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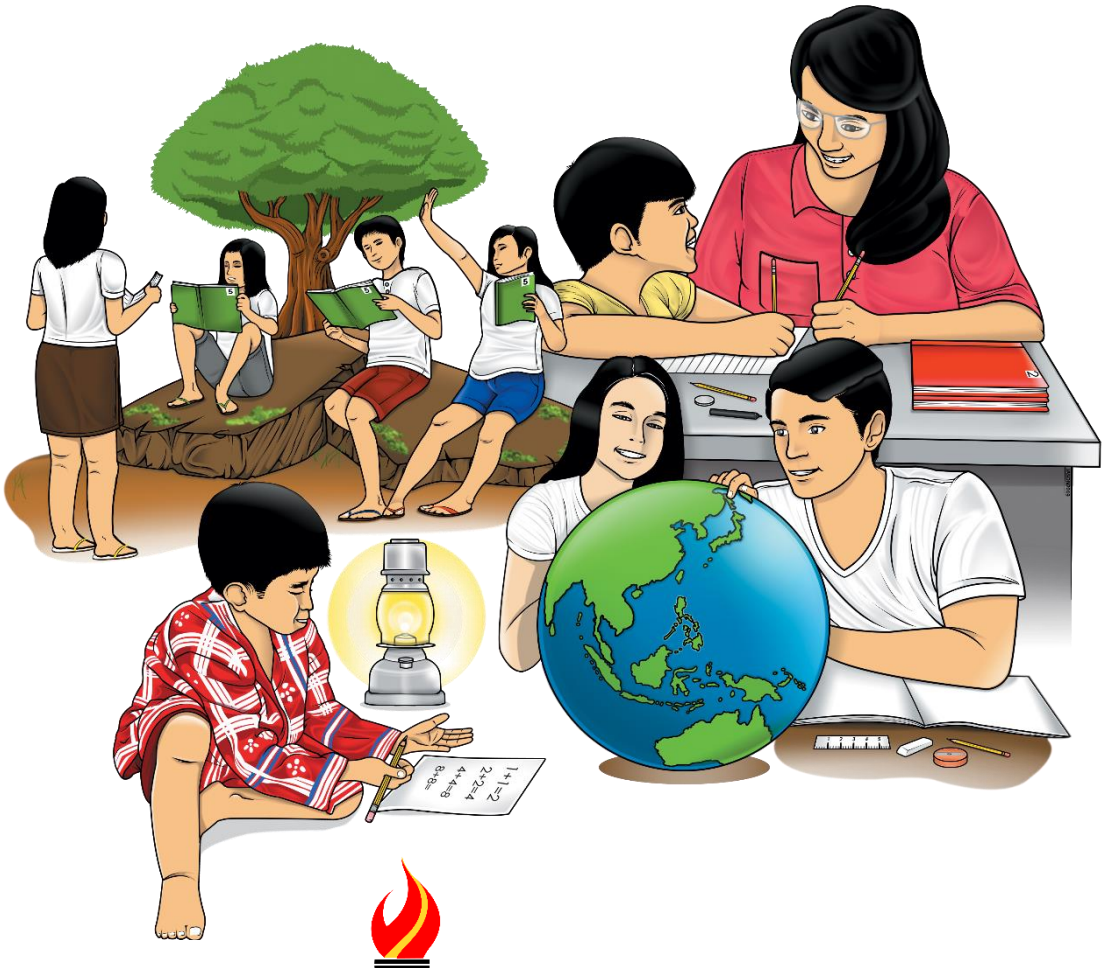
DepED
DEPARTMENT OF EDUCATION

Science

Quarter 1 – Module 2
Lesson 2: Changes in Matter in the Presence or Absence of Oxygen



ALTERNATIVE DELIVERY MODE
ADM

What I Need to Know

My Dear Pupil,

Hi! Do you know that oxygen forms stable chemical bonds with almost all elements to give the corresponding oxide? Oxygen is a very reactive gas. It has the ability to combine with many materials to form oxides but when it combines with a nonmetal, it produces a nonmetallic oxide.

The presence or absence of oxygen has various effects on matter. Among these are combustion and rusting. Changes in matter may happen when oxygen is removed or added to it.

In this module, you will be able to investigate the changes that happen in the materials under the following conditions:

- presence of oxygen
- lack of oxygen

Note: *All the answers should be written on a separate sheet.*

What I Know

Directions: Match the situation in Column A with its scientific basis in Column B.

A	**B**
1. Darkening of eggplant	A. a reaction that occurs when oxygen combines with other substances producing flame and heat
2. Burning of paper	B. color changes observed commonly among vegetables and fruits
3. Decaying garbage	C. a reaction of iron with oxygen present in the air
4. Rusting of iron	D. occurs when there is lack of oxygen in the ponds or bodies of water
5. Fish Kill	E. breakdown of materials due to bacteria and fungus

B. Directions: Supply the statements with the missing word or phrase.

6. Materials made from iron when exposed to moisture may develop _____.
7. Aside from fuel or material, _____ and heat must be present for the combustion to occur.
8. Rusting occurs when _____, oxygen, and water react with one another.
9. When the oxygen supply is cut, the flame will be _____.
10. When overpopulation in an area occurs, a decrease or lack of _____ for breathing may happen.

Lesson 2 Changes in Matter in the Presence or Absence of Oxygen

What's In

What are the changes that matter undergoes?

Directions: Identify which among the following activities shows Physical Change or Chemical Change when applied with heat. Write **PC** for Physical Change and **CC** for Chemical Change.

1. Melting of candle
2. Burning of wood
3. Boiling of water
4. Cooking rice
5. Frying egg

What's New

How did you find the past lesson? Did you find it easy? If you were able to get the correct answer, very good. If not, this module will help you learn more about the changes in matter because of oxygen.

Now, let's do it!

Come and enjoy studying the changes in matter in the presence or absence of oxygen.

Have you observed your mother slicing an eggplant? What was of the color of the eggplant while it was being sliced. What was its color after a few minutes? Were there any changes in the color? Did it turn brown after slicing?

https://www.flickr.com/photos/30478819@N08/48558018671

https://www.flickr.com/photos/anotherpintplease/9691057759

What is It

The changes in the color of the inner fleshy part of the eggplant is due to its exposure to oxygen. The same phenomena could also be observed in potato, banana, guavas, cassava, and other fruits and vegetables.

How do you keep the eggplant from turning brown? Place it in a large bowl of water with a teaspoon of salt dissolved in it. The water should be enough for all the sliced eggplant to dip in fully. This is to prevent the oxygen present in the air to react with the chemicals present in vegetables.

Another example of a change in materials when oxygen is present is in **combustion.** It occurs when oxygen combines with another substance (as fuel) and produces fire with heat and light. Combustion is also known as burning. It is always exothermic, that is giving off heat. In combustion, oxygen, fuel, and heat are always

present. For example, when you lit a candle, its wick burns if oxygen and wax (candle) is present and a lot of heat is produced. Other examples include the burning of wood or coal for cooking and burning of petrol or diesel to run your car.

If oxygen is present in a wet material with iron, such as a nail or steel bar, the formation of rust occurs. It only happens when iron, oxygen, and water react with one another. Rust occurs when iron or alloys such as steel corrode, thus **rusting** is commonly known as iron or steel corrosion.

What's More

Directions: For the given activities, read and study the situations, then answer the follow-up questions.

Activity 1**: "Fire Out"**

Have you seen a fire or flame? If not, observe the fire in the picture below.

https://www.needpix.com/photo/445570/camp-fire-camp-fire-camping-nature-campfire-summer-outdoor-bonfire

- How does fire start?
- Will fire continue its flame in the absence of oxygen?
- Suppose we will cover it with a basin, what do you think will happen to the fire?
- What are the three important things needed for combustion to occur?

Activity 2: **“Fish Kill”**

A fishpond owner reported that there had been a fish kill in the pond. The fisheries bureau investigated the incident, only to find out that the fishpond was overly populated.

https://www.flickr.com/photos/chesbayprogram/20738590870

- What could be the cause of the fish kill?
- What is needed in the overpopulated pond?

Activity 3: **“Rusting”**

Observe the rusted iron nails. What do you think causes the formation of rust?

https://pxhere.com/en/photo/598437

- What causes the formation of rust in the iron nails?
- What shall we do with the iron nails to minimize or prevent it from rusting?
- What are the two factors that influence the formation of rust in the iron nails?

What I Have Learned

Directions: Complete the paragraph below by supplying the statements with the missing word or phrase.

The presence or absence of (1)_____ has various effects on matter. Common examples are (2)_____ and (3)_____.

Fire will continue its flame provided that there is continuous supply of (4)_____, (5)_____, and (6)_____. In the absence of oxygen, there will be no (7)_____ that will occur.

An example of change in the material when oxygen is present is rusting. (8) _____ is formed when iron and oxygen react with water or air moisture.

What I Can Do

Is rusting a problem in your home? Find out 5 ways on how you can prevent rusting of materials that are made of iron. Make a list of it like the one shown below:

Ways to Prevent Rusting

Assessment

Directions: Choose and write the letter of the correct answer in your answer sheet.

1. The presence or absence of oxygen in the materials may result in the _____.
   A. burning of the materials
   B. melting of the materials
   C. change in the materials
   D. materials remain the same
2. Iron, nails, cans and other metals with iron when exposed to moisture may develop _____.
   A. dust
   B. rust
   C. heat
   D. fuel
3. The inner part of the potatoes and apples change in color because of _____.
   A. fuel in it
   B. chemicals in it
   C. exposure to heat
   D. exposure to oxygen
4. The process of burning materials with the aid of oxygen is _____.
   A. conduction
   B. combustion
   C. oxidation
   D. reduction
5. The Bureau of Fisheries investigated that fish kill incident was due to _____.
   A. lack of oxygen supply
   B. hot summer temperature
   C. use of illegal fishing methods
   D. lack of carbon dioxide supply
6. The factors that influence the formation of rust on iron are _____.
   A. increased level of oxygen
   B. moisture and oxygen
   C. dropping of oxygen
   D. oxygen level
7. The absence of oxygen in lighting a candle will cause the candle's flame to _____.
   A. burn
   B. flare
   C. ignite
   D. extinguish
8. The reaction of iron with moisture and oxygen present in the air is called _____.
   A. rusting

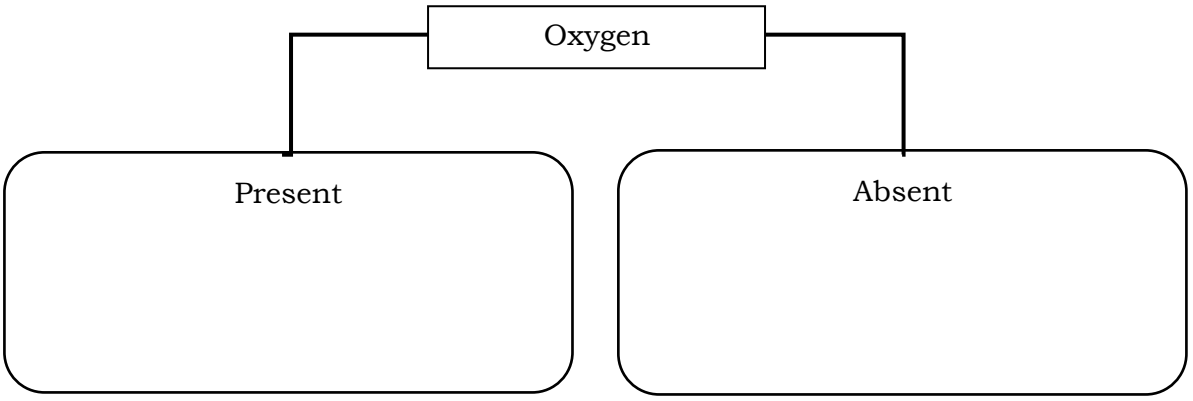
B. cleansing
C. burning
D. combustion

9. We can prevent rusting of materials made of iron at home by _____.
   A. washing the materials after using
   B. exposing material anywhere after use
   C. arranging the material before storing
   D. wiping the material with a clean dry cloth after use

10. Owner of the fishpond could have monitored and controlled the population of fish to avoid _____.
   A. fish kill
   B. a drop of oxygen
   C. increase level of oxygen
   D. low-dissolved oxygen level

Additional Activities

Directions: List down the effects of presence and absence of oxygen in the exposed fruit flesh in a similar diagram below.



What's More

Activity 1

1. Fire starts when a material or fuel, in the presence of oxygen, is exposed to a source of heat.
2. No
3. The fire be extinguished or put off.
4. fuel, oxygen, heat

Activity 2

1. decrease or lack of oxygen to breath in the small or narrow area of the fishpond
2. good supply of oxygen, larger area, controlled population

What's More

Activity 3

1. rust is formed when the iron nails are exposed to moisture, that is to oxygen and water.
2. avoid exposure to moisture, coat with oil or anti-rust liquid, or keep it dry
3. Oxygen and water

What I Know

1. B
2. A
3. E
4. C
5. D
6. rust
7. oxygen
8. iron
9. extinguished/put off
10. oxygen/air

What's In

1. PC
2. CC
3. PC
4. CC
5. CC

What I Have Learned

1. oxygen
2. combustion/burning
3. rusting
4. fuel
5. oxygen
6. heat
7. fire/flame
8. rust

Answer Key

Additional Activities

Present

Note to the teacher: Answers may vary

1. The change in color of the inner fleshy part of some fruits and vegetable.
2. Oxygen depletion in a pond can cause fish kill.
3. The fire will continue its flame provided there is continuous supply of oxygen.
4. The amount of rust formed in an iron depends on the moisture and humidity of the surroundings.

Absent

Note to the teacher: Answers may vary

1. No change of color in fruits and vegetables at all.
2. No fish kill will occur.
3. There will be no fire.
4. No rust.

Assessment

1. C
2. B
3. D
4. B
5. A
6. B
7. D
8. A
9. D
10. A