

Name:

Date:

Changes in Seasonal NDVI

Introduction. Vegetation Indices give us information about the presence, vigor, and/or density of vegetation. NASA's MODIS instrument measures a vegetation index called the Normalized Difference Vegetation Index (or NDVI) over the entire globe. NDVI ranges from -1 to 1, with higher values corresponding to greater vegetation density. In this investigation you will explore seasonal changes in NDVI in multiple locations.

Guiding question: How does NDVI change over time in two different locations?

Section I: How does NDVI change seasonally in your location?

1. From the Data Tools page on the Student Climate Data website, click on 'Carbon Mapper.'
2. Close the introductory pop-up window.
3. In the Layers panel (*on the right*), click the box next to **Background**. Change the Background layer to 'Google Hybrid.'
4. Click and drag the map and use the zoom tool to find your location on the map (i.e., your town, school, etc.).
 - a. What is the latitude and longitude of your location? (*displayed on the bottom of the screen*)
5. Now zoom into the map until you have reached **Zoom Level 12** (*displayed at the bottom of the screen; zoom level 12 is the best level for obtaining only one data point for a particular location*).
6. Now click the box next to the **MODIS NDVI** Layer, and then **NDVI 2013** the MODIS data.
7. Click on the box next to **Winter NDVI** to display the NDVI data on the map.
8. Click on the identify tool - the **i** icon - and then click on the center of the map. The identify box should pop up. Record the Winter NDVI value in Table 1.
(*If you get the message: "Sorry, there was nothing that could be identified. Please select some more layers," try clicking in a slightly different spot on the map.*)
9. In order to obtain NDVI data for the three remaining seasons, close the identify box, then un-click the box next to **Winter NDVI**. One at a time, click on **Spring, Summer, and Fall NDVI** for your location, making sure to un-click the previous layer. For each layer, click on you location on the map to access the identify box and record the NDVI value in the table.

Table 1. Seasonal NDVI for Location 1

Location	Season	NDVI
	Winter	
	Spring	
	Summer	
	Fall	

10. In which season is the NDVI value the highest? Why do you think that is?

11. In which season is NDVI the lowest? What features in your landscape or weather patterns might be contributing to a low NDVI value?

12. Record one or two questions you have about NDVI after observing the patterns in data.

Section II: How does NDVI change in a contrasting location?

1. Return to the Student Climate Data website tab (make sure not to close out of the Carbon Mapper).
2. Follow the link under the Picture Post heading to the Picture Post website (<http://picturepost.unh.edu>).
3. Use the map to choose a second location that you think will show a different NDVI pattern than your first location. To help you choose, either:



- a. Pick a spot with a Picture Post- click on the red marker on the map and click ‘View Pictures’ in the pop-up window to see photos from that location, or...
 - b. Zoom into a location on the map. Drag the Google Man (*yellow figure at the top-left of the map*) onto the map and place him on one of the blue lines to see a ground view of that location.
 - c. What location did you choose? Why did you choose this location?
4. Based on the ground-level photos, predict how NDVI will change over time in this location. Sketch or describe the pattern below. Why do you expect to see this pattern?
5. Return to the Carbon Mapper. Unclick any data layers that are on. Unclick the identify tool icon.
6. Follow the steps 4-9 in **Section I** to complete the table below:

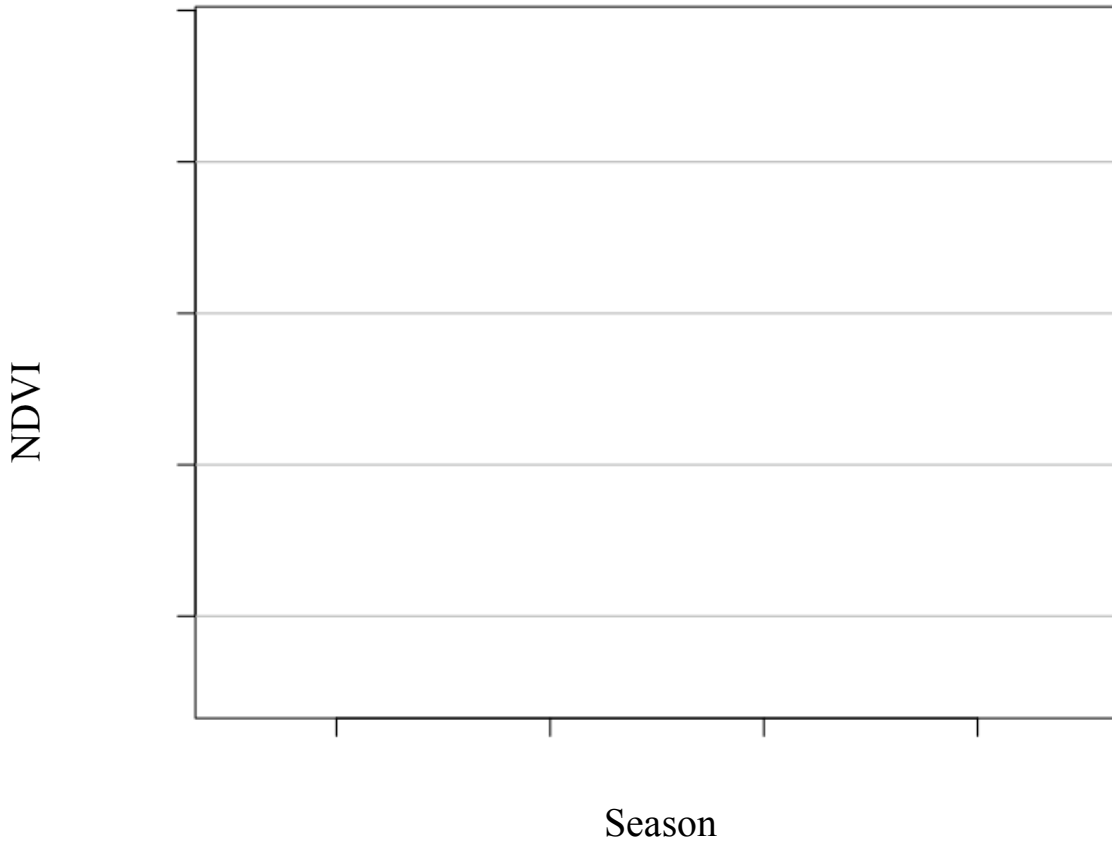
Table 2. Seasonal NDVI for Location 2

Location	Season	NDVI
	Winter	
	Spring	
	Summer	
	Fall	

7. Does the NDVI data show the pattern you expected? Why or why not?

Section III: What features in a location influence NDVI?

1. Using NDVI values (Tables 1 & 2), and the blank graph below, draw a graph of the NDVI for your two locations (use a different colored pen or different line styles for each location) Be sure to label your axes and provide a legend if necessary.



2. Which location has higher NDVI in the summer? Which has higher NDVI in the winter?
3. Do the two locations follow the same seasonal pattern? What features in the landscape might be causing these similarities or differences?