I am an environmentalist and I am trying to estimate the population size of a rare species of frog. That is very difficult, so I am going to use a "Capture, recapture" method to help me estimate the size of the population.

This activity will allow us to come up with a reasonable estimate of a population parameter based on a statistic and sampling.   From the population I will capture 25 "frogs" and mark them (by painting them green). Then I release them back into the population.   I will then recapture 22 frogs and count how many of them are marked.

_____8_____/ 22 marked frogs

Let's use that estimate to calculate a population size....

$$\frac{8}{22} \quad \frac{25}{x} \quad \frac{550}{8} \quad 69.$$

Is this an exact calculation? Why or why not?
No, lots of confounding variables

sampling variability

1. Take your pretend population size. Take out 25 beads and mark them (Paint them red). Place them into the population and mix up the bag and then without looking take out 22 beads. Count the number of "marked" (or red) beads. Repeat this 10 times.

Population size __140__

__4__, 3, 7, 5, 5, 0, 5, 4, 2, 3
22→

min = 0 $Q_1 = 3$ $Q_2 = 4$ $Q_3 = 5$ max = 7

2. Construct a boxplot of your 5 results.
3. Repeat with another population size

Population size __90__

__7__, 6, 8, 7, 8, 7, 10, 5, 7, 5
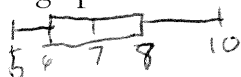
min = 5 $Q_1 = 6$ $Q_2 = 7$ $Q_3 = 8$ max =

4.   Draw your boxplot on the graph on the board.

5 6 7 8   10

Based on the graph, what do you believe the TRUE population size could be? (What values are plausible?) Why?

Point Estimate

Plausible
values

Jenny S
1/14/11

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_____8_____ / 22 marked frogs

Let's use that estimate to calculate a population size….

$$\frac{8}{22} = \frac{25}{x} \qquad 8x = 550$$
$$\bigstar \quad x = 69$$

Is this an exact calculation? Why or why not?

no, sampling variability

1. Take your pretend population size. Take out 25 beads and mark them (Paint them red). Place them into the population and mix up the bag and then without looking take out 22 beads. Count the number of "marked" (or red) beads. Repeat this 10 times.

Population size ___180___

___3___, ___0___, ___2___, ___5___, ___2___, ___1___, ___1___, ___5___, ___2___, ___0___ (out of 22)

2. Construct a boxplot of your 5 results.
3. Repeat with another population size

Population size ___130___

___3___, ___2___, ___6___, ___2___, ___3___, ___6___, ___2___, ___3___, ___3___, ___4___ (out of 22)
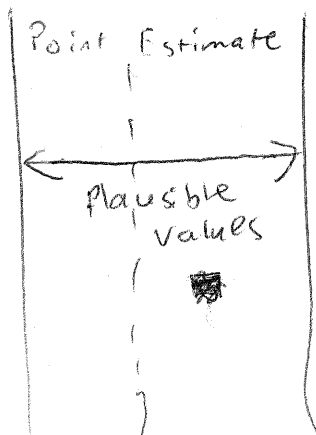
4. Draw your boxplot on the graph on the board.

Based on the graph, what do you believe the TRUE population size could be? (What values are plausible?) Why?

60 – 90 interval; This is where these values concentrated around the original number of marked ~~forg~~ frogs captured.

(8/22)

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_____8_____ / 22 marked frogs

Let's use that estimate to calculate a population size….

$$\frac{8}{22} = \frac{25}{x} \qquad x(pop) = 69$$

Is this an exact calculation? Why or why not?

1. Take your pretend population size. Take out 25 beads and mark them (Paint them red). Place them into the population and mix up the bag and then without looking take out 22 beads. Count the number of "marked" (or red) beads. Repeat this 10 times.

Population size ____120____

__7__, __5__, __4__, __4__, __5__, __5__, __8__, __3__, __3__, __3__

3 3 3 4 4 | 5 5 5 7 8   Min - 3   Q2 - 45   Max - 8
                            Q1 - 3
                                        Q3 - 5

2. Construct a boxplot of your 5 results.
3. Repeat with another population size

Population size ____160____

__5__, __3__, __2__, __3__, __1__, __4__, __2__, __2__, __4__, __4__

1 2 ②2 3 ③ 4 ④ 4 5

4. Draw your boxplot on the graph on the board.

Min - 1   Q2 - 3   Max - 5
   Q1 - 2   Q3 - 4

Based on the graph, what do you believe the TRUE population size could be? (What values are plausible?) Why?

✱ point estimate
✱ plausible values
✱ sampling variability