

Lect 1: Chp 16: Carbon Chemistry 2pts ec

Chemistry of Living Things

Living things are a lot like laboratories... There's some serious chemistry going on inside. Your body is an incredibly complex chemical machine taking in chemicals & food, and causing countless reactions to occur every second.

_____ is the study of substances & processes occurring in all living organisms.

I'm made of what???

Only about _____ elements make up all living things.

97% of your body's mass is made of 4 elements:

- ✓ _____
- ✓ _____
- ✓ _____
- ✓ _____

Two other major elements are _____ & _____

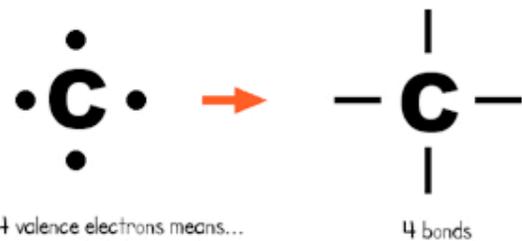
Major Compounds in the Body

- Also relies on _____ & _____
- Typically consists of _____% water. In other words, 2/3 of your body weight is water. Water is important because many of our body's chemical reactions can only occur in solutions containing water. Blood, sweat, urine... all mostly water!
- Salt is also important because of how it can separate into its two ions: Na^+ and Cl^- . Sodium ions regular the amount of water in our cells, while chlorine ions help our body digest food.

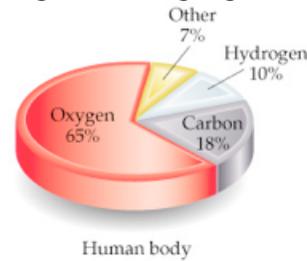
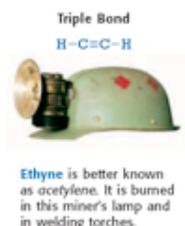
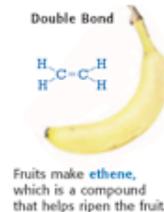
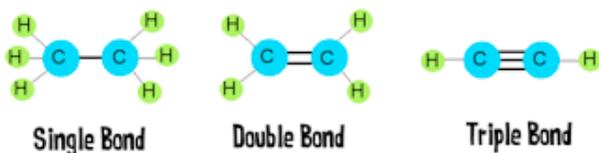
- **The most important element is...** _____ It may not be the most abundant element in living things, but it is the most important. Scientists call carbon compounds _____ compounds. Remember: Not ALL substances made of carbon are living.
- _____ & _____ are pure forms of carbon.

What makes carbon so special?

- It has a "central" role in all living organisms.
- It has _____ electrons
- It makes _____ bonds
- It bonds to itself over & over

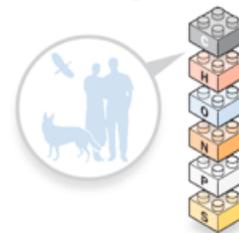


3 Types of Carbon Bonds



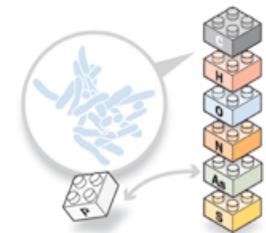
The common version

Six main chemical building blocks were thought to be necessary for life: carbon, hydrogen, oxygen, phosphorus, nitrogen and sulfur.



An alternate version

The bacteria scooped from arsenic-laden Mono Lake in California used arsenic as a building block instead of phosphorus.



So what?

In addition to making sci-fi writers salivate, the discovery means scientists must think more broadly about what life can be made of, and by extension, where it could exist.



Chemistry & Your Body

FACTS:

- You are made of about 65% _____
- You are also made of molecules consisting mostly of _____ & _____
- You are also made up of MANY different kinds of molecules, including small ones like _____ & _____ very large ones like _____ and _____

GOAL: Find out how many pounds of the major elements are in your body.

Step 1: Estimate your weight in _____ pounds. I weigh approximately _____ pounds (lbs).

Step 2: If all of the water was removed from your body, you would be made of following percentages of elements.

Element	% Found in body	% as a decimal	Amount of Element in Body (pounds)
Carbon	53%	0.53	
Oxygen	21%		
Nitrogen	9%		
Hydrogen	8%		
Calcium	4%		
Phosphorous	3%		
Sulfur & Sodium	1%		
All other elements	1%		

Step 3: Determine how many pounds of each element make up your body's mass, less water. Then, fill out the data table. To do this, convert each 5 into decimals. Then, multiply your weight by each decimal.

Example: If Bob weighs 150 lbs, he'd have 150 x 0.53, or 79.5 lbs of carbon in his body.



Video 1. Let's review bonding & Lewis Structures

Video 2. Diamonds & Graphite

Video 3. Covalent Bonding Review

Video 4. Molecular Geometry