Carbon

- Life on Earth is referred to as carbon-based life
- The *biosphere* refers to all the places where life is found and the *lithosphere* refers to all the places where rocks are found
- Cycling involves how the carbon atoms are incorporated into different molecules

Role of autotrophs

- Photosynthetic autotrophs take carbon dioxide from the atmosphere and convert it into carbohydrates
    - In its inorganic form, carbon isn't usable as a food source by the autotrophs or by any consumer, but sugars (organic form of carbon) are
        - Fructose, galactose, starch, cellulose are all made by glucose
        - Other organic compounds, like lipids and amino acids, are also made of glucose
            - Glucose is the starting point in this case, since other elements, such as nitrogen, must be added to it

Carbon dioxide

- Absorbed by photosynthetic autotrophs and is turned into organic compounds
- Consumers eat the producers and use the carbon compounds
- Consumers and decomposers respire and release carbon dioxide back into the environment

Carbon in aquatic ecosystems

- Carbon dioxide can be absorbed by water
- Organisms that live in the water produce cc through cell respiration
- As the carbon dioxide is dissolved in the water, it forms and acid
    - The pH of water decreases and carbon dioxide increases

$$CO_2 + H_2O \Rightarrow H_2CO_3 \quad \text{(carbonic acid)}$$

- HCO_3^- is an inorganic molecule which participates in the carbon cycle

$$H_2CO_3 + H^+ \Rightarrow HCO_3^- \quad \text{(hydrogen carbonate ion)}$$

    - Carbon can be absorbed in this form by organisms
- Carbon by carbon sequestration can turn into:
    - Methane, limestone, peat, fossil fuels