Name _____ Period KEY

Date _____

The Structure of Atoms

Complete the table

Sub-atomic Particle	Symbol	Location in the atom	Mass of particle
Proton	P	nucleus	1
Neutron	n	nucleus	1
Electron	e	electron cloud	$\frac{1}{1836} \approx 0$

1. What two sub-atomic particles are located in the nucleus of the atom?

   proton + neutron

2. What is the difference between the atomic number & the mass number of an element?

   Mass # = atomic # + # neutrons

3. Where is the majority of the mass located in an atom?

   nucleus

Complete the table; the first two rows have been done for you. Use your periodic table to complete the rest.

Element	Symbol	Protons	Neutrons	Electrons
Lithium	Li	3	7-3=4	3
carbon	C	6	12-6=6	6
Sodium	Na	11	23-11 = 12	11
Aluminum	Al	13	27-13 = 14	13
Lead	Pb	82	207-82 = 125	82
Titanium	Ti	22	48-22 = 26	22
Zinc	Zn	30	65-30 = 35	30
Mercury	Hg	80	201-80 = 121	80
Chlorine	Cl	17	35-17 = 18	17
Tungsten	W	74	184-74 = 110	74

Worksheet – Bohr Models

Name: _____ Date: _____ Block: _____

You will be given a Bohr Model Diagram Template to practice drawing Bohr models. 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? 1 Li? 3 Na? 11 K? K
2. In what family or group can you find Li, Na, and K? Alkali Metals
3. In what ways are the Bohr model diagrams for these metals similar? 1 electron in the valence shell

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? 4 Mg? 12 Ca? 20
2. What family or group can you find Be, Mg, and Ca? Alkaline Earth
3. In what ways are the Bohr model diagrams for these metals similar? 2 electrons in the valence shell

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)

1. What is the atomic number for B? 5 Al? 13 C? 6
   Si? 14 O? 8 S? 16 F? 9 Cl? 17
2. In general, in what ways are the Bohr model diagrams for the same family similar? Same # of electrons in valence shell

Bohr Models 4

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

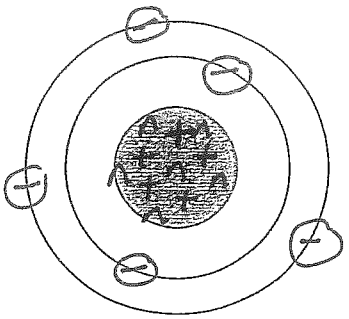
- He, Ne, Ar

1. What is the atomic number for He? 2 Ne? 10 Ar? 18
2. What family or group can you find He, Ne, and Ar? Noble gas
3. In what ways are the Bohr model diagrams for this family similar? full valence shell
4. Do these elements want to gain or lose any electrons? Why or why not? No - valence shell is full.

Atomic Basics

Name KEY

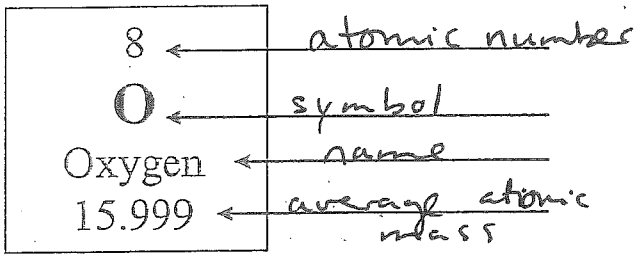
Part A: Atomic Structure



1. Draw five protons in the nucleus of the atom. Label them with their charge.
2. Draw six neutrons in the nucleus of the atom.
3. Draw two electrons in the first energy level and label them with their charge.
4. Draw three electrons in the second energy level and label them with their charge.
5. What element is represented by the diagram? Carbon

Part B: Atomic Calculations

6. Label the information provided in the periodic table.



7. What does the atomic number represent?
# of protons or # of electrons

8. What does the atomic mass represent?
protons + neutrons

9. How would you figure the number of protons or electrons in an atom?
p = atomic #

10. How would you figure the number of neutrons in an atom?
#n = mass# − #p

11. Use your knowledge of atomic calculations to complete the chart.

Element	Atomic Number	Atomic Mass	Protons	Neutrons	Electrons
Li	3	7	3	4	3
P	15	31	15	16	15
Cl	17	35	17	18	17
Ni	28	59	28	31	28
K	19	39	19	20	19
Ag	47	108	47	61	47
H	1	1	1	0	1
Si	14	28	14	14	14
W	74	184	74	110	74
Ne	10	20	10	10	10

Part C: Electron Configuration

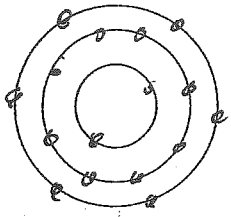
12. How many electrons can each level hold? 1st = 2 2nd = 8 3rd = 8

13. What term is used for the electrons in the outermost shell or energy level? Valence

14. Scientists use two types of diagrams to show the electron configuration for atoms. Follow your teacher's directions to complete the diagrams.

Sulfur
Atomic # = 16
Atomic Mass = 32
Protons = 16
Neutrons = 16
Electron = 16

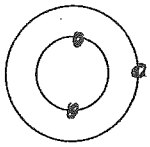
Bohr Diagram
Shows all electrons



Lewis Structure
Shows valence electrons

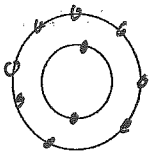
: S .

15. Calculate the missing information and then draw the Bohr Diagram and Lewis Structure for each element.



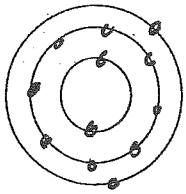
Atomic # = 3
Mass # = 7
# of P = 3
# of N = 4
# of E = 3

Li



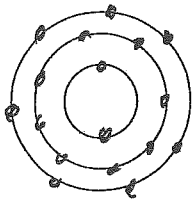
Atomic # = 10
Mass # = 20
# of P = 10
# of N = 10
# of E = 10

Ne



Atomic # = 12
Mass # = 24
# of P = 12
# of N = 12
# of E = 12

Mg

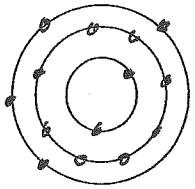


Atomic # = 17
Mass # = 35
# of P = 17
# of N = 18
# of E = 17

Cl

Atomic # = 2
Mass # = 4
# of P = 2
# of N = 2
# of E = 2

He



Atomic # = 14
Mass # = 28
# of P = 14
# of N = 14
# of E = 14

Si

16. Answer the questions below based on the elements in question #15.

(1) Which elements had a filled outermost shell? Ne He

(2) Which element would be most likely to lose electrons in a chemical bond? Li

(3) Which element would be most likely to gain electrons in a chemical bond? Cl

(4) Which elements are not likely to bond with other elements? Ne He Why? valence shells are full

Name: _____

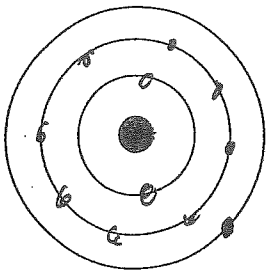
Date: _____

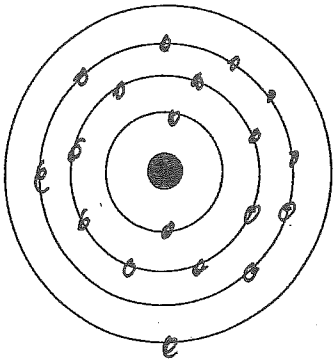
Period: _____

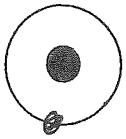
KEY

Bohr Model Practice

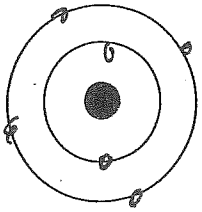
For each element, write the total number of electrons on the line. Then color the correct number of electrons for each orbit. Remember, fill the orbit closest to the nucleus first, but never exceed the number each orbit can hold. *Check the Periodic Table to find out how many electrons each element actually has.*

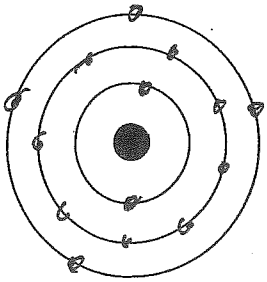


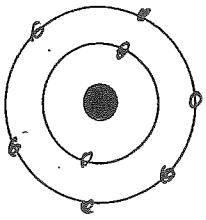




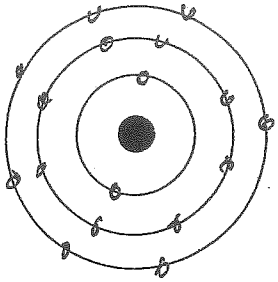
Sodium (Na) 11 Potassium (K) 19 Hydrogen (H) 1

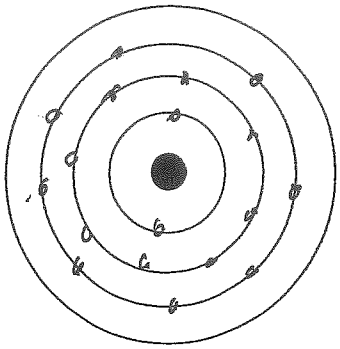


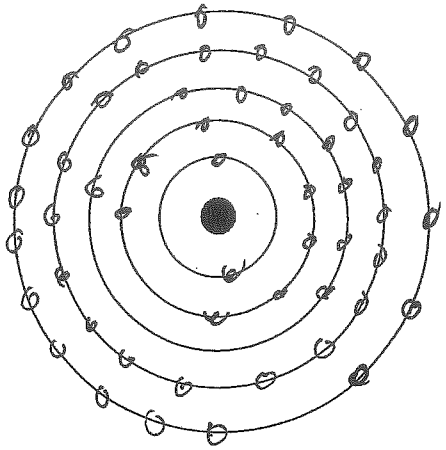




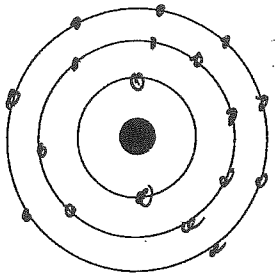
Carbon (C) 6 Silicon (Si) 14 Oxygen (O) 8

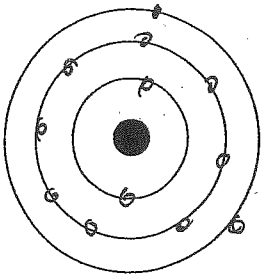


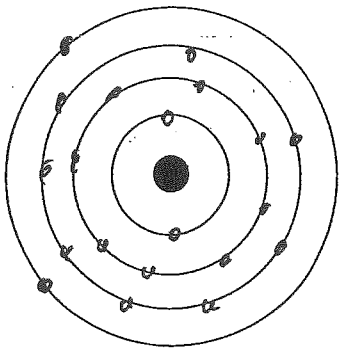




Chlorine (Cl) 17 Bromine (Br) 35 Iodine (I) I





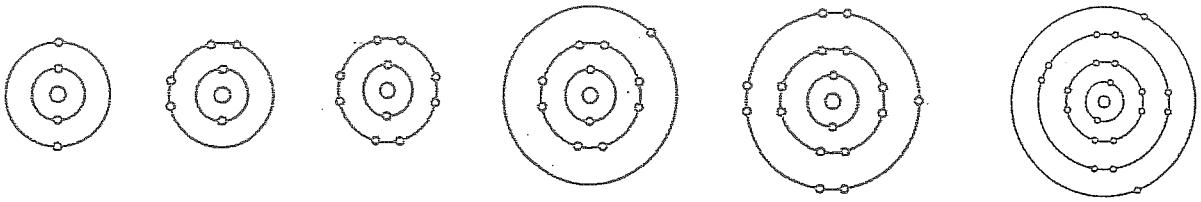


Argon (Ar) 18 Magnesium (Mg) 12 Calcium (Ca) 20

Now draw your own Bohr model diagrams for the following atoms:

Lithium (Li) 3 Sulfur (S) 16 Neon (Ne) 10

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)

(a) Be

(b) C

(c) Ne

(d) Na

(e) Cl

(f) Ca