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Table Periodic about Worksheet الملف

[Almanahj Website](#) → [American curriculum](#) → [7th Grade](#) → [Chemistry](#) → [Term 1](#) → [The file](#)

More files for 7th Grade , Subject Chemistry , Term 1

Chemistry Worksheet	1
Worksheet about Acids and bases and solutions	2
Worksheet about Deformations	3
Worksheet about Comparing Acids	4

NAME:

CLASS & SEC:

CHAPTER 1: INTRODUCTION TO CHEMISTRY

Chemistry – the study of composition of matter and the changes the matter undergoes.

5 main branches of Chemistry:

- **Organic chemistry** – the study of things containing carbon
- **Inorganic chemistry** – opposite of organic chem.
- **Biochemistry** – the study of living things.
- **Analytical chemistry** – the study of matter composition.
- **Physical chemistry** – the study of mechanism, rate, and energy.

Important of Chemistry

Did you know?

Chemistry is Life

Chemistry...it is not just for chemists

Take a good look at the thing around you. What do you see?

Think about your personal and school things?

What have you eaten this breakfast?

These and more are products of chemistry.

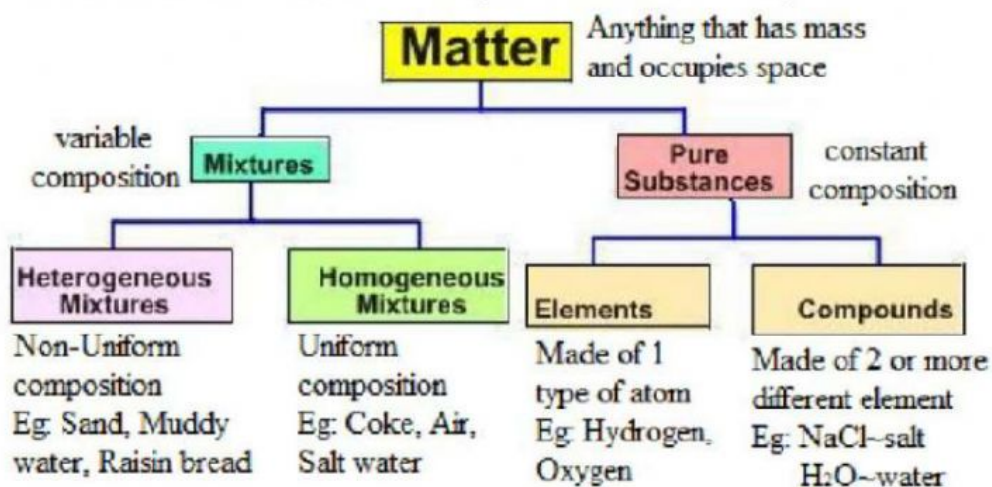
Chemistry is all around us and is involved in everything we need,

Do and interact with in our everyday lives!



Now, can you list the impacts of chemistry in our everyday live?

Basic Fundamental Concepts in Chemistry



Answer each of the questions below.

1. Chemistry is the study of
 - a. living systems
 - b. the stars and planets
 - c. all matter
 - d. reactions in a test tube

2. All of the following are characteristics of matter except
 - a. matter can disappear and reappear
 - b. matter has mass
 - c. matter occupies space
 - d. all things are composed of matter

3. Which of the following is not a chemistry topic?
 - a. the composition of ocean water
 - b. what ocean fish eat
 - c. the height of waves in surf
 - d. what a surf board is made of

4. An analytical chemist is involved with
 - a. studies of what penguins eat
 - b. research to develop new rocket fuels
 - c. the synthesis of new carbon compounds
 - d. measurement of the amount of minerals in cereals

5. Making new compounds for high-speed tires is best done by the
 - a. physical chemist
 - b. organic chemist
 - c. inorganic chemist
 - d. biochemist

6. If you love carbon, which branch of science should you plan on studying?
 - a. physical
 - b. inorganic
 - c. analytical
 - d. organic

7. Which of the following is not matter?
 a. Air
 b. Skin
 c. Water
 d. Energy
8. Which is the best definition of chemistry?
 a. The study of the contents of matter and its chemical properties.
 b. The study of chemical reactions in elements.
 c. The study of the contents of molecules.
 d. The study of ions and atoms
9. Carbon, hydrogen and oxygen are all examples of:
 a. cells
 b. subatomic particles
 c. elements
 d. molecules
10. The basic unit of matter is called a(n):
 a. atom
 b. cell
 c. element
 d. electron

Physical and Chemical Properties

Physical →

- Observed with senses
- Determined without changing matter

See

Gold is shiny



Hear

Metal is sonorous



Feel

Rubber bends



Touch

The ceramic pot is hard



Smell

Acid smells sour



Measure

The temperature is high



Chemical



- Indicates how substance reacts with something else
- Matter will be changed into a new substance after the reaction



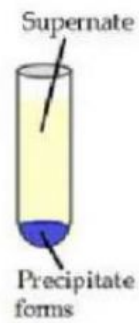
reactivity



Combustibility/flammability



oxidation



Precipitate forms

State whether each of the following is a physical or a chemical property.

Description	Physical/Chemical
1. The sulphur is yellow.	<input type="text"/>
2. Iron reacts with sulphur to give heat and a flame.	<input type="text"/>
3. Baking soda with acid produces bubbles of gas.	<input type="text"/>
4. Metal can be rolled into flat sheets.	<input type="text"/>
5. Oxygen is colorless, odorless and tasteless.	<input type="text"/>
6. Nitrogen dioxide gas has a choking smell.	<input type="text"/>
7. Helium is less dense than air, so a helium balloon floats.	<input type="text"/>
8. Wax candle burns in oxygen	<input type="text"/>
9. An apple rots due to fungi.	<input type="text"/>
10. Mercury metal is a liquid.	<input type="text"/>
11. Iodine gas is purple.	<input type="text"/>
12. Hydrofluoric acid is poisonous.	<input type="text"/>
13. Gold is shiny metal.	<input type="text"/>
14. Cesium is the only other gold-colored metal.	<input type="text"/>
15. Potassium burns with a purple flame to make a white powder.	<input type="text"/>
16. Copper nitrate is a blue crystal.	<input type="text"/>
17. Two colorless solutions mix to give a yellow solid precipitate.	<input type="text"/>
18. Copper can be stretched into a thin wire.	<input type="text"/>
19. Copper metal reacts with nitric acid to make a brown gas.	<input type="text"/>
20. Salt, sodium chloride, is a white crystal that melts at 801°C.	<input type="text"/>

Physical and Chemical Changes



A physical change is a change in a substance that does not change its identity, such as a change in state. Matter can change state when it loses or gains thermal energy. The particles will either speed up or slow down, depending upon if heat is being added or taken away. Freezing, melting and boiling are all examples of changes in state.

A chemical change is a change in which one or more substances combine or break apart to form new substances. Whenever a chemical reaction (or change) occurs, a new substance is ALWAYS formed! Some common examples of chemical changes are rusting, tarnishing, cooking, burning and sugar caramelizing.



Identify which examples are **physical (P)** or **chemical (C)** changes.

1. A pencil breaking in half.

2. Iron turning (oxidizing) into rust.

3. Burning firewood to make carbon and heat.

4. Cutting logs to make firewood.

5. Mining bauxite from the ground.

6. Making aluminum from bauxite.

7. Falling leaves from a tree.

8. Composting leaves into soil.

9. The rain turned to snow.

10. Broke a glass on the bathroom floor.

11. Frying three eggs for breakfast.

12. An important paper caught on fire at the lab.

13. The bread in refrigerator got moldy.

14. Crushing a soda can.

15. Slicing bread.

16. Exploding fireworks.

17. Digesting food.

18. Melting butter.

19. Bending a paper clip.

20. Folding clothes.