SCI – PRODUCERS AND PHOTOSYNTHESIS

Producers (green plants) use photosynthesis to make sugar (glucose, stored chemical energy) from carbon dioxide, water, and light energy. This process which also releases oxygen gas as by-product, is described by the following equation:

$$6CO_2 + 12H_2O \rightarrow C_6H_{12}O_6 + 6O_2 + 6H_2O$$

Chlorophyll in the cells of the plant absorbs the kinetic energy of light and uses it to remove the hydrogen atoms from water (H_2O) molecules. The hydrogen atoms combine with carbon atoms from carbon dioxide to form a growing chain of carbons that eventually becomes a glucose molecule. After the hydrogen atoms are removed from water, the oxygen atoms that remain combine with each other to form oxygen gas, which is released into the air. Water appears on both sides of the equation because 12 molecules are consumed and 6 molecules are newly formed during photosynthesis.

The key energy steps in photosynthesis remove the hydrogen from water molecules and join carbon atom together to form the carbon-carbon and carbon-hydrogen bonds of glucose. These steps convert the low potential energy bonds in water and carbon dioxide molecules to the high-potential energy bonds in glucose.

The structure of glucose