

SNC 2DI  
Chemistry Unit Review

1. Key Terms

At the end of each chapter there is a list of key terms.

- Ch. 5 Chemical is Action – pg. 213
- Ch. 6 Chemical Reactions – pg. 251
- Ch. 7 Rates of Reactions – pg. 285
- Ch. 8 Acids and Bases – pg. 325

Understand the meaning of each term and be able to recognize a definition.

2. Compare the sub-atomic particles:

- a) protons are found in the nucleus, have a charge of +1 and a mass of 1 amu
- b) neutrons are found in the nucleus, have a charge of 0 and a mass of 1 amu
- c) electrons are found in the orbits, have a charge of -1 and a mass of almost 0

3. What does each of the following terms tell us about an atom?

- (a) atomic number: # protons in the nucleus - determines atom's identity
- (b) mass number: # protons + neutrons - determines mass of atom
- (c) Group number: # of valence electrons - determines physical + chem. char.
- (d) neutral atom: atom that contains equal # protons + electrons

4. Complete the following chart:

	Calcium	Bromine	Cesium	Argon	Fluorine
Period	4	4	6	3	2
Group Number	II (2)	VII (17)	I (1)	VIII (18)	VII (17)
# Valence Electrons	2	7	1	8	7
Group Name	alkali earth	halogens	alkali metals	noble gas	halogen
Lewis Dot	$\ddot{\text{Ca}}$	$\cdot\ddot{\text{Br}}\cdot$	$\dot{\text{Cs}}$	$:\ddot{\text{Ar}}:$	$\cdot\ddot{\text{F}}\cdot$

5. Complete the following chart on types of compounds:

Characteristic	Ionic Compound	Molecular Compound
Types of atoms involved	Metal + non-metal	non-metals
Type of bond	ionic	covalent
Electrons (shared/transferred)	transferred	shared
Dissolve in water?	usually	no
Conducts electricity?	yes	no
Example	NaCl	H <sub>2</sub> O

6. Show the bonding for the following compounds:

Chemical Compound	Type of Compound	Lewis Dot Diagram
CaCl <sub>2</sub>	ionic	$\text{Ca} : \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}} : \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}$
H <sub>2</sub> O	molecular	$\text{H} : \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{O}}} : \text{H}$
Al <sub>2</sub> P <sub>3</sub>	ionic	$\begin{array}{c} \text{Al} \quad \text{P} \\   \quad   \\ \text{Al} \quad \text{P} \end{array}$
NH <sub>3</sub>	molecular	

7. Complete the following chart:

Compound	Name	Name	Compound
NaCl	sodium chloride	Calcium nitrate	Ca(NO <sub>3</sub> ) <sub>2</sub>
Mg <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	magnesium phosphate	Iron (III) chloride	FeCl <sub>3</sub>
P <sub>2</sub> O <sub>5</sub>	diphosphorus pentoxide	Hydrochloric acid	HCl
H <sub>2</sub> SO <sub>4</sub>	sulphuric acid	Sulphur trioxide	SO <sub>3</sub>
Cu(OH) <sub>2</sub>	copper (II) hydroxide	Gold (I) sulphate	Au <sub>2</sub> SO <sub>4</sub>

8. Balance the following chemical reactions and classify each reaction.

- (a)  $4 \text{Cu} + \text{O}_2 \rightarrow 2 \text{Cu}_2\text{O}$  synthesis
- (b)  $\text{XeF}_6 + 3 \text{H}_2\text{O} \rightarrow \text{XeO}_3 + 6 \text{HF}$  double displacement
- (c)  $2 \text{Al} + 6 \text{HCl} \rightarrow 3 \text{H}_2 + 2 \text{AlCl}_3$  single displacement
- (d)  $2 \text{PCl}_3 + 3 \text{H}_2\text{S} \rightarrow \text{P}_2\text{S}_3 + 6 \text{HCl}$  double displacement
- (e)  $2 \text{PH}_3 \rightarrow 3 \text{H}_2 + 2 \text{P}$  decomposition
- (f)  $16 \text{Cu} + \text{S}_8 \rightarrow 8 \text{Cu}_2\text{S}$  synthesis
- (g)  $2 \text{SnO} \rightarrow 2 \text{Sn} + \text{O}_2$  decomposition
- (h)  $3 \text{Cu}(\text{NO}_3)_2 + 2 \text{Fe} \rightarrow 2 \text{Fe}(\text{NO}_3)_3 + 3 \text{Cu}$  single displacement

9. Complete the following reaction:



(a) write a balanced chemical equation

already balanced

(b) what type of reaction is this?

single displacement

10. How do you recognize each type of reaction?

(a) synthesis has only one product

(b) decomposition has only one reactant

(c) in single displacement, one element takes the place another element in a compound

(d) in double displacement, the ions from both compounds "change partners"

11. Will the following increase (↑) or decrease (↓) the rate of a chemical reaction?

(a) increasing the temperature of the reactants: ↑

(b) decreasing the surface area of reactants: ↓

(c) adding water to a reactant to decrease its concentration: ↓

(d) adding more reactant to make it more concentrated: ↑

(e) cooling the reactants: ↓

(f) increasing surface area of reactants: ↑

12. Explain the difference between acids and bases:

Property	Acid	Base
Ion that is present in solution	H	OH
Reactivity with metals	yes - produces H	no
Electrical Conductivity	yes	yes
Taste	sour	bitter
Feel	smooth	brittle
pH Range	0-6	8-14
Chemical indicators:		
Phenolphthalein will turn?	clear	pink
Bromothymol blue will turn?	yellow	blue
Litmus paper will turn?	blue → red	red → blue

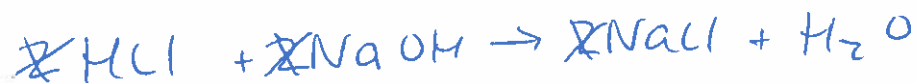
13. Refer to the information in the chart below.

- (a) the strongest acid is apple juice  
(b) the strongest base is liquid bleach  
(c) the weakest acid is folic acid  
(d) the weakest base is soap  
(e) a neutral substance is distilled water  
(f) which is stronger: hair remover or soap? h.m. by how much? pH 3 = 1000 x  
(g) which is stronger, apple juice or folic acid? aj by how much? pH 2 = 100 x

Substance	pH
Red wine	3.8
Hair remover	11
Apple juice	3.0
Soap	8.0
Distilled water	7.0
Folic acid	5.0
Liquid bleach	12.4

14. What happens when a base and an acid are mixed together? What type of reaction is this? Write down the balanced chemical equation that describes this reaction.

- product has a neutral pH
- neutralization reaction



15. Complete the Chemistry Unit Review pg. 330 #4-21.