Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Estimating Population Size Lab**

<http://www.classzone.com/books/hs/ca/sc/bio_07/virtual_labs/virtualLabs.html>

**Problem:** The migratory grasshopper causes more crop damage than any other species of grasshopper in the United States. These grasshoppers can destroy fields of vegetables and grains, such as wheat. Farmers need to be aware of the population of these pests so that they know when to take steps to help prevent damage to their crops. In this investigation, you will use a mark and recapture method to estimate the population of grasshoppers in a field.

**Checklist:**

1. Click on the check list of materials to find out more about them then click procedure:

* North American meadow
* Paint and paint brush
* Two insect sweep nets
* Large plastic container with lid

**Procedure:**

**First Capture:**

1. Look at the meadow. Predict how many grasshoppers are living in the one-acre meadow marked by the flags. Open the notebook and record your prediction to move on **AND** record your answer on the separate answer sheet provided.

2. Click the insect sweep nets to capture grasshoppers and transfer them to the container.

3. Click the insect sweep nets **two** more times to increase the sampling of the first capture.

4. Once you have completed three sweeps of the meadow, click the arrow to advance to step 3.

5. Click the paint and brush to mark each captured grasshopper with a dot of neon orange paint upon the upper chest. Once you have marked all the grasshoppers, click the arrow to step 4.

6. Click the pencil to count how many grasshoppers are in the first capture. Open the lab notebook and record your results to move on **AND** record your answer on your answer sheet. Then, click the arrow to advance to step 5.

7. Click the container to release the grasshoppers to the center of the one-acre meadow. Once you have released the grasshoppers, click the arrow to advance to step 6.

**Second capture:**

8. Click the insect sweep nets to capture grasshoppers and transfer them to the container.

9. Click the insect sweep nets **two** more times to increase the sampling of the second capture.

10. Once you have completed three sweeps of the meadow, click the arrow to advance to step 7.

11. Click the pencil to count the grasshoppers that are in the second capture. This count may include marked grasshopper from the first capture and grasshoppers that were not part of the first capture.

12. Open the notebook and record the total number and the number of marked/recaptured grasshoppers. Once you have recorded your results in notebook **AND** on your answer sheet. You can click the arrow to advance to step 8

13. Open the lab notebook and complete the calculations AND then record to results ion your answer sheet.

M = # of grasshoppers from first capture and marked

n = total # marked and unmarked grasshoppers in second capture

R = # of marked grasshoppers in second capture

14. Once you have completed the calculation, click the arrow to go to step 9

Now analyze your data and answer the questions **on your answer sheet:**

**ANALYSIS:**

1. What is the estimated population size of the grasshoppers living in the meadow?

2. Based on the estimated population you determined, explain whether or not the grasshoppers pose a threat to nearby crops?

4. What are some factors that might cause changes in the population of grasshoppers?

5. What are some factors that might affect the accuracy of your estimate?

6. What are the advantages and disadvantages of the capture-mark-recapture method?