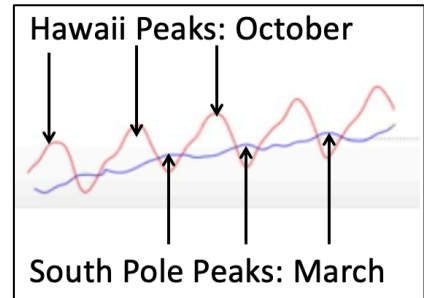


4.5: Seasons and Oceans Worksheet

A. Explaining why CO₂ concentrations in Hawaii are different from CO₂ concentrations at the South Pole

Start by viewing videos that show some important patterns that you will need for your explanation:

- The NOAA “pumphandle” video: <https://www.esrl.noaa.gov/gmd/ccgg/trends/history.html>
Note how the changes each year are different in the Northern and Southern hemispheres.
- Comparing the annual cycle in Hawaii vs. the South Pole:
<https://www.youtube.com/watch?v=UatUDnFmNTY&feature=youtu.be> Note when CO₂ concentrations reach their peak in each location.
- Movie showing rates of photosynthesis at different times of the year: on the PowerPoint presentation Activity 4.5 How Seasons and Oceans Affect Atmospheric CO₂. Note how summer and winter are different in the Northern and Southern hemispheres.



Now try using the Large-scale Four Questions and checklist to write your explanation:

Setting the stage: Describe the pattern in CO₂ concentrations that you are explaining.

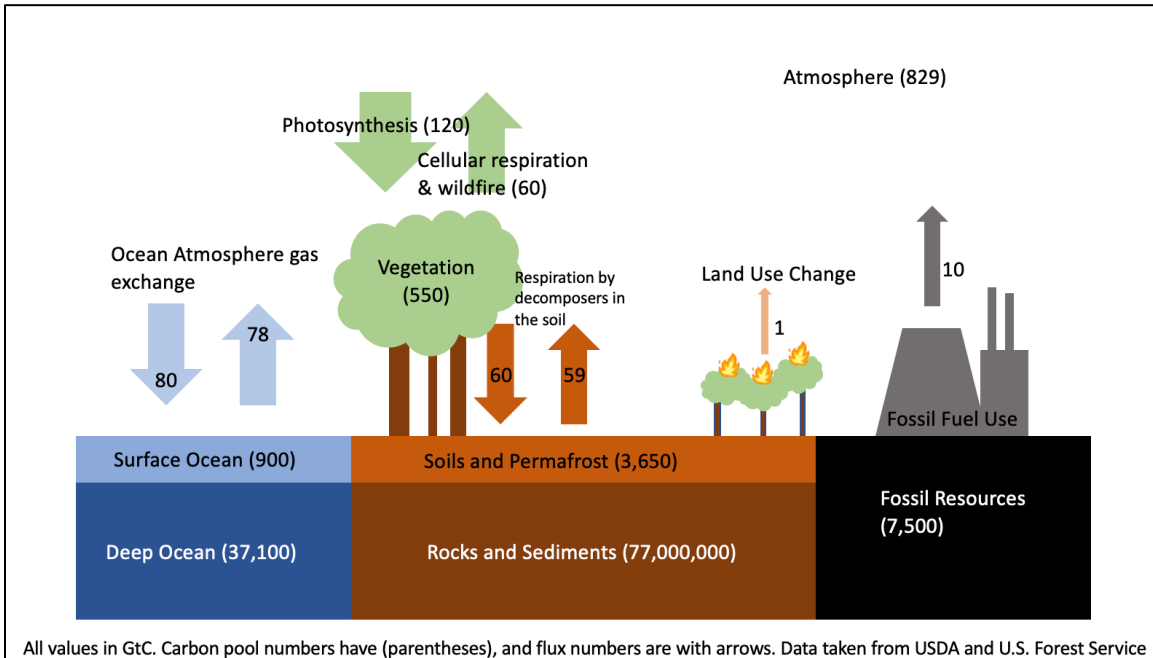
Carbon Pools Question: Which carbon pools are changing?

Carbon Cycling Question: Which carbon flux changes with the seasons? _____

Energy Flow Question: What form of energy changes with the seasons? _____

Stability and Change Question: Now try putting all these ideas together. Why are the annual cycles of CO₂ concentrations different for Hawaii and the South Pole?

B. Using a global carbon cycling diagram to predict the effects of cutting fossil fuel emissions in half.



Try using this diagram to make a prediction of what would happen if humans cut emissions from fossil fuel use in half, but all the other pools and fluxes stayed the same. Show your calculations below.