Estimating Populations by Tagging

For this activity, we will estimate the population of fish in a fish pond by catching some of them, tagging them, and recapturing some to see how many tagged fish we recapture.

- Begin by dividing into small groups.
- Each group will be given a “pond” with a population of “fish”.
- Have someone in your group reach into the “pond” and “catch” 20 fish. Replace these fish with 20 “tagged” fish and stir up the pond.
- Recapture 20 fish and count the number of tagged fish you have caught.

The idea is to assume that the proportion of tagged fish in the entire population is the same as the proportion of tagged fish in the sample that you recaptured. You know the proportion in the sample and you know the number of tagged fish in the population, so using your assumption you can make a guess of how many fish are in the pond.

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\frac{\text{number of fish tagged in the first catch}}{\text{total population of fish}} = \frac{\text{number tagged fish in the second catch}}{\text{size of the second catch}}
\]

Now use this equation to estimate the population of fish in your pond.

Questions:

- Do you think that your assumption is a good one?
- How might the answer in the first question depend on the population of the pond? On the number of fish that you tagged? On the number of fish that you recaptured?
- Compare your estimate to the estimates that some of the other groups came up with.
- Can you think of any ways to get a more reliable estimate? Try out some of your ideas. Do your answers seem better?