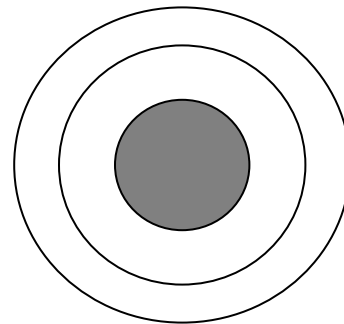


## Atomic Basics

Name \_\_\_\_\_

### 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	← _____
<b>O</b>	← _____
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
<b>Li</b>	3	7			
<b>P</b>	15	31			
<b>Cl</b>		35	17		
<b>Ni</b>	28			31	
<b>K</b>		39			19
<b>Ag</b>	47			61	
<b>H</b>		1	1		
<b>Si</b>				14	14
<b>W</b>			74	110	
<b>Ne</b>				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

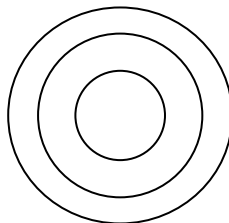
Atomic Mass = 32

Protons = \_\_\_\_\_

Neutrons = \_\_\_\_\_

Electron = \_\_\_\_\_

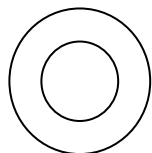
**Bohr Diagram**  
Shows all electrons



**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

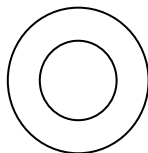
Mass # = 7

# of P = \_\_\_\_\_

# of N = \_\_\_\_\_

# of E = \_\_\_\_\_

**Li**



Atomic # = 10

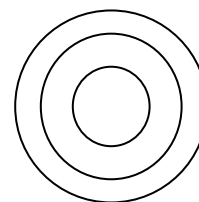
Mass # = 20

# of P = \_\_\_\_\_

# of N = \_\_\_\_\_

# of E = \_\_\_\_\_

**Ne**



Atomic # = 12

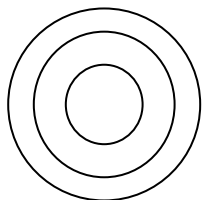
Mass # = 24

# of P = \_\_\_\_\_

# of N = \_\_\_\_\_

# of E = \_\_\_\_\_

**Mg**



Atomic # = 17

Mass # = 35

# of P = \_\_\_\_\_

# of N = \_\_\_\_\_

# of E = \_\_\_\_\_

**Cl**



Atomic # = 2

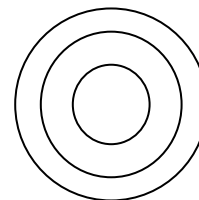
Mass # = 4

# 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? \_\_\_\_\_

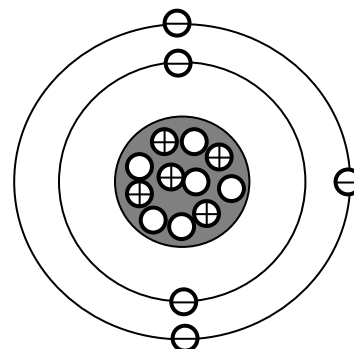
(4) Which elements are not likely to bond with other elements? \_\_\_\_\_ Why? \_\_\_\_\_

## Atomic Basics

## Answer 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? **BORON**



### Part B: Atomic Calculations

6. Label the information provided in the periodic table.

8	←	<b>ATOMIC NUMBER</b>
<b>O</b>	←	<b>SYMBOL</b>
Oxygen	←	<b>NAME</b>
15.999	←	<b>SYMBOL</b>

7. What does the atomic number represent?

**PROTONS or ELECTRONS**

8. What does the atomic mass represent?

**PROTONS + NEUTRONS**

9. How would you figure the number of protons or electrons in an atom? **USE THE ATOMIC NUMBER**

10. How would you figure the number of neutrons in an atom? **SUBTRACT THE ATOMIC NUMBER FROM THE ATOMIC MASS**

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

Element	Atomic Number	Atomic Mass	Protons	Neutrons	Electrons
<b>Li</b>	3	7	<b>3</b>	<b>4</b>	<b>3</b>
<b>P</b>	15	31	<b>15</b>	<b>16</b>	<b>15</b>
<b>Cl</b>	<b>17</b>	35	17	<b>18</b>	<b>17</b>
<b>Ni</b>	28	<b>59</b>	<b>28</b>	31	<b>28</b>
<b>K</b>	<b>19</b>	39	<b>19</b>	<b>20</b>	19
<b>Ag</b>	47	<b>108</b>	<b>47</b>	61	<b>47</b>
<b>H</b>	<b>1</b>	1	1	<b>0</b>	<b>1</b>
<b>Si</b>	<b>14</b>	<b>28</b>	<b>14</b>	14	14
<b>W</b>	<b>74</b>	<b>36</b>	74	110	<b>74</b>
<b>Ne</b>	<b>10</b>	<b>20</b>	<b>10</b>	10	10

*NOTE: The number protons and electrons is equal to the atomic number. To find neutrons, subtract the number of protons from the atomic mass. To find the atomic mass, add the number of protons and neutrons.*

### Part C: Electron Configuration

12. How many electrons can each level hold? 1st = **2** 2nd = **8** 3rd = **18**

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

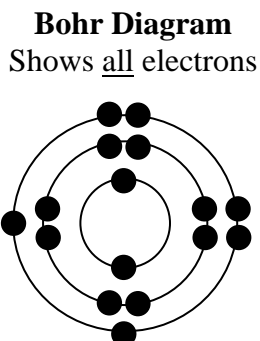
Atomic # = 16

Atomic Mass = 32

Protons = **16**

Neutrons = **16**

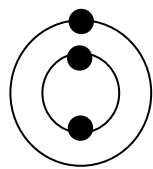
Electron = **16**



**Lewis Structure**  
Shows valence electrons



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



Li

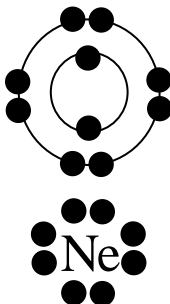
Atomic # = 3

Mass # = 7

# of P = 3

# of N = 4

# of E = 3



Ne

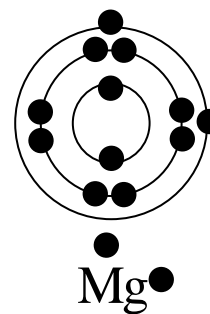
Atomic # = 10

Mass # = 20

# of P = 10

# of N = 10

# of E = 10



Mg

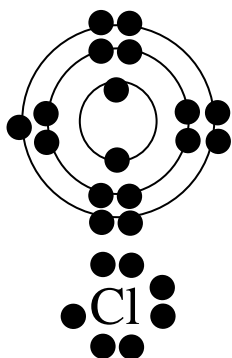
Atomic # = 12

Mass # = 24

# of P = 12

# of N = 12

# of E = 12



Cl

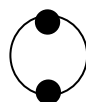
Atomic # = 17

Mass # = 35

# of P = 17

# of N = 18

# of E = 17



He

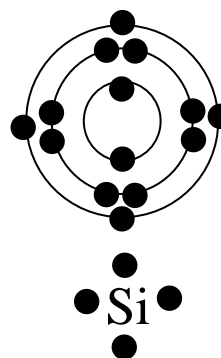
Atomic # = 2

Mass # = 4

# of P = 2

# of N = 2

# of E = 2



Si

Atomic # = 14

Mass # = 28

# of P = 14

# of N = 14

# of E = 14

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

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

(2) Which element would be most likely to lose electrons in a chemical bond? **Li (Only has 1 valence electron)**

(3) Which element would be most likely to gain electrons in a chemical bond? **Cl (Only needs 1 more electron to fill its outer shell)**

(4) Which elements are not likely to bond with other elements? **He & Ne** Why? **They have full outer shells.**