

Lesson: Capture-recapture experiment

Phase of learning

Years 5 - 6, Years 7 - 8, Years 9 - 10

WA Curriculum

K-10 Mathematics, K-10 Science

Region

North Coast, Gascoyne Coast, West Coast, South Coast, Indian Ocean Territories

Summary

To manage the marine environment effectively, marine managers need to know the size and composition of animal populations. Students will investigate methods that are used to estimate animal populations, and consider variables and constraints that can affect the confidence of results.

Outcomes

- Students will simulate a capture-recapture experiment to estimate a fish population size.

Duration

60 - 90 minutes

Preparation

To run this activity, you will need to make multiple copies of Teacher Resource Sheet: [Fish templates for capture-recapture experiment](#). You will require between 200-300 fish for this activity.

If you plan to conduct this activity more than once, you could laminate the rectangle fish cards and use a whiteboard marker or sticky dot to mark the captured species.

Students will each require a copy of Student Worksheet: [Capture-recapture experiment](#)

Steps

1. Keep the fish out of view by placing them in a container such as a photocopy paper box labelled the Ocean. A hole can be cut in the lid of the box to allow students to sample fish from the classroom ocean.

2. Ask the students how many fish are in the sea? Discuss some options that could be used to estimate the numbers or population of fish.
3. Ask students to make an estimate of how many fish are in the classroom ocean.
4. Allow each student to sample one fish from the classroom ocean and instruct them to tag the fish by either writing their name on the fish or colouring-in the fish to make it unique and clearly visible. Remember to count how many fish were sampled and tagged (or student numbers).
5. Ask the students to make a prediction on how many marked fish might be recaptured.
6. Shake the box or bag a few times to evenly mix all the fish.
7. Each student puts their hand in the bag and takes out one fish.
8. Record the number of fish recaptured in sample 2 and the number of fish that are tagged or marked.
9. Place fish back box, shake and repeat a further two times.
10. Calculate the average number of marked fish recaptured.
11. Using the formula on Student Worksheet: [Capture-recapture experiment](#), calculate a population estimate for the fish in the classroom ocean.
12. Discuss with the class, how confident they are with the estimation. Open the box and count all the fish. How close was the estimation to the actual fish numbers?
13. Explain that in the classroom ocean all the fish were contained in the box so that no new fish were added or removed. The box was shaken in an attempt to mix all the tagged mix among the other fish in the box. The tag remained on the fish and the same sampling method was used each time to catch the fish. Explain that the total number of fish was calculated by counting all the fish in the box. This is the equivalent of draining the ocean and counting the fish which, of course, is impossible.
14. Discuss the problems with estimating the population of fish in the field.
 - How many fish would need to be tagged?
 - Who might catch a tagged fish?
 - How long would a tag stay in a fish? What happens if it falls out or if a fish died?

Related resources

[Teacher Resource Sheet: Fish Templates for Capture-Recapture Experiment](#)

[Student Worksheet: Capture-Recapture Experiment](#)

Keywords

Assumption, biomass, exploitation, migration, mortality, population, proportion, ration, representative sample, sample variable