APES: Something's Fishy – Population Study Lab   Name: _____

Purpose: *You will be expected to estimate the size of a sample population using the mark-recapture technique. Be able to apply the technique to new population problems and compare the mark and recapture technique to other methods of population estimating.*

Background: A technique called **sampling** is sometimes used to estimate population size. In this procedure, the organisms in a few small areas are counted and projected to the entire area. For instance, if a biologist counts 10 squirrels living in a 200 square foot area, she could predict that there are 100 squirrels living in a 2000 square foot area. Another method in determining populations of a variety of species biologists use is called **tagging.** This is frequently used in our area with butterflies *(namely monarchs)* and fish. Sometimes the "tags" are stickers *(in the case of butterflies)*, ear clips, or notches made in fins of fish. The purpose of these tags is to **track migration patterns, health, and range as well as to help determine population numbers** of species in an area. Determination of population occurs by capturing and tagging that sample of animals. Biologists would then release the animals and allow them to naturally *"redistribute themselves."* By then taking random samples and determining the percent tagged, biologists are able to *hypothesize the population of that species* in that area.

Procedure:
1. Obtain a bowl with your "species" in it. *("fish" crackers).*
2. *Do NOT count the number of fish in your pond yet!*
3. Have one member of your group remove a **large handful of fish. Write that number here:** _____
4. Count the number of fish you just removed and replace these fish with "tagged" fish *(in this case, **colored** "fish")*
5. Mix your pond well to redistribute the tagged fish among the other fish.
6. One member at a time *(and without looking)*, remove a handful of fish and record the <u>number of total fish in the sample</u>, <u>the number of "tagged fish"</u>, and <u>figure out the percentage of tagged fish</u>. (see chart)
7. Return your handful to the bowl!! Continue with this until you have taken 20 samples.

Data

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Mean
Total Fish																					
Tagged Fish																					
Percent Tagged																					

Questions: *(answer on the back of this sheet)*
1. What is the mean (average) of your percent tagged fish from your 20 samples?

2. Using the following formula, determine an *estimated population* for your pond:
   Population Size = <u>total number captured x number marked (line #3 above)</u>
                          total number *captured* with mark
3. Now, actually count the number of fish in your bowl: <u>___</u> **fish**

4. Find your percentage error by using the following formula: ___%
   100 x (Your estimate of population - Actual size of population) / (Actual size of population)

5. What concerns should a biologist have about a species' habits before (s)he uses this method to approximate the size of a population?

Conclusion: How did you fulfill the purpose**?** *What did you learn?*