Name Key _____ Period _____

Atoms and Their Parts (Subatomic Particles)

Substances that contain only one kind of atom are called **elements**. Some familiar elements are oxygen, gold, silver, and helium. An **atom** is the smallest part of an element that can be broken down and still have the characteristics of that element. All atoms have the same basic structure.

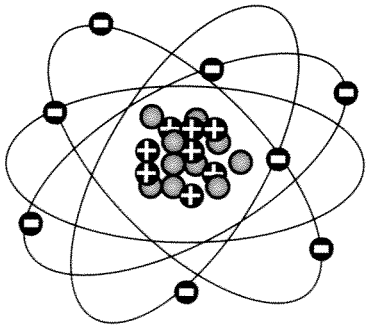
With the exception of hydrogen, all the atoms have three main parts. The parts of an atom are **protons, electrons,** and **neutrons.** A proton is positively charged and is located in the center or **nucleus** of the atom. All atoms of the same element have the same number of protons. The number of protons in the nucleus is call the **atomic number** and again, is unique to each element. A different number of protons would mean you have a different element. Electrons are negatively charged and are located in shells or orbits spinning around the nucleus. The number of protons and electrons can be equal. This equality is important so that the atom is neither positively nor negatively charged. It is said to be **neutral.** The third part of an atom is the neutron. Neutrons are neither positive nor negative and are located in the center of the nucleus of an atom along with the protons. Protons and neutrons are the massive parts of an atom. Their combined masses are called the **atomic mass** of an element. Electrons are so light that we say they have essentially no mass.

After reading the above, use the table below to help you understand the basics about protons, electrons, and neutrons.

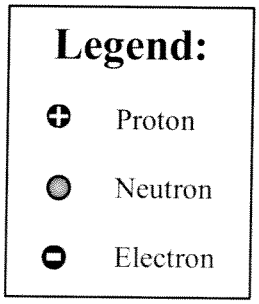
Subatomic Particle	Mass		Charge			Where Found	
	Yes	No	Positive	Negative	Neutral	Inside Nucleus	Outside Nucleus
Proton	X		X			X	
Electron		X		X			X
Neutron	X				X	X	

Study the drawings and answer the questions at the bottom of the page.

Atom A



Atom B



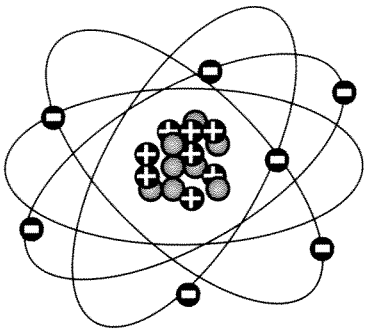
1. How many protons are in atom A? 1 atom B? 8
2. How many neutrons are in atom A? 0 atom B? 10
3. How many electrons are in atom A? 1 atom B? 8
4. What is the atomic mass of atom A? 1 atom B? 18
5. What is the atomic number of atom A? 1 atom B? 8

☆ Hydrogen Oxygen

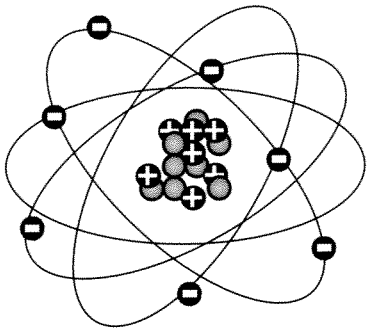
key

Identifying Atoms Worksheet:
From Elements to Subatomic Particles

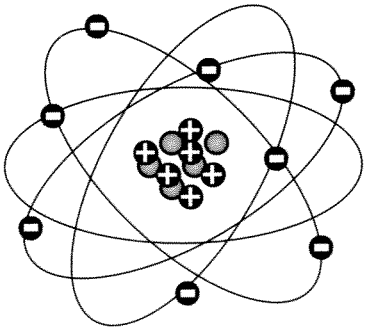
DIRECTIONS: Determine the requested quantities and info about each atom.



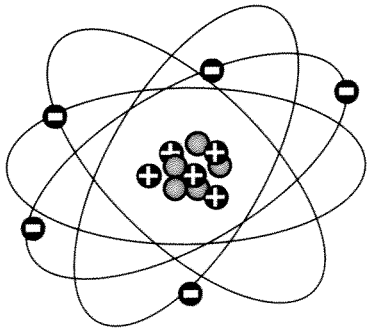
6. Protons 8 Atomic Mass 16
Neutrons 8 Atomic Number 8
Electrons 7 Element Symbol O
Element Name Oxygen
Ion: cation/anion/no Charge +1



7. Protons 7 Atomic Mass 15
Neutrons 8 Atomic Number 7
Electrons 7 Element Symbol N
Element Name Nitrogen
Ion: cation/anion/no Charge 0



8. Protons 6 Atomic Mass 11
Neutrons 5 Atomic Number 6
Electrons 8 Element Symbol C
Element Name carbon
Ion: cation/anion/no Charge -2



9. Protons 5 Atomic Mass 10
Neutrons 5 Atomic Number 5
Electrons 5 Element Symbol B
Element Name Boron
Ion: cation/anion/no Charge 0

☆

Atomic Structure Worksheet: Atom Properties and Isotopes

Name: Key

Date: _____ Period: _____

Part 1: Atom Properties. *Fill in the blanks for the elements listed below.*

Element	Element Symbol	Number of Protons	Number of Neutrons	Number of Electrons	Mass Number	Atomic Number	Symbol w/ AN and MN
Sodium	Na	11	12	11	23	11	
Calcium	Ca	20	20	20	40	20	$^{40}_{20}Ca$
Nitrogen	N	7	7	7	14	7	$^{14}_{7}N$
Neon	Ne	10	10	10	20	10	$^{20}_{10}Ne$
Oxygen	O	8	8	8	16	8	$^{16}_{8}O$
Copper	Cu	29	35	29	64	29	$^{64}_{29}Cu$
Fluorine	F	9	10	9	19	9	$^{19}_{9}F$
Aluminum	Al	13	14	13	27	13	$^{27}_{13}Al$

Part 2: Isotopes. *Fill in the blanks for the elements listed below. Remember not to change atomic number or number of protons for atoms of the same element!!*

Element	Number of Protons	Number of Neutrons	Number of Electrons	Mass Number	Atomic Number	Symbol w/ AN and MN
Carbon-12	6	6	6	12	6	$^{12}_{6}C$
Carbon-13	6	7	6	13	6	$^{13}_{6}C$
Carbon-14	6	8	6	14	6	$^{14}_{6}C$
Chlorine-35	17	18	17	35	17	$^{35}_{17}Cl$
Chlorine-37	17	20	17	37	17	$^{37}_{17}Cl$
Argon-36	18	18	18	36	18	$^{36}_{18}Ar$
Argon-38	18	20	18	38	18	$^{38}_{18}Ar$
Argon-40	18	22	18	40	18	$^{40}_{18}Ar$