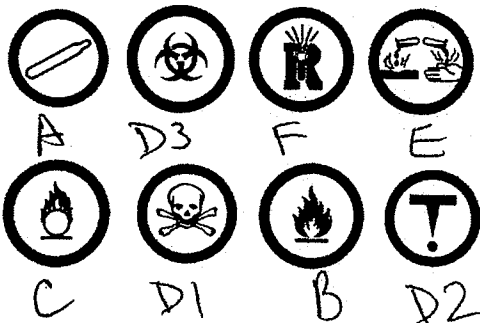


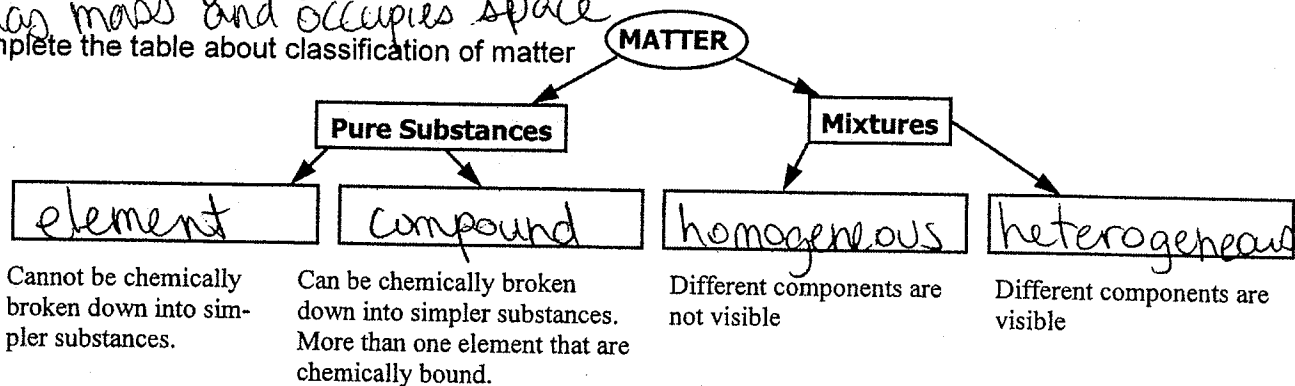
Science 10 – Chemistry Review

1. Match the WHMIS symbols to the names!!



Class A – Compressed Gas
Class B – Flammable and Combustible Material
Class C – Oxidizing Material
Class D – Poisonous and Infectious Material Division 1 Materials Causing Immediate and Serious Toxic Effects
Class D – Poisonous and Infectious Material Division 2 Materials Causing Other Toxic Effects
Class D – Poisonous and Infectious Material Division 3 Biohazardous Infectious Material
Class E – Corrosive Material
Class F – Dangerously Reactive Material

2. Define matter. *Anything that has mass and occupies space*
3. Complete the table about classification of matter



4. Summarize the atomic theories of:

Dalton: *Billiard ball – solid sphere of matter*

Thomson: *Raisin bun – sphere of positive charge with small negative charges embedded*

Rutherford: *Planetary model – small nucleus with electrons orbiting*

Bohr: *Energy levels – electrons travel in orbitals with certain capacities (2, 8, 8, etc)*

5. Compare the masses, charge and atomic location of the three sub-atomic particles,

Protons: *1 amu, +, nucleus*

Neutrons: *1 amu, 0, nucleus*

Electrons: *very light, 1-, orbitals*

6. What does the atomic number of an element represent?

number of protons

7. What is the atomic mass (amu) of an element?

sum of protons and neutrons

8. Complete the table below about atoms:

Element Name	Element symbol	Number of Protons	Number of Neutrons	Number of electrons	Atomic Mass
Nickel-61	^{61}Ni	28	33	28	61
Magnesium-25	^{25}Mg	12	13	12	25
Zinc-64	^{64}Zn	30	34	30	64
Bromine-81	^{81}Br	35	46	35	81

9. What are isotopes of an element? (an example is carbon-12 and carbon-14)

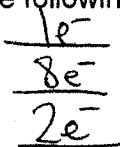
10. Complete the chart below about isotopes

Isotope Name	Atomic Number	Number protons	Number Neutrons	Mass Number	Symbol
1 carbon-13	6	6	7	13	^{13}C
2 oxygen-16	8	8	8	16	^{16}O
3 polonium-212	84	84	128	212	^{212}Po
4 uranium-238	92	92	146	238	^{238}U

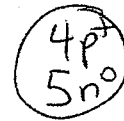
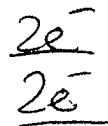
11. Draw energy level diagrams of the following atoms.



hydrogen atom



sodium atom



beryllium atom

12. What are valence electrons?

outermost electrons in an energy level diagram

13. On the periodic table, what is a:

Group (family): columns

Period: rows

14. Where is the location of the following on a periodic table?

Gr 3-12 right of staircase
transition elements, non-metals,

metals, alkali metals, alkaline earth metals, halogens, noble gases, actinide

series Gr 1 Gr 2 Gr 17 Gr 18 elements elements
left of staircase 57-71 89-103

15. What is the empirical definition of a metal?

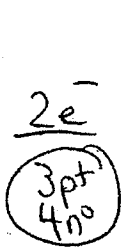
lustrous, malleable, ductile, conducts electricity

16. An ion is a n atom which gained or lost e^- to fill a valence orbital

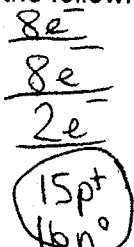
A cation has a + charge because it has lost gained electrons. It is usually a metal/non-metal.

A anion has a - charge because it has lost/gained electrons. It is usually a metal/non-metal.

17. Draw electron energy drawings for the following ions.



lithium ion



phosphide ion

18. Complete the table below.

i, m or a	Chemical Formula	Name of Compound	i, m or a	Chemical Formula	Name of Compound
i	Al ₂ O _{3(s)}	aluminium oxide	m	C ₆ H ₁₂ O _{6(s)}	glucose
a	H ₂ S _(aq)	hydrosulfuric acid	a	HClO _{3(aq)}	chloric acid
i	NiBr _{2(s)}	nickel (II) bromide	i	Pb(SO ₄) _{2(s)}	lead (IV) sulfate
m	B ₂ H ₅	diboron pentahydride	m	P ₆ O ₈	hexaphosphorus octaoxide
i	Sb ₂ S _{3(s)}	antimony (III) sulfide	i	Hg ₃ N _(s)	mercury (I) nitride
a	H ₂ SO _{4(aq)}	sulfuric acid	a	H ₃ PO _{4(aq)}	aqueous hydrogen phosphate
i	Cu ₂ SO _{3(s)}	copper (I) sulfite	i	Ca(OH) _{2(s)}	calcium hydroxide
m	H ₂ O _{2(l)}	hydrogen peroxide	m	CH _{4(g)}	methane
i	Mg ₃ PO _{4(s)}	magnesium phosphate	i	Mg ₃ (PO ₄) _{2(s)}	magnesium phosphate

19. How can you distinguish between an ionic compound, a molecular compound, an acid and a base in the lab?

use a litmus test and a conductivity test
(see below for results)

20. Complete the table below

Type of solution	State of matter when pure	Solubility	Conductivity of solution	Blue litmus paper	Red litmus paper	pH
Acid (eg. HCl)	aq	high	high	red	no change	low
Base (eg. NaOH)	s	usually high	high	no change	blue	high
Neutral ionic (eg. NaCl)	s	according to table	high	no change	no change	7
Neutral molecular (C ₆ H ₁₂ O ₆)	variable	usually low	none	no change	no change	7

21. List 4 properties of acids and bases

form conductive solutions

corrosive

affect litmus (acid → red, base → blue)

taste (acid → sour, base → bitter)

22. List four kinds of evidence of a chemical reaction.

state change energy change
 colour change light

23. Differentiate between an exothermic and an endothermic reaction.

exothermic - energy lost to surroundings, feels hot
 endothermic - energy gained from surroundings, feels cool

24. When 2 solutions were combined in a test tube, the test tube got very cold. Is this evidence of an exothermic reaction or an endothermic reaction?

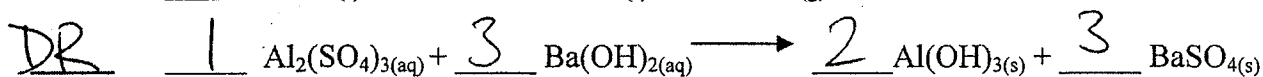
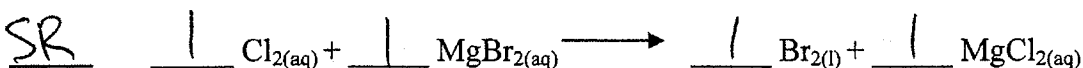
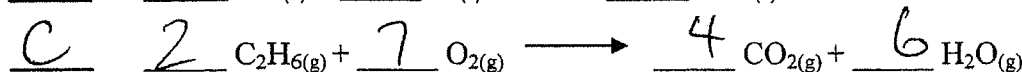
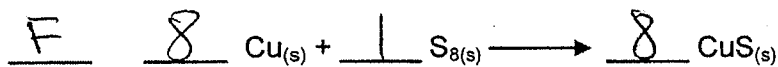
endothermic

25. Do the following ionic compounds have high or low solubility?

KS	high	FeSO ₃	low	CuCl	low	Pb(SO ₄) ₂	high
NiCl ₂	high	NaNO ₃	high	CuCl ₂	high	PbSO ₄	low

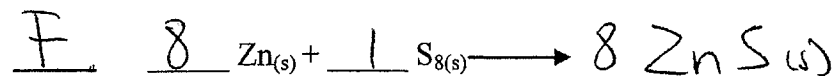
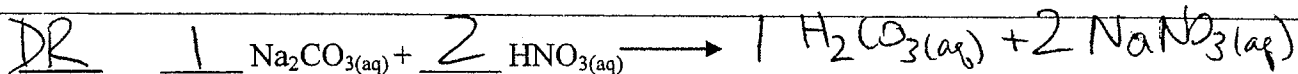
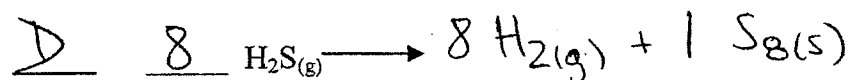
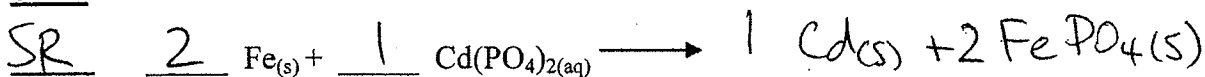
26. Name the type of reaction and balance:

TYPE



→ 27. Name the type of reaction and predict the products of the following reactions

TYPE



DON'T FORGET STATES OF MATTER!!!!

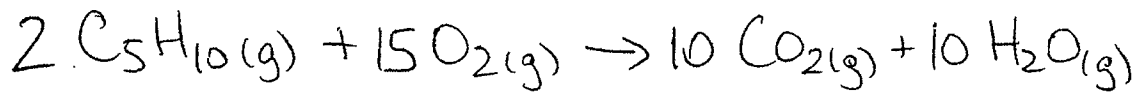
If there is no aqueous solution in the reactants, there cannot be an aqueous solution in the products! If there is an aqueous solution in the reactants you might have to check for solubility of the products to determine state of matter.

28. Name the type of reaction and write the chemical equation for the reaction.

TYPE

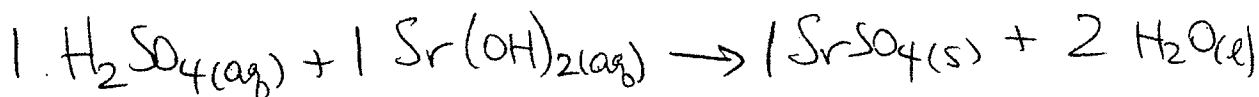
C

Pentane (C_5H_{10}) burns completely in air.



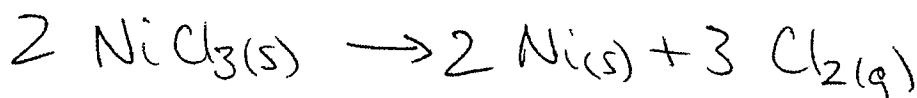
DR

Sulfuric acid reacts with strontium hydroxide in solution.



D

Nickel (III) chloride decomposes into its elements.



29. Calculate the molar mass of the following compounds

a. CuCl 99.00 g/mol

b. As_2S_3 246.05 g/mol

c. NaOH 40.00 g/mol

d. $(NH_4)_2CO_3$ 96.11 g/mol

d. Cesium bromide 212.81 g/mol

e. Aluminum sulphate 317.19 g/mol

30. How many molecules of glucose are in 3 moles of glucose?

$$3 \times 6.02 \times 10^{23} = 18.06 \times 10^{23} \text{ molecules}$$

31. How many moles are in 34.2g of sulphur?

$$M = 256.56 \quad n = 0.133 \text{ mol}$$

32. What is the mass of 1.2 moles of calcium chloride?

$$M = 110.98 \text{ g/mol} \quad m = 1.3 \times 10^2 \text{ g}$$

33. How many moles are in 185.63g of $BaSO_3$?

$$M = 217.40 \text{ g/mol} \quad n = 0.85386 \text{ mol}$$

34. A curious science 10 student wanted to know whether or not the cleaning solutions he found in his bathroom were acidic, basic or neutral. She took samples of each solution into her science classroom and performed the tests described below. She also performed the tests using deionized water.

1. Each solution was tested for electrical conductivity using a conductivity meter.
2. Red and blue litmus paper were dipped into each sample.
3. Three drops of phenolphthalein was added to a sample of each solution and any colour change was recorded.

a. What is the manipulated (independent) variable in the experiment?

Solution tested.

b. What is the responding (dependent) variable in the experiment?

results of testing conductivity, litmus, phenolphthalein

c. Why was water included in the experiment?

Control

Formula	Name
$H_2O_{(l)}$	water
$H_2O_{2(l)}$	hydrogen peroxide
$C_6H_{12}O_{6(s)}$	glucose
$C_{12}H_{22}O_{11(s)}$	sucrose
$O_{3(g)}$	ozone
$NH_{3(g)}$	ammonia
$CH_4_{(g)}$	methane
$C_3H_8_{(g)}$	propane
$C_8H_{18_{(g)}}$	octane
$CH_3OH_{(l)}$	methanol
$C_2H_5OH_{(l)}$	ethanol
$CH_3COOH_{(aq)}$	acetic acid

Molecular Elements or Polyatomic elements

These are elements that are found naturally as molecular compounds of *more than one atom of the same element*. They are not commonly found as individual atoms of the elements.

$H_{2(g)}$, $F_{2(g)}$, $Cl_{2(g)}$, $Br_{2(l)}$, $I_{2(s)}$, $At_{2(s)}$, $O_{2(g)}$, $N_{2(g)}$, $P_{4(s)}$, $S_{8(s)}$.

These are on the periodic table in your data book