

ATOMIC STRUCTURE

Name _____

An atom is made up of protons and neutrons (both found in the nucleus) and electrons (in the surrounding electron cloud). The atomic number is equal to the number of protons. The mass number is equal to the number of protons plus neutrons. In a neutral atom, the number of protons equals the number of electrons. The charge on an ion indicates an imbalance between protons and electrons. Too many electrons produces a negative charge, too few, a positive charge.

This structure can be written as part of a chemical symbol.

Example:

mass
number
↓

$^{15}_{7}\text{N}^{+3}$

↑
atomic
number

charge ↙

7 protons

8 neutrons (15 - 7)

4 electrons

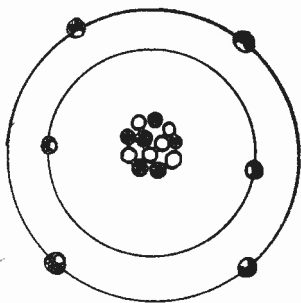
Complete the following chart.

Element/ Ion	Atomic Number	Atomic Mass	Mass Number	Protons	Neutrons	Electrons
H						
H ⁺						
$^{12}_{6}\text{C}$						
$^7_3\text{Li}^+$						
$^{35}_{17}\text{Cl}^-$						
$^{39}_{19}\text{K}$						
$^{24}_{12}\text{Mg}^{2+}$						
As ³⁻						
Ag						
Ag ⁺¹						
S ⁻²						
U						

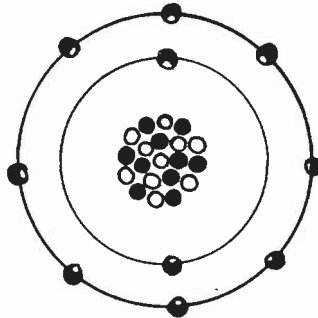
WHICH ATOM IS WHICH?

Every kind of atom has its own unique look. All the atoms of an element have this same look. Here's a chance for you to look at some atoms and tell what elements they are. Write the name of the element next to each atom. You may need to use the Periodic Table to help you out. (You can find one on page 52 of this book.)

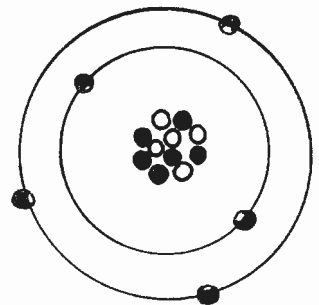
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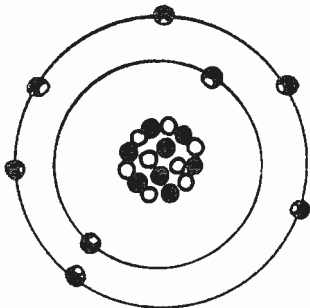
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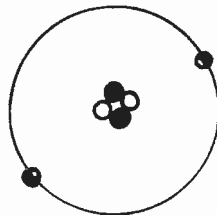
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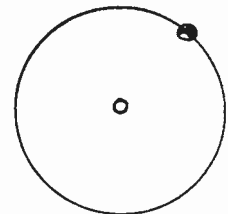
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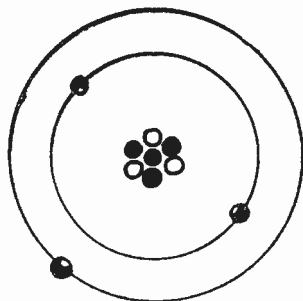
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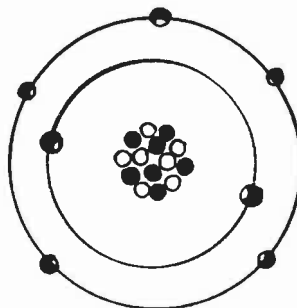
F.



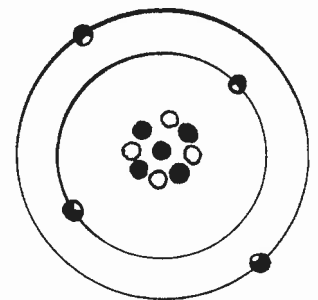
G.



H.



I.



Name _____

Name: _____ Date: _____ Block: _____

Draw the Bohr Models for the Most Common Isotope of the First 20 Elements

(Round the average atomic mass on the periodic table to the nearest whole number to get the mass number of the most common isotope.)

Bohr Models
 Energy Level #1 – up to 2 e-
 Energy Level #2 – up to 8 e-
 Energy Level #3 – up to 18 e-
 Energy Level #4 – up to 32 e-

	Group 1	Group 2	Group 13	Group 14	Group 15	Group 16	Group 17	Group 18
Hydrogen			Boron	Carbon	Nitrogen	Oxygen	Fluorine	Helium
Lithium		Beryllium	Aluminum	Silicon	Phosphorus	Sulfur	Chlorine	Neon
Sodium		Magnesium						Argon
Potassium		Calcium						

At the top of each group, write the:

- 1) Number of valence electrons (electrons in the outermost energy level)
- 2) Oxidation Number (charge)
 - a. An element with 1-4 valence e- will lose its e-.
 - b. An element with 5-7 will gain e- so that it has 8 total valence e-.
 - c. An element with 8 valence e- (and He with 2 valence e-) will not lose or gain e- (oxidation number = 0).

Name: _____ Date: _____ Block: _____

Study Guide for Atomic Structure Test

- List the following particles from lightest to heaviest: proton, electron, alpha particle, beta particle: _____
- The atomic number is the number of _____.
- The mass number represents the number of particles that give the atom most of its mass: _____ and _____.
- An atom of Oxygen has 10 electrons. What is its charge? _____
Did it gain or lose electrons? _____ How many? _____
- Changing the number of protons changes the _____ of the atom.
- Changing the number of neutrons changes the _____ of the atom.
- Changing the number of electrons changes the _____ of the atom.
- Isotopes have the same number of _____ and therefore are the same element, but they have a different number of _____ and so they have a different weight.
- Two neutral atoms of the same element can have a different number of _____.
- In Potassium-40, the number 40 is the _____ number which represents the number of _____ and _____ in the nucleus.
- What is the total number of electrons in an Al^{3+} ion? _____
- What is the total number of electrons in a F^{1-} ion? _____
- An ion has a different number of _____ compared to _____.
- Radioactive elements are those that have an atomic number of _____ or higher.
- Cations are ions with a _____ charge. Cations have [lost or gained?] electrons.
- Anions are ions with a _____ charge. Anions have [lost or gained?] electrons.
- What particle do these symbols represent? ${}^1_1\text{H}^+$ ${}^4_2\text{He}$ ${}^1_0\text{n}$ ${}^0_{-1}\text{e}$
_____ or _____
- What are the charges for each of the particles below?
 - Proton _____
 - Neutron _____
 - Electron _____
 - Alpha _____
 - Beta _____
- What is the symbol for an atom with 34 protons and 36 electrons? _____
- Which of the following has 18 electrons (circle each)? Cl^{1-} Ar K^{1+} Ca Ca^{2+}
- How many neutrons does ${}^{39}_{19}\text{K}^{1+}$ have? _____
- Write the complete symbol for the ion with 5 protons, 2 electrons, and 6 neutrons: →
- Write the complete symbol for the ion with 17 protons, 18 neutrons, and 18 electrons: →

** For Nuclear Reactions review, see last page of packet.