do schooling fish do when threatened by a predator?



## **Activity #4 - Schooling Behavior, Feeding and Survival**

### **BONTIO: A SCHOOLING FISH**

Fish Illustrations from the 1880's by George Brown Goode, Deputy Commissioner of the United States Commission of Fish and Fisheries ([www.photolib.noaa.gov](http://www.photolib.noaa.gov))



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### **SWORDFISH: A PREDATOR**

Fish Illustrations from the 1880's by George Brown Goode, Deputy Commissioner of the United States Commission of Fish and Fisheries ([www.photolib.noaa.gov](http://www.photolib.noaa.gov))