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Department of Education
Region IV (A) – CALABARZON
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District I – A



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STUDENT's ACTIVITY SHEET FOR GENERAL CHEMISTRY 1
STUDENT's ACTIVITY SHEET NUMBER 1

Quarter 1 SAS 1

TITLE/LESSON: Matter, Properties of matter and Separation of Components

I: OBJECTIVES: At the end of the lesson the students are expected to;

- Differentiate physical property from chemical property.
- Give examples of physical and chemical property of the element.
- Classify element as metal or non-metal or metalloid.
- Identify property of an element as physical or chemical property.
- Expound what is meant by solution.
- Explicate the meaning of matter.
- Describe various simple separation techniques.

A. Content Standard: The learner demonstrates understanding the different chemical substance and how to separate compounds from each other

B. Performance Standard: The learners shall be able to demonstrate/perform the different separation techniques.

C. Most Essential Learning Competency/ies: Explain the different properties of different substances and how it will react to one another.

II: LEARNING RESOURCES

A. Materials/IMs Needed :

B. References: Chemistry a Modular Approach By Dr Rosefina Piramide-Japson
Chemistry Module By Rufino A. Villamar Jr. pp 5-15

Adapted from Deped Mandaluyong Chemistry Module Ms.

Rowen E. Eclavia et al.

Royal chemistry of society David Paterson

C. Additional Materials and Learning Resources:

III: TIME FRAME: 4 days

IV: INTRODUCTION/RATIONALE-

This Student Activity Sheet (**SAS**) was designed to provide you with fun and meaningful opportunities for guided and independent learning at your own pace and

time. You will be enabled to process the contents of the learning resource while being an active learner.

Likewise, this learning resource hopes to engage you into guided and independent learning activities at your own pace and time. Furthermore, this also aims to help you acquire the needed 21st century skills while taking into consideration you need and circumstances.

This **SAS** will help you explore the key concepts on topics and immersed you in various activities and hands-on tasks that will help you answer the questions pertaining to **Matter, Properties of matter and Separation of Components**.

Pre-test:

I. Identify the following.

1. _____ it is anything that is a mass and occupy space.
2. _____ it is made up of only one type of atom.
3. _____ It is a state of matter where molecules are compact.
4. _____ it is a reaction wherein heat is given off to the surroundings.
5. _____ it is how substance may change to form another substance.

II. Classify the following as physical and chemical property.

1. Melting point _____
2. Corrosiveness _____
3. Flammability _____
4. Density _____
5. Boiling point _____

INTRODUCTION TO THE LESSON

Matter is anything that occupy space and has a mass, the three physical forms, called states, is which is matter occurs are solid, liquid and gas. A solid has both fixed shaped and fixed volume, it does not follow the shape of the container Examples of solids are ice, stone and naphthalene balls. a liquid has fixed volume but has no definite shape; it takes the shape of the portion of the container that is occupies water, alcohol and vinegar are examples of liquids, a gas has no definite shape nor definite volume; it takes the shape and volume of its container. Air, oxygen and smoke are examples of gases.

Classification of matter

Based on its composition, matter is classified as either a pure substance or a mixture. A pure substance is matter having definite composition and distinct properties. A substance is either an element or a compound

An element is a substance that cannot be decomposed into simpler substance, it is composed of one (1) kind of atom, Ex: {oxygen, iron, carbon, tin} while a compound is a substance that is made up of two or more elements, and

thus composed of two or more kinds of atoms Ex: (NaCl, C₁₂H₂₂O₁₁, NaHCO₃, CH₄)

Properties of matter

The usefulness and behavior of matter can be determined by its properties: These properties are group into physical and chemical properties. Physical properties are those properties that can be determined without changing the composition of material. (Texture, color, odor, length, mass, density boiling point and freezing point) EX: Breaking of chalk, Melting of ice. On the other hand, chemical properties are properties that describe how a substance may change to form another substance, for example the ability of iron to form rust and ripening of fruits.

Below are the properties of the element and the corresponding trend.

Write down the property that corresponds to the trend:

Down the group the property increases and decreases across the period.

Down the group the property decreases and increases across the period.

Metallic Property

Density Flammability

Melting point

Malleability

Corrosiveness

KEY CONCEPTS

The periodic table of elements arranges all the known chemical elements in an informative array. Elements are arranged from left to right and from top to bottom in order of increasing atomic number. Order generally coincides with increasing atomic mass. The periodic table is probably the most important tool in chemistry. Among other things, it is very useful for understanding and predicting the properties of the elements. If you know the physical and chemical properties of one element in a group or family, you can make a good guess about physical and chemical properties of the other elements in the same group and perhaps even of the elements in the neighboring groups.

REVIEW

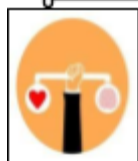
Classify the following as Physical or Chemical Change.

1. Burning of wood: _____
2. Shredding paper: _____
3. Slicing an onion : _____
4. Souring of milk: _____
5. Melting an ice cube: _____

We can measure the melting point of ice by heating a block of ice and recording the temperature at which the ice is converted to water. Water differs from ice only in appearance, not in composition, so this is a physical property;

we can freeze the water to recover the original ice. Therefore, the melting point of a substance is a physical property. Similarly, when we say that helium gas is lighter than air, we are referring to a physical property. On the other hand, the statement “Hydrogen gas burns in oxygen gas to form water” describes a chemical property of hydrogen, because to observe this property we must carry out a chemical change, in this case burning. After the change, the original chemical substance, the hydrogen gas, will have vanished, and all that will be left is a different chemical substance

Activity 1



A. Discover it

Materials: Paper, pencil periodic table and any chemistry book.

Procedure:

1. Make a table with five columns. In the first column list the alkali metals Li, Na, K, Rb and Cs in order. Title the other four columns, as atomic number, melting point, boiling point and density as shown below

Element	Atomic No.	Melting point	Boiling point	Density
Li				
Na				
K				
Rb				
Cs				



(Boiling point and melting points are listed on Chemistry book, periodic table)

2. Make a similar table but list the halogens F, Cl, Br, and I in the first column.
3. Complete each table using the data in the periodic table. You can also get the data from other chemistry book. Include appropriate units.
4. Make a single graph showing melting point and boiling point versus the atomic number.
5. Repeat step 4 for fluorine, chlorine bromine and iodine.

Guide Questions:

1. For the first table, what are the trends in melting point and boiling point as the atomic number increases? _____
2. Are the trends the same or different from the second table? _____
3. What is the general trend in densities of the alkali metals with increasing atomic number? _____
4. What about for the halogens? Explain your answer _____








B. Investigate it

1. Materials: images of the elements, Periodic table

II. Procedure:

- 1. Make a list of 3 or more substances you use or encounter every day that meet your definition of an element.
- 2. Investigate, observe and research on the listed element.
- 3. Record on the similar table below:



Element	Image /Picture	Initial Observation	Conducts electricity	Reacts in vinegar	Metal or Non metal
Aluminum					
Copper					
Iodine					
Sulfur					
Iron					

Guide Questions:



- 1. Which of the elements do you think can conduct electricity?

- 2. Which of the element does not conduct electricity? _____
- 3. Infer the relationship between the position of the element and its property.

- 4. List down examples of Physical property of the element. _____
- 5. List down examples of chemical property of the element. _____



C. Let us do some Reading
The periodic table was constructed after consideration of the physical and chemical properties of the elements. It is possible to predict the properties according to the location of each element. Physical properties are measurable values that describe the physical state of an element whereas chemical properties are qualities of the element evident in a chemical reaction. Moving across the period, from left to right the number generally, elements are solid on the left side of the table and change to liquid and then gas as we move to the

right. There are some exceptions to this rule for example hydrogen is on the left but naturally it is a gas.

Questions:

1. What do you call the property that is measurable?

2. What do you call the property that is evident in chemical reaction? _____
3. In what direction across the periodic table do elements change from solid to gas? _____
4. Complete the sentence " _____ are found at the right side of the periodic table.
5. Complete the sentence "Metals are better conductors of heat and _____ than non-metals.



CHECK YOUR UNDERSTANDING



1. Define the following.

- a. Physical Property _____
- b. Chemical Property _____
- c. Flammability _____
- d. Density _____
- e. Boiling point _____
- f. Melting point _____

MIXTURE

There are three types of mixture:

1. **Solution:** a solution is a homogenous mixture of two substances, Ex: (sugar dissolved in water, soy sauce in vinegar)



2. **Suspension:** a suspension is a heterogenous mixture which particles remain suspended as he can have seen by the naked eye. Ex: (Mud in water, starch in water)

3. **Colloid:** a colloid is a heterogenous mixture in which some particles are too small to be seen by the naked eye but large enough to remain suspended. A colloid appears to be homogenous but when viewed with powerful microscope, some particles can be seen to be suspended. Ex: (jelly, mayonnaise)

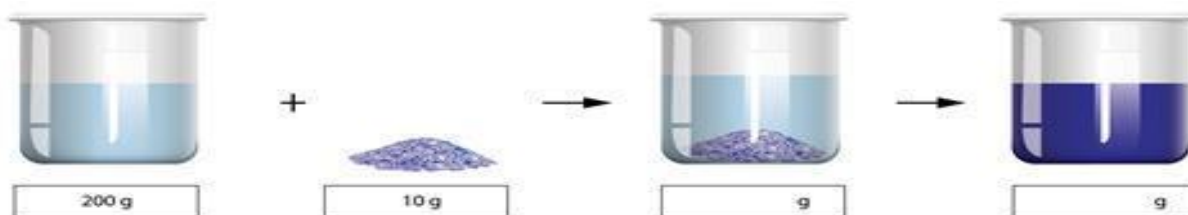
What do students need to know more about mixtures and solutions?

1. Mixtures are materials that contain two or more chemical substances dispersed among each other (mixed together).
2. If no chemical reaction occurs when two materials are mixed, they form a mixture. The chemical properties of the components don't change.
3. Mixtures can be separated by physical methods.
4. There are two general types of mixtures: homogeneous and heterogeneous.
5. Homogeneous mixtures: the particles of the substances are mixed together (there is no clumping of the particles) – eg air.
6. Solutions are homogeneous mixtures: particles of one substance (the solute) are mixed together with the particles of another substance (the solvent) – eg salty water.
7. Heterogeneous mixtures: large aggregations (clumps) of the substances are mixed together – eg emulsions like oil in water.

CHECK YOUR UNDERSTANDING



You have a beaker of water that weighs 200 g. You add 10 g copper sulfate to the beaker of water. Initially, the copper sulfate solid can be seen in the water, but 10 minutes later the solid cannot be seen and the water turns blue.



1. What is the mass of the beaker and its contents when the copper sulfate is first added? _____
2. What is the mass when it has all finally dissolved in the water? Explain your answers. _____

Methods of Separating The components of a mixture

1. **Mechanical separation:** This process involves the use of the hand, magnet, iron filings using magnet.
2. **Filtration:** it is a process of separating solid particles that are suspended in a liquid by pouring the mixture into a filter paper.

3. **Distillation:** it a process of separating components of a mixture based on different boiling point Ex: (purification of alcohol)

4. **Crystallization:** is the solidification of atoms or molecules into a highly structured form called a crystal it is also refer to the solid-liquid separation and purification technique in which mass transfer occurs from to a pure solid crystalline phase.

5. **Sedimentation:** is a process of allowing the solid particles of a mixture to settle at the bottom of the container. Ex: (Tea leaves falling to the bottom of a tea cup).

6. **Decantation:** it is a process of gently pouring out the clear liquid, called supernatant liquid of a mixture into another container

7. **Extraction:** it is a process in which one or more components are separated selectively from a liquid or solid mixture.

V: PROCEDURE/DIRECTIONS/INSTRUCTIONS

Exercises/Activities

- I. Give the methods that can be used to separate the components of the mixture, write the method in their proper order
1. Salt, water and iron filings
 2. Sand and water

- II. Classify each of the following as element, compound or mixture

a. Tungsten	_____	f. Protein	_____
b. Acetic acid	_____	g. Sulfur	_____
c. Milk	_____	h. Phosphorous	_____
d. Glass	_____	i. Lactic acid	_____
e. Soap	_____	j. Beer	_____

- III. Tell whether the property is physical or chemical

a. Hardness	_____	f. Ability of banana to ripen	_____
b. Melting point	_____	g. porosity	_____
c. Flammability	_____	h. Solubility	_____
d. Combustibility	_____	i. Luster	_____
e. Elasticity	_____	j. Ability of water to vaporize	_____

POST TEST



I. Write TRUE if the statement is correct False if it is not correct. Write your answer on the space after the statement.

1. The physical property of the elements becomes more evident during chemical reaction. _____
2. The chemical property is evident when you hammer the element into thin sheets. _____
3. Elements in the periodic table changes from solid to gas across the period. _____
4. Metals are found on the left side of the periodic table. _____

5. Non-metals have high electrical conductivity than metals. _____

II. Identify the following as Chemical Property or Physical Property:

Properties	Physical Property	Chemical Property
1.Malleability		
2.Corrosiveness-		
3. Combustibility		
4. Density		
5. Flammability		

VI: GUIDE QUESTIONS

1. Explicate matter and cite the importance in everyday life.
- 2 Name one product that can be found at home and explain how it is related to chemistry?
3. Give some Human disease and discuss how chemistry has helped in its treatment or prevention.

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