

Diagnostic Assessment: CHEMISTRY UNIT

Answer the following questions to the best of your ability based on concepts you learned in Grade 9 Science.

1. List the 5 statements for the PARTICLE THEORY OF MATTER in your own words.

- a) All matter is made up of tiny particles that have empty spaces between them
- b) Different substances are made up of different kinds of particles
- c) Particles are in constant random motion
- d) The particles of a substance move faster as its Temperature ↑
- e) Particles attract each other

2. Use the particle theory of matter to complete the following chart to explain STATES OF MATTER.

	SOLID	LIQUID	GAS
Energy of particles	least	some	greatest amount
Motion of particles	small vibration	loosely connected collide/move/slide past each other	move freely collide frequently
Force of attraction between particles	high	medium	very little
Volume	fixed	definite volume	no definite volume
Shape	fixed	take shape of container	no definite shape
Compression	incompressible	compressible to a small extent	can be compressed

3. Write definitions for the following and give examples for each.

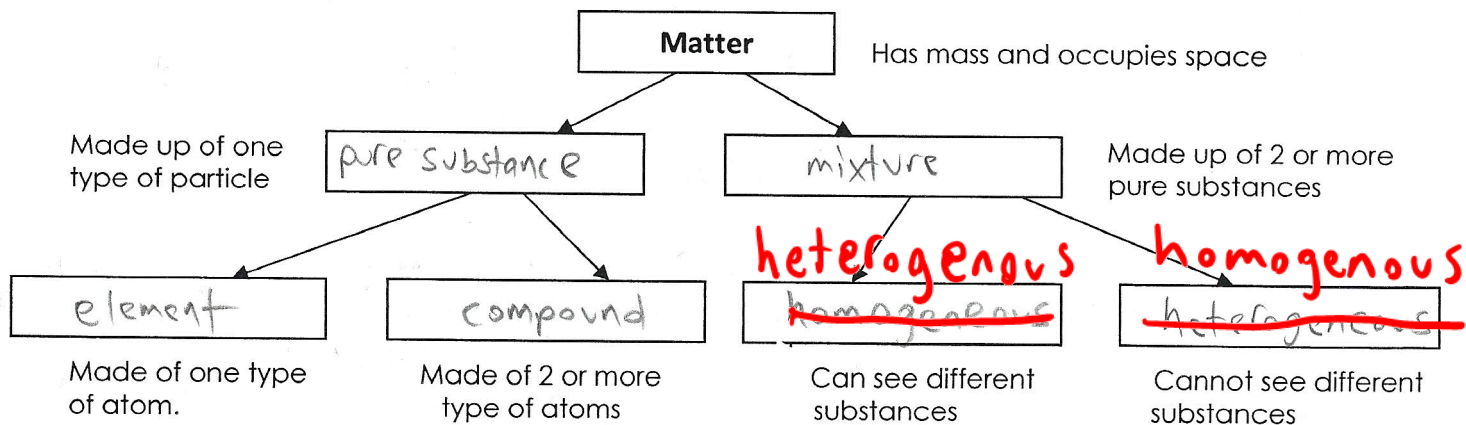
	Definition	Examples
a) QUALITATIVE PHYSICAL PROPERTY	property that is not measured and does not have a numerical value	colour odour texture
b) QUANTITATIVE PHYSICAL PROPERTY	property that is measured and has a numerical value	temperature height mass
c) CHEMICAL PROPERTY	characteristic that is determined when the composition of the substance is changed and one or more new substances are produced	fireworks 2 substances react to produce new substances

4. Complete the following concept map to show the CLASSIFICATION OF MATTER. Use the following key:

- COMPOUND
- ELEMENT

- HETEROGENEOUS
- HOMOGENEOUS
- MIXTURE

- PURE SUBSTANCE



5. Indicate which test is used to test for each of the following gases, and the expected result.

Gas	Test Used	Expected Result
HYDROGEN	burning splint	"pop" sound
WATER VAPOUR	cobalt chloride paper test	blue → pink
CARBON DIOXIDE	lime water test	milky white solution
OXYGEN	glowing splint test	bursts into flame

#6-8 are related to the organization of the periodic table.

6. Define the following, and indicate what information is given by each.

Term	Definition	Information
PERIOD	row on the periodic table	# 1 to 7
GROUP	elements with similar physical & chemical properties	18 different groups

7. Indicate where each CHEMICAL FAMILY is located in the periodic table, and give one property for each.

Chemical Family	Location	Property
ALKALI METALS	group 1 ↓	shiny, silvery, & soft, but highly reactive, low densities (float on water)
ALKALINE EARTH METALS	group 2 ↓	shiny, silvery, not as soft or reactive as alkali metals, burn with bright colourful flames
HALOGENS	group 17 ↓	very reactive, form compounds with alkali metals, poisonous
NOBLE GASES	group 18 (last column) ↓	stable nature or unreactive colourless, odourless, and tasteless, glow brightly when an electrical current is passed through them

8. Indicate where the METALS, NON-METALS, METALLOIDS are located in the periodic table, and give 3 property for each.

Chemical Family	Location	Properties
METALS	left and central parts of the periodic table	element that is lustrous, malleable, and ductile, and conducts heat & electricity
NON-METALS	upper right portion (bold line that resembles a downward staircase starting at boron separates metals & non)	element usually a gas or a dull powdery solid that does not conduct heat or electricity
METALLOIDS	located along the staircase line	element that has properties of both metals & non-metals

9. Complete the following chart for ATOMIC MODELS.

Name of Scientist	Name of Atomic Model	Main Contributions
THOMSON	"plum pudding" - electrons resemble raisins in plum pudding	<ul style="list-style-type: none"> atoms contain \ominus electrons atoms are neutral, rest is \oplus charged \ominus electrons evenly distributed throughout
RUTHERFORD	Rutherford's revised model using gold foil experiment	<ul style="list-style-type: none"> centre of the atom has a \oplus charge nucleus surrounded by a cloud of \ominus charge most of the atom is empty space
BOHR	Bohr-Rutherford model	<ul style="list-style-type: none"> electrons orbit the nucleus of the atom each electron has a definite amount of energy Further the electron, greater its energy jump to and from different orbits each orbit can hold a max # of electrons (2, 8, 8)

10. Complete the following chart.

of protons & neutrons

atomic # = # of protons

protons = # electrons

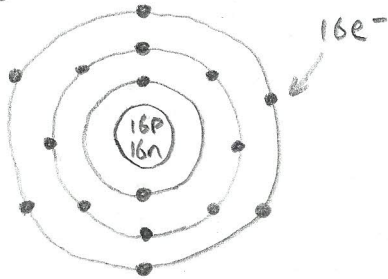
mass # - atomic #

Element Symbol	Mass Number	Atomic Number	Number of Protons	Number of Electrons	Number of Neutrons
Si	28.09	14	14	14	14
F	19.00	9	9	9	10
Br	79.90	35	35	35	45
Cu	63.55	29	29	29	35

11. Draw Bohr-Rutherford diagrams for the following atoms.

mass # → 32 S
atomic # → 16

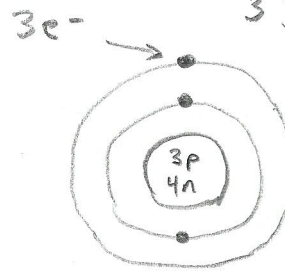
SULFUR



LITHIUM

mass #

atomic #



12. State the type of atoms and the number of each type of atom present in the following molecules. Indicate the total number of atoms.

2 C ₃ H ₅ O		Al ₂ (SO ₄) ₃	
Name of element	Number of atoms	Name of element	Number of atoms
Carbon	2 × 3 = 6	Aluminum	2
Hydrogen	2 × 5 = 10	Sulfur	3 × 1 = 3
Oxygen	2 × 1 = 2	Oxygen	4 × 3 = 12
Total number of atoms	18	Total number of atoms	17

13. Complete the following chart.

+/- charge

2 or more different elements

Substance	Element or Compound	Ionic, Atomic or Molecular
H ₂ O	compound	molecular compound
N ₂	element	molecular element
2+ MgCO ₃ 2-	compound	ionic
Cu	element	Atomic

metal non-metal