Name __*Key*__   Course/Section _____

Date _____   Professor/TA _____

Activity 52.1 What methods can you use to determine population density and distribution?

1. To measure the population density of the chipmunks in a particular park, you sample several plots and capture 50 chipmunks. You mark each of their backs with a small dot of red paint and then release them. The next day, you capture another 50 chipmunks. Among the 50, you find 10 that are marked.

a. Use the mark-recapture formula

$$\frac{\text{Number of recaptures in second catch}}{\text{Total number in second catch}} = \frac{\text{Number marked in first catch}}{\text{Total population } N}$$

to estimate how many chipmunks the population contains.

$$\frac{10}{50} = \frac{50}{x} \qquad 10x = 2500$$
$$x = 250$$

There are approx. 250 chipmunks

b. What effect would each of these discoveries have on your estimate?

i. You later discover that you sampled the one area of the park that was most favored by the chipmunks.

your estimate would be too low

$$ex. \; \frac{5}{50} = \frac{50}{x} \qquad 5x = 2500$$
$$x = 500$$

ii. You later discover that the chipmunks were licking the marks off of each others' backs.

$$\frac{25}{50} = \frac{50}{x} \qquad 25x = 2500$$
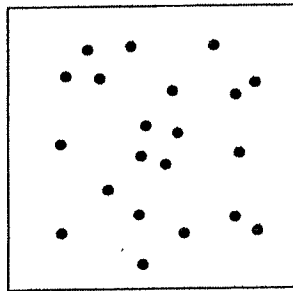$$x = 100$$

your estimate would be too high

c. How could you modify your sampling program to ensure that you make more accurate estimates of population size?

Do it multiple times in a variety of locations.

2. Look at these two proposals for the distribution of a tree species.
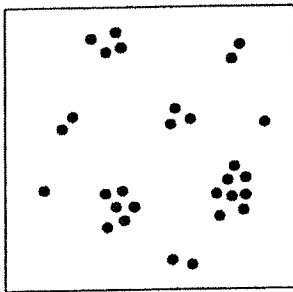
Proposed distribution 1   Proposed distribution 2

a. What type of distribution does each proposal represent?

Distribution 1: *Clumped*

Distribution 2: *random*

b. Given these possible distributions, what factors do you need to consider in setting up a sampling plan for the area? In other words, how will you know if you have chosen a plot size that gives you a good representation of both the size of the population and the actual distribution of organisms within the sampling area?

multiple plots or big plots,
*repetition
*sample size.