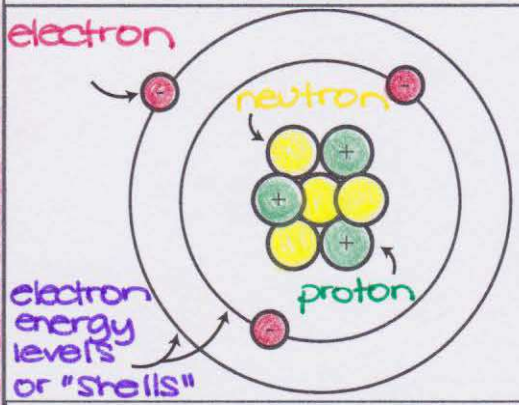
Chem You Need for Bio

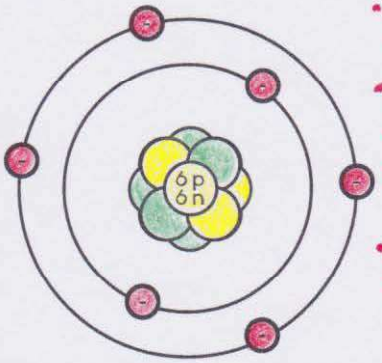
Name: _____



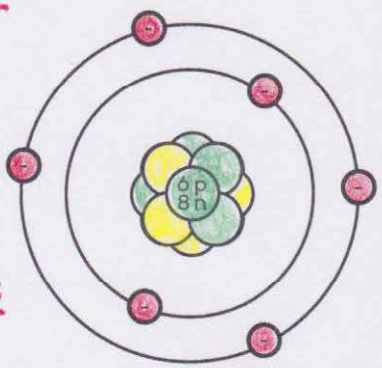
- Atoms are made up of subatomic particles
- Electrons are negatively charged and are found in electron "shells" or "electron cloud" outside the nucleus.
- Protons and neutrons are found in the nucleus
- Protons are positively charged and the number of protons determines the element or "type" of atom

Everything, including living things, are made of atoms.

- Biologists use isotopes in their research
- Carbon dating
- Radioactive isotopes can be used to label molecules in an experiment

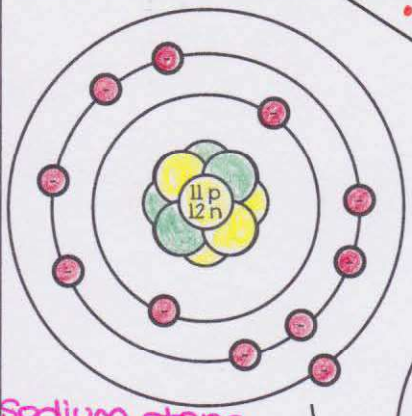


- Same number of protons
- DIFFERENT number of neutrons
- They are called Isotopes



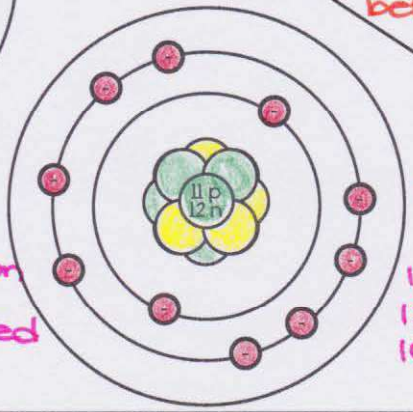
Isotopes are atoms of the same element that have a different number of neutrons.

- When solid salts like NaCl dissolve in water, they form ions
- Positive ions have fewer electrons and negative ions have more ions than their normal atoms.
- Ions are used to communicate between cells (like nerve cells).
- Many biochemical reactions occur only when there is a particular salt concentration in the cell or solution.
- Our body cells have a normal concentration of salt similar to "saline."



Sodium atom (Na)
11 protons
12 neutrons
11 electrons

Electron is removed

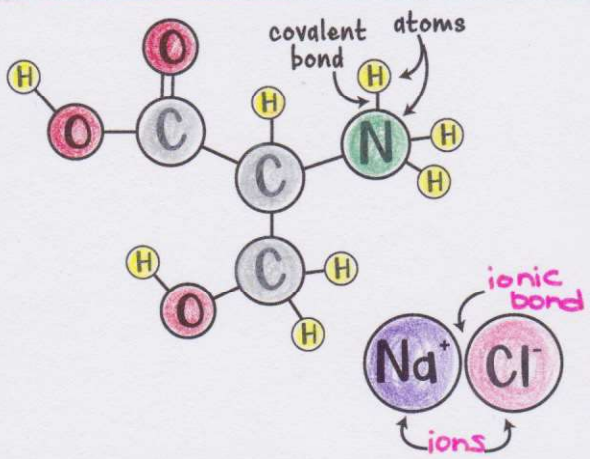


Sodium ION (Na^+)
11 protons
12 neutrons
10 electrons

Ions are atoms that have more or fewer electrons than protons; that's why they are "charged".

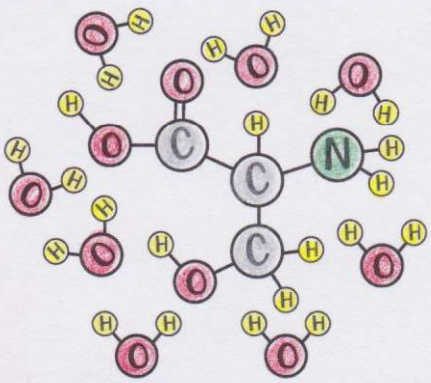
Name: _____

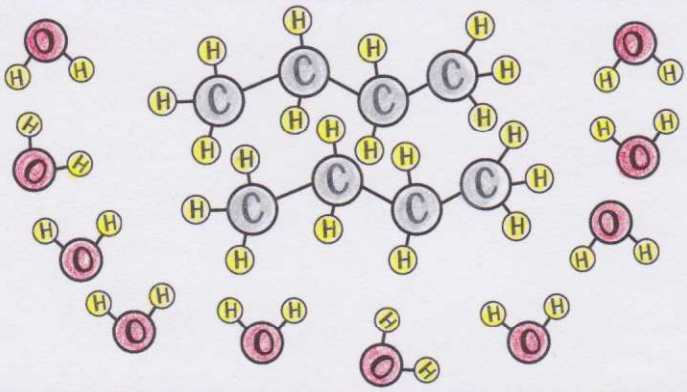
- Atoms in molecules are held together by covalent bonds.
- Atoms in a covalent bond together share electrons.



- Atoms in ionic solids are held together by ionic bonds.
- Ionic bonds form when one or more electrons are transferred from one atom to another.
- The one that loses electrons becomes positively charged. The one that gains becomes negatively charged.

Molecules and Ionic Solids are made of atoms



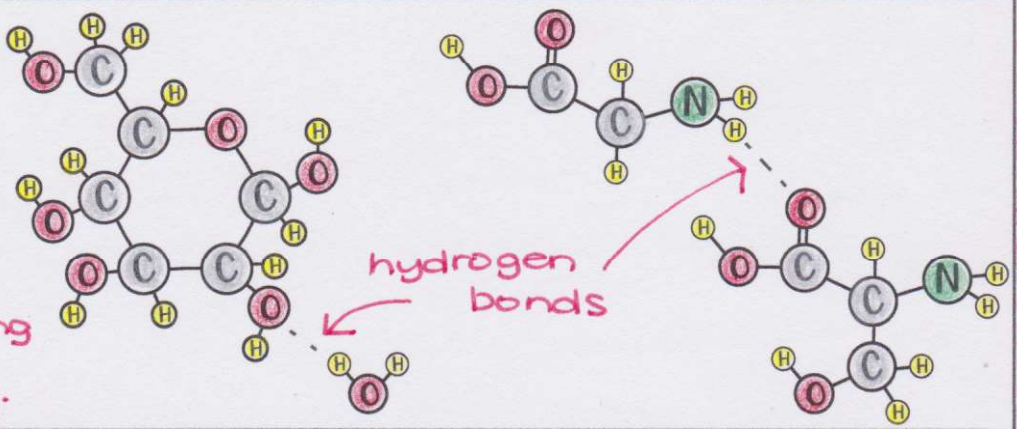


- Some molecules are attracted to or "stick" to water molecules.
- These are polar and are called hydrophilic molecules.
- They often have nitrogen, oxygen, or sulfur atoms

- Some molecules are not attracted to water and stick to each other, away from water when possible.
- These are nonpolar and called hydrophobic molecules.
- They are often mostly made of carbon and hydrogen atoms and have few oxygen or nitrogen atoms.
- The tendency for hydrophobic molecules to stick to each other and keep water out is called "hydrophobic interaction"

Some molecules act differently in water.

- Polar molecules are attracted to each other.
- Hydrogens bonded to oxygen or nitrogen atoms are VERY attracted to nearby oxygens or nitrogens. This strong attraction is called the hydrogen bond.



Hydrogen bonds are really strong and really important.