

# Review Package (Matter & Inorganic Naming)

November 29, 2017 8:20 PM

Chem 11 Matter & Inorganic Naming Review Package \_\_\_\_\_

Hebden: Units III & IV \_\_\_\_\_

## UNIT III: MATTER

In addition to these questions, make sure to look at the definitions and examples in your notes.

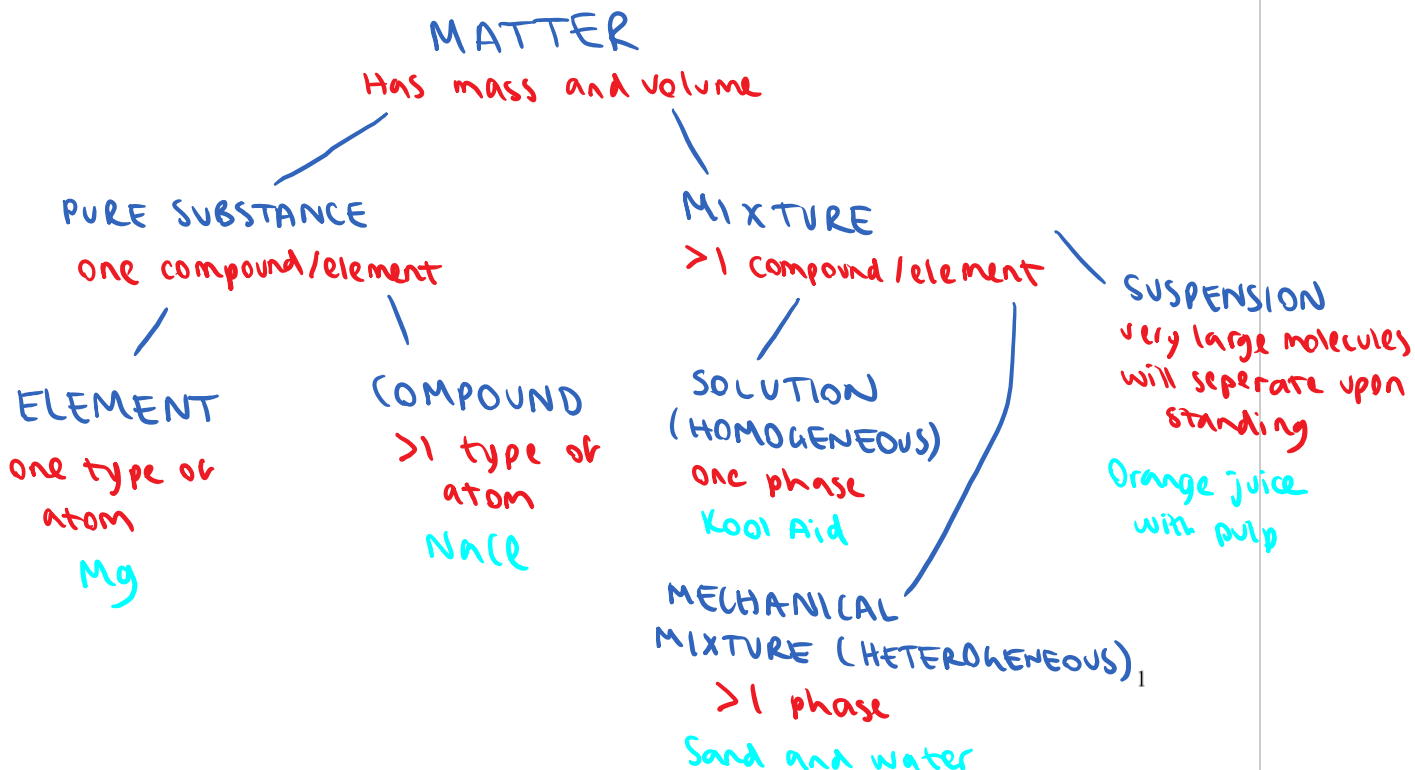
1. A mixture (**is** / **is not**) composed of two or more substances.
2. **True or False:** An element can be broken down into a simpler substance.
3. From the following list, circle the ones that are elements:

silver  
water  
oxygen  
air  
carbon dioxide  
hydrogen

gold  
sulphur  
alcohol  
carbon  
sugar  
magnesium

chromium  
nitrogen  
salt  
nickel

4. Draw the classification of matter diagram. Be sure to include the following: matter, suspensions, compounds, mixtures, pure substances, elements, solutions, and mechanical mixtures. Write a characteristic below each word.



5. Classify the following as pure substances or mixtures.

air M gasoline M gold PS  
 water PS sugar PS salt water M  
 mercury PS oxygen PS

6. Classify the following as heterogenous or as homogeneous (assume they are all mixtures).

salt water HOMO tossed salad HETERO iron with rust HETERO  
 aluminum foil HOMO unfiltered air HETERO wood HETERO  
 tap water HOMO an apple HETERO

7. a) Explain the principles behind how chromatography works.

Chromatography separates mixtures based on how the components of a mixture interact with the stationary & mobile phases.

b) Calculate the  $R_f$  and identify the dye used from this data.

Table 1. Chromatography Data.

	Colour	$d_1$ (cm)	$d_2$ (cm)	$R_f$	Identified Dye
Unknown #1	Blue	6.7	8.6	0.78	Blue #2
Unknown #2	Red	4.9	8.2	0.60	Red #4

Table 2. Known Dyes and  $R_f$  values.

Dye	Red #2	Red #3	Red #4	Yellow #5	Yellow #6	Blue #1	Blue #2
$R_f$	0.81	0.41	0.62	0.95	0.77	1.0	0.79

8. Answer the questions below.

### Elements, Compounds, and Mixtures

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

A= Element

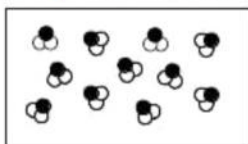
B= Compound

C= Mixture of elements

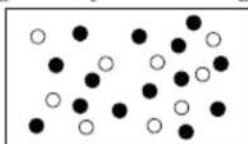
D= Mixture of compounds

E= Mixture of elements and compounds

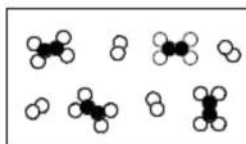
Each circle represents an atom and each different color represents a different kind of atom. If two atoms are touching then they are bonded together.



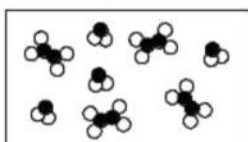
1) B



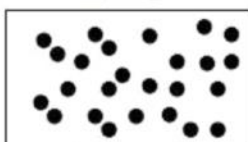
2) C



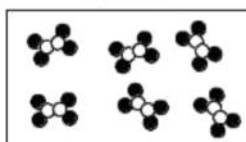
3) D



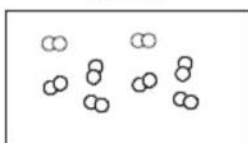
4) D



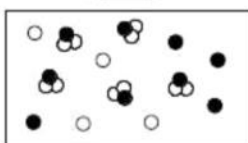
5) A



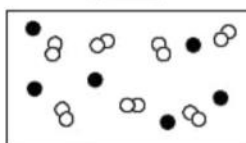
6) B



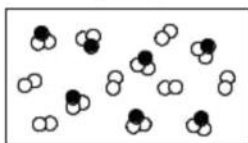
7) B



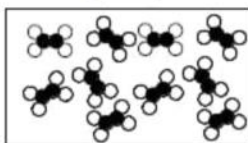
8) E



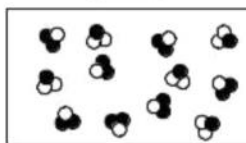
9) E



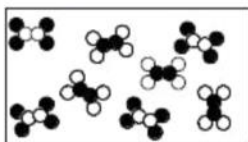
10) D



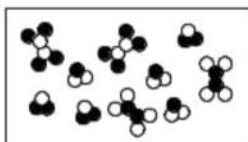
11) B



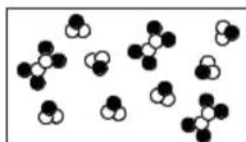
12) D



13) D



14) D



15) D

9. Classify the following properties of matter as physical or chemical.

Colour P

Density P

Burns easily (flammable) C

Boils at 450°C P

Melts at 145°C P

Dissolves in water P

10. Classify the following as an intensive property (I) or an extensive property (E).

Mass	_____	E	Colour	_____	I
Density	_____	I	Volume	_____	E
Melting Point	_____	I	Length	_____	E

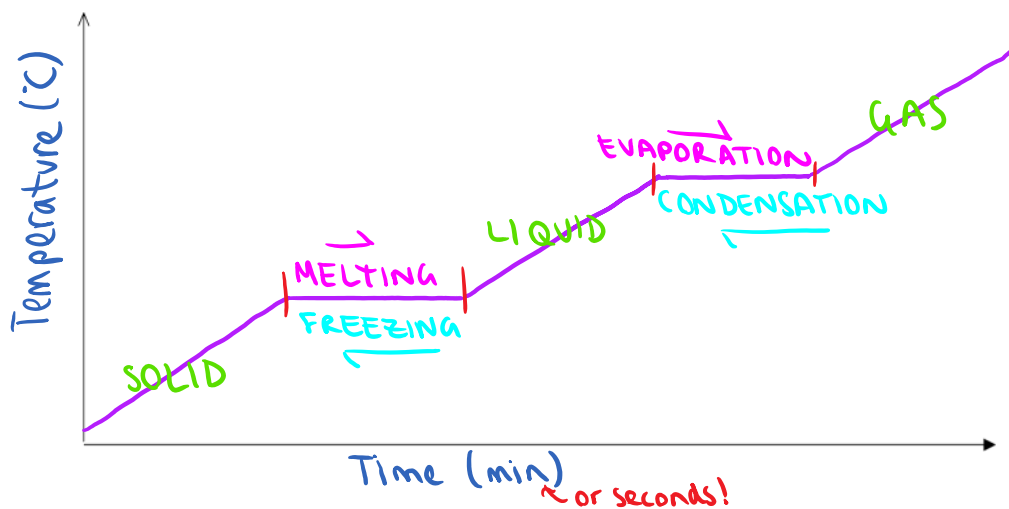
11. Fill in the table below by checking the appropriate column.

Change	Physical Change	Chemical Change
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.	✓	

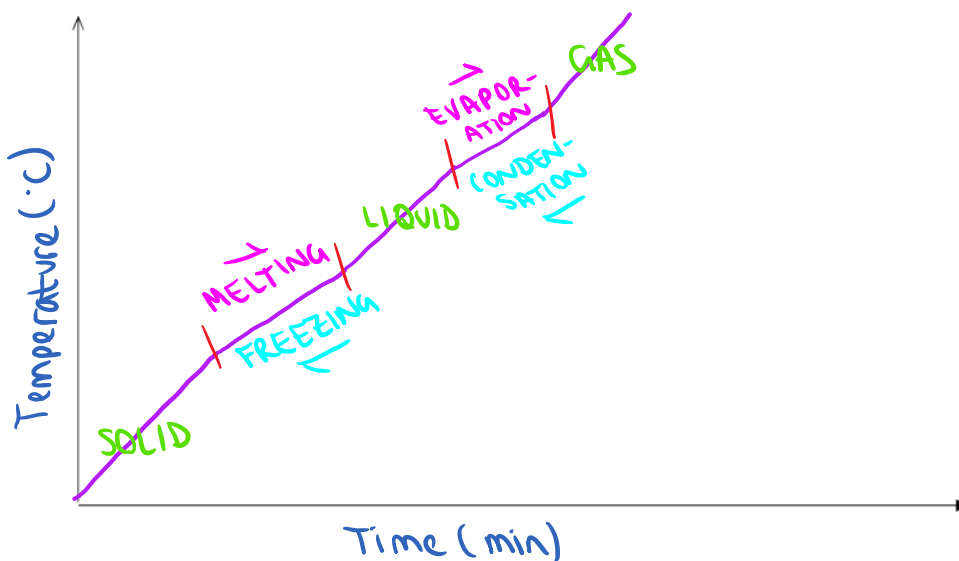
12. Draw a heating curve for both a pure substance and mixture below (on separate graphs). Be sure to include the following:

- x and y axis titles
- Label: solid, liquid and gas states
- Label: phase changes occurring (melting/freezing & evaporation/condensation ranges)
- Be sure that the difference between the curves of two graphs is obvious!

Heating Curve of a Pure Substance



Heating Curve of a Mechanical Mixture



## UNIT IV: INORGANIC NOMENCLATURE

In addition to these questions, there are a LOT more question in your textbook under Unit IV.

1. Write the word that best characterizes each given species from the choices:

- |                 | <i>atom</i> | <i>anion</i> | <i>cation</i> | <i>molecule</i> | <i>polyatomic ion</i> |
|-----------------|-------------|--------------|---------------|-----------------|-----------------------|
| a) $S^{2-}$     |             | <u>anion</u> |               |                 |                       |
| b) $C_2H_6$     |             |              |               | <u>molecule</u> |                       |
| c) $Y^{3+}$     |             |              | <u>Cation</u> |                 |                       |
| d) $Tl$         |             |              |               |                 | <u>atom</u>           |
| e) $CrO_4^{2-}$ |             |              |               |                 | <u>polyatomic ion</u> |

2. Name the following compounds.

Write out ions with  
their charges here

I = ionic  
C = covalent

- |  |      |                                      |  |
|--|------|--------------------------------------|--|
| $Na^+ OH^-$                            | I    | a) NaOH                              | <u>Sodium hydroxide</u>                  |
| $NH_4^+ H_2PO_4^-$                     | I    | b) $NH_4H_2PO_4$                     | <u>ammonium dihydrogen phosphate</u>     |
|  | C    | c) $C_3S_5$                          | <u>tricarbon pentasulphide</u>           |
| $Fe^{+3} CH_3COO^-$                    | I    | d) $Fe(CH_3COO)_3$                   | <u>iron (III) acetate (or ethanoate)</u> |
| $Mn^{+3} O^{-2}$                       | I    | e) $Mn_2O_3 \cdot 3H_2O$             | <u>manganese (III) oxide trihydrate</u>  |
| $Cu^{+1} Cr_2O_7^{-2}$                 | I    | f) $Cu_2Cr_2O_7$                     | <u>copper (I) dichromate</u>             |
| $2H^+ SO_3^{-2}$<br>sulphite           | Acid | g) $H_2SO_3(aq)$                     | <u>sulphurous acid</u>                   |
| $Ni^{+2} SO_3^{-2}$                    | I    | h) $NiSO_3 \cdot 7H_2O$              | <u>Nickel (II) sulphite heptahydrate</u> |
| $Ba^{+2} CO_3^{-2}$                    | I    | i) $BaCO_3$                          | <u>barium carbonate</u>                  |
| $Fe^{+2} SO_4^{-2}$                    | I    | j) $FeSO_4 \cdot 5H_2O$              | <u>iron (II) sulphate pentahydrate</u>   |
| $H^+ CH_3COO^-$<br>acetate             | Acid | k) $CH_3COOH$<br>$= CH_3COO^- + H^+$ | <u>acetic acid (or ethanoic acid)</u>    |
|  | C    | l) $I_2O_5$                          | <u>diiodine pentoxide</u>                |
| $H^+ NO_3^-$<br>nitrate                | Acid | m) $HNO_3$                           | <u>nitric acid</u>                       |
| $H^+ ClO_3^-$<br>chlorate              | Acid | n) $HClO_3$                          | <u>chloric acid</u>                      |
| $Hg_2^{+2} C_2O_4^{-2}$<br>mercury (I) | I    | o) $Hg_2C_2O_4$                      | <u>mercury (I) oxalate</u>               |

3. Write the formula for each of the following compounds.

- |  |  |   |
|--|--|---|
| a) calcium nitride                           | $\text{Ca}^{+2} \text{N}^{-3}$                   | <u><math>\text{Ca}_3\text{N}_2</math></u>   |
| b) methane ( <i>aka</i> carbon tetrahydride) |  | <u><math>\text{CH}_4</math></u>   |
| c) molybdenum (V) sulfide trihydrate         | $\text{Mo}^{+5} \text{S}^{-2}$                   | <u><math>\text{Mo}_2\text{S}_5 \cdot 3\text{H}_2\text{O}</math></u>               |
| d) nitric acid                               | $\text{H}^+ \text{NO}_3^-$<br><i>nitrate</i>     | <u><math>\text{HNO}_3</math></u>  |
| e) zinc hydrogen sulfite                     | $\text{Zn}^{+2} \text{HSO}_3^-$                  | <u><math>\text{Zn}(\text{HSO}_3)_2</math></u>                                     |
| f) iron (II) dihydrogen phosphate            | $\text{Fe}^{+2} \text{H}_2\text{PO}_4^-$         | <u><math>\text{Fe}(\text{H}_2\text{PO}_4)_2</math></u>                            |
| g) iron (III) sulfate nonahydrate            | $\text{Fe}^{+3} \text{SO}_4^{-2}$                | <u><math>\text{Fe}_2(\text{SO}_4)_3 \cdot 9\text{H}_2\text{O}</math></u>          |
| h) lead (II) iodide                          | $\text{Pb}^{+2} \text{I}^-$                      | <u><math>\text{PbI}_2</math></u>  |
| i) hydrocyanic acid                          | $\text{H}^+ \text{CN}^-$                         | <u><math>\text{HCN}</math></u>  |
| j) lead (II) acetate decahydrate             | $\text{Pb}^{+2} \text{CH}_3\text{COO}^-$         | <u><math>\text{Pb}(\text{CH}_3\text{COO})_2 \cdot 10\text{H}_2\text{O}</math></u> |
| k) xenon tetrafluoride                       |  | <u><math>\text{XeF}_4</math></u>  |
| l) ammonia ( <i>aka</i> nitrogen trihydride) |  | <u><math>\text{NH}_3</math></u>   |
| m) hypochlorous acid                         | $\text{H}^+ \text{ClO}^-$<br><i>hypochlorite</i> | <u><math>\text{HClO}</math></u>   |
| n) mercury (I) monohydrogen phosphate        | $\text{Hg}_2^{+2} \text{HPO}_4^-$                | <u><math>\text{Hg}_2\text{HPO}_4</math></u>                                       |
| o) manganese (VIII) sulfide tetrahydrate     | $\text{Mn}^{+8} \text{S}^{-2}$                   | <u><math>\text{MnS}_4 \cdot 4\text{H}_2\text{O}</math></u>                        |