**HUMAN IMPACT AND THE CARBON CYCLE**

For tens of thousands of years, the concentration of CO2 in the atmosphere has fluctuated but stayed within a relatively narrow range. This is because the processes affecting it (photosynthesis and cell respiration) have been in balance. Today the concentration of CO2 has skyrocketed to the highest level in recorded history, and is continuing to increase at an accelerating rate every year. Scientists believe this is because of the many tons of CO2 added to the atmosphere daily by humans burning ever-increasing amounts of fossil fuels.

What exactly are fossil fuels and why does burning them affect CO2 levels? Sometimes conditions are such that dead organisms do not decompose. This was especially true during the Carboniferous Period, 360-286 million years ago. During this time, land on Earth was covered with gigantic swamps filled with huge trees and other large, leafy plants. The oceans were filled with algae. As trees, plants, and algae died they often sank to the bottoms of the swamps and oceans. There they did not decompose but formed layers of a spongy material called peat. Over many hundreds of years, the peat was covered with layers of sand, clay and other minerals which eventually turned into sedimentary rock. As more and more layers of rock formed, its weight began to compress the peat, squeezing out all the water. Eventually, over millions of years, the ever-increasing pressure turned it into coal, oil (petroleum), or natural gas. Because these fuels formed from the bodies of long-dead organisms they are called “fossil fuels”.

As we know from cellular respiration, when organic compounds are rearranged in the presence of oxygen, large amounts of energy are released and CO2 and water are produced as a waste product. This is exactly what happens when we burn fossil fuels because, like food, they are organic molecules. The difference is that burning rearranges the molecules all at once instead of in many small steps as it does in cellular respiration. However both processes produce the same end products, CO2 and water.

So why is increasing the amount of CO2 released into the atmosphere a problem? Because the amount of CO2 released by burning these fuels is far more than Earth’s photosynthetic organisms can absorb, it isaccumulating in our atmosphere. The result is a phenomenon known as the “Greenhouse Effect”. The built-up layer of CO2 traps surface heat that would normally radiate back out into space causing Earth’s average temperature to rise. Global warming melts glaciers, causes sea levels to rise, and causes an increase in extreme weather events all over the planet.

