

# FACTivity

**Time Needed:** One class period; indoor or outdoor.

This FACTivity will represent the methods the scientists used to collect vegetation data in the study. The question students will answer in this FACTivity is: How well does sampling work to represent the entire **population** of something being studied?

**Materials Needed:**

- 200 dried beans (3 different colors: 80 beans represent aquatic plants, 70 beans represent marshy plants, and 50 beans represent woody plants (NOTE: You are starting with 40-percent “aquatic” beans, 35-percent “marshy” beans, and 25-percent “woody” beans. This will be important to remember later on!).
- 8 pieces of string or yarn, each 6’ long with knots or tape every foot.
- Three pieces of thin rope or thick string (one piece 20-25’, one piece 35-40’, and one piece 55-60’), with the ends tied to make three large loops.
- A toilet plunger.
- A large piece of fabric, about 7-8’ square (an old sheet works well).
- 48 paper plates with the center cut out (leaving only about 1” so that the plate becomes a ring).
- Paper and pencil for recording data.
- Chart to record data (see below).

Think about the different types of plants in a Carolina bay wetland. Then think about how the scientists sampled areas in the Carolina bays. You will do something similar in this FACTivity.

Take the large piece of fabric and place it on the ground. This area is the water in the wetland. Remember wetlands are not perfectly round, so students may cut the fabric to make the wetland into a unique (but somewhat round) shape. Have students chose a center point of the wetland and place the toilet plunger at this point.

The three pieces of looped string indicate the different vegetation zones. Each looped string will be placed on the “wetland,” around the center. The first zone from the wetland is the aquatic plants (the smallest loop), the second is the marshy plants (the next biggest loop), and the third is the woody plants (the largest loop). The zones should be somewhat concentric around the center pole, and the largest loop may go outside of the “wetland.” Scatter the appropriate color beans in the right zone.

Divide the class into eight groups. Give each group a piece of string. Tell the groups to attach all eight pieces of string to the pole. Stretch out the string away from the pole like eight equal pieces of pie. Tell the students to place the paper plate rings at each knot in the string, with the center of the ring at the knot. (Compare with photo, page 21.) For the area closest to the pole, start at the second knot. Have the students count and record the number and color of the beans in each zone located within the ring. Each group will count the beans within six rings. One student will record the zone and the total number of beans found within all of the rings in each zone.

Repeat this exercise at least three times. To record observations provide each group with a copy of this chart. Remember, not every one of these boxes will be filled out. This should become clear as you do the FACTivity.

Student Names:

	Ring 1	Ring 2	Ring 3	Ring 4	Ring 5	Ring 6	Total Number
Aquatic Zone							
Marshy Zone							
Woody Zone							

Then, add the number of beans in each category from all eight groups and put the numbers in the chart below.

	Aquatic Zone	Marshy Zone	Woody Zone
First Sampling			
Second Sampling			
Third Sampling			
Total Number			

Add the total number of beans that fell under all of the rings for each sampling. (Add the last row of the chart above and record the number below.) Then add across to get the total number.

Aquatic Zone	Marshy Zone	Woody Zone	Total Number

Now calculate the percentage of each color of beans you found in your samples compared to the total number of beans in all of the samples. Write this in the table below. You will do this by dividing the total number found in the rings (from each zone, columns 1 to 3 from the chart above) in each zone by the total number of beans in all of the rings (column 4 from the chart above).

Aquatic Zone	Marshy Zone	Woody Zone

Now, compare the 3 percentages above with the original percentages. (You can find the percentages in the first line under "Materials" at the beginning of this FACTivity). How do the numbers compare? Did your sample percentages resemble the percentages of the population of beans? Why do you think this is so? Answer the question posed at the beginning of this FACTivity. Why do scientists often choose to take a sample of what they study and not identify or study every individual? If you continued to sample three more times, do you think your sample percentages would come closer to the population percentages? Why or why not?



If you are a Project Learning Tree-trained educator, you may use activity #29, "Rain Reasons" and # 71, "Watch on Wetlands" as an additional resource.

**Additional Web Resources:**

USGS's National Wetlands Research Center  
<http://www.nwrc.usgs.gov/>

EPA's Wetlands, Oceans, and Watersheds Kids' Page  
<http://www.epa.gov/owow/kids.html>

