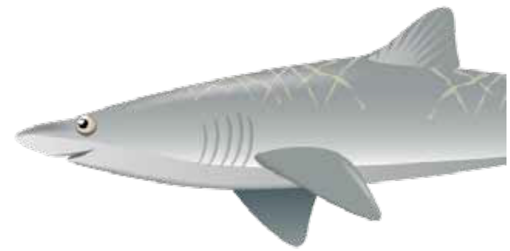
Mark-Recapture Activity Sheet

Name: ______________________

Date: ______________________

1. Gather the following materials:

    - Original and Colored Goldfish crackers
    - Paper bag or small bowl (ocean)
    - Paper plate
    - Paper cup (net)



2. Place Original Goldfish in the paper bag or small bowl.

3. How many fish do you think are in your population? ______________________

4. **Capture a sample** of goldfish from the brown bag (one cup full), and place them on the paper plate to count. Record this number of fish captured on your data table (represented as **M**).

5. Tag/mark these captured fish by replacing each one with a colored fish (marked individuals). *(Since in this lesson we are tagging by replacement, the goldfish replaced by colored fish can no longer count as part of the population and MUST be disregarded, or eaten)*

6. Put the colored (marked) fish back into the bag and shake the bag (or stir the fish in the bowl) to distribute them.

7. **Recapture** another sample from the bag using the cup and pour onto the plate.

8. Record the number of color and non-color fish in the appropriate columns. Return the entire sample to the bag.

9. Shake the bag to distribute them.

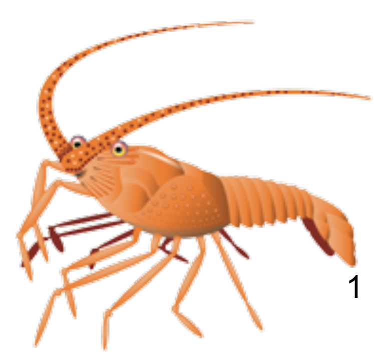
10. Repeat steps 7-9 two or more times. (The first capture (**M**) remains constant for all samples.)

11. This Population Proportion allows you to estimate the total fish in the population **(X)** for each sampling. Fill in the column on your data table that solves for X.

$$\frac{\textbf{X} \text{ (Total Fish in Population)}}{\textbf{M} \text{ (Total Marked Fish)}} = \frac{\textbf{C} \text{ (Total Fish Captured in Sample)}}{\textbf{R} \text{ (Marked Fish Recaptured in Sample)}}$$

14. Calculate the average of your population estimations (average of X).

13. Finally, count the actual number of fish in the population (marked fish included!) and record it on your data table.



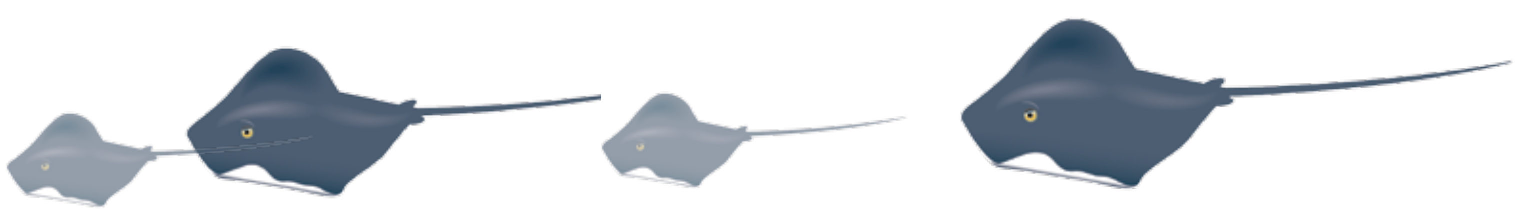
DATA TABLE

Original number of fish marked (M): _______________

Sample Time	Number of fish captured in sample (C)	Number of marked fish recaptured in sample (R)	Population Calculation $X = \frac{C*M}{R}$	Calculated Estimated Population (X)
1				
2				
3				
4				
5				

Average of X: __________________

Count of Total in Actual Population: __________________

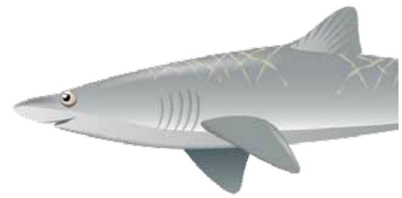


Specialized Selective Nets

Name: ______________________

Using the same materials as above plus Cheese-Its, create a model of a specialized net!

1. Replace one-fourth of the gold fish with Cheese-Its. The goldfish are now the juvenile fish and the Cheese-Its are the larger, more mature fish.
2. Gently shake the bag (or stir the contents of the bowl) to insure randomness.
3. Cut two dime sized holes in the bottom of the paper cup (net). The holes should be large enough to enable the smaller fish to slip through but not so large as to allow the larger fish to escape.
4. Capture a sample of fish from the bag (ocean) using the net (cup). Shake gently to allow the smaller fish to slip through.
5. Repeat as needed.

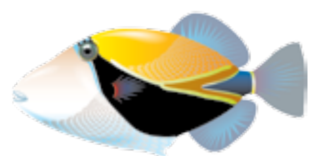


Activity Questions:

1. How do your population estimates (X) compare to the actual population count?

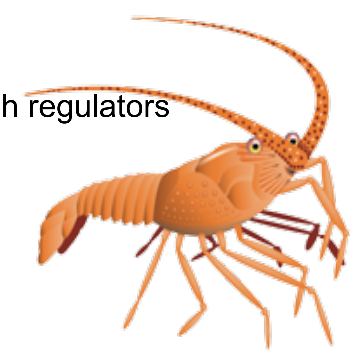
2. Were your calculations fairly accurate?

3. What may account for discrepancies?



4. In step #13, you counted all of the fish in the bowl, and were able to compare your population estimate to the actual number of fish. How does this compare to real life?

5. How might calculations of population size assist scientists and fish regulators determine fish regulations and fish catch limits?



6. How do selective nets work?

7. Can a specialized net be successful in releasing smaller juvenile fish?

8. What are factors that may prevent the smaller fish from escaping?

9. How might a device such as a specialized net be improved?

10. Why is it important to implement specialized nets?

11. Why is it important to sustain fish populations in terms of food chains and food webs?