canopy in the clouds
dosel en las nubes

Name: _____

Section: _____

Date: _____

SOIL BASICS: FUNCTION AND VARIATION

Much of Earth's surface is covered in soil, yet this critical component is often overlooked when examining natural environments. The *Soil Science Society of America* describes six general functions of soil:

1) Soils serve as a substrate for the growth of plants.
2) Soils contribute to the atmosphere by emitting and absorbing gas (H_2O, CO_2, etc.)
3) Soils provides habitat for small organisms like fungus and bacteria.
4) Soil holds absorb, hold, release, alter and purify most water in terrestrial ecosystems.
5) Soils recycle nutrients, so that organisms can use them again and again.
6) Soils serve as the foundation for construction of buildings, roads, and other infrastructure.

Now that you understand the important roles that soil plays in an ecosystem, it becomes clear that it is worthy of further investigation!

Soil can vary quite dramatically in the matter of a few feet distance and certainly over an entire forest. Using the multimedia tools on the *Canopy in the Clouds* website, we can take a close look at the soils in this tropical montane cloud forest. The more we understand about the soil of the cloud forest, the better we can understand the ecosystem as a whole.

Your first mission is to view several soil sampling videos and to record information at each site. Let's begin by watching an overview of soil sampling. Go to Panorama #1 and watch video #3 on the ground. The biologist notes several characteristics of the soil that are of interest:

(1) Soil structure: the manner in which soil particles are arranged.
(2) Biomass of plant roots: the total dry weight of the plant roots in a given area.
(3) Water content: the amount of water present in a given amount of soil.
(4) Nutrient concentrations: the quantity of nutrients present in a given amount of soil. This is often related to the amount of organic (currently or formerly living) matter that is in the soil.

Now follow the prompts on your data table to view the remaining soil sampling videos. You may need to play clips more than once. Use the table provided to record the data. If a certain property of the soil is not explained at a given site, write "not available" in that cell of the table. Please note that you may have to provide relative data instead of absolute data. Relative data compares one thing with another (e.g., this area is sunnier than that area), while absolute data gives a specific figure (e.g., this area receives 12 hours of sunlight per day). The first row of the data table has been completed for you as an example.

Tropical Montane Soils Data

Panorama (site name)	Hotlink	Elevation[1] (meters)	Color	Water content	Organic content	Other characteristics
1 (Low Elevation Forest)	2 (ground)		*-uniform -medium brown, like coffee grounds*	*Less than other sites*	*Not available*	*Crumbly, falls out of researcher's hand easily*
2 (Mid Elevation Forest)	2 (ground)					
3 (High Elevation Forest)	2 (ground)					

[1] Hint: You can find this by placing the mouse pointer over the site number on the forest map (on the homepage).

Tropical Montane Soils Data, continued

Panorama (site name)	Hotlink	Elevation (meters)	Color	Water content	Organic content	Other characteristics
4 (Elfin Forest)	2 (ground)					
5 (Atlantic Slope)	2 (ground)					

Graphing

Scientists often create graphs using their data. Graphs allow you to view data in different ways, and help you identify patterns and trends. When you examine your data in graph form, you can gain a much better understanding of the information you collected. Let's try it using two subsets of your data, water content and organic content, to create graphs.

First, rewrite the relevant data in the tables below.

Site name	Elevation (meters)	Water content
Low elevation forest		
Mid-elevation forest		
High elevation forest		
Elfin forest		
Atlantic slope		

Site name	Elevation (meters)	Organic content
Low elevation forest		
Mid-elevation forest		
High elevation forest		
Elfin forest		
Atlantic slope		

Now create a graph to represent the data in each table. Plot elevation (in meters) along your x-axis and water/organic content (on a continuum from low to high) on the y-axis. Be sure to label your axes and to give each graph an appropriate title.

Graph analysis

Take a close look at your graphs, then answer the questions below.

(1a) Do you see any patterns or trends on your elevation versus soil water content graph? If so, please describe them. If not, please describe what you see.

_____
_____
_____
_____

(b) Use your background knowledge and critical thinking skills to suggest an explanation of the pattern/trend (or lack thereof) that you observed in this graph.

_____
_____
_____
_____

(c) If you *do* see a pattern or trend, are there any data points that are clear outliers? Why might these not fit the trend? Refer back to your original data table or the videos for clues.

_____
_____
_____
_____

(2a) Do you see any patterns or trends on your elevation versus soil organic content graph? If so, please describe them. If not, please describe what you see.

_____
_____
_____
_____

(b) Use your background knowledge and critical thinking skills to suggest an explanation of the pattern/trend (or lack thereof) that you observed in this graph.

(c) If you *do* see a pattern or trend, are there any data points that are clear outliers? Why might these not fit the trend? Refer back to your original data table or the videos for clues.