ORGANIC COMPOUNDS

Overview

Organic chemistry is the study of Carbon compounds. Because there are so many of these in living things, organic chemistry is sometimes thought of as living chemistry.

The Carbon atoms of organic compounds are very unusual. Because a Carbon atom has four valence electrons spread around the atom in the outer energy level, Carbon can bond in many directions around itself with four covalent bonds.

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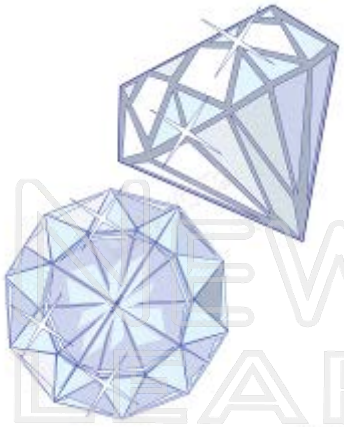
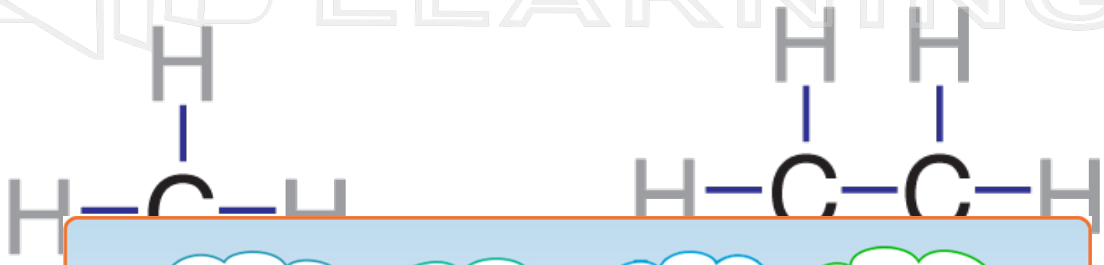


Lesson Checkpoint:
What makes a Carbon compound strong?

Pure Carbon Compounds

Other types of pure Carbon compounds include hollow spheres of Carbon atoms called **fullerenes** and hollow tubes called **nanotubes**. Both of these structures are extremely strong.

Another large group of organic compounds are called **hydrocarbons**. These compounds contain only Carbon and Hydrogen atoms. Some examples of hydrocarbons are shown below.

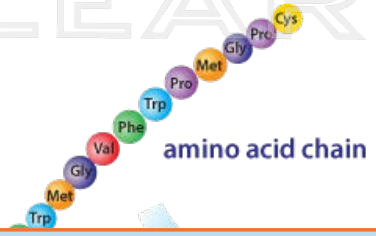


HydroCarbons, like methane, with their names ending in “ane” have only single covalent bonds. Hydrocarbons with double or triple bonds between the Carbon atoms are named with the endings “ene” and “yne”. Methane is considered a **saturated** hydrocarbon because it has as many Hydrogen atoms bonded in it as possible. On the other hand, ethane and ethyne are considered **unsaturated** because, if it were not for the double and triple bonds, more hydrogen atoms could be bonded.

Lesson Checkpoint:
What is a hydrocarbon and how do they differ from one another?

Organic Chains

Many kinds of organic compounds can be linked together to form long chains called **polymers**. The single unit that is repeated over and over again in a polymer is called the **monomer**. One of the most important natural polymers is a **protein**. The monomer, which is the building block, is called an **amino acid**. Other natural polymers include silk and cotton while **synthetic**, or man-made polymers, include plastic and nylon.



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thing[illegible] and **cellulose**. These are made from repeating units of the sugar, glucose. In **organisms**, the third largest category of organic compounds is the **lipids**. These large molecules are the fats and oils that living things need. Last, are the **nucleic acids**. The famous nucleic acid, **DNA**, is a very long polymer that makes up our genes and chromosomes and is responsible for almost everything about us. It is the length of DNA that makes it possible for so many gene combinations.

Lesson Checkpoint: Name a few polymers that are important to living things.