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UNDERSTANDING SEASONALITY IN THE CLOUD FOREST

Spring, summer, fall, winter. These four words often come to mind at the mention of the word “seasons”. A season is a period of time (usually several months) that exhibits a unique set of meteorological conditions. Do seasons exist in the cloud forest of Monteverde, Costa Rica, where it is warm and cloudy almost all of the time? Let’s use the *Canopy in the Clouds* resources and a few data sets to find out!

Qualitative and Quantitative Data

You will collect both qualitative data and quantitative data in this activity. Qualitative data are data that are not expressed numerically. For example, you might observe that one site has *more* plants on the ground than another. “More” is *qualitative*. On the other hand, you could count the plants and report that there is an average of *thirty plants per square meter* in the area. “Thirty plants per square meter” is a *quantitative* measurement.

Qualitative Data

Let’s begin by learning a bit about the meteorological conditions at several sites within Monteverde’s cloud forests. You will specialize in one area of the forest, then share your findings with your classmates. Use the table below to record your observations as well as the information from classmates who specialized in other sites. Read the notes below for hints about how to fill in each column.

Temperature: You will not be able to view a thermometer at each site, but you can use contextual clues to give you some information about the temperature. For example, what is the researcher wearing: fleece hat and gloves, shorts and a tee shirt, something else? Can you see snow, ice, steam, or other evidence of a temperature extreme?

Moisture: Is it raining? Is it foggy? Does the material on the ground appear moist or dry?

Other notes: Is there anything else you noticed about the site that seemed interesting or relevant to you?

SITE	Clues about TEMPERATURE	Clues about MOISTURE	OTHER NOTES
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Panorama 1 Ground video 1 <i>(Low elevation forest)</i>			
Panorama 2 Ground video 1 <i>(Mid elevation forest)</i>			
Panorama 3 Ground video 1 <i>(High elevation forest)</i>			
Panorama 4 Ground video 1 <i>(Elfin forest)</i>			
Panorama 5 Ground video 1 <i>(Atlantic slope)</i>			



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The information in your table pertains to ground conditions, but in the cloud forest, the canopy often experiences different conditions. Go to Panorama 3, head up to the canopy, and watch video #1.

What two factors are mentioned as key to the microclimate of the canopy?

Why does the narrator mention orchids? How are they connected to the microclimate of the canopy?

Quantitative Data

The type of data collection you've just done is important, but you need to use quantitative data in order to gain a more accurate understanding of the meteorological conditions in the cloud forest. There are two sets of quantitative data for you to use: temperature in the cloud forest and precipitation in the cloud forest.

After viewing the data sets, you will graph them. Graphs allow you to view data in different ways, and help you identify patterns and trends. Seasons can be identified by trends in temperature and precipitation, so graphs make excellent tools when you are trying to find out whether a particular region experiences seasons.

Month	Average Rainfall (mm)	Average Temperature (°C)
September	530.4	20.7
October	866	19.8
November	356	19.5
December	80.6	19.8
January	9.6	18.7
February	59.8	18.9
March	25.6	19.3
April	1.2	21.0
May	115.5	20.4
June	334	19.8
July	268.4	20.2
August	325.5	20.4



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Start with the temperature data set. Plot date along your x-axis and temperature along the y-axis. Be sure to label your axes and to give each graph an appropriate title.

Next, graph the precipitation data. Plot date along your x-axis and precipitation along the y-axis. Use the same scale for date that you used in your temperature graph. This will make it easier to compare the graphs later on.

Graph Analysis

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

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

(b) If you *do* see a pattern or trend, are there any data points that are clear outliers? Why might these not fit the trend?

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



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(b) If you *do* see a pattern or trend, are there any data points that are clear outliers? Why might these not fit the trend?

(3) Compare your temperature graph to your precipitation graph. Do you notice any relationships between temperature and precipitation? If so, describe them.

(4) Define “season”.

(5a) Based on your graph analysis, do you think that there are seasons in the cloud forests of Monteverde, Costa Rica? Explain using evidence from your graphs.



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(b) If you do think that there are seasons in the cloud forests of Monteverde, please give each season a name and describe the conditions that accompany each.

(c) If you do not think that there are seasons in the cloud forests of Monteverde, describe the conditions that exist in the single season.
