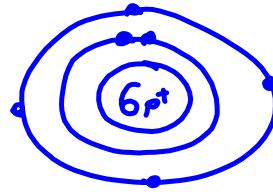
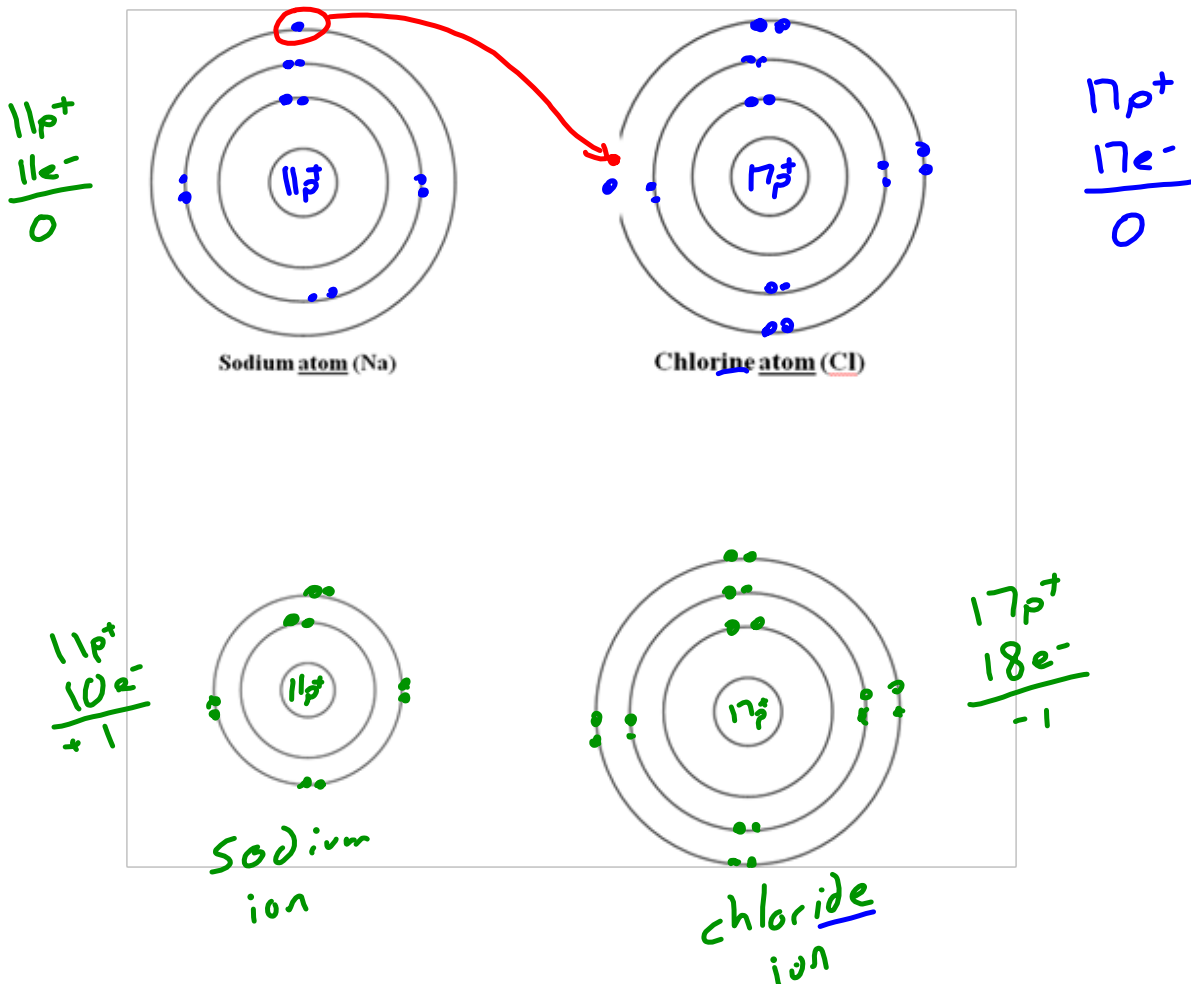


Topic 2 - Ions and Isotopes



When atoms turn into ions

- The outer energy level of an atom is called the valence shell (energy level).
- Electrons in the valence shell are called valence electrons.
- The octet rule states that atoms react in such a way that they gain/lose enough electrons to achieve a full valence energy level.



<http://www.youtube.com/watch?v=Mx5JJWI2aaw>

There are two types ions, cations and anions

Cations:

- Cations are positively charged ions
- Metal atoms have 3 or less valence electrons so they always lose them to empty the energy level
- Electrons are lost by a metal atom during a chemical reaction. Therefore the resulting ion has more positive protons than negative electrons.
- All metals will form cations.
- Naming Cations: metal cation keeps its original name (ex. Sodium ion)

Anions:

- Anions are negatively charged ion
- Non metals always have more than 4 valence electron so they gain electrons to fill up the energy level
- Electrons are gained by a non-metal atom during a chemical reaction. Therefore the resulting ion has more negative electrons than positive protons.
- Reactive non-metals will form anions.
- Noble gases, carbon, silicon, and boron don't form anions.
- Naming anions: change the ending of the name of the atom to ...ide
 - Chlorine becomes chloride

Isotopes - http://www.chem.duke.edu/~jds/cruise_chem/nuclear/uses.html

- An isotope is an element that can have different numbers of neutrons

Ex. Carbon always has 6 protons, but the number of neutrons can be 4, 6, 7 or 8.

- The mass number of an isotope is the number of protons and neutrons in the atom

- Mass number can be represented two different ways

- Isotopes have identical chemical properties, yet have very different nuclear properties.

- For example, there are three isotopes of hydrogen. Two of these isotopes are stable, (not radioactive), but tritium (one proton and two neutrons) is unstable.

Name	Mass Number	Atomic Number	Number of Protons	Number of Neutrons
carbon-14	14	6	6	8
hydrogen-1	1	1	1	0
hydrogen-2	2	1	1	1
carbon-12	12	6	6	6
oxygen-18	18	8	8	10
helium-4	4	2	2	2
neon-20	20	10	10	10
copper-64	64	29	29	35
bromine-80	80	35	35	45
nitrogen-14	14	7	7	7
			16	16
			20	21
		9		10
		26		30
		53		74
calcium-40				
	119	50		
			26	33
	208		82	
silver-108				
mercury-201				

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