

Cull Key

Science 10 Review: Chemistry Unit Name: _____
 To be completed _____

1. Understand the meaning of the following terms. Be able to recognize their definitions:
 Protons, Chemical Family or Group, Ionic compound, Double displacement reaction, Neutrons,
 Chemical Period, Covalent bond Precipitate, Electrons, Covalent Compound Rate of reaction,
 Atomic number, Valence electrons, Law of Conservation of Mass Temperature, Mass number,
 Reactants, Acid (and its pH range)
 Ion, Products, Base (and its pH range), Metal, Anion and cation, Synthesis reaction
 Neutralization reaction, Non-metal, Chemical formula, Decomposition reaction, Ionic bond,
 Single displacement reaction, Hydrochloric acid (stomach acid)

2. Compare the sub-atomic particles:
 a) protons are found in the nucleus, charge of +1 mass of 1000x e⁻
 b) neutrons are found in the nucleus, charge of 0 mass of 1p⁺
 c) electrons are found in the orbitals, charge of -1 mass of 1/1000 p⁺

3. What does each of the following terms tell us about an atom?
 a) atomic number: # Protons
 b) mass number: # Protons + Neutrons
 c) Group number: Family charge
 d) neutral atom: net charge of 0 balanced

4. Complete the chart for the following atoms and ions:

Name of Element	Symbol for Element	Atomic Number	Number of Protons	Number of Electrons	Number of Neutrons	Mass Number	Total Electric Charge
Phosphorus ion	P ³⁻	15	15	18	16	31	3-
Manganese ion	Mn ²⁺	25	25	23	30	55	2+
Magnesium	Mg	12	12	12	14	26	0
Fluorine ion	F ⁻¹	9	9	10	10	19	-1
Argon	Ar	18	18	18	22	40	0
Manganese ion	Mn ⁴⁺	25	25	21	30	55	4+
Scandium ion	Sc ³⁺	21	21	18	28	45	3+
Chlorine	Cl ⁻¹	17	17	18	19	36	1-
phosphorus	P ³⁺	15	15	12	16	31	3+

6. Complete the following chart to compare metals and non-metals:

Property	Metal	Non-metal
Where is it on the Periodic Table?	Left	Right
Usual colour	shiny	dull
State at room conditions	Solid	S/L/G
Lustre of the solid (shiny or dull)?		
Malleable or brittle?	moll.	brittle
Does it conduct electricity?	yes	no
Number of valence electrons	less than 4	more than 4
Does it lose or gain valence electrons?	lose	gain
Does it form positive or negative ions?	+	-

7. Complete the following chart:

	calcium	bromine	cesium	magnesium	argon	fluorine
Period	4	4	6	3	3	2
Group Number	2	17	1	2	18	17
# of Valence Electrons	2	17	19	2	8	7
Group Name	Alkaline earth	Halogen	Alkali	Al. Earth	Noble gas	Halogen

8. Complete the following chart, assuming that hydrogen is a non-metal.

Chemical Formula	Ionic or Covalent Compound?	Number Of Each Type Of Atom Or Ion Present			
$C_2H_2F_4$	C	2 C	2 H	4 F	
NO_2	C	1 N	2 O		
$Ba(NO_3)_2$	I	1 Ba	2 N	6 O	
$C_6H_{12}O_6$	C	6 C	12 H	6 O	
$Ca(HCO_3)_2$	I	1 Ca	2 H	2 C	6 O
PBr_3	C	1 P	3 Br		
$Sn_3(PO_4)_4$	I	3 Sn	4 P	16 O	

9. Complete the following chart to compare the properties of ionic and covalent compounds:

Property	Ionic	Covalent
Made from what type of elements?	Metals	Non-m
Are electrons shared or transferred?	trans.	shared
State at room conditions	S	S/L/G
Melting point	??	??
Do they usually have an odour?	Yes	No
Do they dissolve in water?	Yes	No
Do they conduct electricity in solution?	Yes	No

10. Name the following ionic compounds (remember to use Roman Numerals where necessary):

Ca_3P_2	Calcium phosphato	$\text{Na}_2(\text{CO}_3)$	Sodium Carbonate
Fe_2O_3	Iron (III) oxide	PbCl_4	Lead (IV) Chloride
BaS	Barium Sulfide	$\text{Mg}(\text{NO}_3)_2$	Magnesium Nitrate
$\text{Co}_2(\text{SO}_4)_3$	Cobalt (III) Sulfate	CrBr_3	Chromium (III) bromide
$\text{NH}_4(\text{HCO}_3)$	Ammonium Bicarbonate	$\text{Al}(\text{OH})_3$	Aluminum hydroxide
$\text{Ni}(\text{PO}_4)$	Nickel (II) phosphate	MnF_2	Manganese (II) Fluoride

11. Write the chemical formulas for the following compounds:

iron (II) sulfide	FeS	zinc carbonate	ZnCO_3
tin (IV) nitride	Sn_3N_4	manganese (II) bromide	MnBr_2
cobalt (III) nitrate	$\text{Co}(\text{NO}_3)_3$	nickel (III) hydroxide	$\text{Ni}(\text{OH})_3$
lead (IV) oxide	$\text{Pb}_2\text{O}_4 \rightarrow \text{PbO}_2$	ammonium phosphate	$(\text{NH}_4)_3\text{PO}_4$
potassium sulfate	K_2SO_4	silver iodide	AgI
aluminum phosphide	AlP	mercury (II) carbide	HgC_2

12. Balance the following chemical reactions. Classify each reaction as a synthesis, decomposition, single displacement or double displacement reaction.

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

13. 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"

14. Write the Law of Conservation of Mass. How is it related to balancing chemical equations?

mass of reactants = mass of products

15. 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: ↑

16. Describe three (3) ways that you could make a "chunk" of aluminum react more SLOWLY with acid.

cool, less conc. acid, Decrease Surface area of chunk.

17. Compare the properties of acids and bases:

Property

pH range

does it react with metal? gas produced?

colour with red or blue litmus

colour with phenolphthalein

ion formed

Acids

0-7

yes

blue → red

H⁺

Bases

7-14

no

red → blue

OH⁻

18. Write the general equation that occurs when you mix an acid and base together. What is this called?

Neutralization

19. Complete by referring to the information in the following chart

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

a) the strongest acid is A.J.

b) the strongest base is LB

c) the weakest acid is FA

d) the weakest base is SOAP

e) a neutral substance is D.W.

f) which is stronger: hair remover or soap? HR by how much? 3

g) which is stronger, apple juice or folic acid? AJ by how much? 2

20. Write the general equation that occurs during the combustion of an hydrocarbon..

