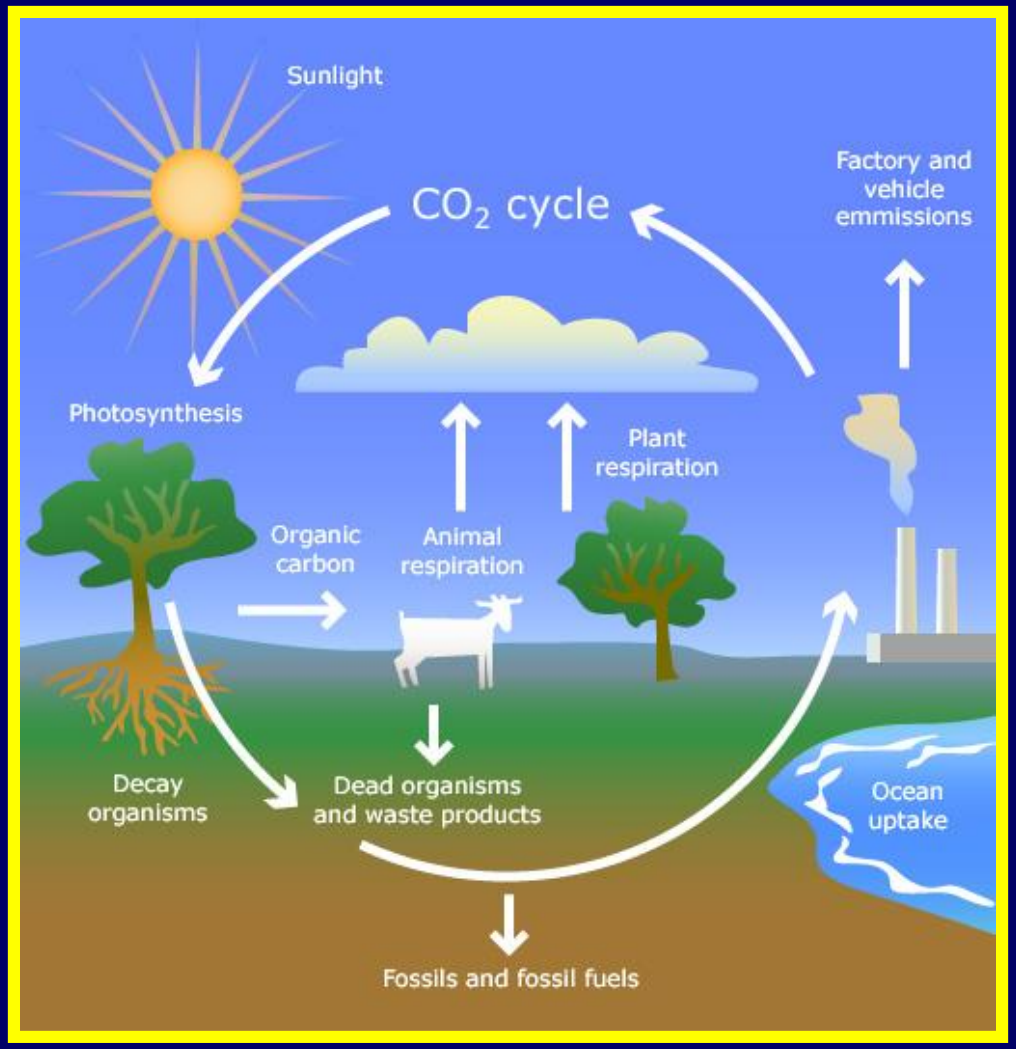
Carbon Cycle



Essential Standard 2.6

Analyze patterns of global climate change over time.

Learning Objective 2.6.3

Analyze the impacts that human activities have on global climate change such as the burning of hydrocarbons, greenhouse effect, and deforestation.

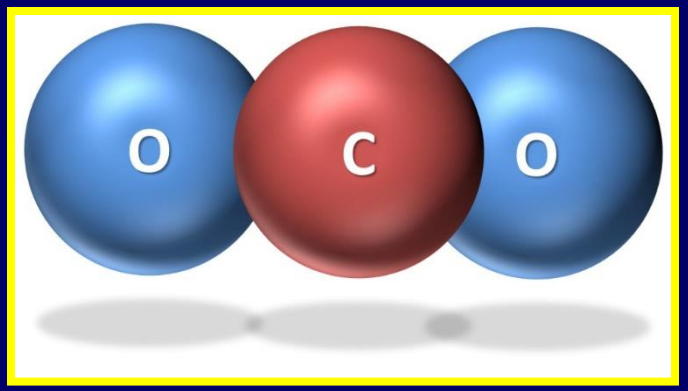
I Can Statements

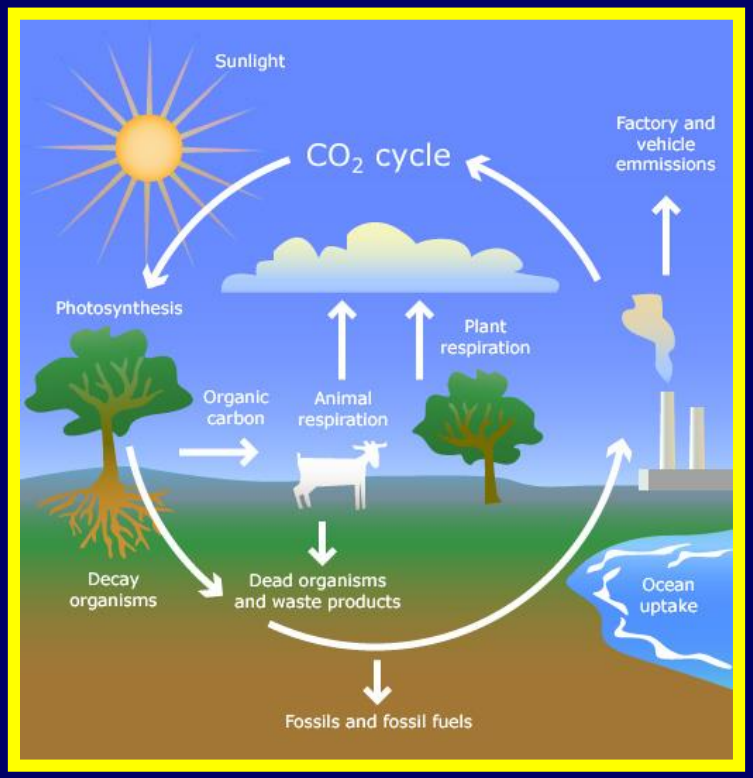
At the end of this lesson, you should be able to say, with confidence:

- I can explain how carbon dioxide is cycled through various processes in the carbon cycle.
- I can explain how human activity led to an increase in carbon dioxide in the atmosphere and how scientists know it is from human activity.
- I can explain the relationship between increased carbon dioxide levels and an increase in the global average temperature.

Carbon Cycle

Carbon dioxide, CO_2, molecules consist of one carbon atom bonded to the two oxygen atoms.

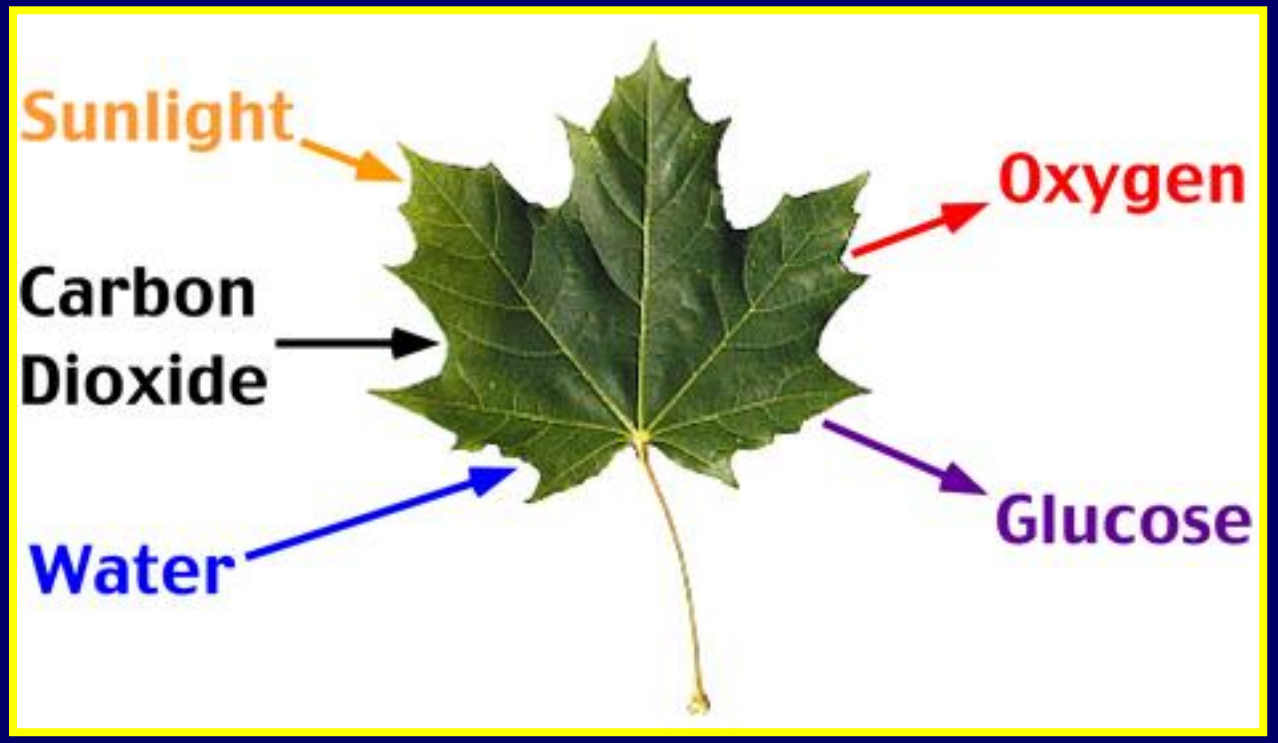




Carbon dioxide, CO_2, is cycled through the atmosphere, hydrosphere, lithosphere, and biosphere through processes that make up the carbon cycle.

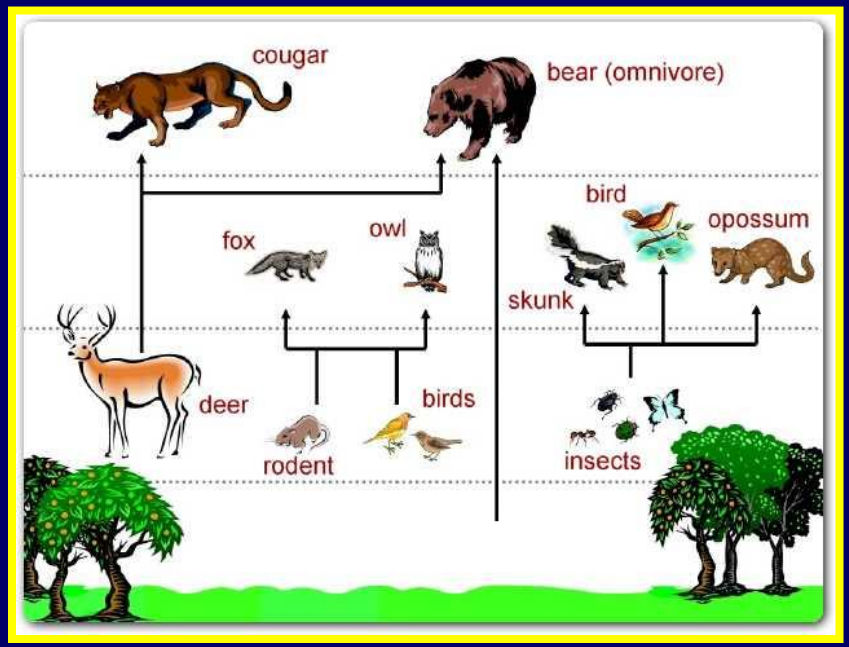
Photosynthesis

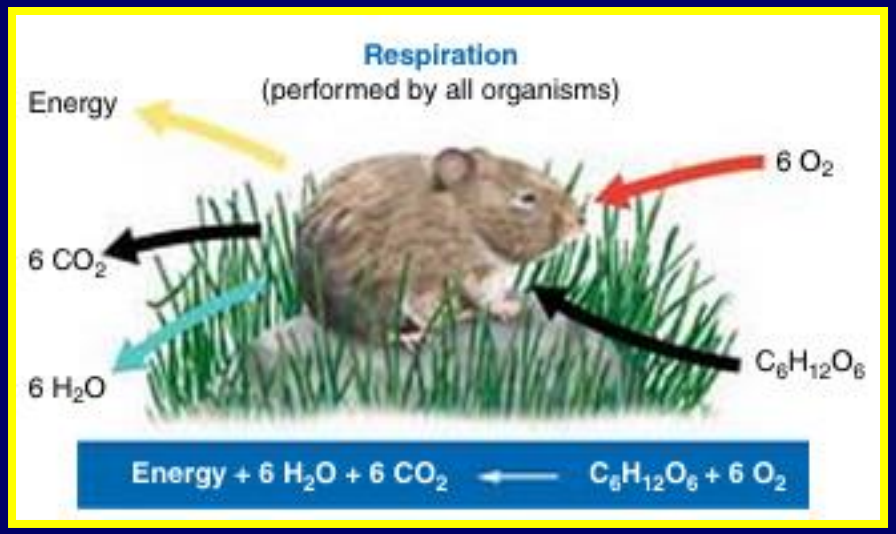
During photosynthesis, plants, plankton, other algae, and cyanobacteria remove carbon dioxide, CO_2, from the atmosphere and use light energy to convert the carbon into glucose, $C_6H_{12}O_6$.



Respiration

Carbon, in the form of glucose, $C_6H_{12}O_6$, is then passed through the food chain.





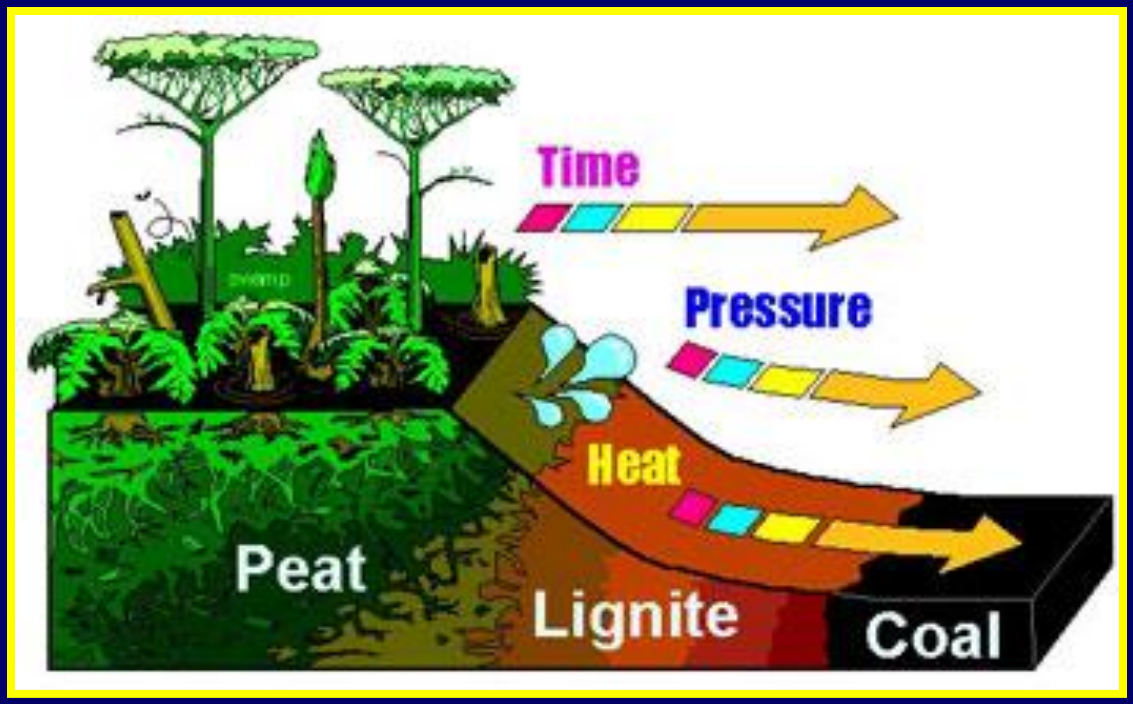
As food is broken down, carbon dioxide, CO_2, is released back into the atmosphere through the process of respiration.

Decomposition

Decomposition also releases carbon dioxide, CO_2, into the atmosphere, as plant and animal wastes are broken down by decomposers.

Fossil Fuels

Organic matter, rich in carbon, that is not decomposed ends up being buried and, overtime, due to heat and pressure, turns into carbon-rich fossil fuels such as coal, oil, and natural gas.



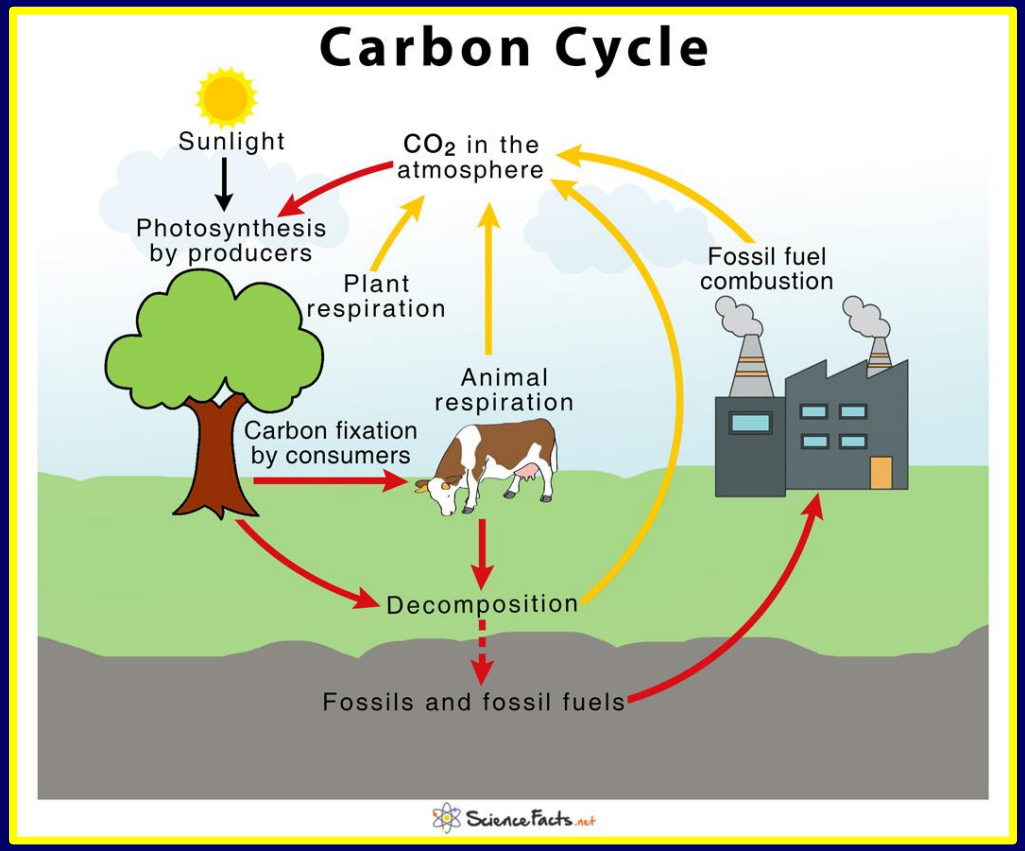
Combustion

When fossil fuels are burned, during a process called combustion, large amounts of carbon dioxide, CO_2, are released into the atmosphere.

Combustion also occurs when wood is burned and carbon dioxide, CO_2, is released.

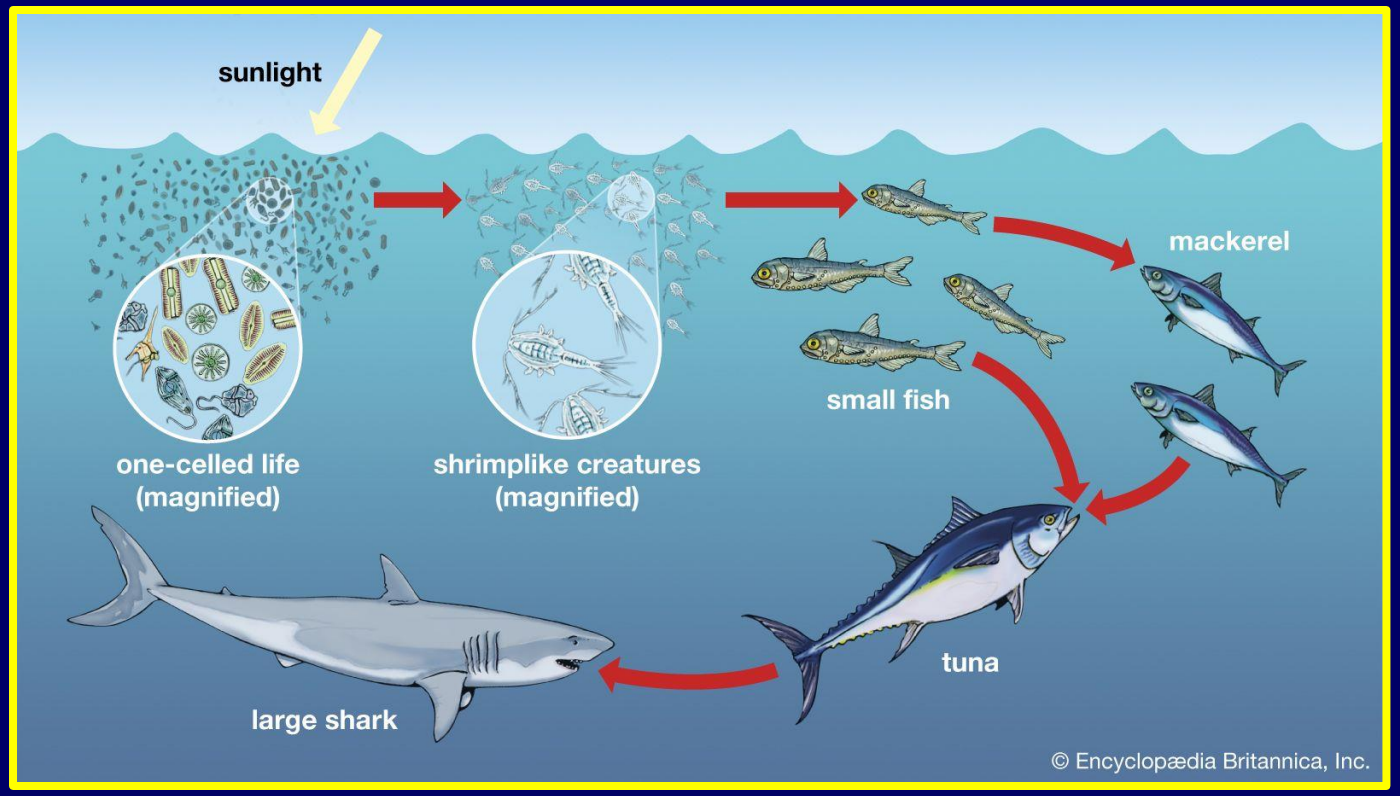
Carbon Cycle

The cycling of carbon dioxide, CO_2, through the atmosphere, biosphere, lithosphere, and hydrosphere is called the Carbon Cycle.



Aquatic Carbon Cycle

The cycling of carbon dioxide, CO_2, also occurs in aquatic ecosystems with phytoplankton removing CO_2, from the atmosphere or water to produce glucose, $C_6H_{12}O_6$, that is passed up the food chain.

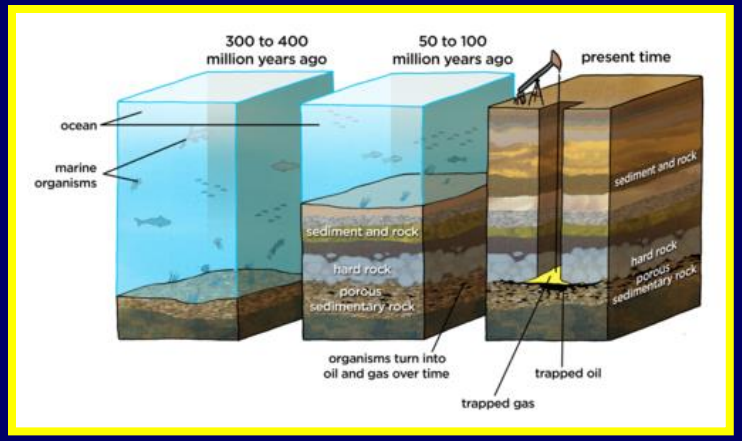


Carbon Sinks

Carbon sinks are places where carbon is stored for long periods of time, thus removing it from the carbon cycle so it doesn't enter the atmosphere.

The ocean is the largest carbon sink, as it can hold enormous amounts of dissolved carbon dioxide.

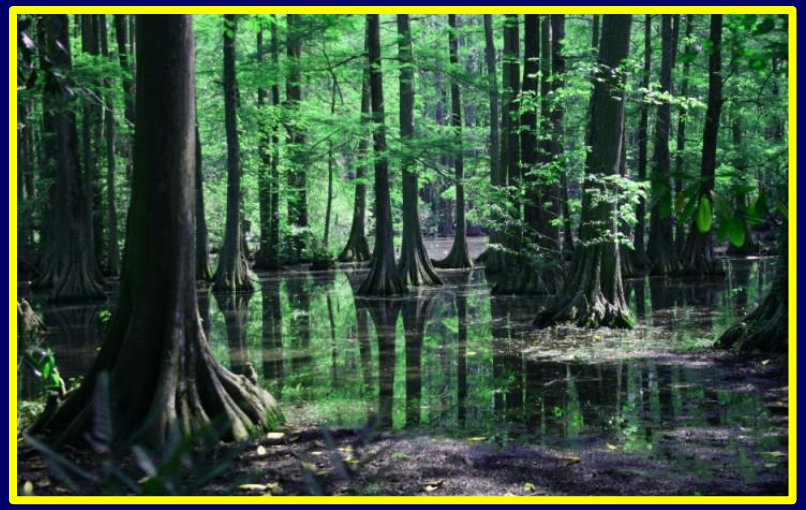
Organic wastes of marine organisms also become buried and over time and are turned oil and natural gas.



Carbon Sinks

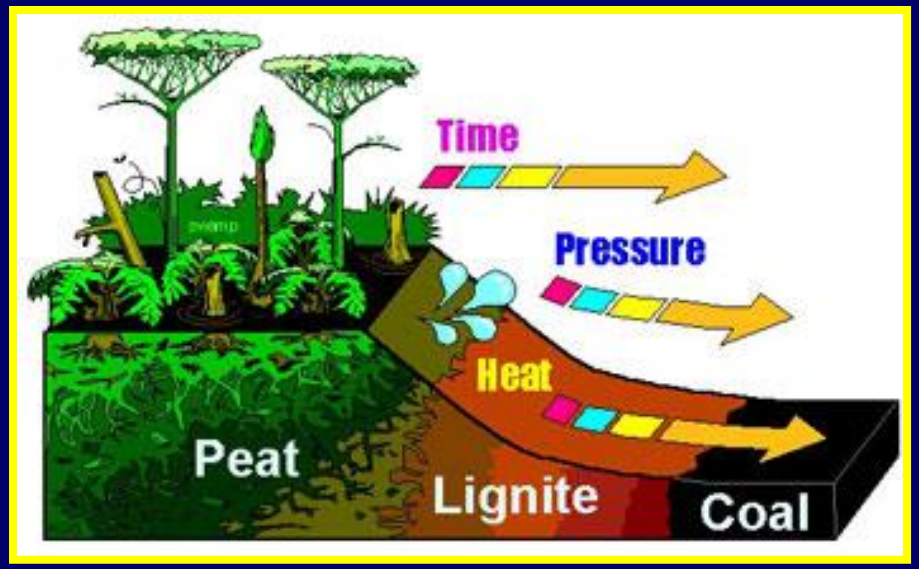
Trees and forests are also large carbon sinks, as the plants use and store the carbon as they make their bark, branches, and leaves.

Carbon Sinks



Trees that died in swamps millions of years ago were unable to decompose due to the lack of oxygen in the water and soil.

The dead trees were eventually buried and over time, heat and pressure turned the carbon rich material into coal.



Carbon Sinks

Coal is a carbon sink, as it takes millions of years to form and remains underground until removed.

The End