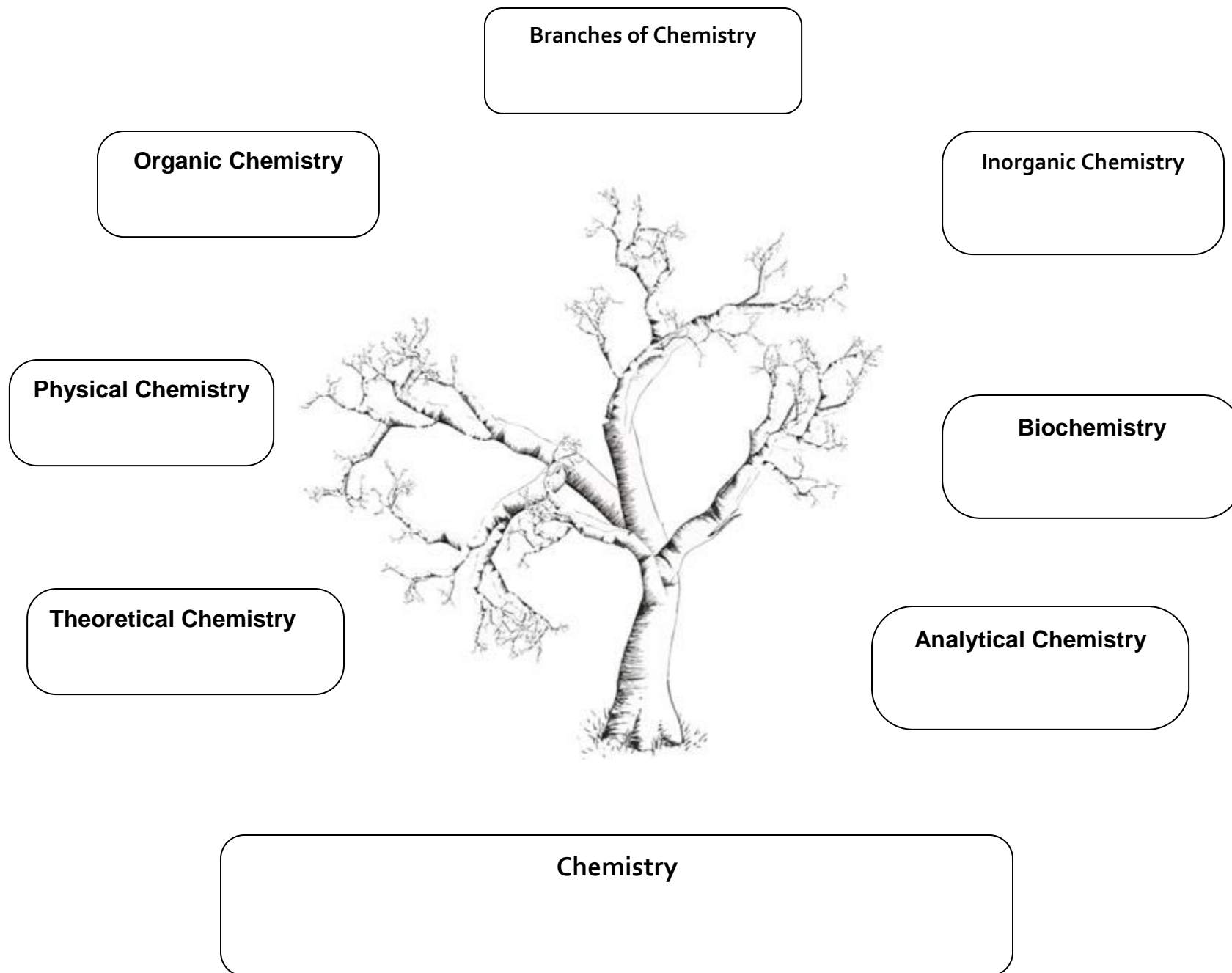


## Objective 3



**Chemistry I / Chemistry I/II  
Physical Science Review**

**Read Chapter 1 pages 3 - 11 (top) and define the following terms:**

- 1. Chemistry –**
- 2. Mass-**
- 3. Volume –**
- 4. Extensive properties –**
- 5. Intensive properties-**
- 6. Physical properties –**
- 7. Chemical properties -**
- 8. Physical change –**
- 9. Chemical change -**
- 10. Solid –**
- 11. Liquid-**
- 12. Gas –**
- 13. Plasma –**
- 14. Change of state –**

**Classify The following changes as chemical or physical:**

- 1. Cutting down a tree**
- 2. Burning down a tree**
- 3. Evaporating water**
- 4. Silver tarnishing**
- 5. Milk turning sour**
- 6. Water turns to ice crystals**
- 7. Iron rusting**
- 8. Nitroglycerine detonating**
- 9. Dry ice subliming**
- 10. Hydrogen peroxide decomposing**

**Give an example of a practical application of each of the following branches of chemistry.**

- 1. Analytical Chemistry**
- 2. Physical Chemistry**
- 3. Organic Chemistry**
- 4. Inorganic Chemistry**
- 5. Biochemistry**
- 6. Theoretical Chemistry**

## Indications of Chemical Reaction

**Chemical Reaction:**

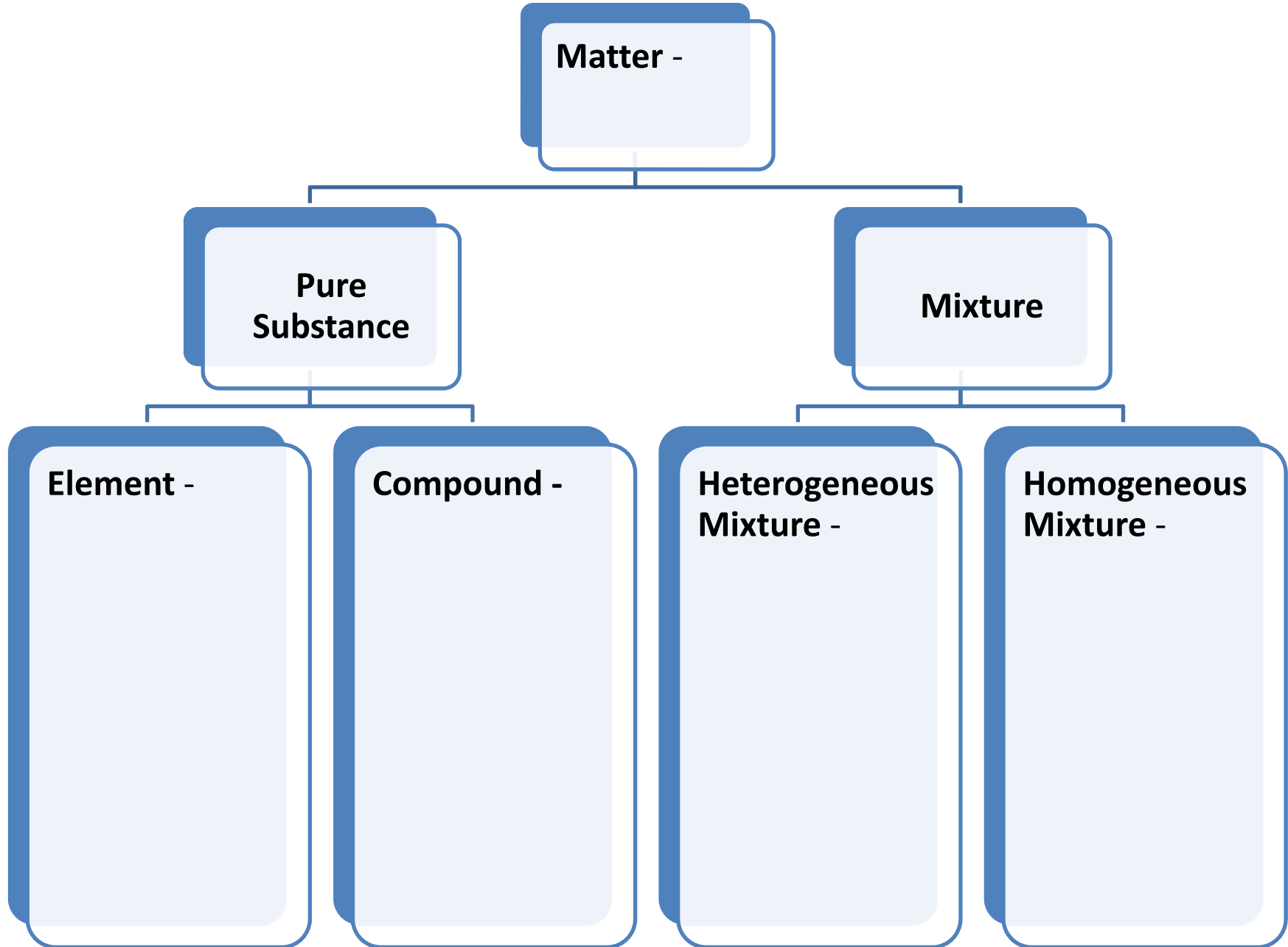
**Observations that indicate a chemical reaction has occurred:**

- 1.
- 2.
- 3.
4.
  - a.
  - b.

## The Flaming Bubble Demonstration

1. **What are some chemical and physical properties of the reactants in the reaction?**
2. **What are some chemical and physical properties of the products in the reaction?**
3. **What evidence did you observe that a chemical reaction has occurred?**
4. **Write a word equation for the reaction you observed.**

# Classification of Matter – Class Objectives 8, 9, 10



## Chemistry Worksheet: Matter #1 - Objectives 8 & 9

1. A mixture (**is/is not**) a chemical combining of substances.
2. In a compound the (**atoms/molecules**) are (**chemically/physically**) combined so that the elements that make up the compound (**retain/lose**) their identities and (**do/do not**) take on a new set of properties.
3. The smallest identifiable unit of a compound is a(n) \_\_\_\_\_, which is made up of \_\_\_\_\_ which are chemically bonded.
4. True or False: A mixture is always made up of a combination of elements.
5. In a mixture, the substances (**lose/retain**) their identities.
6. In a mixture the substances involved (**can/cannot**) be separated by a simple physical process.  
In a compound the elements involved (**can/cannot**) be separated by a simple physical process because the elements are (**physically combined/chemically bonded**).
7. True or False: An element can be broken down into a simpler substance.
8. The smallest identifiable unit of an element is a(n) \_\_\_\_\_.
9. From the following list of substances, circle the ones that are elements:

silver	carbon dioxide	wood alcohol	chromium
water	hydrogen	carbon	nitrogen
oxygen	gold	sugar	salt
air	sulfur	magnesium	nickel
10. Explain how to separate the sugar and water in a solution of sugar and water.
11. How would you separate a mixture of alcohol and water?
12. How would you separate sand and water?

13. Classify the following as pure substances or as mixtures:

air	gasoline	grain alcohol
water	sugar	gold
mercury	oxygen	salt water

14. Classify the following as heterogeneous or as homogeneous:

sand & salt mixture	hydrogen	iron
salt water	unfiltered air	iron with rust
pure water	an apple	nitric acid
tossed salad	granite	wood

15. Classify the following as an element, a compound, a solution, or a heterogeneous mixture:

aluminum	raisin bread
carbon dioxide	water
sugar and water	sulfur
sulfuric acid	mercury
an orange	water & instant coffee
a pencil	carbon particles & sugar
nitrogen	air
gasoline	grain alcohol

## Elements, Compounds, and Mixtures

Classify each of the pictures below by placing the correct label in the blanks below:

A= Element

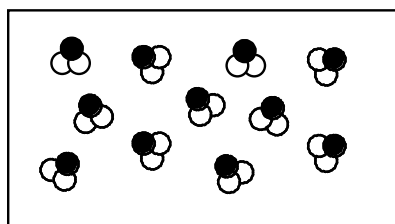
D= Mixture of compounds

B= Compound

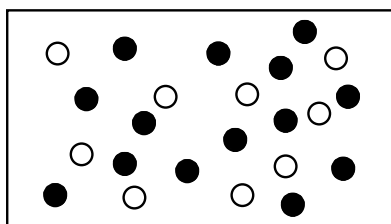
E= Mixture of elements and compounds

C= Mixture of elements

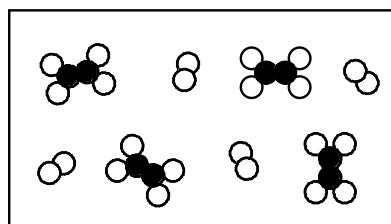
Each circle represents an atom and each different color represents a different kind of atom. If two atoms are touching then they are bonded together.



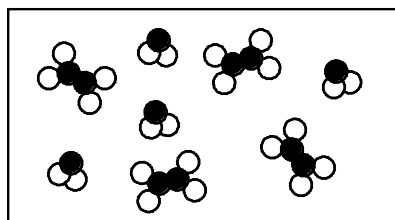
1) \_\_\_\_\_



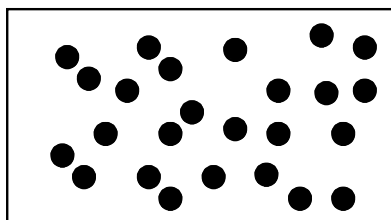
2) \_\_\_\_\_



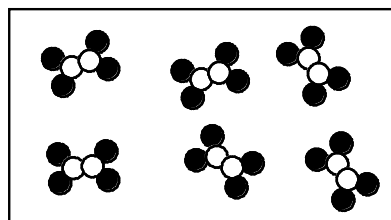
3) \_\_\_\_\_



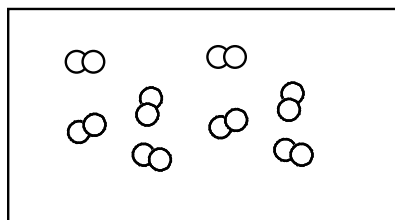
4) \_\_\_\_\_



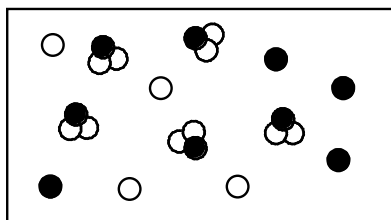
5) \_\_\_\_\_



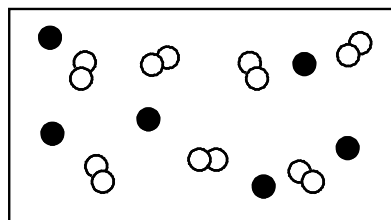
6) \_\_\_\_\_



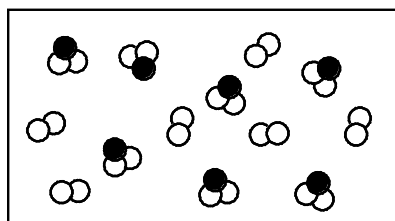
7) \_\_\_\_\_



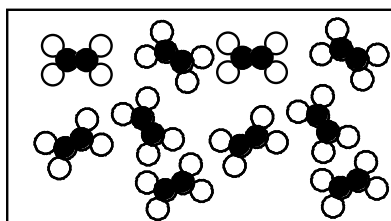
8) \_\_\_\_\_



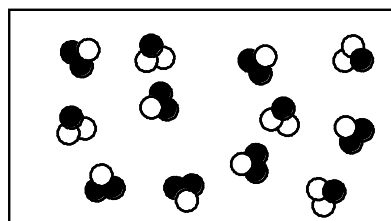
9) \_\_\_\_\_



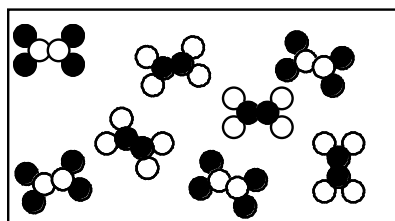
10) \_\_\_\_\_



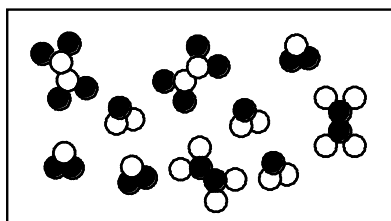
11) \_\_\_\_\_



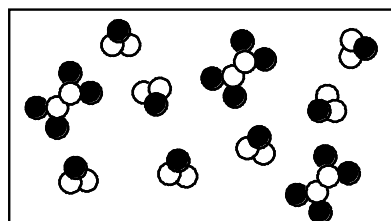
12) \_\_\_\_\_



13) \_\_\_\_\_



14) \_\_\_\_\_



15) \_\_\_\_\_



**Physical and Chemical Changes**  
Objectives 4,5,6,8,9

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

Date: \_\_\_\_\_ Hour: \_\_\_\_

Place a check in the appropriate column:

<b>Change</b>	<b>Physical Change</b>	<b>Chemical Change</b>
Salt dissolves in water.		
Hydrochloric acid reacts with magnesium to produce hydrogen gas.		
A piece of copper is cut in half.		
A sugar cube is ground up.		
Water is heated and changed to steam.		
Iron rusts.		
Ethyl alcohol evaporates.		
Ice melts.		
Milk sours (goes bad).		
Sugar dissolves in water.		
Sodium and potassium react violently with water.		
Pancakes cook on a griddle.		
Grass grows on a lawn.		
A tire is inflated with air.		
Food is digested in the stomach.		
Water is absorbed by a paper towel.		
Ethyl alcohol boils at 79°C.		
Paper burns.		
Water freezes at 0°C.		
Fireworks explode.		
Alka-Seltzer gives off carbon dioxide when added to water.		
Clouds form in the sky.		

NAME \_\_\_\_\_

**INSTRUCTIONS:** Write **E** in the blank if the material is *heterogeneous* or **O** if it is *homogeneous*.

- |                                |       |                               |       |
|--------------------------------|-------|-------------------------------|-------|
| 1. Wood                        | _____ | 6. Dirt                       | _____ |
| 2. Freshly-brewed black coffee | _____ | 7. Sausage-and-mushroom pizza | _____ |
| 3. Water                       | _____ | 8. Air                        | _____ |
| 4. Lucky Charms <sup>®</sup>   | _____ | 9. Milk                       | _____ |
| 5. Salt                        | _____ | 10. Gold                      | _____ |

**INSTRUCTIONS:** Classify each of the following as an *element* [**E**], a *compound* [**C**], or a *mixture* [**M**].

- |                        |       |                            |       |
|------------------------|-------|----------------------------|-------|
| 11. Gold               | _____ | 16. Air                    | _____ |
| 12. Water              | _____ | 17. Carbon dioxide         | _____ |
| 13. Seawater           | _____ | 18. Silver                 | _____ |
| 14. Sugar              | _____ | 19. Ice                    | _____ |
| 15. A chocolate sundae | _____ | 20. A Big Mac <sup>®</sup> | _____ |

**INSTRUCTIONS:** Classify each of the following properties of matter as *physical* [**P**] or *chemical* [**C**].

- |                              |       |                                    |       |
|------------------------------|-------|------------------------------------|-------|
| 21. Color                    | _____ | 26. Reacts violently with chlorine | _____ |
| 22. Density                  | _____ | 27. Good conductor of heat         | _____ |
| 23. Burns easily (flammable) | _____ | 28. Dissolves readily in water     | _____ |
| 24. Not affected by acids    | _____ | 29. Melts at 145 °C                | _____ |
| 25. Boils at 450 °C          | _____ | 30. Malleable                      | _____ |

**INSTRUCTIONS:** Classify each of the following changes in matter as *physical* [**P**] or *chemical* [**C**].

- |                                 |       |                                |       |
|---------------------------------|-------|--------------------------------|-------|
| 31. Grinding chalk into powder  | _____ | 36. Burning gasoline           | _____ |
| 32. Dissolving salt in water    | _____ | 37. Hammering gold into foil   | _____ |
| 33. Dissolving zinc in acid     | _____ | 38. Melting ice                | _____ |
| 34. Tearing a piece of paper    | _____ | 39. Digesting food             | _____ |
| 35. Stretching copper into wire | _____ | 40. Making hydrogen from water | _____ |

**INSTRUCTIONS:** Classify each of the following as an *intensive property* [**I**] or an *extensive property* [**E**].

- |                   |       |            |       |
|-------------------|-------|------------|-------|
| 41. Mass          | _____ | 46. Color  | _____ |
| 42. Density       | _____ | 47. Volume | _____ |
| 43. Melting point | _____ | 48. Length | _____ |

**Element Assignment – Objectives 11,12,13,15**  
**1A**

Using only information from your partner, complete the following chart by filling in the element name and type.

<b>Symbol</b>	<b>Name</b>	<b>Type</b>
Al	Aluminum	
Sb		Metalloid
As	Arsenic	
Ba		
Bi		Metal
Br	Bromine	
Ca	Calcium	
C		
Cl	Chlorine	Nonmetal
Cr		Metal
Co	Cobalt	Metal
Cu		Metal
F		
Au	Gold	
H	Hydrogen	
I		Nonmetal
Fe	Iron	
Pb		
Mg	Magnesium	Metal
Mn		Metal
Hg	Mercury	
Ni		Metal
N	Nitrogen	
O	Oxygen	Nonmetal
Xe		Noble Gas
Cs	Cesium	

**Element Assignment - Objectives 11,12,13,15**  
**1B**

Using only information from your partner, complete the following chart by filling in the element name and type.

<b>Symbol</b>	<b>Name</b>	<b>Type</b>
Al		Metal
Sb	Antimony	
As		Metalloid
Ba	Barium	Metal
Bi	Bismuth	
Br		Nonmetal
Ca		Metal
C	Carbon	Nonmetal
Cl		
Cr	Chromium	Metal
Co		
Cu	Copper	
F	Fluorine	Nonmetal
Au		Metal
H		Nonmetal
I	Iodine	
Fe		Metal
Pb	Lead	Metal
Mg		
Mn	Manganese	
Hg		Metal
Ni	Nickel	
N		Nonmetal
O		Nonmetal
Xe	Xenon	
Cs		Metal

### Chemistry 1 Periodic Table Activity - Objectives 14,15,16

1. Color all of the metals that you identified one color.
2. Color all of the nonmetals that you identified another color.
3. Pick a different color and color all of the metalloids that color.
4. Color all of the Noble Gases that you identified a different color.
5. Where are the metals located on the periodic table?
6. Where are the nonmetals located on the periodic table?
7. Where are the metalloids located on the periodic table? (Hint: there are 6 of them)
8. Draw a single line between the metals and the nonmetals.
8. Where are the Noble Gases located on the periodic table?

## The Chemical Elements - Objectives 14,15,16,17,18

Periodic Table: Organizes elements into \_\_\_\_\_ or \_\_\_\_\_ that have similar properties.

**Groups/Families:**

**Periods:**

**Family Names – Commit these to memory! This is part of the language of Chemistry!**

IA –

IIA –

IIIA –

IVA –

VA –

VIA –

VIIA –

VIIIA –

## 4 General Classes of Elements

### I. Metals

#### A. Characteristics

1.

2.

3.

4.

5.

6.

#### B. Examples:

### II. Nonmetals

#### A. Characteristics

1.

2.

3.

4.

5.

6.

#### B. Examples:

### III. Metalloids

#### A. Characteristics

1.

2.

#### B. Examples

- IV. Noble Gases
- A. Characteristics
- 1.

B. Examples:

States of Matter:



# Periodic Table of the Elements

1 H 1.00794																	1 H 1.00794	2 He 4.002602
3 Li 6.941	4 Be 9.012182											5 B 10.811	6 C 12.0107	7 N 14.00674	8 O 15.9994	9 F 18.9984032	10 Ne 20.1797	
11 Na 22.989770	12 Mg 24.3050											13 Al 26.981538	14 Si 28.0855	15 P 30.973761	16 S 32.066	17 Cl 35.4527	18 Ar 39.948	
19 K 39.0983	20 Ca 40.078	21 Sc 44.955910	22 Ti 47.867	23 V 50.9415	24 Cr 51.9961	25 Mn 54.938049	26 Fe 55.845	27 Co 58.933200	28 Ni 58.6934	29 Cu 63.546	30 Zn 65.39	31 Ga 69.723	32 Ge 72.61	33 As 74.92160	34 Se 78.96	35 Br 79.904	36 Kr 83.80	
37 Rb 85.4678	38 Sr 87.62	39 Y 88.90585	40 Zr 91.224	41 Nb 92.90638	42 Mo 95.94	43 Tc (98)	44 Ru 101.07	45 Rh 102.90550	46 Pd 106.42	47 Ag 107.8682	48 Cd 112.411	49 In 114.818	50 Sn 118.710	51 Sb 121.760	52 Te 127.60	53 I 126.90447	54 Xe 131.29	
55 Cs 132.90545	56 Ba 137.327	57 La 138.9055	72 Hf 178.49	73 Ta 180.9479	74 W 183.84	75 Re 186.207	76 Os 190.23	77 Ir 192.217	78 Pt 195.078	79 Au 196.96655	80 Hg 200.59	81 Tl 204.3833	82 Pb 207.2	83 Bi 208.98038	84 Po (209)	85 At (210)	86 Rn (222)	
87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (263)	107 Bh (262)	108 Hs (265)	109 Mt (266)	110 (269)	111 (272)	112 (277)		114 (289) (287)		116 (289)		118 (293)	

58 Ce 140.116	59 Pr 140.90765	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.964	64 Gd 157.25	65 Tb 158.92534	66 Dy 162.50	67 Ho 164.93032	68 Er 167.26	69 Tm 168.93421	70 Yb 173.04	71 Lu 174.967
90 Th 232.0381	91 Pa 231.03588	92 U 238.0289	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)

S.E. Van Bramer, 7/22/99

1995 IUPAC masses and Approved Names from <http://www.chem.qmw.ac.uk/iupac/AtWt/>  
masses for 107-111 from C&EN, March 13, 1995, P 35

112 from <http://www.gsi.de/z112e.html>

114 from C&EN July 19, 1999

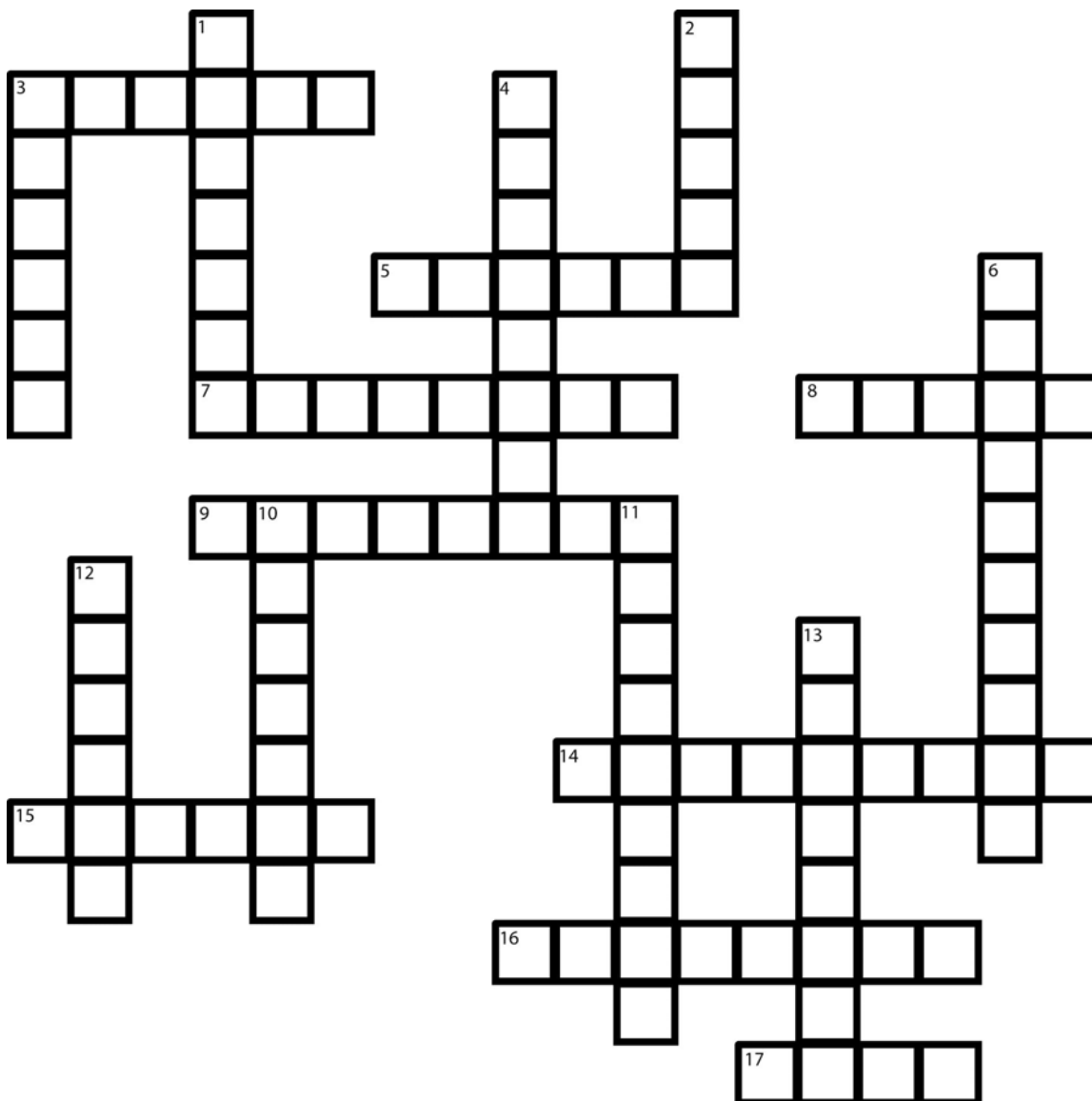
116 and 118 from <http://www.lbl.gov/Science-Articles/Archive/elements-116-118.html>

# Periodic Table worksheet

Name \_\_\_\_\_

1. Define a family. \_\_\_\_\_
2. What is a period? \_\_\_\_\_
3. What is the symbol for the following elements.
  - a. Magnesium \_\_\_\_\_
  - b. Potassium \_\_\_\_\_
  - c. Sodium \_\_\_\_\_
  - d. Copper \_\_\_\_\_
  - e. Tin \_\_\_\_\_
  - f. Xenon \_\_\_\_\_
  - g. Manganese \_\_\_\_\_
  - h. Silver \_\_\_\_\_
4. What are the names of the following elements? (Correct spelling please!)
  - a. Cl \_\_\_\_\_
  - b. F \_\_\_\_\_
  - c. Au \_\_\_\_\_
  - d. Sr \_\_\_\_\_
  - e. Fe \_\_\_\_\_
  - f. Pb \_\_\_\_\_
  - f. Co \_\_\_\_\_
  - g. B \_\_\_\_\_
  - h. K \_\_\_\_\_
  - i. Hg \_\_\_\_\_
5. In what period are the following elements?
  - a. He \_\_\_\_\_
  - b. Ge \_\_\_\_\_
  - c. Rb \_\_\_\_\_
  - d. I \_\_\_\_\_
6. In what group are the following elements?
  - a. Sulfur \_\_\_\_\_
  - b. Ca \_\_\_\_\_
  - c. Iodine \_\_\_\_\_
  - d. Fe \_\_\_\_\_
7. Name an element with the following characteristics.
  - a. Halogen \_\_\_\_\_
  - b. Nonmetal \_\_\_\_\_
  - c. Alkali metal \_\_\_\_\_
  - d. metalloid \_\_\_\_\_
  - e. Lanthanide series \_\_\_\_\_
  - f. Alkaline Earth metal \_\_\_\_\_
  - g. Transition metal \_\_\_\_\_
  - h. Nobel gas \_\_\_\_\_

# Element Crossword



## Across

- 3 Na
- 5 C
- 7 N
- 8 B
- 9 Al
- 14 Be
- 15 He
- 16 F
- 17 Ne

## Down

- 1 Si
- 2 Ar
- 3 S
- 4 H
- 6 P
- 10 Li
- 11 Mg
- 12 O
- 13 Cl