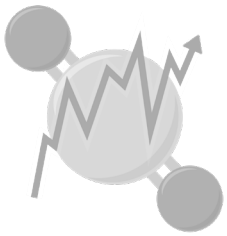
Name: _____ Date: _____ Period: _____



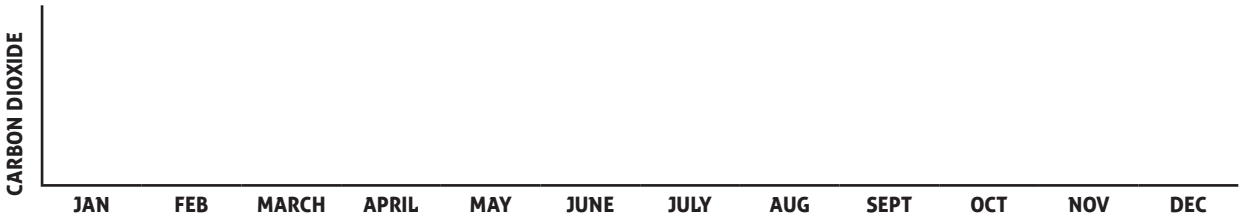
SEASONAL SAWTOOTH PATTERNS IN THE CARBON CYCLE

1. CO_2 Monitoring Station Location: _____

   Month(s) with **highest** CO_2 levels: _____

   Month(s) with **lowest** CO_2 levels: _____

2. Sketch the pattern of one year of CO_2 levels in the atmosphere in the graph below.



ON YOUR COMPUTER:

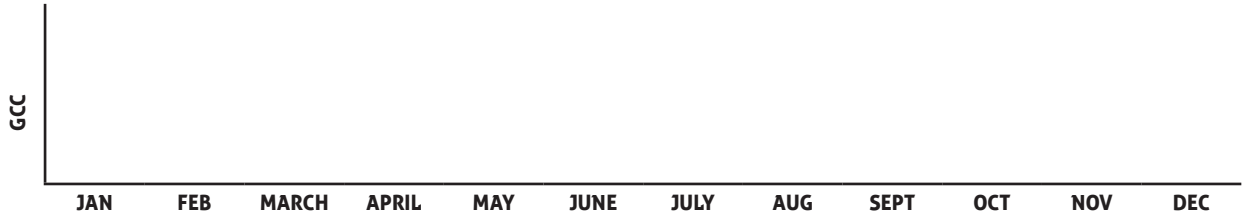
1. Go to phenocam.nau.edu.
2. Click Map in the top menu.
3. Choose the Streets layer to add states and cities to the map.
4. Zoom in to find Phenocams and click on a green dot in a location near the CO_2 monitoring station you used above.
5. Click on the picture to go to the camera's page.
6. Click the button below the words "ROI Timeseries" on right side of the large picture.
7. Examine the greenness graph. Use the sliders under the graph to change the dates shown on the graph.
8. Hover your mouse over points on the graph to see the date of each data point.

3. Phenocam Location: _____

   Month(s) with **highest** GCC levels: _____

   Month(s) with **lowest** GCC levels: _____

4. Sketch the pattern of one year of Green Chromatic Coordinate (GCC) levels in the graph below.



5. Compare the two graphs you sketched:

   a. When the local GCC (greenness) is high, CO_2 levels are _____ (HIGH / LOW).

   b. When the local GCC (greenness) is low, CO_2 levels are _____ (HIGH / LOW).

6. Based on your graphs, what is causing the seasonal decrease in CO_2 levels? Explain your reasoning.

7. As people produce CO_2, the greenhouse effect traps heat energy inside the atmosphere and leads to climate change. One of the impacts of climate change is _____ (HIGHER / LOWER) air temperatures. The change in temperature leads to a/an _____ (INCREASE / DECREASE) in evaporation and transpiration, which means that there is less water available to plants. Plants will be _____ (MORE / LESS) green, which means they take up _____ (MORE / LESS) CO_2 through photosynthesis. When photosynthesis _____ (INCREASES / DECREASES) because of higher temperatures there is _____ (MORE / LESS) CO_2 in the air. This _____ (INCREASES / DECREASES) the greenhouse effect, which will lead to _____ (HIGHER / LOWER) temperatures.

8. How would a wildfire affect the local CO_2 data? Explain your reasoning.

9. If your hometown decided to plant 100 new trees downtown, how would that affect climate change? Explain your reasoning.

10. The Phenocam graph from Vindeln, Sweden shows higher-than-normal GCC in the most recent years. This may be because warmer temperatures allow for more plant growth in places where cold used to limit plant growth. How could this impact global CO_2 levels?