

Matter:

1. Define the term "matter".

-anything with mass and volume

2. Differentiate between an atom, ion and molecule (hint, use their definitions).

- atom: smallest particle of an element that still has the chemical properties of the element; neutral \rightarrow protons = electrons
- ion: atom or group of atoms that has gained or lost electrons to form a negative or positive charge
- molecule: neutral group of atoms connected by covalent bonds

Mixtures vs. Pure Substances:

1. Match each separation technique with its appropriate description.

<u>Technique</u>	<u>Description</u>
<u>D</u> centrifugation	A. components of a mixture separate into layers on their own
<u>G</u> chromatography	B. solid component of the mixture becomes trapped in a screen, allowing the liquid component to pass through
<u>F</u> crystallization	C. oil, detergent, or some other chemical is added to a mixture, air is forced through the mixture as a means of stirring, and the desired component is skimmed off the top
<u>E</u> distillation	D. mixture is spun at high speeds creating a force which pulls heavier solid particles towards the bottom of the container
<u>H</u> electrolysis	E. the mixture is heated until a liquid component reaches its boiling point and is evaporated, leaving the other component behind
<u>B</u> filtration	F. the mixture is concentrated and cooled until the solid component slowly forms at the bottom of the container
<u>C</u> floatation	G. the mixture is applied to a solid support and separated into its components by a solvent which carries the various components up the solid support at different rates
<u>A</u> settling	H. a process in which an electric current is applied to a sample, decomposing the sample into its component elements

2. State three things that distinguish a pure substance from a mixture (consider nature, properties)

Pure Substances	Mixture
- only one type of compound	- more than one type of compound present
- cannot be separated physically	- can be separated physically
- unique set of chemical + physical properties	- chemical + physical properties change based on proportions of components

3. Describe what a MECHANICAL MIXTURE is (its nature and properties), provide an example, and state the separation method that should be used to isolate its component parts.

- a heterogeneous mixture (can tell there is more than one component) because there is more than one phase present

- separate using mechanical separation (physically pick apart or use magnets)

4. How is it possible to determine whether a pure substance is an element or a compound?

Provide an example of an element and a compound.

- a compound can be separated by chemical means (electrolysis), elements cannot be separated

- examples will vary

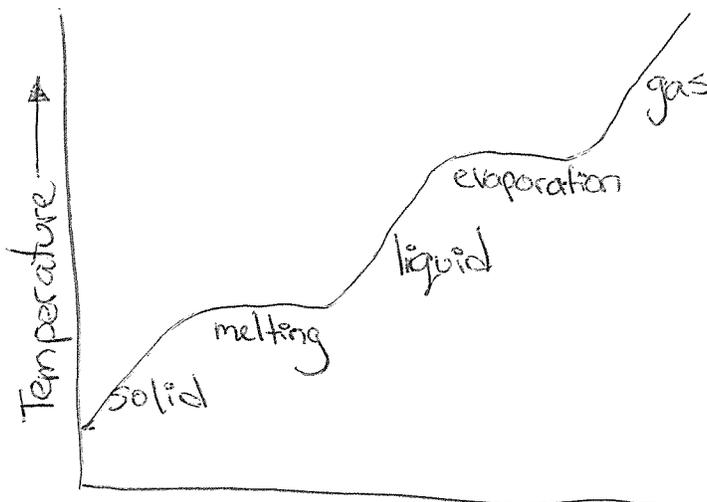
5. How can you determine whether a material is "homogeneous" or "heterogeneous"?

- visual inspection

- homogeneous is the same throughout (no visible difference)

- heterogeneous is different in composition (visible difference)

6. Sketch the phase diagram that would be produced when solid nitrogen is heated. Label all states and phase changes.



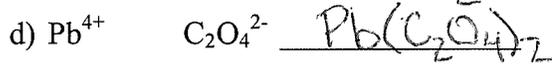
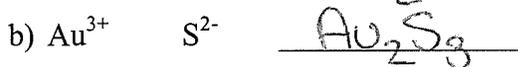
Ionic Compounds:

1) Compare the following properties of both IONIC and MOLECULAR compounds:

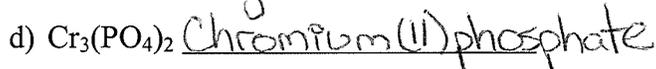
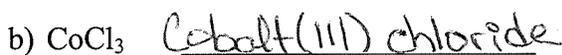
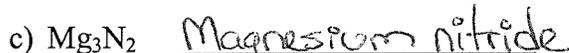
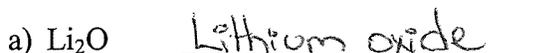
- Component elements (metal vs nonmetal)
- Type of chemical bonding (ionic vs covalent)
- Most likely states at room temperature (solid, liquid, gas)
- General trend in melting point temperatures
- General trend in electrical conductivity

Ionic	Molecular (Covalent)
- metal - non-metal	- non-metal - non-metal
- ionic	- covalent
- usually solid (due to strong bonding)	- gases or liquids usually
- high melting point	- melting points usually low
- conduct electricity in water / in molten form	- don't conduct electricity

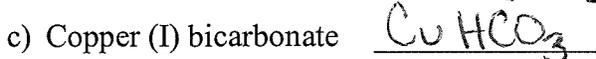
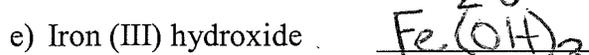
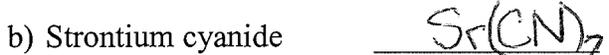
2) Write the chemical formulae resulting from the combination of the following ions.



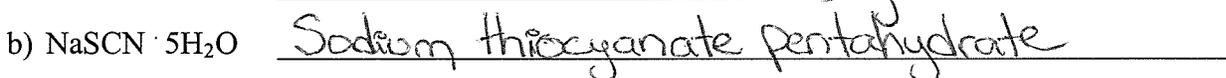
3) Write the correct name for each of the following ionic compounds.



4) Write the correct formula for each of the following ionic compounds.



5) Write the correct name for each of the following ionic hydrates.



Acids and Bases:

1. State three properties of acids and three properties of bases. (you might need your textbook)

Acids	Bases
- dissolve in water to form "H ⁺ " ions	- form "OH ⁻ " ions
- sour/tart taste	- bitter taste
- sting on skin	- feel slippery on skin
- react with most metals	- don't react with most metals
- conduct electricity	- conducts electricity

2. Write the correct names for the following bases.

a. Ca(OH)₂ Calcium hydroxide b. LiOH Lithium hydroxide

3. Provide the missing formula or name for the following simple (binary) acids.

a. Hydrofluoric acid HF c. H₂S_(aq) Hydrosulphuric acid
b. Hydrobromic acid HBr d. HI_(aq) Hydroiodic acid

4. Provide the missing formula or name for the following complex acids.

a. Chromic acid H₂CrO₄ d. H₂CO_{3(aq)} Carbonic acid
b. Sulphurous acid H₂SO₃ e. H₃PO_{4(aq)} Phosphoric acid
c. Hypochlorous acid HClO f. HNO_{2(aq)} Nitrous acid

Molecular Compounds:

1. Write the correct name for each of the following molecular compounds.

a. NF₃ Nitrogen trifluoride d. N₂O₄ Dinitrogen tetroxide
b. CO₂ Carbon dioxide e. SCl₆ Sulphur hexachloride
c. P₂O₅ Diphosphorus pentoxide f. N₂O Dinitrogen monoxide

2. Write the correct formula for each of the following molecular compounds.

a. Silicon disulphide SiS₂ d. Triarsenic pentabromide As₃Br₅
b. Carbon tetrachloride CCl₄ e. Dicarbon hexahydride C₂H₆
c. Oxygen gas O₂ f. Iodine heptachloride ICl₇

Mixed Naming:

- 1) Provide the correct name for each of the following compounds.

a) CsBr Cesium bromide c) H₂SO₄ Sulphuric acid
b) ICl Iodine monochloride d) Cu(NO₃)₂ Copper(II) nitrate