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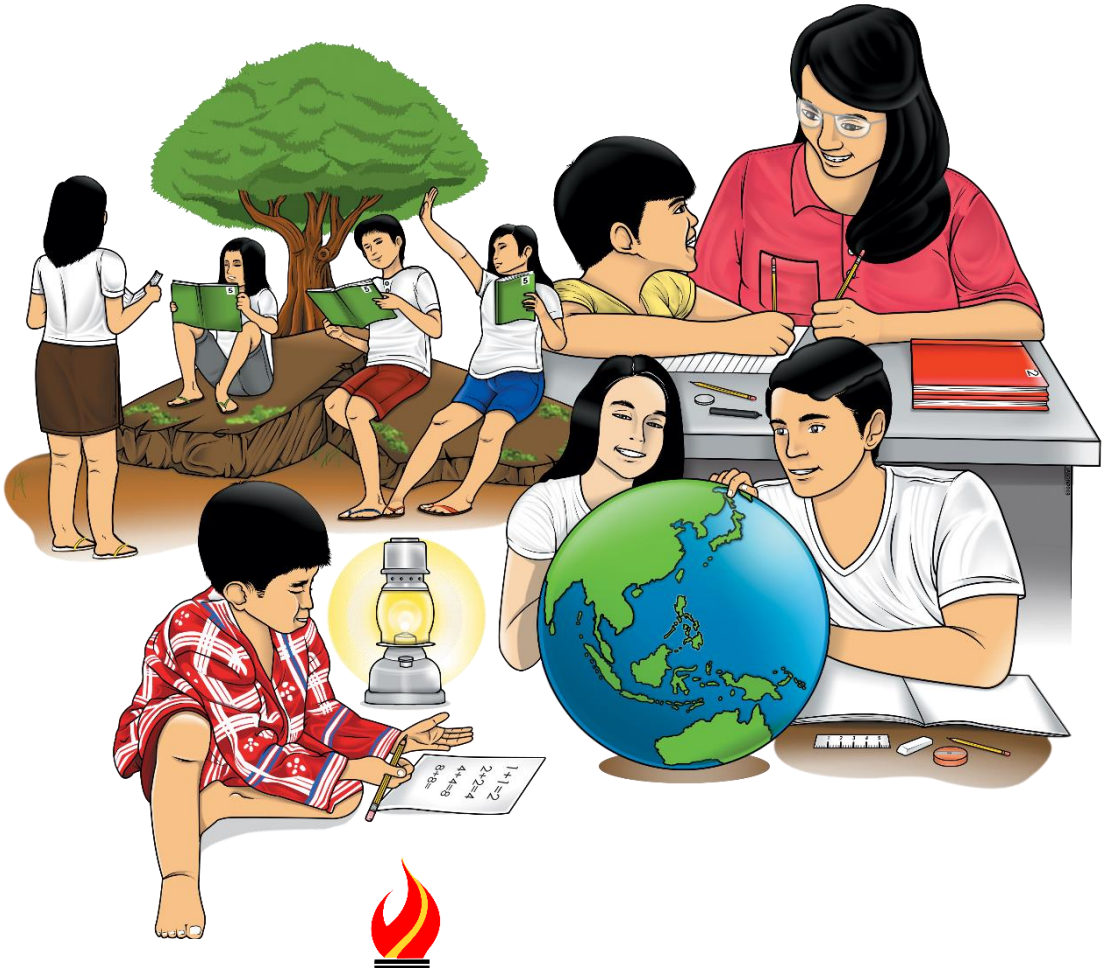
DEPARTMENT OF EDUCATION

Science

Quarter 1 – Module 3: Changes in Properties of the Materials when Exposed to Different Temperatures



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Quarter 1 – Module 3: Changes in Properties of the Materials when Exposed to Different Temperatures

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Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

Development Team of the Module

Writer: Gladys S. Modina
Editor: Carmen R. Lim
Reviewers: Rosemarie A. Redaja
Ma. Fe P. Papuran
Layout Artist: Marjorie L. Gabumpa
Management Team:
Marilyn B. Siao
Ma. Luz I. Orbe
Cecilia A. Arga
Carmen R. Lim
Eveliza S. Quinoñes

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Office Address: Maharlika Highway, Purok 4, Brgy. Payao
Catbalogan City, 6700, Samar, Philippines
E-mail Address: depedcatbalogancitydivision15@gmail.com
Facebook Page: fb.com/CatbaloganCityDivision

What I Need to Know

This module was designed and written with you in mind. It is here to help you master the changes in properties of the materials when exposed to different temperatures. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

This module will help you describe changes in properties of materials when exposed to certain conditions such as temperature.

The module is divided into two lessons, namely:

- ✓ Lesson 1 – Changes in Materials When Heated
- ✓ Lesson 2 – Changes in Materials When Cooled

After going through this module, you are expected to:

1. Describe what happens to the materials when heated.
2. Describe what happens to the materials when cooled.

What I Know

Directions: Read and understand the questions below. Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. When crayon is cooled after it is melted, there is a change in _____.
   a. size only
   b. shape only
   c. texture only
   d. all forms

2. Vicky left her crayons outside the house the whole afternoon. What will likely happen to the crayons?
   a. It will double its size.
   b. It will disappear.
   c. It will melt.
   d. It will harden.

3. Ana brought 2 bars of chocolates to school. When she opened it during recess, the chocolates became soft and sticky. She kept the chocolates back in her lunch bag and placed them in the refrigerator when she arrived home in the afternoon. After a while, the chocolates hardened. What changes occurred in the chocolates?
   a. Solid-liquid
   b. Liquid-gas
   c. Liquid-solid
   d. Gas-liquid

4. When materials like margarine and butter are heated, changes occur. What property/ies of matter has changed?
   a. Size, shape and texture
   b. Size and shape
   c. Shape and texture
   d. Shape only

5. What causes chocolates and crayons to melt?
   a. Size, shape and texture
   b. Direction of the wind
   c. Temperature
   d. Freezing

6. What will happen to crayons when heated?
   a. Melted
   b. Remained the same
   c. Hardened
   d. All of the above

7. The butter/margarine when heated will be _____.
   a. melted
   b. unchanged
   c. hardened
   d. none of the above

8. When chocolate is heated, there is a change in _____.
   a. size only
   b. shape only
   c. texture only
   d. all forms

9. When butter/margarine is heated, there is a change in _____.
   a. size only
   b. shape only
   d. texture only
   e. all forms

10. When crayon is cooled after it is melted, there is a change in _____.
   a. size only
   b. shape only
   c. texture only
   d. all forms

Lesson 1 Changes in Materials When Heated

Matter is constantly changing, trees get cut, butter melts, glass breaks and many more. When the butter melts where do they go? It turns into liquid form, that's all about our lesson for today. The next activity will help you describe the changes in the properties of the materials when they are exposed to different temperature. What do you think will happen to the materials when being heated?

What's In

In your previous lesson, you have described changes in solid materials when they are bent, pressed or cut.

Let's check your prior knowledge before we go through deeper into the activities and discussion.

Directions: Describe the following materials when bent. What changes happened? Write the letter of the correct answer in your activity notebook/answer sheet.

Materials	**Changes that Happened**		
	a. size	b. shape	c. color
1. hair pin			
2. crayon			
3. cellphone wire charger			
4. plastic spoon			
5. plastic ruler			

What's New

Today, we are going to perform an activity to observe how heat changes the appearance of matter. Study the procedure very well and prepare all the needed materials before you work on this. You may conduct this activity outside your house or in any safe place. For your own safety, ask an adult to assist you in conducting this activity.

What you need:

- ✓ 2 pcs. crayon
- ✓ 2 pcs. chocolate bar
- ✓ 2 teaspoons butter or margarine
- ✓ 3 pcs clean tin cans (empty cans of sardines or corned beef, meat loaf, etc.)
- ✓ gasera or candle (alcohol lamp if available)
- ✓ match
- ✓ kitchen gloves or a piece of thick cloth

Directions:

1. Prepare all the materials needed for the activity.
2. Mark each tin can A, B and C.
3. Place the following materials in the tin cans:
   - tin can A - 2 pieces of crayon
   - tin can B – 2 bars of chocolate 22
   - tin can C – 2 teaspoons of butter or margarine
4. Light the gasera (if using a candle, let it stand on the floor firmly)
5. Hold tin can A with a thick cloth and place it over the fire until the crayons melt.
6. Repeat the same procedure for tin can B and tin can C.
7. Put off the flame of the gasera or the candle.
8. Record your observations in the table provided below.
9. Allow the materials in the tin cans to cool off before disposing them properly.

Materials	Observations	
	Before heat is applied	When heat was applied
2 pieces of crayons		
2 pieces of chocolate bars		
2 teaspoons of butter/ margarine		

Note to the learners: *Dispose and return all materials from where you got them properly after the activity and clean the area you worked on.*

Guide Questions:

1. What happens to each material (crayon/chocolate bar/ butter or margarine) when they were heated? Why?
2. Is there a change in the appearance of the materials?
3. How would you describe the changes that took place to the materials when heated?

What is It

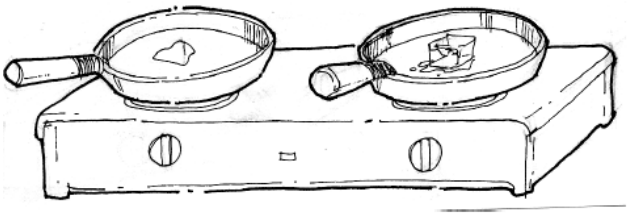
When the materials are heated, they changed their size, shape, and texture. They also changed their forms. When cooled, the liquid materials were changed to solid. The materials (crayon/chocolate/butter or margarine) changed its form from solid to liquid when heated. It also changed its size, shape, and texture. Some materials (crayon/chocolate/butter or margarine) changed back to its form from solid to liquid when cooled

What's More

Activity 1

What to do:

1. Ask an adult (your mother, older sister or older brother) in performing this activity.
2. Prepare two pans. Place the two pans over a stove (or a native wood stove)
3. Slowly put a small piece of floor wax or candle wax in the first pan and put an ice cube in the second pan.
4. Heat both pans over slow fire.
5. Observe what happens.



Picture 1: Two pans over a stove

Assessment:

Directions: Read carefully the following questions. Write your answers in your notebook.

1. Describe the appearance of the wax and the ice cube at the start of the activity.
2. What changes happened to the piece of wax and the ice cube after they were exposed to heat?
3. Why is there a change in the appearance of the wax and the ice cube?

Activity 2

Directions: Read and analyze the table below. Identify the changes of the materials when heat is applied. Write your answer on the right column.

Materials	Type of Change (size, shape)
Bar of chocolates	
Pieces of crayons	
Spoonful of butter/margarine	
Lipstick	
Lard	

Lesson 2 Changes in Materials When Cooled

Cooling and Freezing are two of the processes that matter undergo. In previous lessons, you learned that when materials are heated, they changed in their size, shape and texture. In this lesson, you are going to find out what will happen to the material that have been heated after cooling down.

What's In

Directions: Read and answer the following questions. Write your answer on your answer sheet or Science notebook.

1. What happen to the crayons when directly exposed to the heat coming from the gasera/candle?
2. Describe the crayon after it has cooled down.

What's New

Directions: What properties of materials are changed when cooled? Write your answers or observations on the right column.

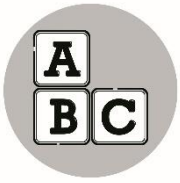
Materials when cooled	Changes happens/Observations
Ex. Bar of chocolates	Size, shape
1. Pieces of crayons	
2. Teaspoonful of margarine	
3. Lipstick	
4. Candles	

What is It

When the materials are heated, they changed their size, shape, and texture. They also changed their forms. When cooled, the liquid materials were changed to solid.

The materials (crayon/chocolate/butter or margarine) changed its form from solid to liquid when heated. It also changed its size, shape, and texture.

The materials (crayon/chocolate/butter or margarine) changed back to its form from solid to liquid when cooled. It also changed its size, shape, and texture.



What's More

Activity 1: How does some solid change?

What you need: tin can, candle, match, barbeque stick, plate

What to do:

1. Secure the candle in the can.

2. Light the candle.

3. Observe the candle until it is totally melted.

4. Use the stick to empty the can.

Assessment

Directions: Based from the activity conducted, answer the following questions. Write your answer on a separate sheet of paper or in your notebook.

1. What happened to the lighted candle?

2. When candle melted, what is its state? Is it still a candle?

4. What do you call the process when solid turns to liquid?

5. When you emptied the can, what have you collected?

6. What is its state? Is it still a candle?

7. What do you call the process when liquid turns into solid?

8. What changes did the candle undergo?

9. What factors brought about such changes?

Activity 2: Short–Answer Test

Directions: Read and understand the following questions. Write your answer on a separate sheet of paper or in your notebook.

1. An ice is placed under the heat of the sun for a few minutes. What do you think will happen to the ice?

2. What will you do to turn melted ice into solid?

What I Have Learned

A. Directions: Write a check (/) mark if the statement is not true, and an cross (X) mark if it is true

1. All materials change their size, shape and texture when heated.

2. Butter changes its form from solid to liquid when heated.

3. Butter in its liquid form will return to solid when cooled.

4. After being heated, some materials change in size, shape and texture when cooled.

5. Some materials change in size, shape and texture when heated.

B. Directions: Fill in the blanks with the correct answer. Choose from the words provided inside the box.

cooled	heated	size	texture	shape

When the materials are (1)_____, they changed their (2)_____, (3)_____, and (4) _____. They also changed their forms. When (5)_____, the liquid materials were changed to solid.

What I Can Do

A. Directions: Box the correct word that will make the statement complete. Write your answer in your Science notebook.

1. Butter when placed in a hot pan will become (solid, liquid, gas).
2. Lard when placed on top of a hot pan will change in (shape, smell, sound).
3. Crayon when heated will become (soft, hard, liquid).
4. The butter will (harden, melt, remain the same.) when placed under the heat of the sun.
5. Juice when placed inside the freezer will become (solid, liquid).

B. Directions: The table below are some common materials. Identify what happen to these materials when heated and after it has cooled down. Fill in the table below and answer the guide questions.

Name of Materials	When Heated	When Cooled
Ex. Water	Turns to vapor	Returns to its original
Crayons		
Steel		
Margarine in a pan		

Guide Questions:

1. What happen to the steel when heated?
2. Describe what you observed with the margarine when it was heated in a pan and after it has cooled down.
3. What would be the result after the crayon has been cooled?

Assessment

Directions: Read and understand the questions below. Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper or notebook.

1. The butter/margarine when heated will be____.
   a. melted
   b. hardened
   c. remain the same.
   d. all of the above

2. When the chocolate was heated, there was a change in____.
   a. size only
   b. shape only
   c. texture only
   d. all forms.

3. When the butter/margarine was heated, there was a change in____.
   a. size only
   b. shape only
   c. texture only
   d. all forms

4. When the crayons where cooled after it has melted, there was a change in____.
   a. size only
   b. shape
   c. texture only
   d. all forms

5. Vicky had her art class and left her crayons outside the house the whole afternoon. What is likely to happen to the crayons?
   a. It will double its size.
   b. It will disappear.
   c. It will melt.
   d. It will remain the same.

6. What causes chocolates and crayons to melt?
   a. size, shape and texture
   b. direction of the wind
   c. temperature
   d. all of the above

7. Why do butter harden when placed in a refrigerator?
   a. It has been heated
   b. It has been cooled
   c. It has been fried
   d. It has been boiled

8. Ana brought 2 bars of chocolates to school. When she opened it during recess, the chocolates became soft and sticky. She kept the chocolates back in her lunch bag and placed them in the refrigerator when she arrived home in the afternoon. After a while, the chocolates hardened. What changes occurred in the chocolates?
   a. solid-liquid
   b. liquid-gas
   c. liquid-gas
   d. liquid-solid

9. When materials like margarine and butter are heated, changes occur. What property/ies of matter has changed?
   a. size, shape and texture
   b. size and shape
   c. shape and texture
   d. none of the above

10. What causes chocolates and crayons to melt?
   a. size, shape and texture
   b. direction of the wind
   c. shape and texture
   d. temperature

Additional Activities

A. Write TRUE if the statement is correct, write FALSE if not.

1. When the margarine is being heated it will melt.
2. The crayon exposed to the flame will change its shape and size.
3. When the materials are being heated, they change their size, shape and texture.
4. When the chocolate bars are heated it change into liquid but when cooled it will remain the same.
5. The crayons that are being heated will melt, when cooled it will change back into solid.

B. Put check (/) in the appropriate column if the word is heating (X) if it is cooling.

Materials	Heating	Cooling
Cooking rice		
Freezing of ice cream		
Melting a crayon		
Freezing water		
Heating butter		

Answer Key

Lesson 1

What I Know

1. d
2. c
3. c
4. a
5. c
6. a
7. a
8. d
9. d
10. d

What's In

Materials	Changes that Happened		
	a. size	b. shape	c. color
1. hair pin		/	
2. crayon	/	/	
3. cellphone wire charger		/	
4. plastic spoon		/	
5. plastic ruler		/	

What's New

Materials	Observations	
	Before heat is applied	When heat was applied
2 pieces of crayons	solid, hard	melted, changed its appearance; size, shape, form, and texture
2 pieces of chocolate bars	solid, hard	melted, changed its appearance; size, shape, form, and texture
2 teaspoons of butter/ margarine	solid, hard	melted, changed its appearance; size, shape, form, and texture

Guide Questions:

1. When crayon/chocolate bar/butter or margarine were heated, these materials melted or the materials changes from solid to liquid. Because of the change temperature.
2. Yes, there is a change in the appearance of the materials.
3. The materials when heated changes the size, shape, form, and texture.

What's More

Activity 1 – Assessment:

1. Both the wax and the ice cube are solid and hard.
2. The wax became softer and it melted and the ice cube melted and changed from solid to liquid.
3. There is a change in the appearance of the wax and the ice cube because of the heat applied to them. The heat is responsible for the change of phase of matter from solid to liquid.

Activity 2

Materials	**Type of Change (size, shape)**
Bar of chocolates	size, shape
Pieces of crayons	size, shape
Spoonful of butter/margarine	size, shape
Lipstick	size, shape
Lard	size, shape

Lesson 2

What's In

1. The crayons melted when directly exposed to the heat coming from the gasera/candle.
2. The crayons after it has cooled down, changes its form to solid.

What's New

Materials when cooled	**Changes happens**
Ex. Bar of chocolates	Size, shape
Pieces of crayons	Size, shape
Teaspoonful of margarine/butter	Size, shape
Lipstick	Shape, size
Candles	Size, shape and form

What's More

Activity 1 – Assessment:

1. The lighted candle melted.
2. Yes, it is still a candle.
3. Liquefaction is a process of changing solid to liquid.
4. We collected a candle wax when the can was emptied.
5. Solid Yes, it is still a candle.
6. Solidification is the process when liquid turns into solid.
8. The candle change its shape, size, and texture.
9. The change of the materials is because of temperature.

Activity 2: Short–Answer Test

1. The ice will melt when placed under the heat of the sun for a few minutes.
2. To turn the melted ice into solid, put it back to the freezer.

What I Have Learned

A.

1.X

2. 
3. 
4 
5. 

B.

1.heated

2. size
3. shape
4. texture
5. cooled

What I Can Do

A.

1. Liquid
2. Shape
3. Liquid
4. Melt
5. Solid

B.

Name of Materials	**When Heated**	**When Cooled**
Water	Turns to vapor	Returns to its original
Crayons	Melts	Color remains Size changed
Steel	melts	Returs to solid
Margarine/butter in a pan	melts	Change its size

Guide Questions:

1. The steel melts when heated.
2. The margarine/butter in the pan melts and change its size, shape, and form.
3. The shape and color of the crayon changes after it has been cooled.

Assessment

1. d
2. d
3. d
4. d
5. c
6. c
7. b
8. d
9. a
10. d

Additional Activities:

A.

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

B.

Materials	Heating	Cooling
Cooking rice	/	
Freezing of ice cream		X
Melting a crayon	/	
Freezing water		/
Heating butter	/	

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