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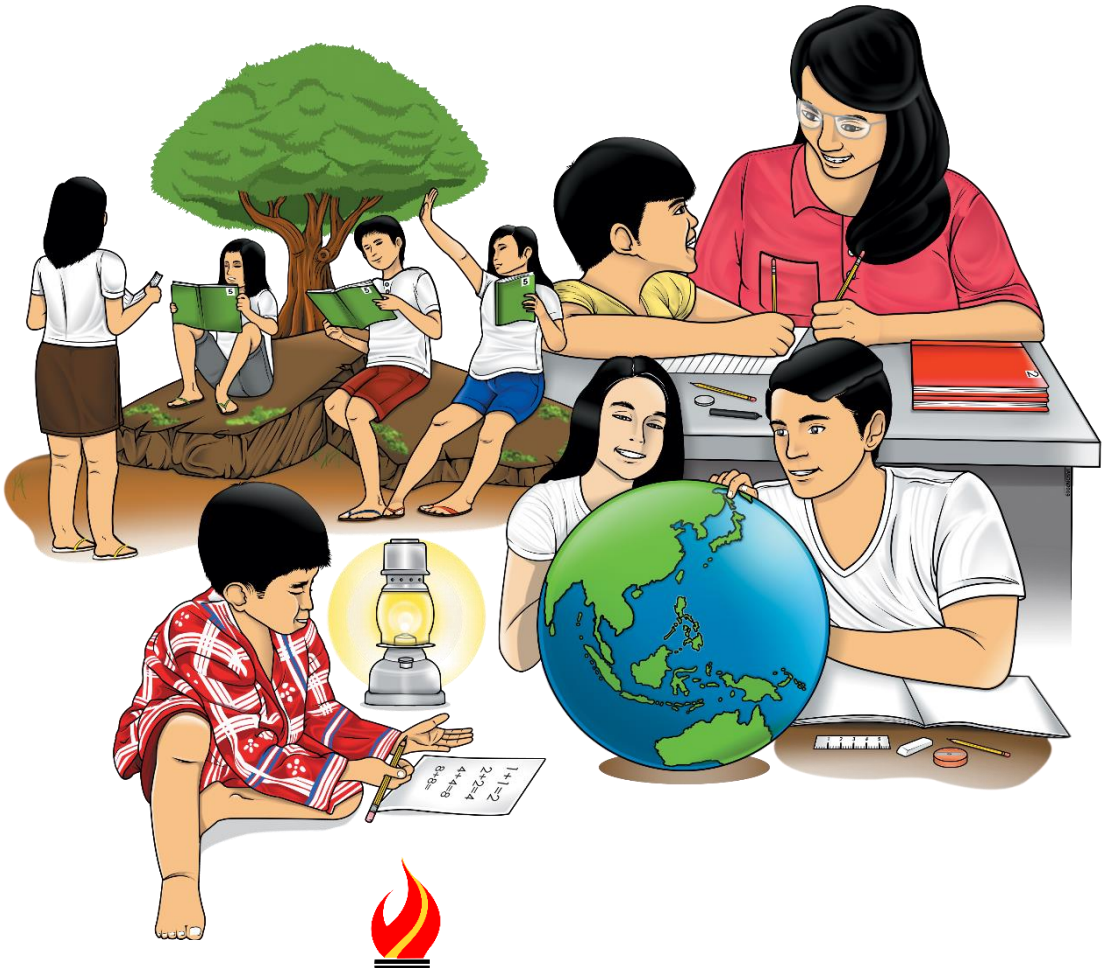
DepED
DEPARTMENT OF EDUCATION

Science

Quarter 1 – Module 2
Lesson 1: How Matter Changes When Applied with Heat



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What I Need to Know

Have you ever asked yourself how materials change? How does matter changes when applied with heat? When matter is heated enough, its molecules move faster with great energy. It is like watching an ice cube in your palm that becomes smaller until it melts or a boiling water that turns into a steam. If enough heat is added, solid can become liquid and liquid change to gas.

In this lesson, you will be able to explain how matter changes when applied with heat.

Note: Write your answers on a separate sheet.

What I Know

A. Directions: Identify the kind of change the following activities undergo when there is an application of heat. Write whether it is ***Physical Change*** or ***Chemical Change***.

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

B. Matching Type

Directions: The following pictures are activities that show application of heat. Match the pictures in Column A with their corresponding results in Column B. Choose the letter of the correct answer.

A	**B**
Pictures	**Results**
1.  https://commons.wikimedia.org/wiki/File:Charcoal-barbecue-lighters.jpg	A. Melted butter
2.  https://www.pexels.com/photo/barbecue-blur-charcoal-cooking-604660/	B. Baked rice cake
3.  https://en.wikipedia.org/wiki/Butter#/media/File:%C5%A0v%C3%A9dsk%C3%BD_kol%C3%A1%C4%8D_naruby_904_(cropped).JPG	C. Barbecue
4.  https://commons.wikimedia.org/wiki/File:Drying_fish_in_Oqaatsut,Gronland.jpg	D. Charcoal
5.  https://www.pxfuel.com/en/free-photo-imjff	E. Dried fish

Lesson 1 How Matter Changes When Applied with Heat

What's In

Directions: Based on the given physical and chemical properties of matter, identify which property is being described. Choose your answer from the words in the box.

Hardness	Elasticity	Conductivity	Biodegradability	Brittleness

1. Ability to break easily.
2. Ability to decomposed by microorganism.
3. Ability to let the heat and electricity to pass through.
4. Ability to be stretched and return to its original shape.
5. Ability to resist pressure that may cause deformation.

What's New

Directions: The following are activities or objects where heat is applied. Draw a star ★ if it shows physical change or a half moon ◗ if it shows chemical change.

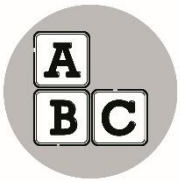
1. Heating a handful of sugar
2. Boiling of water
3. Burning of paper
4. Drying of clothes
5. Grilling pork

What is It

Heat, as discussed in your previous grade, is a form of energy. It is described as how high the temperature is. We use a thermometer to measure the heat. Our largest source of heat is the Sun. Heat can bring about a physical change in matter. Some solid materials melt when the heat is applied to them. A common example is a piece of melting ice taken out of the refrigerator. The ice absorbs heat from the surroundings, which will then melt after a few minutes. On the other hand, if water evaporates when it is subjected to heat. Just like when your mother hangs your wet laundry under the sun. After several minutes or hours, the clothes become dry, which means that the water in your clothes evaporated.

Heat does not only produce a physical change in materials, sometimes heating a material causes it to undergo chemical changes. The chemical changes caused by heat are irreversible. One common example of this is cooked food. The egg your mother cooked for your breakfast has undergone a chemical change.

Now, can you bring the egg back into its liquid form before it was cooked? Applying heat to the matter results in processes of physical and chemical changes. **Physical change** only happens when the appearance of the matter changes and no new material is formed. Meanwhile, **chemical change** happens when the heat is applied and the matter changes its size, shape, color, and smell, and new material is formed.



What's More

Activity 1

Directions: Read the following sentences carefully. Write ***True*** if the situation shows how matter changes when applied with heat. Write ***False*** if not.

1. Melting ice cube, boiling water, and drying clothes are examples of physical changes.
2. Physical and chemical changes are results when heat is applied to matter.
3. A vanilla ice cream melts when taken out from a refrigerator for a long time.
4. Charcoal burning on the grill is an example of chemical change.
5. When heat is applied to matter or material nothing happens.

Activity 2

Directions: Read the following questions carefully then write the letter of the correct answer.

1. Which of the following is an example of chemical change when heat is applied?
   A. Burning of wood
   B. Cutting clothes
   C. Freezing of water
   D. Sharpening a pencil
2. Which is TRUE about chemical change?
   A. A new product is formed.
   B. Chemicals change as a result of physical change.
   C. The product can be changed to its original form.
   D. A chemical change is more important than any other process.
3. What happens when a piece of paper is burned inside a tin can?
   A. A new material is formed.
   B. There are no changes.
   C. Both physical changes and chemical changes happen.
   D. It became ashes and after a few minutes, it turns to its original form.
4. What happens to the ice cube, and butter after heat is applied?
   A. They melt, physical change happens.
   B. They melt, chemical change happens.
   C. Nothing happens to the materials.
   D. All the materials dissolve in the removed air.
5. What process is applied in the melting of ice cream, drying of wet clothes, and cooking of vegetables that result in physical and chemical change?
   A. Boiling
   B. Drying
   C. Freezing
   D. Heating

Activity 3

Directions: From the given activities below, identify which shows physical change or chemical change by writing your answers using the table below as a guide.

Frying egg	Drying of wet clothes
Boiling water	Heating of white sugar
Burning paper	Melting of cone ice cream
Grilling chicken	Drying fishes under the sun
Melting chocolate	Drying wet *palay* under the sun

Physical change through the application of heat	**Chemical change through the application of heat**

What I Have Learned

Directions: Express your understanding of the lesson in this module by supplying the blanks in the following sentence with a word or a phrase.

I learned that ____ (1) ____ application in matter results to either _____(2)_____ and _____(3)_____ .

What I Can Do

Directions: Study the following objects. Determine the by-product or result when the material is applied with heat. Remember, some examples of heat sources are the Sun, burning fuel, electric heater, and human body. Caution: DO NOT place the actual materials below in direct heat like fire.

1. 

https://www.flickr.com/photos/rutlo/3198806471
rubbing alcohol

2. 
https://www.flickr.com/photos/30478819@N08/46033845245
ice cubes

3.  paint

https://www.wallpaperflare.com/assorted-color-paints-multi-colored-high-angle-view-art-and-craft-wallpaper-aofwf

4.  water in the kettle

https://pixabay.com/photos/kettle-bubble-glass-device-blow-2016616/

5.  chocolate bars

https://pngimg.com/download/4257

Assessment

Directions: Study the following situations and identify what is likely to happen when the heat is applied to the object. Choose the answer inside the parenthesis.

1. The _____ (melting, melts) of butter when left out in a warm room is an example of _____ (chemical change, physical change)

2. An ice cream cone _____ (melting, melts) on a hot day is an example of _____. (chemical change, physical change)

3. Charcoal _____ (burns, burning) on the grill is an example of _____ (chemical change, physical change).

4. Frying an egg on a _____ (heated, heating) pan is an example of _____. (chemical change, physical change)

5. An ice _____ (melting, melts) when taken out from a refrigerator is an example of _____. (chemical change, physical change)

6. Ben likes to eat toasted marshmallow. So, his mother cooked some. _____ (Toasting, Toasted) marshmallow is an example of _____. (chemical change, physical change)

7. Burning woods change to ashes. Turning into _____ (ashes, ash) is an example_____. (chemical change, physical change)

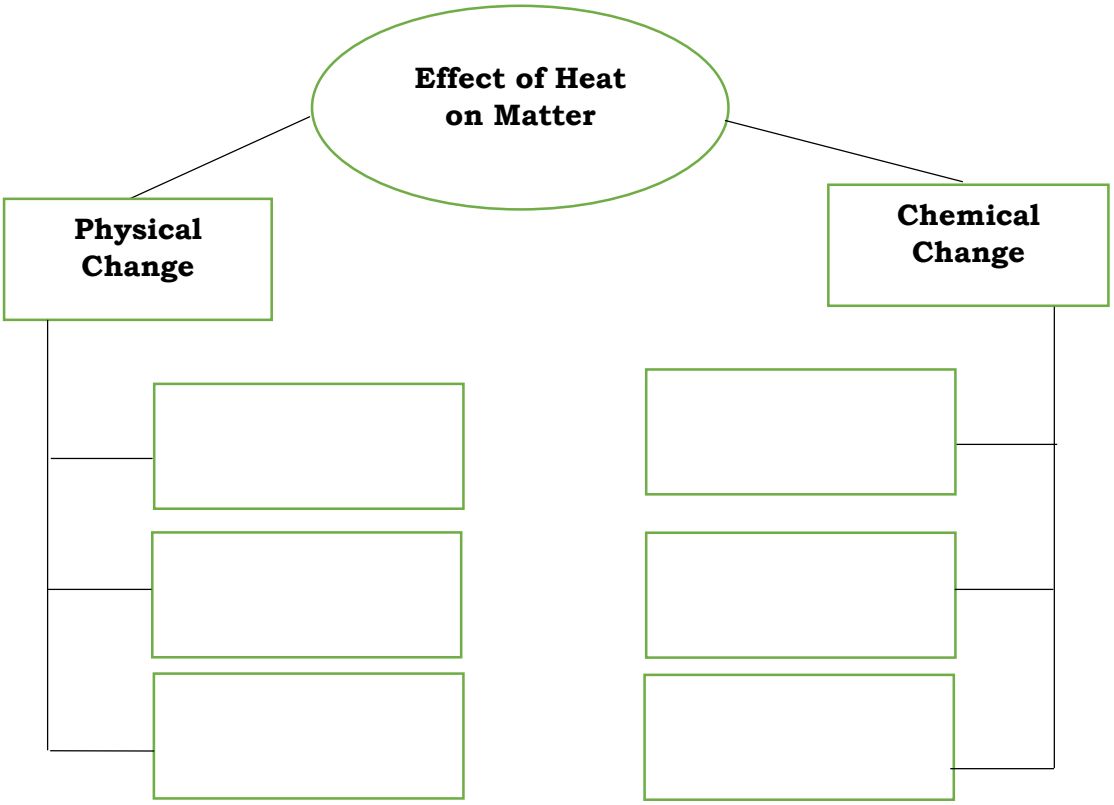
8. A lighted candle _____ (melting, melts) on a dark night. This is an effect of applying heat to a material. It results to _____. (chemical change, physical change)

9. A spoon of white sugar was heated over a stove for 3- 5 minutes. The result was the white sugar turned into _____ (brown and black, white and black). Burnt sugar is an example of _____. (chemical change, physical change)

10. A chocolate bar was left on a _____ (cool, warm) room for a day and melted. It is an example of _____. (chemical change, physical change)

Additional Activities

Directions: Copy the following diagram and supply it with 3 examples of physical change and chemical change when the heat is applied.



Answer Key

What's New

1.
2.
3.
4.
5.

What's In

1. Brittleness
2. Biodegradable
3. Conductivity
4. Elasticity
5. Hardness

What I Know

A.

1. Chemical change
2. Physical change
3. Physical change
4. Chemical change
5. Chemical change

B.

1. D
2. C
3. A
4. E
5. B

What's More

Activity 1

1. True
2. True
3. True
4. True
5. False

Activity 2

1. A
2. A
3. A
4. A
5. D

What I have Learned

1. heat
2. chemical change
3. physical change

What's More

Activity 3

Chemical Change through application of heat:

- Heating of white sugar
- Burning paper
- Frying fish
- Grilling chicken

Physical Change through application of heat

- Drying of wet clothes
- Drying fish under the heat of the sun.
- Boiling water
- Melting chocolate
- Drying of wet palay under the sun
- Melting of cone ice cream.

What's New

1.
2.
3.
4.
5.

Additional Activities

Chemical change

1. Toasted marshmallow
2. Toasted bread
3. Burning paper

(Answers may vary)

Physical change

1. Boiling water
2. Drying clothes
3. Cutting paper into pieces

(Answers may vary)

Assessment

1. melting -Physical change
2. melting- Physical change
3. burning -Chemical change
4. heated- Chemical change
5. melting- Physical change
6. toasted- Chemical change
7. ashes -Chemical change
8. melts -Physical change
9. brown and black - Chemical change
10. warm- Physical change

What I Can Do

1. The alcohol inside the bottle evaporates.
2. The ice cube melts after.
3. Paint warm part may dry, the paint droplets as they strike the surface and prevent good leveling. Heat part may reduce the paint viscosity and lead to sags.
4. Boiling water
5. Melting of chocolates

Note to the teacher:
Answers may vary