Hands-On Activities to Model Sampling, Habitat Degradation, and Animal Choice

Estimating Population Cover with Transects

Using transects is a common sampling technique that is based on the statistical principle that the average population found along a transect is equivalent to the total population in the habitat. The most common method of using transects is to run multiple transect lines randomly throughout the habitat to be studied. At set distances along each transect, an observer records the population at each point. After the data from several transects has been gathered, it is compiled and averaged, with the results extrapolated to apply to the entire area for which the data was gathered.

In this activity, you will use transect lines to determine the percent coverage of each of the 3 colors on the Population Sheet.

Materials

Laminated Population Sheet
Overhead Marker
Ruler
Calculator or Phone

Procedure

1. Using the ruler and marker, make five 100-mm lines, or transects, on the Population Sheet. (Each line should be randomly placed on the sheet by closing your eyes and dropping the ruler from above the Population Sheet. All lines must be completely within the colored portion of the sheet.)
2. Draw a small dot or line every 5 millimeters along each transect.
3. Beginning at the 0-mm starting point of the first transect drawn, record the color of the square the transect line is touching on your Population Cover Data Sheet.
4. Move along the transect and at every 5 millimeters determine which square the transect line is touching. Record the color information for each of these points on your Population Cover Data Sheet. (In some cases it may be difficult to determine which square the transect is touching, and you will have to make a judgment call. Be consistent with your criteria for determining which square the line is touching.)
5. Repeat this process with the other 4 transects so that you have 5 complete data sets. Then predict the population cover for each of the colors.

Prediction of population cover

Using the information recorded on your Population Cover Data Sheet, find the total number of blue squares, red squares, and green squares that were touching the transect lines. Record these totals on the sheet also.

Use the following equation to determine the percent of the habitat (i.e., the Population Sheet) that is covered by each color.

Percent Cover = Total Points for the Color ÷ Total Number of Data Points

Population Cover Data Sheet

	Transect 1	Transect 2	Transect 3	Transect 4	Transect 5
0 mm					
5 mm					
10 mm					
15 mm					
20 mm					
25 mm					
30 mm					
35 mm					
40 mm					
45 mm					
50 mm					
55 mm					
60 mm					
65 mm					
70 mm					
75 mm					
80 mm					
85 mm					
90 mm					
95 mm					
100 mm					

	Total	Percent Coverage
Blue		
Red		
Green		

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Hands-On Activities to Model Sampling, Habitat Degradation, and Animal Choice

Habitat Degradation

Habitat degradation is a leading cause of biodiversity loss around the world. It causes a loss of viable habitat, disrupts migratory patterns, and limits seed dispersal. Of the many ways humans harm biodiversity, none are as pervasive and easily observable as habitat degradation. In this activity, you will work in pairs to simulate habitat degradation using small choice chambers and pill bugs.

Materials

Choice Chamber
Pill Bugs
Spoon
Moist Terrarium
Blue Absorbent Pad
Sorting Brush
Waste Container
Timer or Watch
Soil

Procedure

Add a bag of soil to the plastic terrarium and then add water until the soil is moist. All pairs should share the soil. The experiment uses a negative control—the soil-free side of the choice chamber

1. Put 8 level spoons of moistened terrarium soil into 1 side of the choice chamber. The chamber should be 85% filled, allowing enough room for the pill bugs and to replace the lid.
2. Transfer 5 pill bugs to each side of the chamber and put on the lids. This is your time zero reading with 0 scoops removed.
3. Count the number of pill bugs on the soil and not on the soil, recording your data every 30 seconds for 2 minutes on the provided data sheet (“0 scoops removed”).
4. After 2 minutes, use the plastic spoon to quickly remove 2 scoops of soil (no more than 1/4 of the soil) from the choice chamber. Place removed soil in waste container and ensure no pill bugs are removed. If a pill bug is mistakenly removed, return it to the soil side of the choice chamber.
5. Repeat the counting and timing procedure from step 3. Record your counts on the data sheet (“2 scoops removed”).
6. After 2 minutes, remove 2 additional scoops of soil from the choice chamber.
7. Repeat the counting and timing procedure every 30 seconds for 2 minutes. Record your counts on the data sheet (“4 scoops removed”).
8. Remove 2 additional scoops of soil from the choice chamber.
9. Repeat the counting and timing procedure and record your counts on the provided data sheet (“6 scoops removed”).
10. Remove 2 additional scoops of soil from the choice chamber.
11. Repeat the counting procedure every 30 seconds for 2 minutes and record your counts on the data sheet (“8 scoops removed”).
12. Use the sorting brush to gently return all the pill bugs to the pill bug container.
13. Using the graph template provided, plot the number of pill bugs found on the soil over time as the number of scoops of soil removed was increased and the amount of habitat available to the pill bugs was decreased.

Thought questions

1. What relationship did you observe between the number of pill bugs and the amount of soil removed?
2. Based on the lab results, describe possible long-term effects of habitat degradation.

Data Table

Amount of Soil	Time (in minutes)	Number of Pill Bugs	
		On Soil	Not on Soil
0 scoops removed	0:00		
	0:30		
	1:00		
	1:30		
	2:00		
	2:30		
	3:00		
2 scoops removed	0:00		
	0:30		
	1:00		
	1:30		
	2:00		
	2:30		
	3:00		
4 scoops removed	0:00		
	0:30		
	1:00		
	1:30		
	2:00		
	2:30		
	3:00		
6 scoops removed	0:00		
	0:30		
	1:00		
	1:30		
	2:00		
	2:30		
	3:00		
8 scoops removed	0:00		
	0:30		
	1:00		
	1:30		
	2:00		
	2:30		
	3:00		

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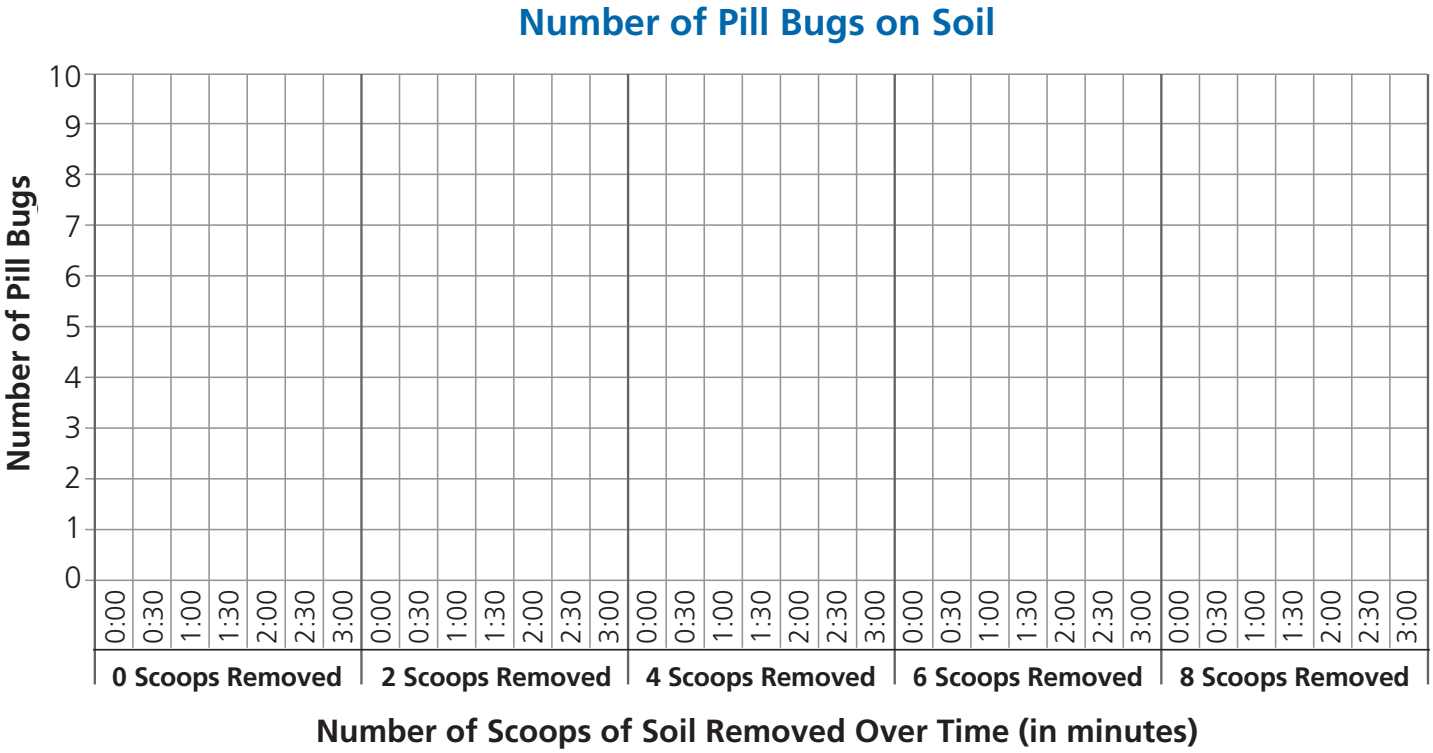
Data Graph



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Hands-On Activities to Model Sampling, Habitat Degradation, and Animal Choice

Make a Choice

Materials

Carolina™ Large Choice Chamber Kit
Additional Black Choice Chamber and Lid

Pick an Organism:

Bess Bugs
Millipedes
Pill Bugs
Roaches

Optional Item (based on preference test):

Heat Packs
Water
Soil

Procedure

1. Break into groups of 2 to 4 people.
2. Determine which organism you want to observe (millipedes, roaches, bess bugs, or pill bugs).
3. Build a 2-chamber apparatus. If you want to do a 3- or 4-chamber test, you can partner with another team.
4. Design an experiment to test a variety of parameters with partners at your table (some examples might be wet vs. dry, light vs. dark, etc.). Don't forget that you may want a control chamber.
5. Determine a hypothesis about which choice chamber the organisms will prefer (or avoid).
6. Remove the lid of the tunnel in the middle and add your organisms. You can also opt to add them directly into the choice chambers. Remove the gates to allow access to the choice chambers. It may take a few minutes for the organisms to get acclimated to their environment.
7. Observe your organisms over the next few minutes to determine the results of the experiment.
8. Place the organisms back into their appropriate containers for storage when your experiment is complete.
9. Remove all test materials from the choice chambers and clean them with paper towels before returning them to the plastic bags for storage.

Thought questions

1. Which organism and parameter (condition) did your group test?
2. Based on your observations, what was your organism's preference for habitat?
3. Did the preference you observed make sense based on what you know about your organism's behavior and biology?

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