Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: 2/21/14 Period: \_\_\_\_\_\_\_ LAB

**Lab: Overfishing and By-Catch**

**Objective:**

To understand and describe:

* Sustainable fishing practices that reduce by-catch and leave fish for future generations are important.
* Marine protected areas (MPAs) protect certain areas of the ocean from harmful human activity.

**Materials**

* M&Ms
* Beans (lima or other big bean)
* Paper bags

**Background Information:**

Fishermen often catch not only the fish they are going to sell but also other unwanted marine organisms (like turtles) that eventually get dumped back into the ocean – this is called by-catch. For example, turtles get stuck on fish hooks.

**Procedures:**

1. Get in your lab groups. Send one person to the front to get a paper bag filled with M&Ms and beans.
2. Your goal is to simulate fishing. M&Ms=fish that you are fishing for, beans=by-catch (not what you are fishing for—can’t sell/eat it).
3. You will need to “catch” (or grab by hand) some fish (M&Ms) in order to survive. You are **NOT ALLOWED** to look in the bag and grab only the M&Ms; you have to grab whatever your hand grabs. (In conventional fishing, fishermen often catch both commercially important and unimportant species, the latter of which represents by-catch.)
4. **Each person will grab 1 handful of “fish” from the bag in each trial. Put everyone’s catch in 1 big pile and count how many total fish you caught. (Please take a NORMAL handful!)**
5. One you have a handful, remove the M&Ms from your “catches” and place them in a clear plastic baggie. Put the beans back in the paper bag.
6. Record your catch in the data table below.
7. If/when you run out of “fish” (M&Ms), you may join the group next to you.
8. Repeat steps 3-8 5 times.

**Data Table 1:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Trial #** | **# M&Ms caught (wanted fish)** | **# Beans caught (by-catch)** | **Total # organisms caught** |
| **1** |  |  |  |
| **2** |  |  |  |
| **3** |  |  |  |
| **4** |  |  |  |
| **5** |  |  |  |

**Questions:**

1. Compare trial #1 to trial #5. What happened to the number of M&Ms caught?
2. Why is reducing by-catch important?
3. What would happen if you ran out of M&Ms? What if someone came to fish in your bag?
4. **On a separate sheet of graph paper, draw a bar graph that compares the number of M&Ms and beans in each trial.**

**Teacher Notes:**

**Setup:**

* Have the students work in groups of between 2 and 4 people.
* Prepare the bags beforehand. I typically make a class set of bags (maybe 10 total depending on the size of the groups) and don’t let students eat the m&ms. You should fill the bags about a quarter to a third of the way full, with an equal amount of m&ms and beans.
* The bags must be paper so that students can’t see into it and “pick and choose” what they catch.
* Over the course of each trial, the number of m&ms they catch should decrease, and the number of beans they catch should increase.
* Students can shake the bag gently in between each trial to mix the m&ms and beans.
* For the graph, you should expect to see something like this: