

# Ion, Isotope, Bohr model, & Lewis Dot

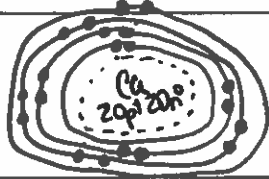
Notes: Remember that Metals tend to lose their electrons, falling back to their inner octet, becoming smaller, forming positive "cations". Nonmetals tend to gain electrons, filling up their current energy levels, becoming larger, forming negative "anions". Complete the chart below.

Element	Lewis Dot	# of Valance e-	Gain/Lose ___ e-	Valance Charge	Cation Anion
Na	Na	1	L 1	+1	Cation
Be					
Cl					
S					
Al					
Ne					
K					
N					
O					
Ca					
P					
B					
Mg					

# Chemical Bonds – Ionic Bonds

## 1. Identify the Number of Valance Electrons and Draw the Lewis Dot Structure

Notes: Scientists use *Lewis Dot Structures* to show the valance electrons of an element as dots. Since bonding involves the valance shell electrons only, it is only necessary to illustrate those outer electrons.

Element	Bohr Diagram	Group Number (PT)	# of Valance Electrons	Lewis Dot Structure
Calcium		2A	2	Ca·
Carbon				
Hydrogen				
Helium				
Oxygen				
Fluorine				
Neon				
Sodium				
Aluminum				

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## Atoms vs. Ions worksheet

### Cations:

Have a positive charge

Have lost electrons

### Anions:

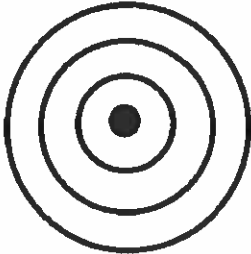
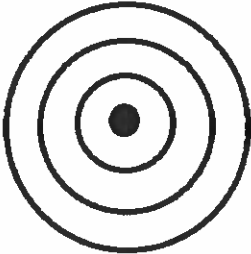
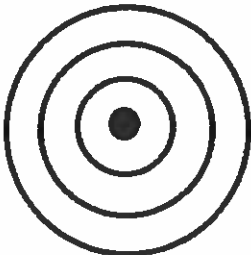
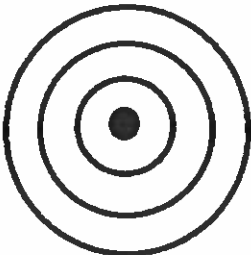
Have a negative charge

Have gained electrons

### Ion symbol:

To write the ion symbol, you must write the element symbol with the charge written on the top right.

Example:  $\text{Ca}^{2+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Ag}^{1+}$

		<b>Lithium atom</b>	<b>Lithium ion</b>
		Atomic number:	Atomic number:
		Mass number:	Mass number:
		Protons:	Protons:
		Neutrons:	Neutrons:
		Electrons:	Electrons:
<b>Lithium atom</b>	<b>Lithium ion</b>	Cation/Anion:	Ion symbol:
		<b>Beryllium atom</b>	<b>Beryllium ion</b>
		Atomic number:	Atomic number:
		Mass number:	Mass number:
		Protons:	Protons:
		Neutrons:	Neutrons:
		Electrons:	Electrons:
<b>Beryllium atom</b>	<b>Beryllium ion</b>	Cation/Anion:	Ion symbol:





NAME: \_\_\_\_\_

**Reminders:**

1. In a neutral atom the number of protons equals the number of electrons.
2. An atom can NEVER gain or lose protons
3. The number of protons equals the atomic number

# Ion Practice Set

1. What is an ion?
2. What does the number next to the ions signify?

**Complete the following table, using the periodic table in the back of your book.**

	ELEMENT NAME	ION SYMBOL	NUMBER OF PROTONS	NUMBER OF ELECTRONS	NUMBER OF ELECTRONS LOST OR GAINED
ex	Fluorine	F <sup>-</sup>	9	10	gained one
1			53	54	
2			16		gained two
3	potassium				lost one
4		Ca <sup>+2</sup>			
5			35	36	
6		Sr <sup>+2</sup>			
7		H <sup>+</sup>			
8			8		gained two
9			12		lost two
10	aluminum			10	
11			34	36	
12		H <sup>-</sup>			
13	lithium				lost one
14		Rb <sup>+</sup>			
15			17	18	

## Worksheet – Bohr Models

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

Make sure to write the symbol and atomic number (# of protons) for each model in the space provided. You will need to use your periodic table to find the atomic number.

### Bohr Models 1

In the spaces provided, draw Bohr model diagrams for the following elements:

H	Li	Na	K

1. What is the atomic number for H? \_\_\_\_\_ Li? \_\_\_\_\_ Na? \_\_\_\_\_ K? \_\_\_\_\_
2. In what family or group can you find Li, Na, and K? \_\_\_\_\_
3. In what ways are the Bohr model diagrams for these metals similar? \_\_\_\_\_

### Bohr Models 2

In the spaces provided, draw Bohr model diagrams for the following elements:

Be	Mg	Ca

1. What is the atomic number for Be? \_\_\_\_\_ Mg? \_\_\_\_\_ Ca? \_\_\_\_\_
2. What family or group can you find Be, Mg, and Ca? \_\_\_\_\_
3. In what ways are the Bohr model diagrams for these metals similar? \_\_\_\_\_

### Bohr Models 3

In the spaces provided, draw Bohr model diagrams for the following pairs of elements:

- (B, Al); (C, Si); (O, S); (F, Cl)

B	Al
C	Si
O	S
F	Cl

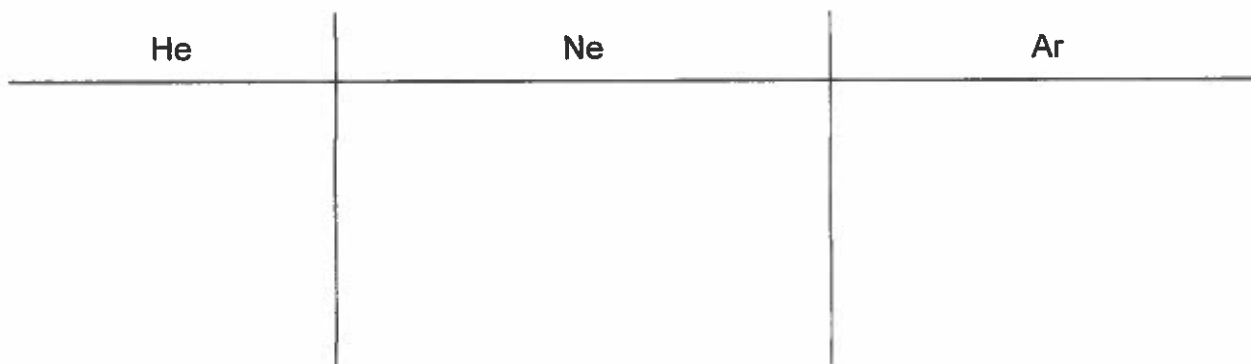
1. What is the atomic number for B? \_\_\_\_\_ Al? \_\_\_\_\_ C? \_\_\_\_\_  
Si? \_\_\_\_\_ O? \_\_\_\_\_ S? \_\_\_\_\_ F? \_\_\_\_\_ Cl? \_\_\_\_\_
2. In general, in what ways are the Bohr model diagrams for the same family similar?  
\_\_\_\_\_



## Bohr Models 4

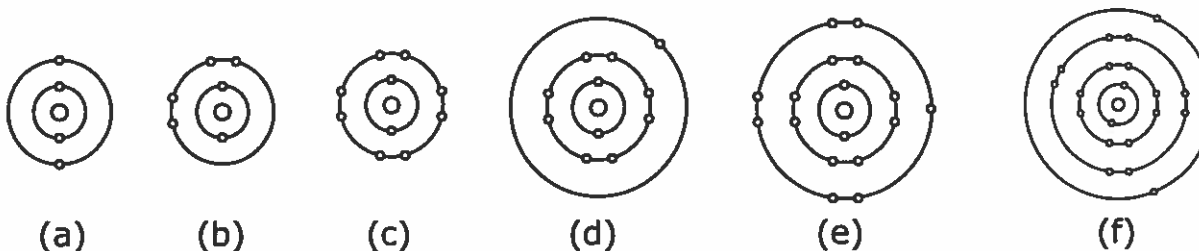
In the spaces provided, draw Bohr model diagrams for the following elements:

- He, Ne, Ar



1. What is the atomic number for He? \_\_\_\_\_ Ne? \_\_\_\_\_ Ar? \_\_\_\_\_
2. What family or group can you find He, Ne, and Ar? \_\_\_\_\_
3. In what ways are the Bohr model diagrams for this family similar? \_\_\_\_\_
4. Do these elements want to gain or lose any electrons? Why or why not? \_\_\_\_\_

Identify the elements whose Bohr model diagrams are shown below. Write the names of the elements in the spaces provided.



- (a) \_\_\_\_\_
- (b) \_\_\_\_\_
- (c) \_\_\_\_\_
- (d) \_\_\_\_\_
- (e) \_\_\_\_\_
- (f) \_\_\_\_\_

# Isotope Practice Worksheet

Name: \_\_\_\_\_

1. Here are three isotopes of an element:  ${}_6^{12}\text{C}$        ${}_6^{13}\text{C}$        ${}_6^{14}\text{C}$
- The element is: \_\_\_\_\_
  - The number 6 refers to the \_\_\_\_\_
  - The numbers 12, 13, and 14 refer to the \_\_\_\_\_
  - How many protons and neutrons are in the first isotope? \_\_\_\_\_
  - How many protons and neutrons are in the second isotope? \_\_\_\_\_
  - How many protons and neutrons are in the third isotope? \_\_\_\_\_

2. Complete the following chart:

Isotope name	atomic #	mass #	# of protons	# of neutrons	# of electrons
${}_{92}^{235}\text{U}$					
${}_{92}^{238}\text{U}$					
${}_5^{10}\text{B}$					
${}_5^{11}\text{B}$					

3. Naturally occurring europium (Eu) consists of two isotopes with a mass of 151 and 153. Europium-151 has an abundance of 48.03% and Europium-153 has an abundance of 51.97%. What is the atomic mass of europium?
4. Strontium consists of four isotopes with masses of 84 (abundance 0.50%), 86 (abundance of 9.9%), 87 (abundance of 7.0%), and 88 (abundance of 82.6%). Calculate the atomic mass of strontium.