

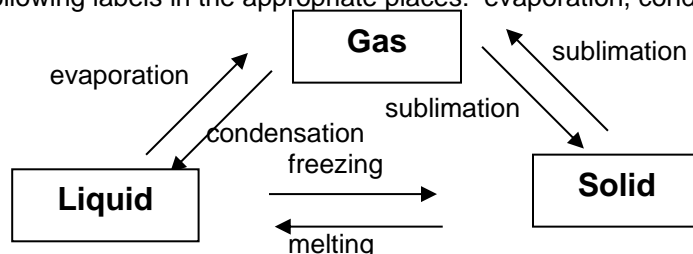
GRADE 10 CHEMISTRY REVIEW ANSWERS

Chemistry & Matter

1. What is chemistry? *The study of matter and the changes it undergoes.*

2. **Matter** is anything that **has mass** and **occupies space**. Matter can exist in any one of three states: **solid (s), liquid (l) and gas (g)**.

Add the following labels in the appropriate places: evaporation, condensation, melting, freezing, sublimation.



Particle Theory of Matter

1. All matter is made up of tiny **particles**.
2. All particles of a pure substance are **identical**.
3. The space between particles is **large** compared to the sizes of the particles themselves.
4. Particles of matter are always **moving**.
5. There are forces of **attraction** that exist between particles.

Describing and Classifying Matter

1. Distinguish between a physical change and chemical change.

Physical change- change that affects the physical appearance but not its composition (change of state, form, dissolving)

Chemical change-occurs when a new substance with new physical and chemical properties are formed. Clues that a chemical change occurred are: new colour, gas formed, precipitate, or heat/light is given off or heat is absorbed.

2. Classify each situation as either a physical change or a chemical change. Explain your reasoning.

- a. Rose bush from a seed that you have planted and nourished – Chemical change
- b. A green coating forms on a copper statue when the statue is exposed to air – Chemical change
- c. Your sweat evaporates to help balance your body temperature – Physical change
- d. Frost forms on the inside of a freezer – Physical change
- e. Salt is added to clear chicken broth – Physical change
- f. Your body breaks down food you eat to provide energy for your body's cells. – Chemical change
- g. Juice crystals dissolve in water – Physical change
- h. An ice-cream cone melts on a hot day – Physical change

3. What physical property is described by each of the following statements?

(Use one of the following words: malleability, boiling point, melting point, hardness, conductivity, ductility, density, viscosity)

- a. Ice melts at 0°C. – Melting point
- b. Diamond can scratch glass. - Hardness
- c. Copper wire is used for electrical circuitry in homes. – Conductivity
- d. One millilitre of water has a mass of one gram – Density
- e. Copper metal can be stretched into wires. - Ductility
- f. Pancake syrup flows slower than water. – Viscosity
- g. Aluminum can be hammered into thin sheets. - Malleability

4. Identify each property as either **physical (P)** or **chemical (C)**.

- Chemical** Hydrogen gas is extremely flammable.
- Physical** The boiling point of ethanol is 78.5°C.
- Physical** Chlorine gas is pale green in colour.
- Chemical** Sodium metal reacts violently with water.

5. (a) Distinguish between the two terms in each of the following pairs of terms. Provide examples where possible. (**use lined paper**)

- atomic number-number of protons in an element
mass number-number of protons + neutrons
- metal – good conductor, shiny, malleable, usually solid, generally grey in colour
nonmetal – good insulator, dull, brittle, various states, various colours
- qualitative property – described using words.
quantitative property – described using numbers.
- pure substance – contains only one type of particle (although may have many different elements)
mixture – contains more than one pure substance (more than one type of particle)
- heterogeneous mixture – more than one phase is visible (oil and water)
homogeneous mixture – only one phase is visible (coffee)
- element – pure substance consisting of only one type of atom
compound – pure substance consisting of more than one type of atom
- solute – the substance found in a lesser quantity in a solution
solvent – the substance found in greater quantity in a solution

b) Choose one substance and describe its qualitative and quantitative properties.

For example: Substance: Liquid water

Qualitative: clear colourless, odourless and transparent liquid

Quantitative: boils at 100°C

Substance: Aluminum

Qualitative: Grey, lustrous, malleable, ductile, solid

Quantitative: density 2.7 g/cm³

c) Identify each property as either physical or chemical

- Hydrogen gas is extremely flammable - **chemical**
- The boiling of ethanol is 78.5°C - **physical**
- Chlorine gas is pale green in colour - **physical**
- Sodium metal reacts violently with water - **chemical**

6. (a) Look carefully at the diagrams on page 3 of your textbooks. Decide whether each diagram represents an element, a compound, or a mixture. If the diagram represents a mixture, state how many elements and how many compounds are present in the mixture. Note that each different circle represents a different atom.

- Pure substance, one type of element
- Pure substance, compound, two elements
- Pure substance, compound, two elements
- Mixture, 2 elements (no compounds)
- Mixture, 2 elements (no compounds)
- Mixture, 3 molecules, 1 compound and 2 elements
- Mixture, 3 molecules, 2 compounds and 1 element

h. Mixture, 2 molecules, 1 compounds and 1 element

b) List one mixture that you use frequently.

- i) Explain how you know that each is a mixture
Coffee – contains a mixture of water, coffee particles, milk and sugar. Particles could be separated.
- ii) Classify the mixture as either heterogeneous or homogeneous
Homogeneous – there is only one phase visible.

(c) List one pure substance that you use frequently.

- i) Explain how you know that each is a pure substance
Sugar – all of the particles are the same
- ii) Try to classify the substance as an element or a compound. Explain your reasoning.
Compound – consists of carbon, hydrogen and oxygen

7. Complete the following table. **Subatomic Particles**

Particle	Relative mass	Relative charge	Location within atom
proton	1u	+1	inside nucleus
electron	0u	-1	outside nucleus
neutron	1u	No charge	inside nucleus

8. Using the periodic table at the back of your textbook, list the elements that belong to each of the following groups in the periodic table:

- (a) halogens (Group VIIA or 17) F, Cl, I, Br
- (b) alkali metals (Group IA or 1) Li, Na, K, Rb
- (c) noble gases (Group VIIIA or 18) He, Ne, Ar, Zn
- (d) alkaline earth metals (Group IIA or 2) Be, Mg, Ca

9. Each of the following chemical formulae represents a compound. Describe the composition of each molecule. (i.e., name the element and state the number of atoms found in each).

a) $\text{HNO}_{3(\text{aq})}$ e.g., Name: **Nitric acid**

Atom	
Hydrogen	1 atom
Nitrogen	1 atom
Oxygen	3 atoms
Total # of atoms	5 atoms

b) $\text{C}_6\text{H}_{12}\text{O}_{6(\text{s})}$

Atom	
Carbon	6
Hydrogen	12
Oxygen	6
Total # of atoms	24

c) $(\text{NH}_4)_3\text{PO}_4$

Atom	
Nitrogen	3
Hydrogen	12
Phosphorus	1
Oxygen	4
Total # of atoms	20

d) NH_3

Atom	
Nitrogen	1
Hydrogen	3
Total # of atoms	4