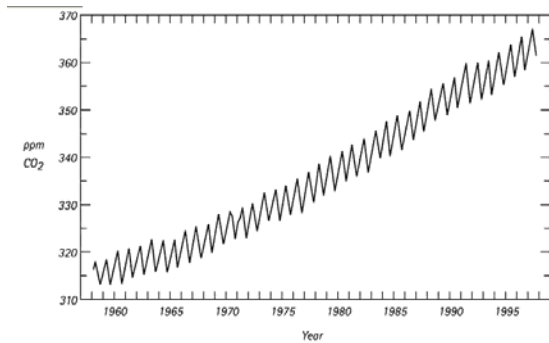


5) What does the circulation of the Hadley cell have to do with the location of tropical rainforests and deserts in North and South America? Which of these two terrestrial biomes is more productive?

6) We know, from measurements of the concentration of CO₂ in the Earth's atmosphere, that the concentration is going up. The most famous example of this is the "Keeling curve", shown below. This record of CO₂ increase was obtained from continuous measurements made at Mauna Loa in Hawaii by Charles Keeling (of UCSD!). Can you explain why the Keeling curve for CO₂ has such a jagged, "sawtooth" – type pattern of increase?



7) What is the turnover time for oceanic primary producers vs. terrestrial primary producers? How is this significant to the global distribution of primary production?

8) What is the biological organic carbon pump in the ocean and how is the efficiency of this pump affected by the structure of the oceanic food web?

9) What is the relative timescale for each of these processes in terms of the carbon cycle? Use numbers, not just words.

- a) Atmosphere/upper ocean exchange
- b) Terrestrial forest/atmosphere exchange
- c) Deep ocean/surface ocean exchange
- d) Ocean sediment/atmosphere exchange
- e) Terrestrial soil/atmosphere exchange

10) How does the solubility pump work to move CO₂ from the atmosphere into the deep ocean? in what regions of the ocean does this happen?

11) Limestone (carbonate) weathering does not lead to the net removal of carbon dioxide from the atmosphere. Why not?

12) Why is plate tectonics critical to the maintenance of an atmosphere-ocean reservoir rich in carbon?