

Key

Science 9: Matter and Chemical Change Review

1. Identify or illustrate the following W.H.M.I.S symbols.



Corrosive



Toxic



Flammable



Compressed Gas



Poisonous :
infectious causing
immediate : serious toxic effects.



Reactive

Combustible

2. Identify the five main points in the particle model of matter.

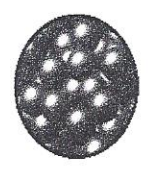
1. all matter is made up of extremely small particles
2. Each pure substance has its own kind of particle, different from the particles of other pure substances.
3. Particles are always moving.
4. Particles at a higher temperature move faster on average than particles at a lower temperature.

3. Identify each state of matter and describe the action of the particles in that state.



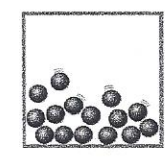
Solid

- Particles are tightly packed and vibrate in place.



Liquid

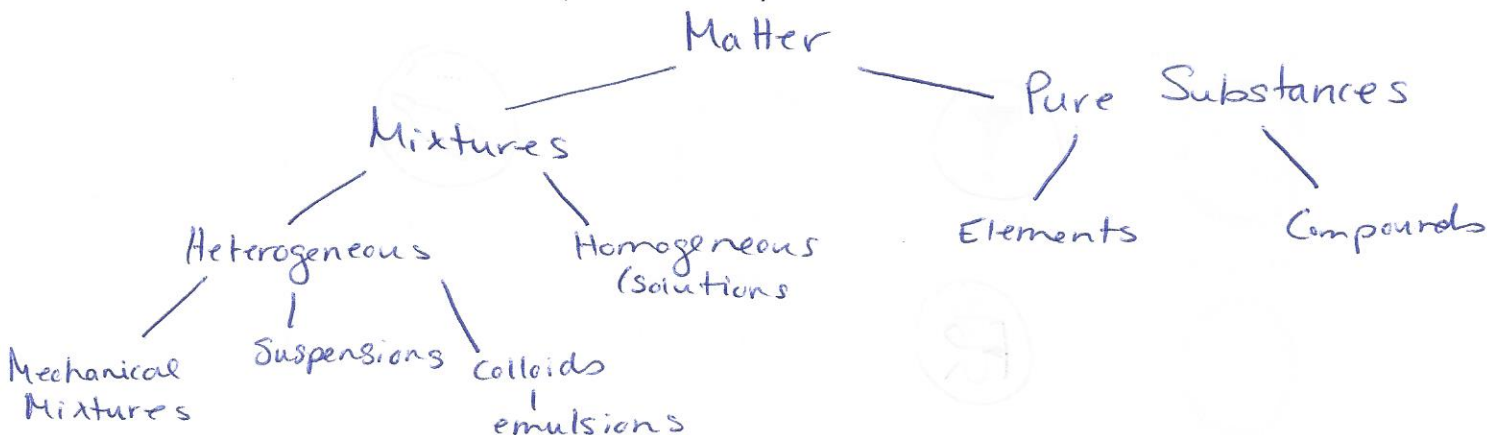
- Particles are somewhat loosely packed. They vibrate and collide.



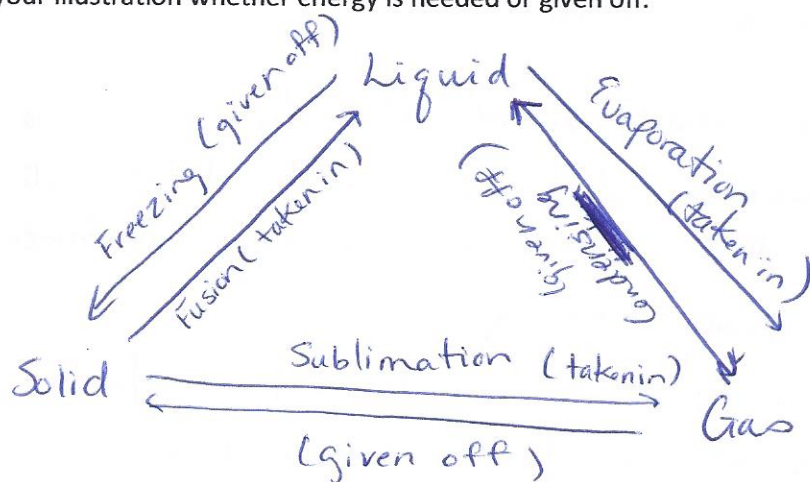
Gas

- Particles are very loosely packed. They are constantly vibrating & colliding.

4. How is matter classified? (Use a flow chart)



5. Using a triangle relationship illustrate what happens when matter changes state and identify in your illustration whether energy is needed or given off.



6. What happens during a physical change?

A change of state/phase occurs.

7. What happens during a chemical change?

A new substance with new chemical properties is formed.

8. What are the clues that describe a change as being chemical?

Heat is produced/absorbed.

Starting material is used up.

Colour change

New material is formed.

Gas bubbles

Precipitate

Change is difficult to reverse.

* 2 or more.

9. Give a physical property and a chemical property for each example of matter.

Matter	Physical Property	Chemical Property
Gold	Malleable	Relatively Stable
Iron	Melts at high temperatures	Reacts with oxygen
Water	Melts at 0°C.	Reacts with acids & bases.
Hydrogen	Gas at Room Temp.	Combustible

10. What are the four original elements?

Fire, Water, Earth, Air

11. Explain what the Law of Conservation of Mass describes.

The total mass of the products is always the same as the total mass of the reactants.

12. Explain what the Law of Definite Composition describes.

Compounds are pure substances that contain two or more elements combined together in definite (fixed) proportions.

13. What is Dalton's Atomic theory as it applies to matter?

- All matter is made up of small particles called atoms.
- Atoms cannot be created, destroyed or divided into smaller particles.
- All atoms of the same element are identical in mass and size.
- Compounds are created when atoms of different elements combine in definite proportions.

14. Put all the models of the atom in chronological order including the name of the scientist who is responsible for each model?

Dalton Atomic Theory → Thomson's Raisin Bun → Rutherford's Planetary Model → Bohr's Atomic Model → Electron Cloud Model.

15. Describe each Chemical Family and explain how it is represented in the Periodic Table.

Chemical Family	Description	Table Representation
Transition Metals	Metals that have fewer metallic properties going right.	Close to staircase line.
Other Metals	Good conductor of heat & electricity	Left of staircase line.
Metalloids	In between metals & non-metals.	B, Si, Ge, As, Sb, Te, Po, At
Non - Metals	Can be solid, liq., gas.	Right side of staircase line.
Rare Earth Metals	Elements present in the Earth's crust.	(57 - 71)
Alkali Metals	Very Reactive	Far left column
Alkaline Earth Metals	fairly Reactive	2 nd from left column.
Noble Gases	Unreactive	Far right column
Halogens	Very Reactive / Corrosive	F, Cl, Br, I, At

16. What system did Medeleev use to organize the elements?

By increasing atomic mass.

17. Explain what each of the following tells us about an element

Atomic Number

number of protons in an element's nucleus.

Mass Number

number of protons and neutrons

Atomic Symbol ^{universal} ~~2~~ letter or letter combination used to represent an element.

Atomic Mass average mass of an atom of an element.

18. How many elements are known? What are the Horizontal rows called? How are they numbered?

Horizontal rows are periods. They are numbered as the top row being 1, then increasing going downwards.

1 → 4 →
2 → 5 →
3 → etc.

19. Explain the difference between organic and inorganic compounds.

Organic compounds contain carbon in their chemical makeup.
Inorganic compounds do not contain carbon or hydrogen atoms.

20. Write the chemical formulas as determined by the name of the compound.

Aluminum oxide $Al_2O_3 (s)$

Calcium nitrite $Ca(NO_2)_2 (s)$

Sodium chloride $NaCl (s)$

21. Write the name of the compound as determined by the chemical formula.

~~NO₂~~ NO_3 nitrogen trioxide

~~C₈H₁₂O₆~~ $C_8H_{12}O_6$ octacarbon dodecahydride heptaoxide

~~C₁₂H₂₂O₁₁~~ $C_{12}H_{22}O_{11}$ Sugar (Table) dodecacarbon hencosa hydride hendeca oxide.

$NaCl$ Sodium chloride

* Know Table Sugar \therefore Glucose $C_6H_{12}O_6$.

22. Compare the properties of molecular and ionic compounds.

Ionic	Molecular
metal : non-metal	non-metal(s)
forms ions	does not form ions
conducts electricity	does not conduct electricity
Solid at room temp	Solid, liquid, gas at room temp.

31. What three things are needed for combustion reactions?

1. Fuel
2. Oxygen
3. Heat

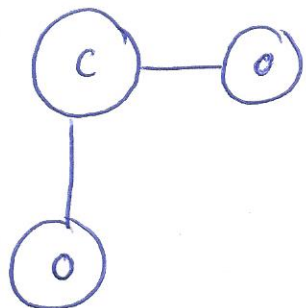
32. List some harmful by-products of combustion.

Smoke, Ash, Heat, Soot, CO, CO₂, sulfur oxides, nitrogen oxides.

33. Illustrate a molecular model and an ionic model.

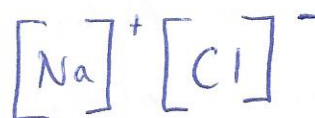
Molecular

Carbon dioxide



Ionic

Sodium chloride



1. The first part of the paper is devoted to a general discussion of the problem.

2. In the second part we consider the case of a homogeneous medium.

3. The third part is devoted to the case of an inhomogeneous medium. In this case the problem is more complicated and requires a more detailed analysis. We shall therefore consider the case of a medium with a constant refractive index n and a constant magnetic permeability μ . The wave equation for the vector potential A in this case is given by

$$\nabla^2 A = -\mu j$$
where j is the current density. The general solution of this equation is given by

$$A = \frac{\mu}{4\pi} \int \frac{j(r')}{|r-r'|} dV'$$

4. In the fourth part we consider the case of a medium with a varying refractive index. In this case the wave equation for the vector potential A is given by

$$\nabla^2 A + k^2 A = -\mu j$$
where k is the wave number. The general solution of this equation is given by

5. In the fifth part we consider the case of a medium with a varying magnetic permeability. In this case the wave equation for the vector potential A is given by

23. How are ions formed?

An element gains or loses an electron.

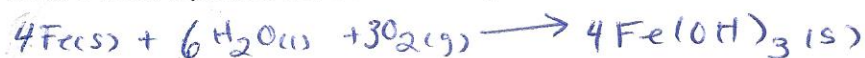
24. What are polyatomic atoms?

a charged ion composed of two or more atoms covalently bonded.

25. What are the four main types of chemical reactions?

Combination / Synthesis $A + B \rightarrow AB$
Decomposition $AB \rightarrow A + B$
Single Replacement $A + BC \rightarrow B + AC$
Double Replacement $AB + CD \rightarrow AD + CB$

26. Write a word equation and a chemical equation for the corrosion of iron.



27. Explain the difference between an Endothermic and Exothermic reaction.

Endothermic is a reaction that requires heat/energy in order to occur. Exothermic is a reaction that releases heat/energy as a product.

28. What are the four main factors that change the speed of a chemical reaction?

1. Change concentration of reactants.
2. " temperature of
3. Stir / Agitate the reactants.
4. Add a catalyst or inhibitor.

29. Explain how a catalyst and an inhibitor work.

Catalysts speed up reactions without taking part in the reaction. Inhibitors are agents that slow or interfere with reactions.

30. Explain galvanization and electroplating.

Galvanization - applying a protective layer of zinc coating to a metal to prevent it from rusting.

Electroplating - Using a current to create a metal coating on an electrode (another metal)