"Something's Fishy"
Population Sampling Lab

Name: _____

Purpose: To determine the population of "fish" by using the capture – mark – recapture method.

Background: In determining populations of a variety of species, one method biologists use is tagging. This is frequently used in our area with butterflies, birds, and fish. Sometimes the "tags" are stickers (in the case of butterflies), ear clips, metal bands around bird's legs, 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 a 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 "pond" full of "fish" (brown beans in a paper sack).
2. Do NOT count the number of "fish" in your "pond" yet!!
3. Have one member of your group remove a handful of "fish".
4. Count the number of "fish" you just removed and write that number here: _____
5. Replace these "fish" with "tagged fish" (in this case, white beans)
6. Mix your "pond" well to redistribute the "tagged fish" among the other "fish".
7. Without looking, take a sample (remove a handful) of "fish". Record the total number of "fish" in the sample and how many of them are "tagged fish". Determine the percentage of "fish" that were tagged.
8. Return your handful to the "pond"!!
9. Continue with this until you have taken 10 different samples.

Data:

	1	2	3	4	5	6	7	8	9	10	Mean
Total Fish											
Tagged Fish											
Percent Tagged											

Questions:

1. Using the following formula, determine an estimated population for your pond:

   Population Size = (Number Originally Tagged / Mean of the Sample %'s) x 100

2. To see how close you were, count the ***actual number of "fish" in your bag*** = _____ **fish**

3. Find your percentage error by using the following formula: _____%

   [(Your estimate of population – Actual size of population) / (Actual size of population)] x 100%

Practice Problems:

1. Gypsy moth populations soar every few years in the Northeastern deciduous forests, causing great damage to the trees their larvae eat. In order to determine the population of gypsy moths in a forest, 200 were trapped, marked, and released. The next night, more moths were collected. Of the 150 that were collected, 15 were already marked. What is the size of the population of gypsy moths in the forest?

   (Hint: Just use a simple ratio.)

$$\frac{\text{200 marked}}{\text{Total populations}} = \frac{\text{15 recaptured \& marked}}{\text{150 recaptured}}$$

2. In order to determine snail populations, 340 snails were captured, tagged, and released. Later, 420 snails were captured. Of the 420 snails, 16 were already marked. What is the size of the snail population?

3. 150 marlin were captured, tagged, and returned to the deep ocean, where they live. Later, when 140 marlin were captured, 7 of the marlin had tags. What is the size of the marlin population?

4. It is known that Canada Geese return to the same place each year to mate and raise their young. In the summer, 356 geese were captured and tagged. When the geese returned in the spring from their voyage south for the winter, 338 geese were captured and 43 were marked. What is the size of the Canada Goose population?

5. Describe factors that might interfere with the accuracy of the population estimates for the examples above.