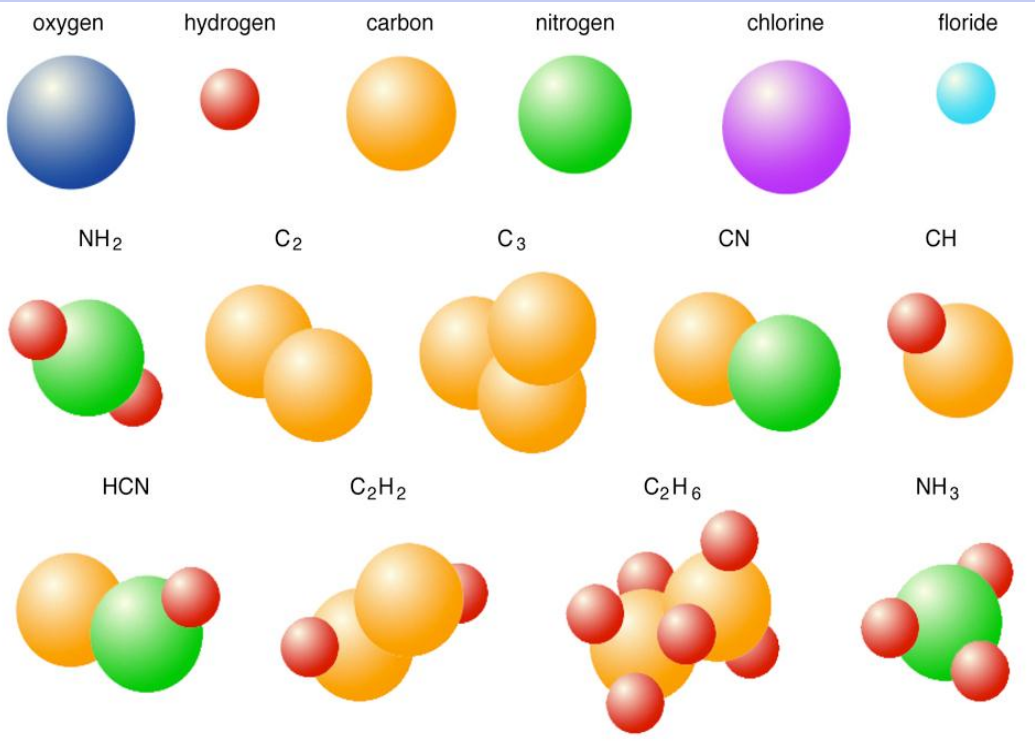
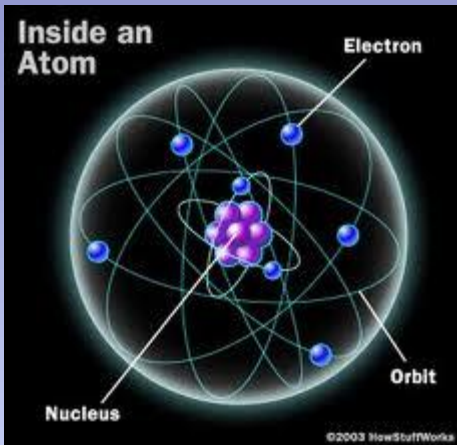


Matter

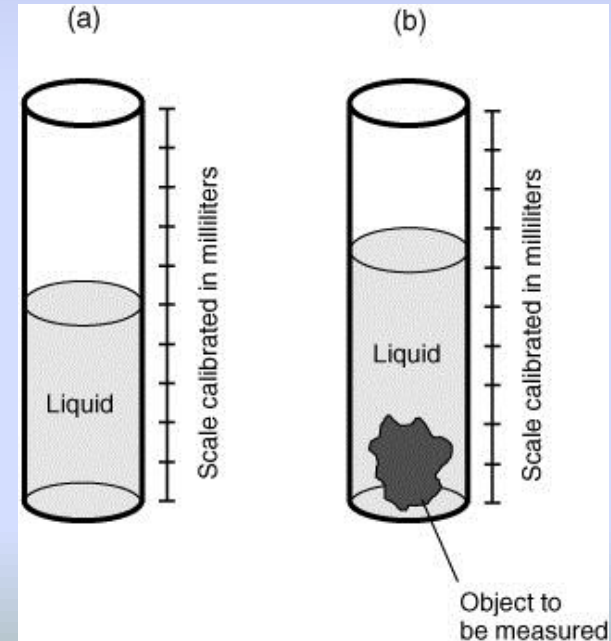
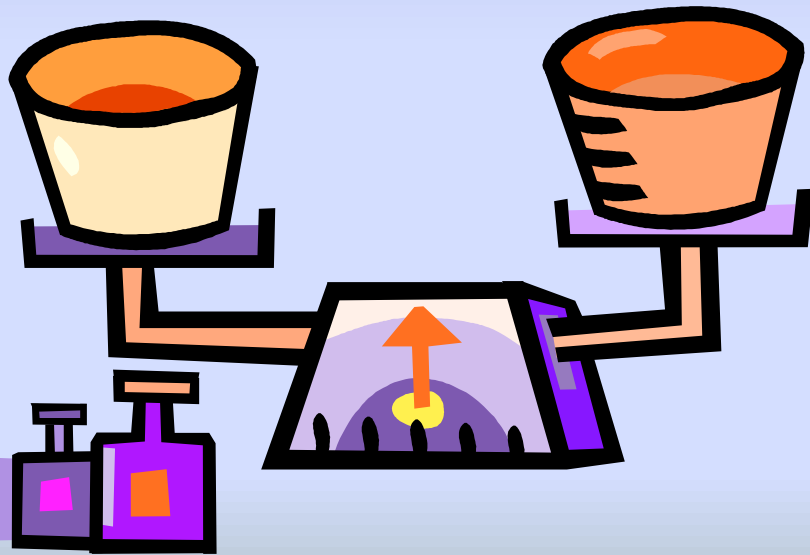


...and more

Matter



Anything that has mass and takes up space. (has volume)



Mass v. Weight

- Mass is the measure of the amount of matter something is made of. It is measured in grams
- Weight is the measure of gravitational force exerted on an object. It is measured in Newtons.
- The greater the mass, the greater the attraction to the earth. The greater the mass, the more the force of gravity acts upon it.



Mass v. Weight



- **Mass**

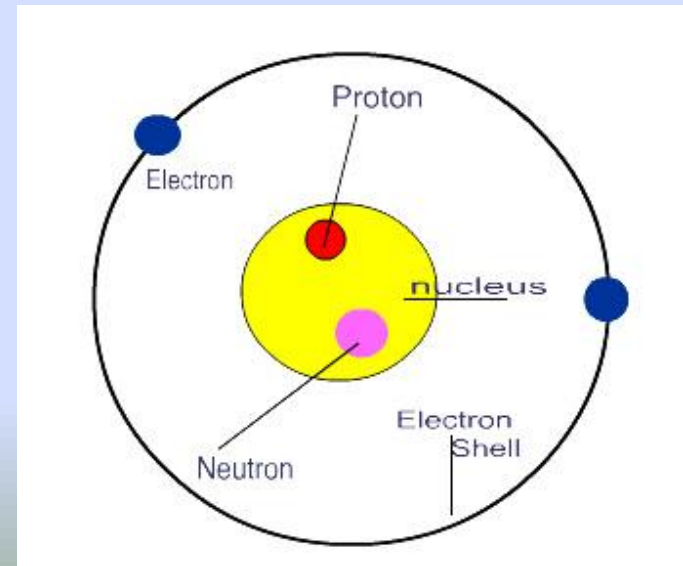
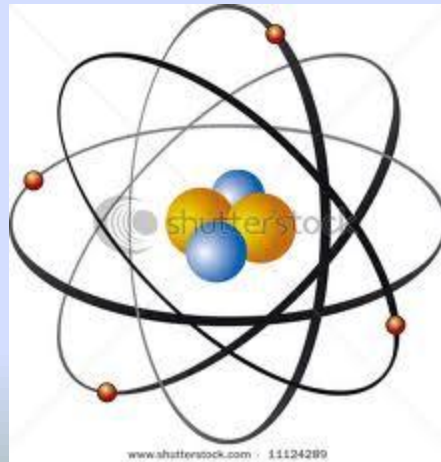
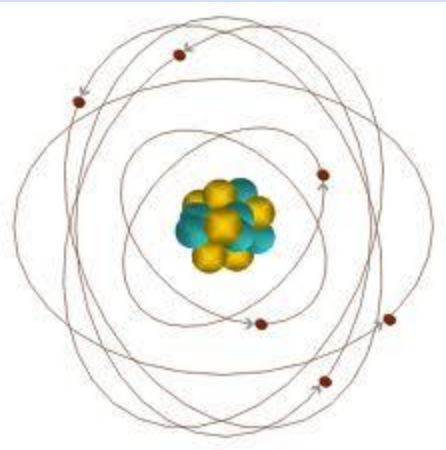
- The amount of matter in an object
- Always constant
- Measured with a balance
- Expressed in grams

- **Weight**

- Measures the gravitational force on an object
- Varies depending on where it is
- Measured using a spring scale (or a digital scale)
- Expressed in Newtons

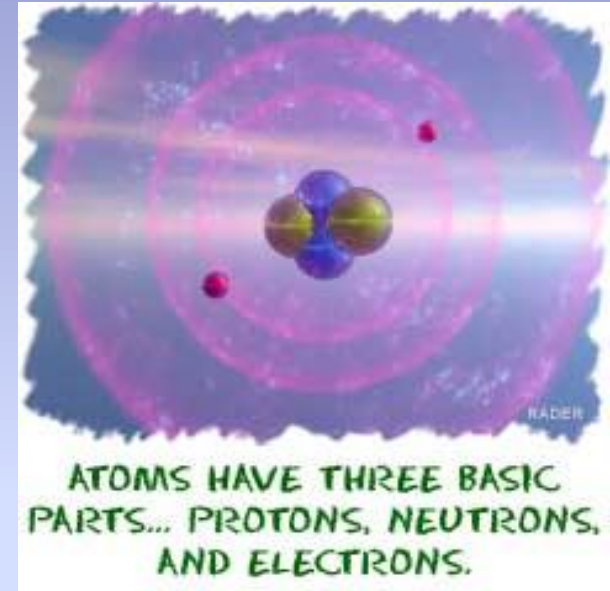
ATOMS

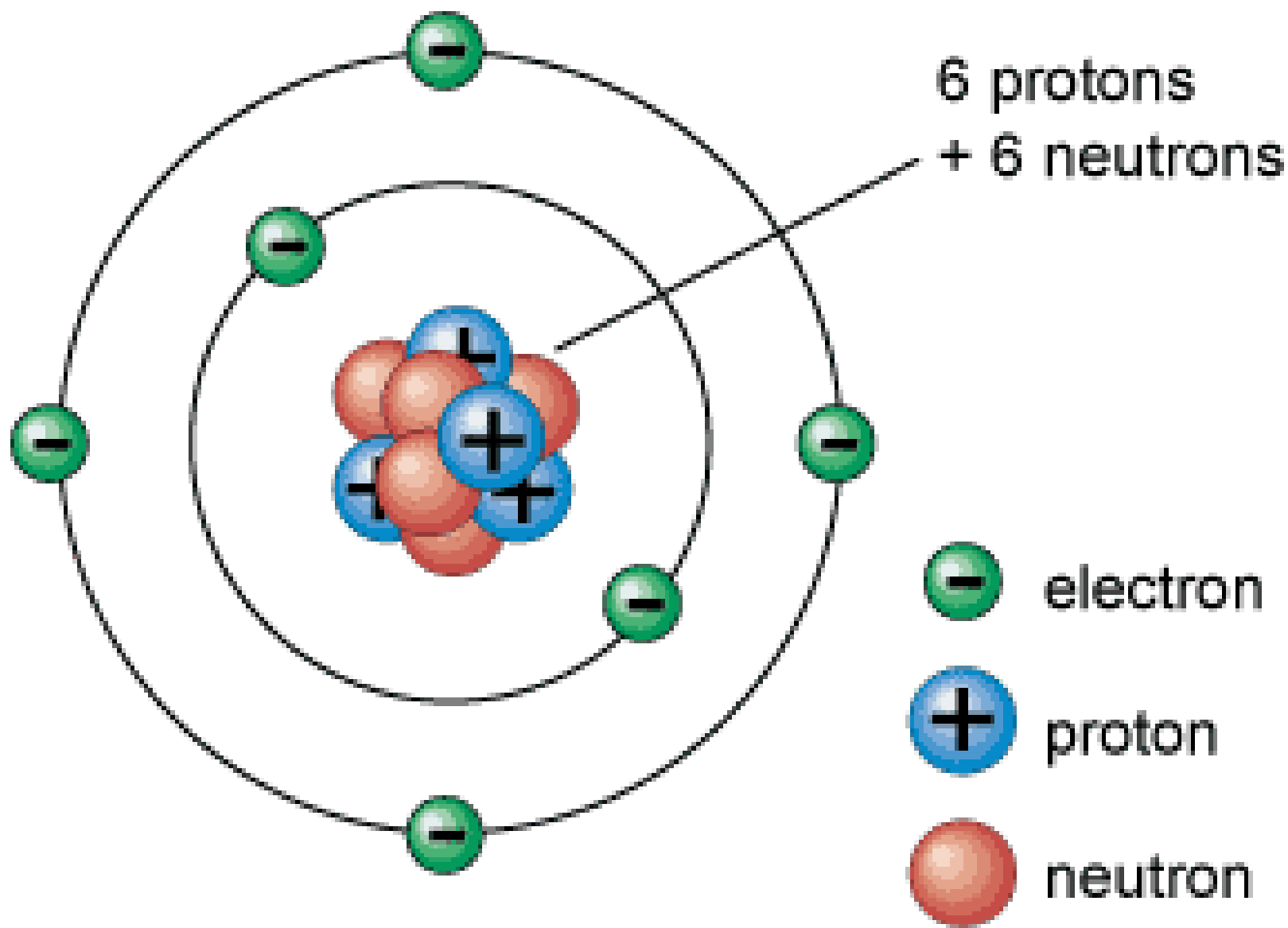
The building blocks of all
matter.



Models

- Because scientists work with atoms, molecules, and other things that are too small to actually see, they construct and use models based on what they know about these things and their behavior.
- Bohr Model – This is the accepted model of the atoms. Contains:
- nucleus with protons (+) and neutrons (0)
- Electrons (-) in different energy levels surrounding the nucleus





Carbon atom

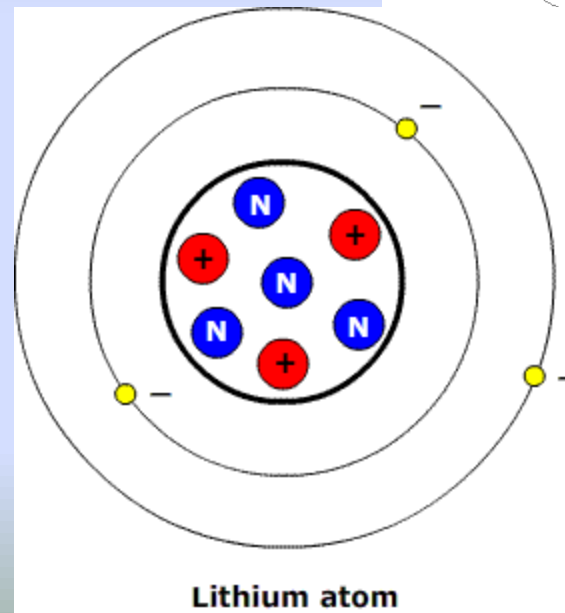
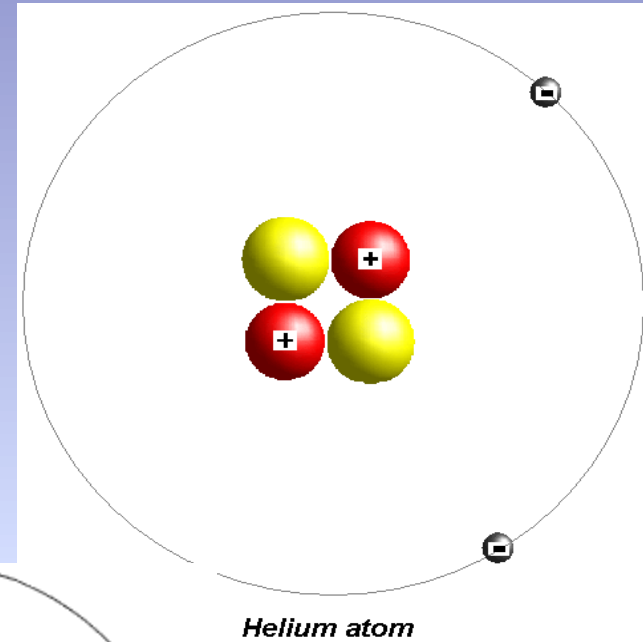
ATOMS consist of protons, neutrons, Electrons, and lots of empty space.

<u>Particle</u>	<u>Charge</u>	<u>Location</u>	<u>Mass</u>
<u>Proton</u>	<u>+</u>	<u>nucleus</u>	<u>1 atomic mass unit</u>
<u>Neutron</u>	<u>0</u>	<u>nucleus</u>	<u>little more than proton</u>
<u>Electron</u>	<u>-</u>	<u>energy levels</u>	<u>almost nothing</u>

Each part of the atom is important to what the atom is and how the atom behaves.

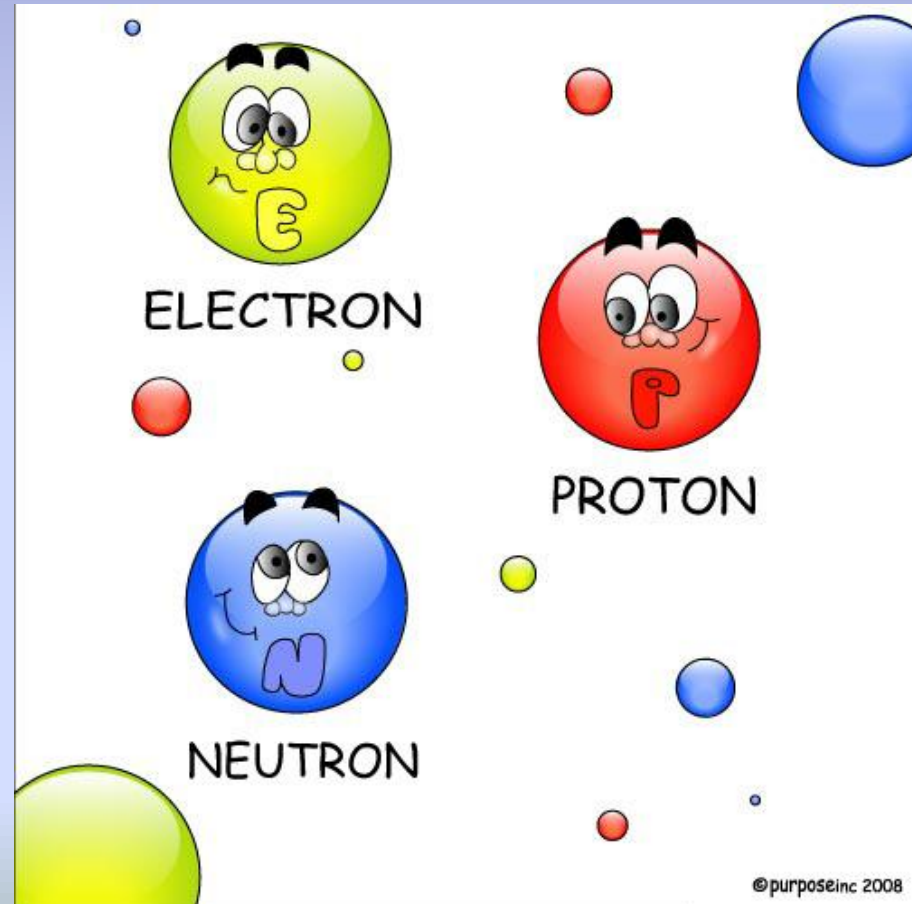
Protons

- Protons have a positive charge
- The number of protons determines the kind of atom.
- No two different kinds of atoms can have the same number of protons.
- Atoms are identified by their atomic number, which is the same as the number of protons in the nucleus
- Each kind of atom has a unique atomic number



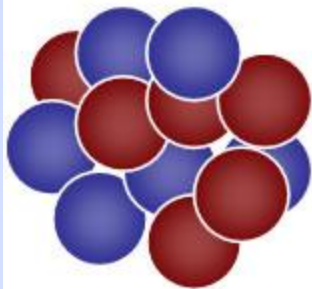
Neutrons

- Neutrons have a neutral or zero charge
- Neutrons contribute to the mass of an atom. The total mass of the atom is called the atomic mass.
- If you round the atomic mass of an element and subtract the number of protons, you can determine the number of neutrons

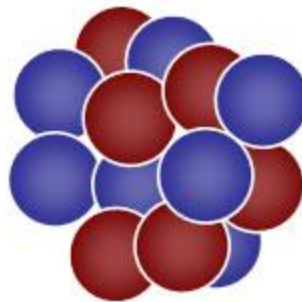


Isotopes

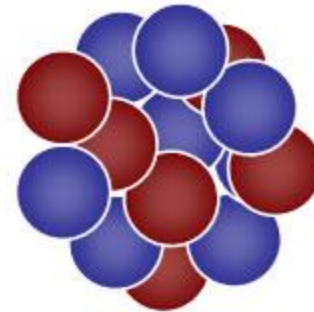
- Neutrons are responsible for what are called **isotopes**
- An atom that is missing a neutron or has more than it is supposed to is called an isotope.
- Isotopes can be formed through what is called radioactive decay. This is when an atom loses neutrons over time and becomes more or less radioactive.



carbon-12
98.9%
6 protons
6 neutrons



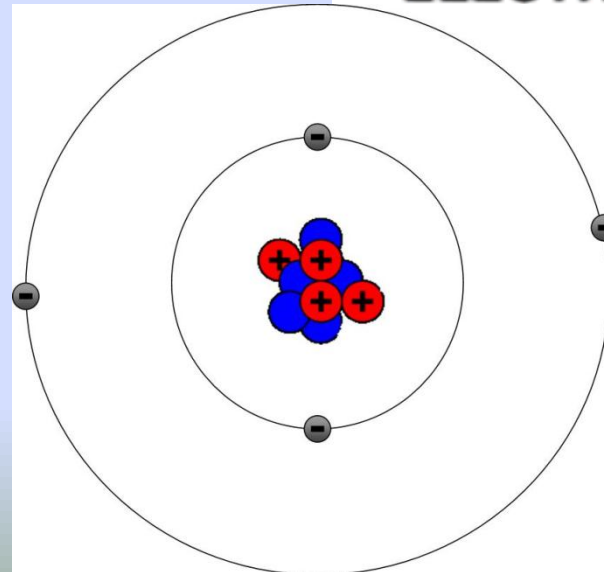
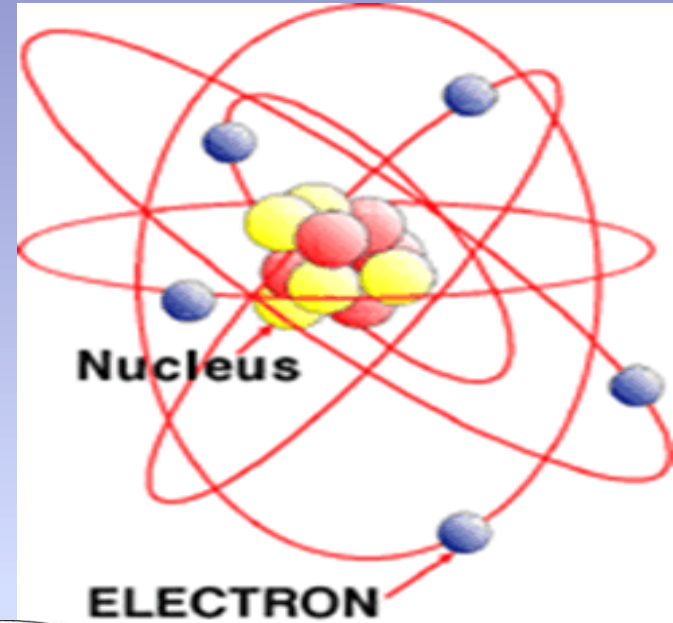
carbon-13
1.1%
6 protons
7 neutrons



carbon-14
<0.1%
6 protons
8 neutrons

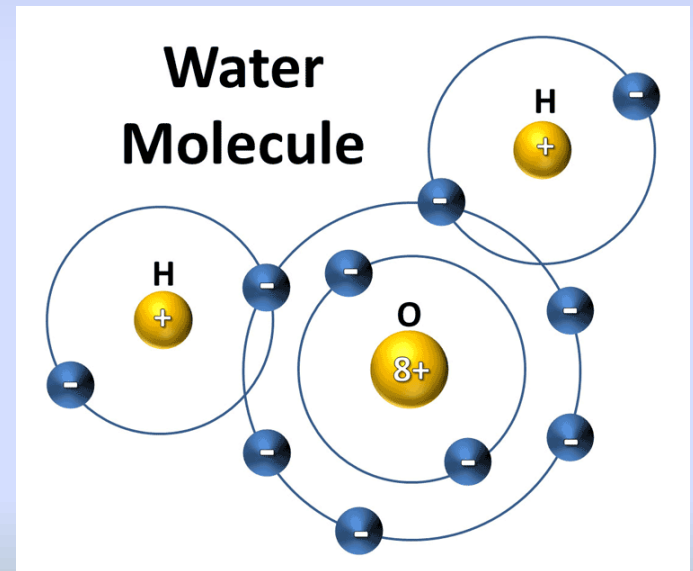
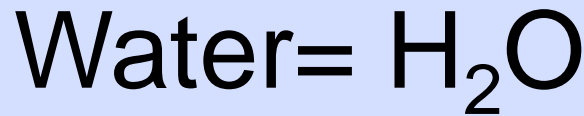
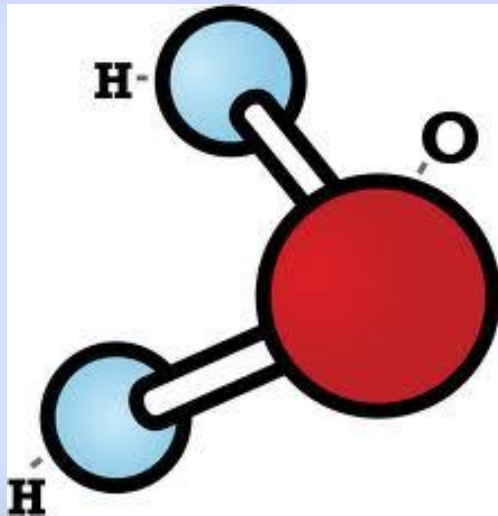
Electrons

- Electrons have a negative charge.
- Electrons reside in orbitals (also called energy levels or energy shells) surrounding the nucleus of the atom
- Electrons are attracted to the positive charge of the protons in the nucleus and thus remain in orbit around the nucleus without being attached to it.
- Electrons are important because they determine how the atom reacts with other atoms



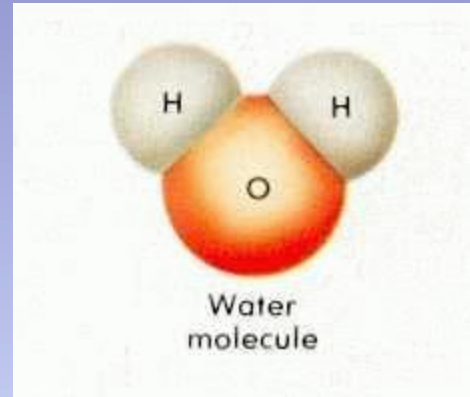
MOLECULE

Particle of matter that is
made up of two or more
atoms bonded together.



What about MOLECULES?

These are
MULTI-ATOM
particles

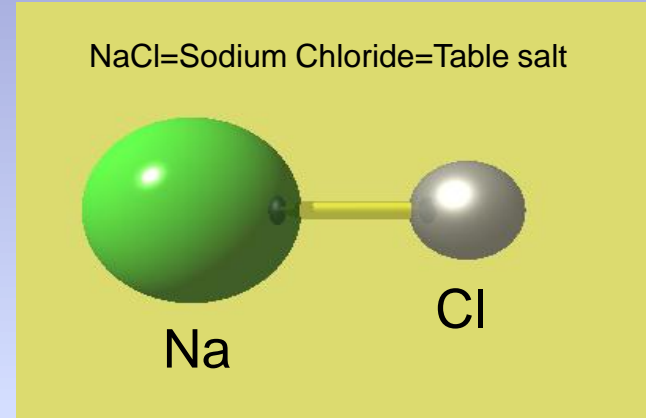
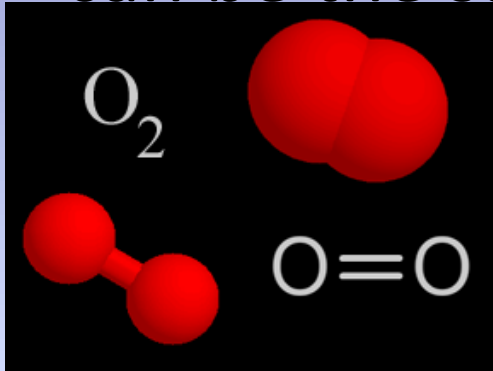


They are the smallest particle of a substance made of two or more atoms that still retains the properties of that substance.

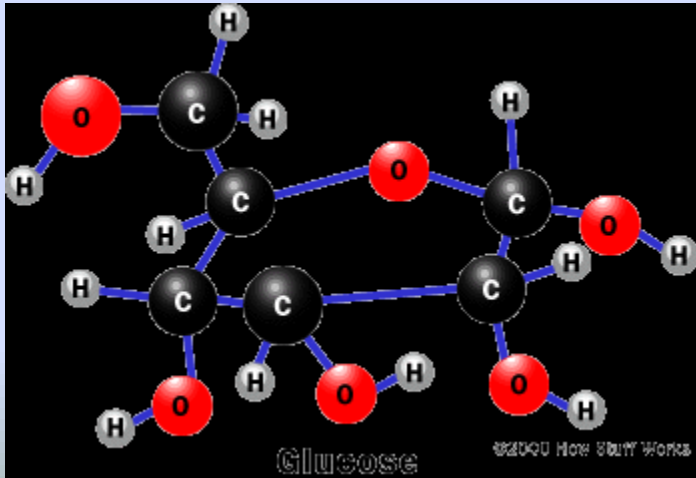
So the smallest piece of water is the water molecule. It is only three atoms.

Molecules

- Some molecules are made of only two atoms. They can be the same kind of atom or different kinds



- Molecules can also be made of many atoms



Glucose is $C_6H_{12}O_6$