



# Chemical Interactions

Unit 1 Study Guide KEY

8<sup>th</sup> Grade Science

**Part A: Use your notes to help you complete each statement.**

1. A **MIXTURE** is made of two or more substances that are mixed together, but NOT chemically combined.

2. A **COMPOUND** is made of two or more elements that are chemically combined.

3. Classify each item listed below as an element (E), mixture (M), or compound (C).

Stainless Steel **M**

Kool Aid **M**

Cool Whip **M**

Gold **E**

Carbon Monoxide **C**

Sodium **E**

Graphite **E**

H<sub>2</sub>SO<sub>4</sub> **C**

4. The ATOMIC NUMBER is the number of protons  
OR electrons in an atom.

$$A\# = P \text{ or } E$$

5. The ATOMIC MASS is the number of protons and  
neutrons in an atom.

$$M\# - A\# = N$$

6. A BOHR diagram is used to show the location of all the electrons in an  
atom.

7. A LEWIS structure is used to show the number of valence electrons.

*Remember ... You will be allowed to use YOUR colored periodic table  
and can write NOTES (not typed) on that page only.*

## 8. Complete the chart about subatomic particles.

Particle	Proton	Neutron	Electron
Charge	+	None	-
Location	NUCLEUS	NUCLEUS	ENERGY LEVELS

## 9. Use the information to calculate each answer.

A) If an atom has an atomic number of 9 and an atomic mass of 19, how many protons does it have? 9

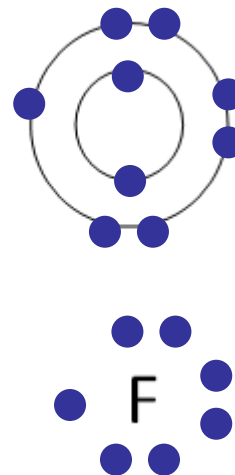
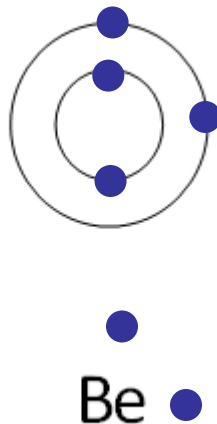
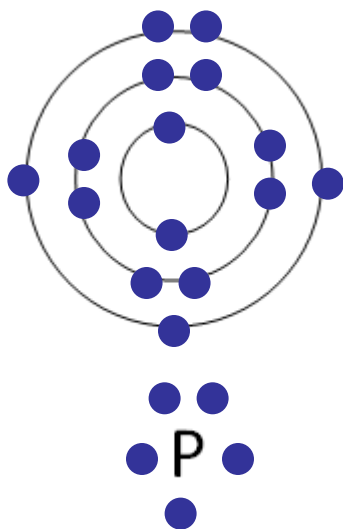
$$A^{\#} = P \text{ or } E$$

$$M^{\#} - A^{\#} = N$$

B) If an atom has an atomic number of 5 and an atomic mass of 11, how many electrons does it have? 5

C) If an atom has an atomic number of 31 and an atomic mass of 70, how many neutrons does it have? 39

10. Draw the Bohr Diagram AND Lewis Structure for each element shown.



**Bohr Diagram – All the electrons like a “bullseye”**

**Lewis Structure – Just the valence electrons**

# 11. To which family does each element belong?

Columns = Group

Na - Alkali Metal      Xe - Noble Gases      Sb - Nitrogen Family

Al - Boron Family      Fl - Carbon Family      At - Halogen (Halide)

**CLASSIFICATION KEY**  
 METAL (Green)    NONMETAL (Red)    METALLOID (Blue)

**PHASE AT ROOM TEMPERATURE KEY**  
 SOLID (White)    LIQUID (Black)    GAS (Red)

1	1	2	Transition Metals (Groups 3-12)										13	14	15	16	17	18	
1	H 1.008																		2 He 4.0026
2	3 Li 6.94	4 Be 9.0122											5 B 10.81	6 C 12.011	7 N 14.007	8 O 15.999	9 F 18.998	10 Ne 20.180	
3	11 Na 22.990	12 Mg 24.305	3	4	5	6	7	8	9	10	11	12	13 Al 26.982	14 Si 28.085	15 P 30.974	16 S 32.06	17 Cl 35.45	18 Ar 39.948	
4	19 K 39.098	20 Ca 40.078	21 Sc 44.956	22 Ti 47.867	23 V 50.942	24 Cr 51.996	25 Mn 54.938	26 Fe 55.845	27 Co 58.933	28 Ni 58.693	29 Cu 63.546	30 Zn 65.38	31 Ga 69.723	32 Ge 72.630	33 As 74.922	34 Se 78.97	35 Br 79.904	36 Kr 83.798	
5	37 Rb 85.468	38 Sr 87.62	39 Y 88.906	40 Zr 91.224	41 Nb 92.906	42 Mo 95.95	43 Tc (98)	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.60	53 I 126.90	54 Xe 131.29	
6	55 Cs 132.91	56 Ba 137.33	57-71 * #	72 Hf 178.49	73 Ta 180.95	74 W 183.84	75 Re 186.21	76 Os 190.23	77 Ir 192.22	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.2	83 Bi 208.98	84 Po (209)	85 At (210)	86 Rn (222)	
7	87 Fr (223)	88 Ra (226)	89-103 #	104 Rf (265)	105 Db (268)	106 Sg (271)	107 Bh (270)	108 Hs (277)	109 Mt (276)	110 Ds (281)	111 Rg (280)	112 Cn (285)	113 Nh (286)	114 Fl (289)	115 Mc (289)	116 Lv (293)	117 Ts (294)	118 Og (294)	

6\* Lanthanide series

57 La 138.91	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.96	64 Gd 157.25
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7# Actinide series

89 Ac (227)	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)
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**Column** = Group or Family  
 Same # of VALENCE ELECTRONS

# 12. Identify whether the element is a metal (M), nonmetal (N), or metalloid (MD).

Ca - M    Ge - MD    F - N    Hg - M    H - N    Cf - M

**CLASSIFICATION KEY**  
■ METAL    ■ NONMETAL    ■ METALLOID

**PHASE AT ROOM TEMPERATURE KEY**  
 SOLID     LIQUID     GAS

<b>1</b>	1 H 1.008											2 He 4.0026							
	2	3 Li 6.94	4 Be 9.0122											10 Ne 20.180					
	3	11 Na 22.990	12 Mg 24.305											18 Ar 39.948					
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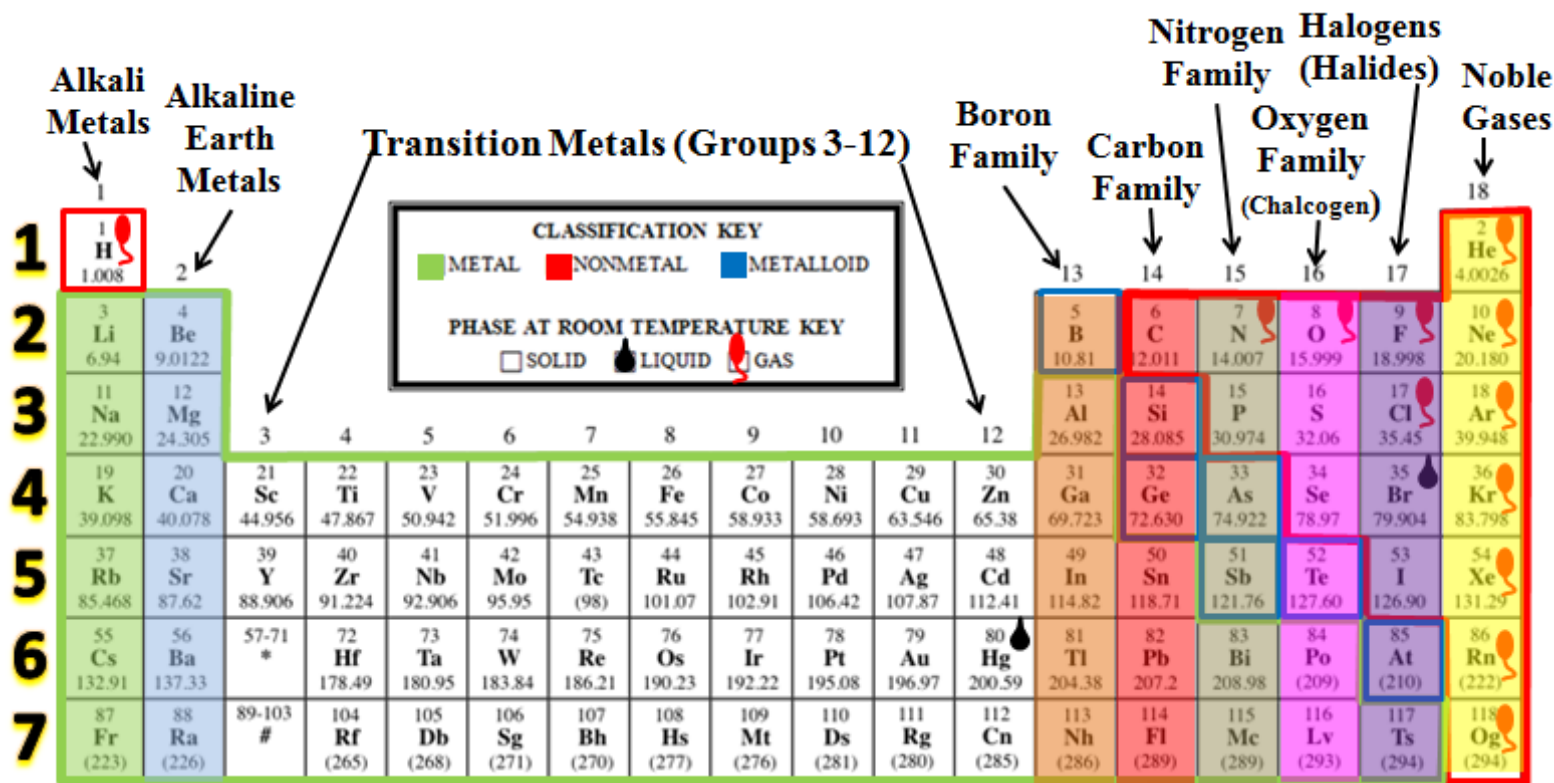
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**7** # Actinide series

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# 13. How many energy levels would each atom have?

H - 1 Po - 6 He - 1 Ar - 3 Am - 7 Db - 7



**6** \* Lanthanide series

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**ROW** = Period

Same # of ENERGY LEVELS



# 14. How many valence electrons would each an atom of each element have?

Li 1 Ga 3 I 7 Sr 2 Se 6 Bi 5

Alkali Metals    Alkaline Earth Metals    Transition Metals (Groups 3-12)    Boron Family    Carbon Family    Nitrogen Family (Halides)    Oxygen Family (Chalcogen)    Noble Gases

1    2    3    4    5    6    7    8    9    10    11    12    13    14    15    16    17    18

Period	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
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**Column** = Group or Family

Same # of VALENCE ELECTRONS

15. Identify each "mystery" element by symbol based on the clues provided.

Mg I have 12 neutrons and 2 valence electrons.

13

W I am a transition metal with 74 electrons.

Rn I have a full outer shell and have a total of 6 energy levels.

K I am an Alkali metal in the 4th period.

O I am a gas with 2 electrons in my first energy level and 6 in my second energy level.

-valence

At I am a solid halogen with 125 neutrons.

U I am a transition metal with 7 energy levels and 92 electrons.

**NOTE: You will be allowed to use YOUR colored periodic table and can write NOTES (not typed) on that page only.**

*Done? If not, finish your study guide now!*

*We will be having a Mystery Element Quiz TOMORROW!*

*Test will be on Tuesday!*

*Try the Quia Mystery Element Smillionaire game to practice identifying Mystery Elements. You may use your colored periodic table.*

*You will have to sign in to Quia and click the link to the Class Web Page to find the game.*

# Periodic Table Smillionaires

Taylor

Jessilyn

Kristen G.

Brooklyn<sup>2</sup>

Krista

Sydney

Lindsey

Drew

Kearney

ADAM

Triscuit

Autumn

Nina  
Lia

Rhyan

NOVY



**What have we learned so far?  
Check off the learning targets you know!**

**I CAN...**

- Describe the parts of an atom (subatomic particles, nucleus, & electron cloud).
- Use a periodic table to determine the atomic number and atomic mass as well as the number of protons, neutrons, and electrons (total and valence).
- Explain how an atom changes by changing the number of protons, neutrons, or electrons.
- Draw the Bohr diagram for an atom that shows the location of all of its electrons.
- Draw the Lewis structure which shows the number of valence electrons an atom has.
- Predict whether an element will gain or lose electrons in a bond. ?
- Identify the elements in each family on the periodic table.
- Predict the number of valence electrons and the number of energy levels for an element based on its position in the periodic table.
- Identify the chemical symbols and/or formulas for common elements and compounds.
- Determine the elements in a compound and the number of each. ?
- Describe common chemical reactions that take place in the world around us.
- Explain how an ionic bond forms between a metal and a nonmetal.
- Explain how a covalent bond forms between two nonmetals.
- Identify physical and chemical properties of matter.
- Identify physical and chemical changes in matter.
- Explain how specific variables affect the reaction rate of a chemical reaction, i.e. concentration, surface area, and temperature.
- Describe the law of conservation of mass using specific chemical reactions and/or balanced equations.
- Explain the process of polymerization as it relates to the production of petrochemicals (plastics).

