

Lesson Plan: Wildlife Sampling-Capture-Recapture

This lesson is written for the 7th grade. It takes about 1 class session to complete. The only advance preparation for this lesson is to get the materials (listed below) and copy the student recording sheet.

Background and lesson objectives: Students should work in small groups of three or four to complete this lab. This lab will simulate the capture-recapture method of population sampling and incorporates math and science benchmarks. It can be used as an introductory lesson to population sampling and to begin discussions of how scientists use data to make decisions regarding protected areas and wildlife management. The math expectations are different. Students should have prior knowledge of how to solve proportions. This lesson was modified from the Glencoe-Course 2 Mathematics Book, 2006.

Science Content Expectations:

S.IP.M.1 Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.

L.EC.06.32 Identify the factors in an ecosystem that influence changes in population size.

L.EC.06.41 Describe how human beings are part of the ecosystem of the Earth and that human activity can purposefully, or accidentally, alter the balance in ecosystems.

L.EC.06.42 Predict possible consequences of overpopulation of organisms, including humans, (for example: species extinction, resource depletion, climate change, and pollution).

Michigan Math Grade Level Content Expectations:

N.FL.07.05-Solve proportion problems using methods as unit rate, scaling, finding equivalent fractions, and solving the proportion equation $a/b=c/d$; know how to see patterns about proportional situations in tables.

Relevant Vocabulary –sampling, population, proportion, capture/recapture

Student Recording Sheet:

Materials: small bowl, dried beans, paper cup, markers

Investigate:

1. Work in small groups of four to complete the lab below. Make sure to record your data in the table below.
2. Put all of the beans in the bowl. Using the paper cup, “capture” a sample of the beans. Mark each of these beans with a small X. This is the original captured amount. Record this number _____.
3. Put these beans back into the bowl. “Capture” another sample of beans. Record this total in the sample column. Record the number of beans that have “recaptured” or are marked with an X.
4. Repeat step 3 nine more times, recording your data in the table below.
5. Use this information to calculate the total population (P) of beans in the bowl. To do this use the proportion: $\frac{\text{Original}(\#2)}{P} = \frac{\text{Recaptured}}{\text{Sample}}$

Wildlife Sampling

Trial	Sample	Recaptured	P (total Population)
A			
B			
C			
D			
E			
F			
G			
H			
I			
J			
TOTAL			

Write about it:

1. Find the mean of the estimates you calculated for the Total Population (P). Do you think that this is a good way to estimate of the number of beans in the bowl? Explain your reasoning.

2. Count the actual number of beans in the bowl. How does this number compare to your estimate in #1? Explain.