

Science 9 – Atomic Model Worksheet Name: _____

1. Complete the chart below summarizing the main points of each of the atomic models, and draw a sketch of the atom that corresponds to each model.

The main ideas in the model	The aspects of the model that scientists no longer agree with	Diagram of the atom according to this model
Greek Model		
Dalton Model		
Thomson Model		
Rutherford Model		
Bohr Model		

2. Complete the chart below describing the 3 main subatomic particles.

Particle	Location in the atom	charge	Mass in "atomic mass units"
proton			
Neutron			
electron			

3. Define each of the following terms:

Electron cloud	
Isotope	
Mass number	
Atomic mass	
Atomic number	

4. Use the following information to answer this question:

Element	Atomic number	Mass number
Hydrogen	1	1
Helium	2	4
Carbon	6	12
Nitrogen	7	14
Oxygen	8	16
Fluorine	9	19
sodium	11	23
aluminum	13	27
suifur	16	32

- How many neutrons are found in an atom of aluminum? _____
 - How many protons are found in an atom of fluorine? _____
 - How many energy levels are occupied in an atom of oxygen? _____
 - Carbon has a mass number of 12 and an atomic mass of 12.011. Why are these numbers different? (explain)
- e. Draw the electron configuration of the following atoms:
- hydrogen
 - sodium

5. Draw an atom of nitrogen-14. Include in the diagram the correct number of protons, neutrons, electrons, and energy levels.

6. Compare the isotopes hydrogen-1, and hydrogen-3 (otherwise known as tritium) by completing the following chart:

	Hydrogen-1	Hydrogen-3 (tritium)
Atomic mass		
Atomic number		
Number of neutrons		
Number of electrons		

7. Complete the following chart:

element	Atomic number	Mass number	Number of protons	Number of neutrons	Number of electrons in the atom	Number of electrons in the most common ion
sodium	11			12		
magnesium			12	12		
aluminum		27	13			
phosphorous	15			16		
sulfur		32			16	
chlorine		35	17			

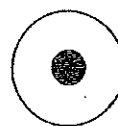
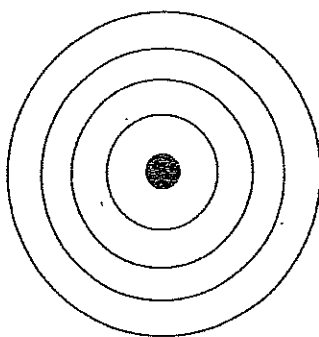
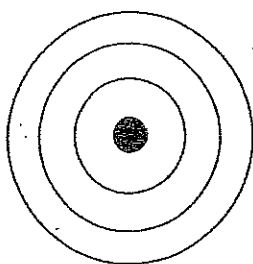
Name: _____

Date: _____

Period: _____

Bohr Model Practice

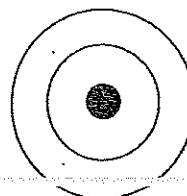
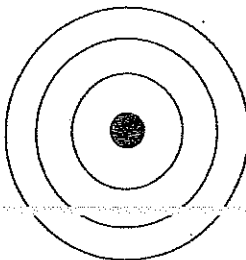
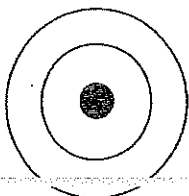
For each element, write the total number of electrons on the line. Then color the correct number of electrons for each orbit. Remember, fill the orbit closest to the nucleus first, but never exceed the number each orbit can hold. *Check the Periodic Table to find out how many electrons each element actually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



Sodium (Na) _____

Potassium (K) _____

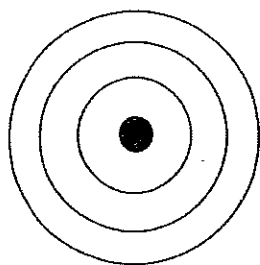
Hydrogen (H) _____



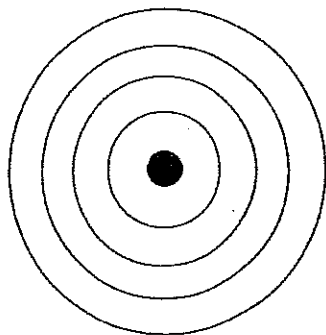
Carbon (C) _____

Silicon (Si) _____

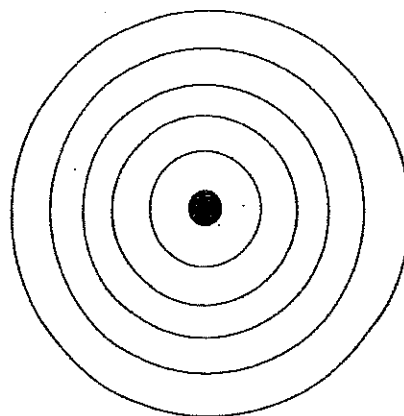
Oxygen (O) _____



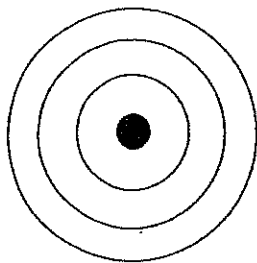
Chlorine (Cl) _____



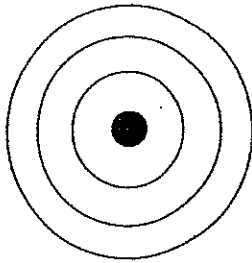
Bromine (Br) _____



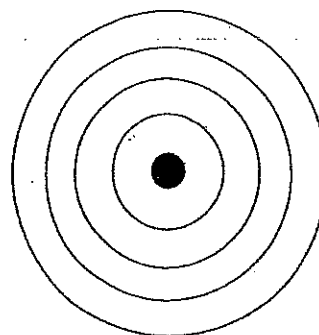
Iodine (I) _____



Argon (Ar) _____



Magnesium (Mg) _____



Calcium (Ca) _____

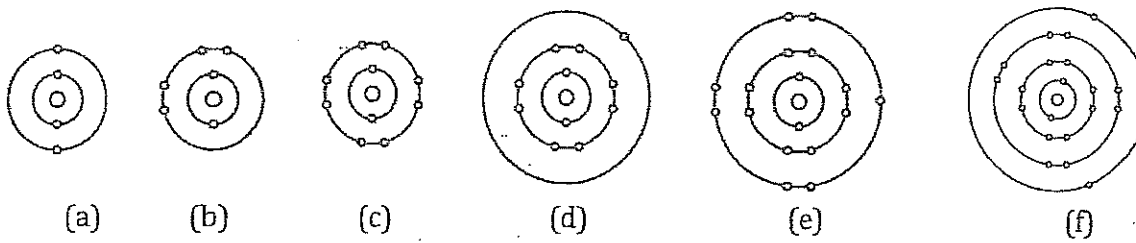
Now draw your own Bohr model diagrams for the following atoms:

Lithium (Li) _____

Sulfur (S) _____

Neon (Ne) _____

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) _____

Name _____

Period _____

Date _____

The Structure of Atoms

Complete the table

Sub-atomic Particle	Symbol	Location in the atom	Mass of particle
Proton			
Neutron			
Electron			

- What two sub-atomic particles are located in the nucleus of the atom?
- What is the difference between the atomic number & the mass number of an element?
- Where is the majority of the mass located in an atom?

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				
Aluminum				
	Pb			
	Ti			
	Zn			
		80		
				17
Tungsten				

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? _____ 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)

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:

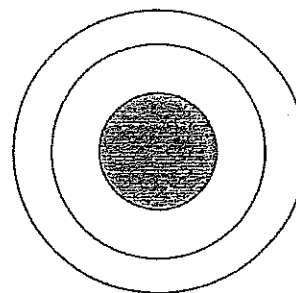
- He, Ne, Ar

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? _____

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? _____



Part B: Atomic Calculations

6. Label the information provided in the periodic table.

8	← _____
O	← _____
Oxygen	← _____
15.999	← _____

7. What does the atomic number represent?
_____ or _____

8. What does the atomic mass represent?
_____ + _____

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

10. How would you figure the number of neutrons in an atom?

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

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

Part C: Electron Configuration

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

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

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

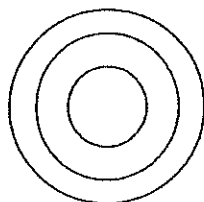
Atomic Mass = 32

Protons = _____

Neutrons = _____

Electron = _____

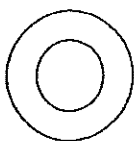
Bohr Diagram
Shows all electrons



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

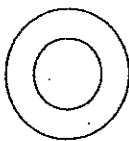
Mass # = 7

of P = _____

of N = _____

of E = _____

Li



Atomic # = 10

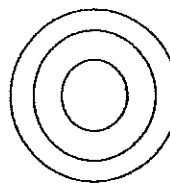
Mass # = 20

of P = _____

of N = _____

of E = _____

Ne



Atomic # = 12

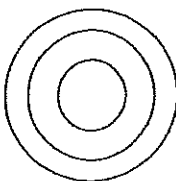
Mass # = 24

of P = _____

of N = _____

of E = _____

Mg



Atomic # = 17

Mass # = 35

of P = _____

of N = _____

of E = _____

Cl



Atomic # = 2

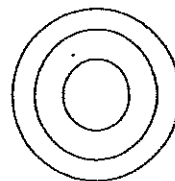
Mass # = 4

of P = _____

of N = _____

of E = _____

He



Atomic # = 14

Mass # = 28

of P = _____

of N = _____

of E = _____

Si

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

(1) Which elements had a filled outermost shell? _____

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

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

(4) Which elements are not likely to bond with other elements? _____ Why? _____