



Estimate the number of black bears (beads) in the forest

Materials:

- Pony beads, black (500) and any other color (200)
- Container to store pony beads
- Scoop
- Calculator

Background:

Biologists use a process called *Mark and Recapture* to estimate how many individuals are in a bear population. Bears are caught, tagged (marked), and then released back into the forest (first round). After a set period of time, biologists return to the same area and catch bears again (second round). This process is repeated at numerous locations throughout the forest, giving the biologists a large data set to work with. They then perform complex statistical analyses, comparing how many bears are re-caught (were marked during the first round) to how many bears are caught for the first time during the second round.

Procedure:

Mix together 500 black beads and 200 other color beads in a container, this represents the results of the black bear population after the first round of captures. The black beads represent your unmarked black bears and the other color beads represent your marked bears. Ask a student to take a scoop of beads (bears) from the container (forest), this will represent the second round of captures. The student should count and record how many black beads and how many other color beads they scooped up (caught). Students will then use the formula below to estimate how many bears are in the entire forest. Return the beads to the container (release the bears back into the forest) and repeat this process at least five times. The more times this process is completed the more accurate the population estimate.

Equation:

$$\text{Population Estimate} = (M \times C) \div R$$

M = total number other color beads (marked/re-caught bears) in container (forest) – *constant (200 other color beads)*

C = number of *all* beads (bears) in scooped sample

R = number of *other color* beads (marked/re-caught bears) in scooped sample

NOTE: While biologists do know how many marked bears there are in the forest while conducting a Mark and Recapture study, they do not know how many unmarked bears there are in the forest, but in this exercise the instructor will know how many total beads (bears) are in the container (forest).

