

Estimating Deer (Marshmallow) Population

Lesson Plan

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Goal: Use proportions to determine the deer population in a given area.

Grade and Course: 9th grade Algebra I

KY Standards: MA-HS-NPO-U-5, MA-HS-NPO-S-RP1

Objectives: The students will be able to apply ratios and proportions to real life problems. They should be able to collect data, make observations and use the data to solve problems.

Resources/materials needed: White and colored marshmallows, small paper bags, Styrofoam cups, paper plates, worksheet.

Description of Plan: Students will be in groups of three. They will use white and colored marshmallows to simulate the process of capture-recapture to estimate deer population.

Lesson Source: Algebra I by Holt, Rinehart, and Winston

Instructional Mode: Group work

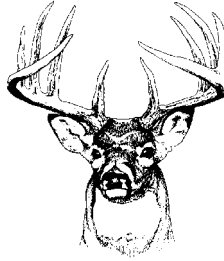
Date Given: 12/10/07

Estimated Time: 1-2 days

Date Submitted to Algebra³: 12/10/07

Estimating Deer (Marshmallow) Population

Name: _____



Imagine that you are an employee of the Kentucky Fish and Wildlife Service. Hunting season is coming up and you have been asked to estimate the deer population in the state. Trying to count them by catching them all would take too long, so you decide to use the *capture-recapture* method. This is a method that uses proportions to estimate the population of animals. In this activity we will simulate this by using marshmallows.

Tools:

Each group will need:

- ◆ 1 paper sack – the “forest”
- ◆ A supply of white marshmallows – the “deer”
- ◆ A supply of colored marshmallows – the “tagged deer”
- ◆ 1 styrofoam cup – the “trap”
- ◆ 1 paper plate

Procedure:

1. Collect the Data
 - a. Capture
 - i. Each group will receive a bag with white marshmallow inside.
 - ii. With the cup, “trap” several white marshmallows and place them on the paper plate.
 - iii. Count the number of white marshmallows you trapped and write that number down. _____. DO NOT put these back in the bag (in fact, you can eat them!)
 - iv. Replace the number of white marshmallows you caught with colored marshmallows. These represent the “tagged” deer.
 - v. Put these colored marshmallows in the bag and mix thoroughly.

b. Recapture

- i. Use the cup again to trap some marshmallows.
- ii. Count the TOTAL number of marshmallows you caught and record it the table below.
- iii. Count the number of COLORED marshmallows in this sample and record it in the table below.
- iv. Return ALL of these marshmallows to the bag and mix.
- v. Repeat this process until you fill out the entire table.

Sample	Total number of Marshmallows in sample	Number of colored Marshmallows in sample
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
AVERAGE		

2. Analyze the Data

- a. To find the AVERAGE number of marshmallows in each sample, add up the number of marshmallows in each sample and then divide by 10. Do the same to find the average number of colored marshmallows in each sample.
- b. Using these averages, we can write a RATIO of colored marshmallows in the sample to the total number of marshmallows in the sample. How should this ratio compare to the ratio of colored marshmallows to the total number of marshmallows in the bag?

- c. Set up a proportion to estimate the number of marshmallows in the bag.

ESTIMATED NUMBER: _____

- d. Now count the total number of marshmallows in the bag.

TOTAL NUMBER: _____

- e. How close was your estimate?