

**Physical Science**  
**Chemistry Review Worksheet**

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

<b>Polyatomic Ions</b>					
Ammonium	$\text{NH}_4^+$	Hydroxide	$\text{OH}^-$	Cyanide	$\text{CN}^-$
Carbonate	$\text{CO}_3^{2-}$	Nitrate	$\text{NO}_3^-$	Nitrite	$\text{NO}_2^-$
Phosphate	$\text{PO}_4^{3-}$	Sulfate	$\text{SO}_4^{2-}$	Sulfite	$\text{SO}_3^{2-}$
Chlorate	$\text{ClO}_3^-$	Chromate	$\text{CrO}_4^{2-}$		

- Place the following models of the atom on a timeline, earliest to latest:
  - Atoms are mostly space
  - Electrons move in complex shapes called orbitals
  - Matter is made up of indivisible atoms
  - Electrons orbit in very distinct energy levels and can move from one to another
  - Atoms have positively charged and negatively charged parts
  - Atoms of an element are all alike, and different from atoms of other elements
  - In an atom, electrons orbit around a nucleus

**c f e (a g in either order) d b**

- Which of the atomic models above is necessary to explain how a flame test works?

**d**

- Using your periodic table, fill in the following table:

Name	Symbol	Atomic Number	Atomic Mass	Protons	Neutrons	Electrons
Sodium	Na	11	23	11	12	11
Iron	Fe	26	56	26	30	26
Thallium	Tl	81	204	81	123	81
Barium	Ba	56	137.3	56	81	56
Tin	Sn	50	119	50	69	50
Molybdenum	Mo	42	96	42	54	42
Potassium	K	19	39	19	20	19

4. **Level 1:** Draw abbreviated Bohr models of the following:

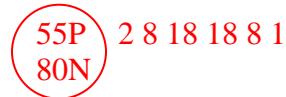
a. Zn



b.  $\text{Mo}^{2+}$



c.  ${}_{135}^{55}\text{Cs}$



5. **Level 1:** Provide the electron configuration for the atoms above in #4

1s<sup>2</sup>  
2s<sup>2</sup> 2p<sup>6</sup>  
3s<sup>2</sup> 3p<sup>6</sup> 3d<sup>10</sup>  
4s<sup>2</sup>

1s<sup>2</sup>  
2s<sup>2</sup> 2p<sup>6</sup>  
3s<sup>2</sup> 3p<sup>6</sup> 3d<sup>10</sup>  
4s<sup>2</sup> 4p<sup>6</sup> 4d<sup>2</sup>  
5s<sup>2</sup>

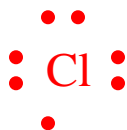
1s<sup>2</sup>  
2s<sup>2</sup> 2p<sup>6</sup>  
3s<sup>2</sup> 3p<sup>6</sup> 3d<sup>10</sup>  
4s<sup>2</sup> 4p<sup>6</sup> 4d<sup>10</sup>  
5s<sup>2</sup> 5p<sup>6</sup>  
6s<sup>1</sup>

6. Draw Lewis dot diagrams of the following:

a. Mg



b. Cl



c.  $\text{Se}^{2-}$



7. Fill in the following table:

Symbol	Name	Oxidation Number	Valence Electrons
N	Nitrogen	-3	5
K	Potassium	+1	1
Ca	Calcium	+2	2
F	Fluorine	-1	7
Sr	Strontium	+2	2
Sn	Tin	None	4

8. Write the chemical formulas for the following compounds:

a. Magnesium chloride



b. Aluminum oxide



c. Carbon tetrachloride



d. Dihydrogen monoxide



e. Iodine heptafluoride



**Level 1:**

f. Iron (III) oxide  
 $\text{Fe}_2\text{O}_3$

g. Barium nitrate  
 $\text{Ba}(\text{NO}_3)_2$

h. Calcium hydroxide  
 $\text{Ca}(\text{OH})_2$

i. Magnesium phosphate  
 $\text{Mg}_3(\text{PO}_4)_2$

9. Write the name of each of the following:

a.  $\text{CaCl}_2$       Calcium Chloride

c.  $\text{SO}_3$       Sulfur Trioxide

b.  $\text{N}_2\text{O}_4$       Dinitrogen Tetroxide

d.  $\text{CO}$       Carbon Monoxide

**Level 1:**

e.  $\text{CuF}_2$       Copper (II) Fluoride

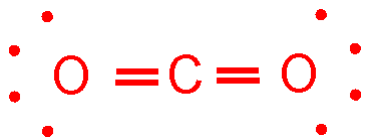
f.  $\text{MgSO}_4$       Magnesium Sulfate

10. Name the naturally occurring diatomic molecules:

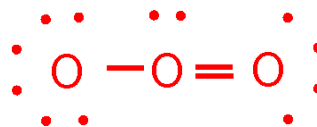
$\text{H}_2$   $\text{N}_2$   $\text{O}_2$   $\text{F}_2$   $\text{Cl}_2$   $\text{Br}_2$   $\text{I}_2$

11. Draw Lewis diagrams showing the molecular structure of the following. Show all bonds as lines, and unpaired electrons.

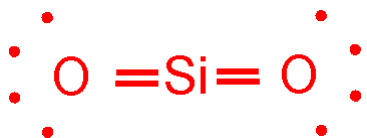
a.  $\text{CO}_2$



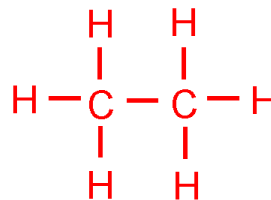
b.  $\text{O}_3$



c.  $\text{SiO}_2$

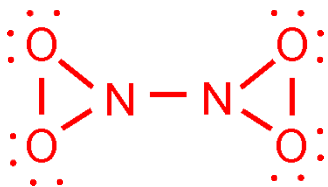


d.  $\text{C}_2\text{H}_6$

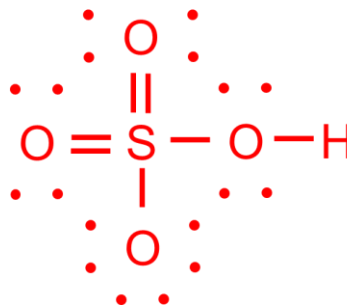


**Level 1:**

e.  $\text{N}_2\text{O}_4$



f.  $\text{HSO}_4^-$



12. Label each of the following characteristics as more typical of ionic or covalent compounds:

- |  |          |
|--|----------|
| a. Low melting points                            | covalent |
| b. Form a crystal lattice                        | ionic    |
| c. Combine two non-metals                        | covalent |
| d. Formed with hydrogen                          | covalent |
| e. Combine two elements in different proportions | covalent |

13. Give an example of a balanced chemical equation for each of the following types of reactions:

- |                            |   |
|----------------------------|---|
| a. Composition (synthesis) | $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$                |
| b. Decomposition           | $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$                |
| c. Single replacement      | $\text{Al}_2\text{O}_3 + 3\text{Mg} \rightarrow 3\text{MgO} + 2\text{Al}$ |
| d. Double replacement      | $2\text{KCl} + \text{MgO} \rightarrow \text{K}_2\text{O} + \text{MgCl}_2$ |
| e. Combustion              | $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$ |

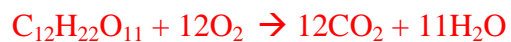
14. Balancing the following:

- |   |  |
|---|--|
| a. $\text{Na} + \text{H}_2\text{O} \rightarrow \text{NaOH} + \text{H}_2$            | $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$           |
| b. $\text{P}_4\text{O}_{10} + \text{H}_2\text{O} \rightarrow \text{H}_3\text{PO}_4$ | $\text{P}_4\text{O}_{10} + 6\text{H}_2\text{O} \rightarrow 4\text{H}_3\text{PO}_4$ |

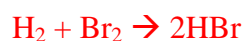


15. Write a balanced equation for the following:

a. Sugar ( $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ ) burns



b. Composition of hydrogen gas and bromine liquid



**Level 1:**

c. Single replacement reaction for copper (II) nitrate and magnesium



d. Potassium hydroxide reacts with aluminum chloride in water in a double replacement reaction



16. (**Level 1**) Using the electronegativities shown, classify the bonds in the following compounds as covalent ( $<0.3$ ), polar covalent, or ionic ( $>1.7$ ):

a. HCl      polar covalent (0.96)

b. NaF      ionic (3.08)

c. N<sub>2</sub>      covalent (0)

d. AlBr<sub>3</sub>    polar covalent (1.35)

e. CS<sub>2</sub>      covalent (0.03)

f. BCl<sub>3</sub>      polar covalent (1.12)

H 2.20							
Li 0.98	Be 1.57		B 2.04	C 2.55	N 3.04	O 3.44	F 3.98
Na 0.90	Mg 1.31		Al 1.61	Si 1.90	P 2.19	S 2.58	Cl 3.16
K 0.82	Ca 1.00		Ga 1.81	Ge 2.01	As 2.18	Se 2.55	Br 2.96

16. (**Level 1**) Put the following compounds in order of most non-polar covalent to most ionic:

a. NaCl

b. SO<sub>2</sub>

c. H<sub>2</sub>

d. CaO<sub>2</sub>

e. AlBr<sub>3</sub>

f. GaP

Non-polar covalent c f b e a d Ionic