

MARK RECAPTURE Activity Instructions

Activity summary: This activity is meant to illustrate how to estimate the size of a population using the mark recapture method. The mark recapture method is used to estimate population sizes by capturing, marking, releasing and recapturing individual animals.

Learning outcomes:

- Understand the concepts of “**estimation**”, “**sample**” and “**population**”.
- Understand what the mark recapture method is, as well as when, how and why scientists use it.
- Understand how scientists estimate population size through the mark-recapture method.

Resources:

Hammond, P. S. (2009). Mark-Recapture. *Encyclopedia of Marine Mammals*, 705–709. <https://doi.org/10.1016/b978-0-12-373553-9.00163-2>

RoyalStatSoc. (2018, September 14). *Hands-on statistics – Capture recapture*. YouTube. <https://www.youtube.com/watch?v=Gkg8Q6nYdQM>

Number of participants required: minimum of 1 (can be done with groups).

Materials needed:

- Printed PDFs available on the “Sampling Activities & Resources” section of the website (see Attachments for guidance).
- 50 to 60 identical and numbered rubber ducks (or any other set of identical and numbered objects, such as lollipop sticks or laminated pictures of ducks or other animals).
- Opaque bag to place the ducks.
- White board pen.



How to run the activity (step-by-step):

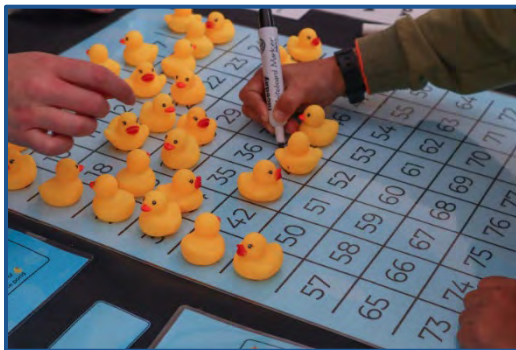
1. Explain the main goal of the activity – estimate the number of rubber ducks in the bag – and give some context on the mark recapture method.
2. Take 2 big handfuls of ducks from the bag.



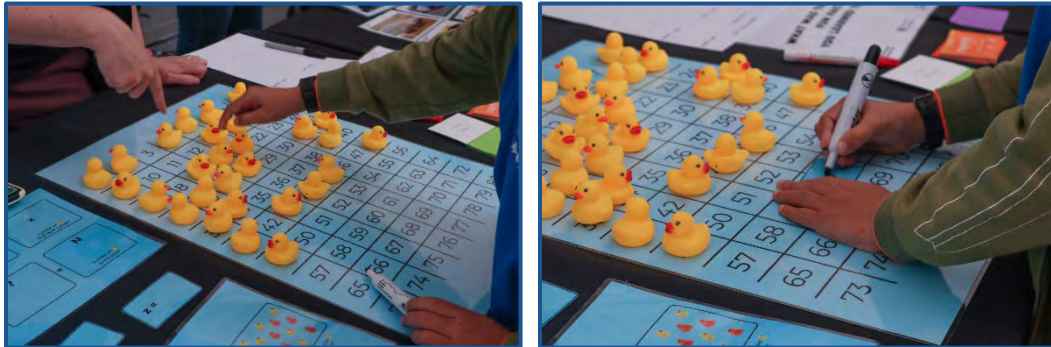
3. Place the ducks on the grid according to their number.



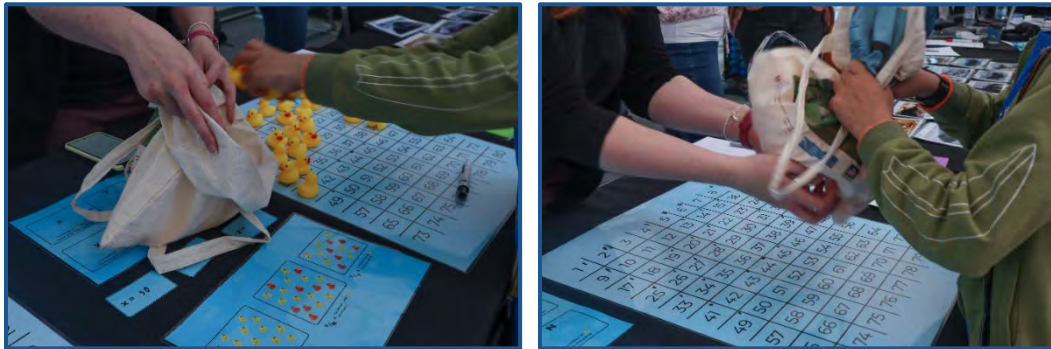
4. With the white board pen, mark every square that has a duck.



- Count how many ducks were captured – this will be your x (number of ducks that have been marked) – and write it down on the x flashcard.



- Place the ducks back in the bag and mix them around.

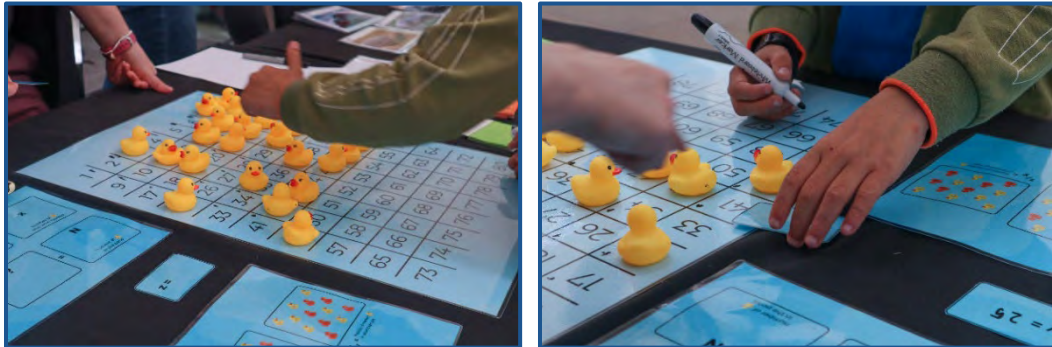


- Take another 2 big handfuls of ducks.

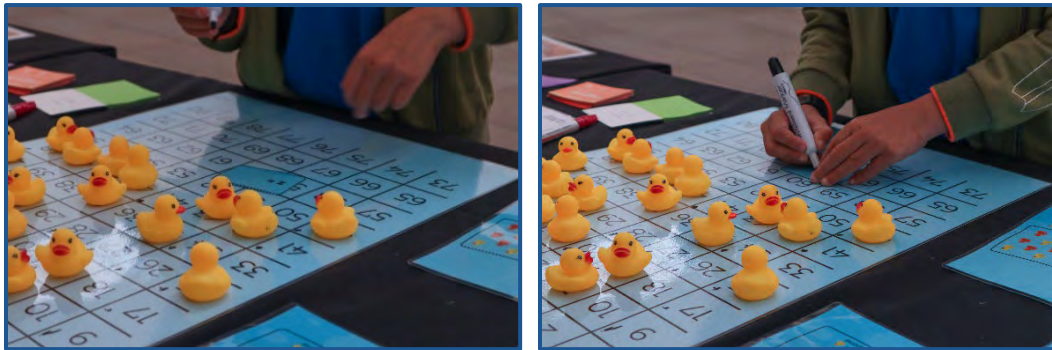
- Once again, place the ducks on the grid according to their number.



9. Count how many ducks were taken out of the bag – this will be your **y** (number of ducks in the second sample) – and write it down on the y flashcard.



10. Count how many ducks have been recaptured (ducks in the marked squares) – this will be your **z** (number of ducks that were seen twice) – and write it down on the **z** flashcard.



11. Place each flashcard on the formula sheet and solve the equation to calculate **N** – estimated number of ducks.




12. Compare the **N** that you calculated with the real number of ducks in the bag.

After finishing the activity, you can begin a discussion by covering questions such as:

- Do you think your estimate matches the true number of animals in the box?
- Do you think your estimate is higher or lower than the true number of animals? Why?
- If you ran this experiment again, would you get exactly the same answer?
- How does your estimate compare to the estimates made by other groups?
- How could you combine the estimates from the different groups into a single number?
- Can you suggest a way to express the variability across our estimates?

Attachments

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64
65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80

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PDF FILE NAMES


- 1 – “markrecapture-grid” (A3 and laminated)
- 2 – “markrecapture-flashcards” (laminated and cut into flashcards)
- 3 – “markrecapture-explained” (A4 and laminated)
- 4 – “markrecapture-formula” (A4 and laminated)

2


x =

y =

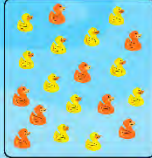
z =

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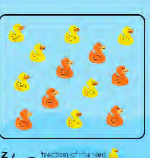
3




$N =$ number of 🦆 in the pond



$x/N =$ fraction of marked 🦆 in the scene



$z/y =$ fraction of the 🦆 (observed) seen 2x

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4

z
number of 🦆 that were seen both times

x

?

=

x
number of 🦆 that have been marked

y
number of 🦆 in the second sample

x

?

=

N
number of 🦆 in the pond

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