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DepED
DEPARTMENT OF EDUCATION

# Science

## Quarter 1 – Module 2:
## Changes That Material Undergo

## *What I Need to Know*

This module was designed and written with you in mind. It is here to help you master Measuring Motion in Terms of Distance and Time. 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 solid materials when they are bent, pressed or hammered.

This module contains:

- **Lesson 1** – Changes in solid materials

After going through this module, you are expected to:

1. Define what is solid;
2. Identify some ways of changing solid materials in terms of size, shape, texture, etc.; and
3. Describe the changes that happens in solid materials.

## *What I Know*

**Directions:** Choose the letter of the best answer.

1. The three states of matter are _____
   a. solid, liquid, and gas
   b. buoyancy, mass, shape
   c. gas, liquid, and mixture
   d. density, weight, and gas

2. Which of the following has a definite shape?
   a. solid
   b. sugar-water solution
   c. gas
   d. liquid

3. Kurt was playing with his modelling clay. As he pressed the clay, he was able to form/make different toys/materials. Which of the following describes clay when it was pressed?
    a. The clay changed its size and color.
    b. The clay changed its size and shape.
    c. The clay changed its volume and color.
    d. The clay changed its volume and color.

4. What is the characteristic that only solids have?
    a. They have weight.
    b. They have definite shape.
    c. They have no definite shape.
    d. They can flow easily.

5. Claudia bought several pieces of tie wire from the hardware. Accidentally, on her way home some pieces of the tie wire bent. Describe the changed happened in the properties of the tie wire when it is bent
    a. Materials change their size and shape.
    b. No new material is formed.
    c. Physical appearance of the materials is changed.
    d. All of the above.

6. Angel need a tin sheets for projects. She has an empty tin can of sardines. How will she able to flatten the shape of it?
    a. By hammering
    b. By stretching
    c. By pressing
    d. By cutting

7. Maria cuts a piece of wring pad. What changes happened in the property of the piece of paper when it was cut?
    a. The piece of paper changed its size and shape.
    b. The piece of paper changed its colour and texture.
    c. The piece of paper changed its volume and odor.
    d. The piece of paper changed its size and odor.

8. What changes in material when pressed?
    a. odor  b. color  c. texture  d. physical appearance

9. What happened to the solid materials when they were bent?
    a. The materials change their color.
    b. The materials change their odor.
    c. The materials change their texture.
    d. The materials change their size and shape.

10. Which is a condition that tells if an object is matter?
    a. It has mass and occupies space.
    b. It has definite shape.
    c. It can be seen.
    d. It can be heard.

# Lesson 1 Changes in Solid Materials

The materials that we see around us exist in different forms: solids, liquids, or gases. Like other materials, solids have different characteristics/properties such a size, shape, color, odor, texture and others. The solid materials could also undergo changes when exposed to certain conditions such as temperature or when mixed with other materials. In this lesson, you will think of some ways which you could change the solid materials, and then observe the change that happened in each material.

## *What's In*

What is a solid? What are some ways of changing solid materials? What changes may happen to solid materials when change in temperature and/or surrounding pressure is applied?

**"How can I change it?"**

**What you need:**

1. 1 piece of candle, aluminum foil, ice cube, wooden stick, crepe paper, plastic cup, chocolate bar
2. Match (matchstick)/lighter

**What to do:**

1. With the given solid materials, show ways by which you could change the state of the materials' size, shape, texture, etc.
2. In your science notebook, copy the table below. Fill in column 2 to identify way/s of changing the material.
3. Fill in column 3 to describe the change/s that occurred in the matter.

| (1)<br>Material | (2)<br>What can I do to change the material? | (3)<br>What change happened in the material? |
|---|---|---|
| *candle* | | |
| *Crepe paper* | | |
| *Aluminum foil* | | |
| *Plastic cup* | | |
| *Drinking straw* | | |
| *Ice cube* | | |
| *Chocolate bar* | | |
| *wooden stick* | | |
| *Rubber band* | | |

Guide Questions:

1. What are some ways of changing solid materials?
2. What changes may happen to solid materials when change in temperature and/or surrounding pressure is applied?
3. How do these changes occur?

## *What's New*

**Activity 1: What Happens to the Solid Materials When Bent?**

What do you think will happen to solid materials when bent?... Let's find out in our next activity.

**What you need:**

- 2 pcs. of: soft plastic ruler, electric wire (12 inches long), paper clip, metal spoon (used for eating)
- 1 pair rubber slipper

**What to do:**

1. Bend each of the given solid materials. Observe and describe what happens to each material.
2. Copy the table below in your science notebook. Record your observations.

| Material | What happened to the material when bent? |
|---|---|
| Plastic ruler | |
| Electric wire | |
| Paper clip | |
| Metal spoon | |
| Rubber slippers | |

Guide Questions:

1. What happened to the solid materials when bent?
2. Was a new material formed when solid material was bent?
3. What characteristics of solid were evident in this experiment?

**Activity 2: What Happens to the Solid Materials When Pressed?**

What do you think will happen when solid materials are pressed?

We are going to investigate it in our activity today.

**What you need:**

- 1 pc. of banana, modelling clay, pandesal, paper cup, clean plastic sheet, small wood, empty glass/bottle, large stone

**What to do:**

1. Using the piece of wood or empty glass bottle or large stone, press each of the given materials. Observe what happens to each of the material.
2. Record your observations in your science notebook using the table below.

| Material | Observation |
|---|---|
| Modelling clay | |
| pandesal | |
| Paper cup | |
| banana | |

Guide Questions:

1. What happened to the solid materials when they are pressed?
2. Was a new material formed when solid material was pressed?
3. What characteristics of solid were evident in this experiment?

**Activity 3: What Happens to the Solid Materials When Hammered?**

If solid materials are hammered, what do you think will happen to the materials. Let's do an activity that will help you understand what happens to solid materials when they are hammered.

**What you need:**

- 1 pc. of block of wood, empty tin can (lata), hollow block, small sheet of galvanized iron, hammer

**What to do:**

***Caution: Be careful in handling the materials. Do not play with the materials.***

1. Hammer each of the given materials. Observe what happens.
2. Record your observations in your science notebook using the table below:

| **Material** | **Observation** |
|---|---|
| Block of wood | |
| Empty tin can (lata) | |
| Piece of hollow block | |
| Sheet of galvanized iron | |

Guide Question:

1. What happened to the solid materials when they were hammered?
2. Was a new material formed when solid material was hammered?
3. Explain the phases each material underwent as hammering was applied.

**Activity 4: What Happens to the Solid Materials When Cut?**

What do you think will happen to the solid materials when cut? Let's investigate this in the next activity.

**What you need:**

- 1 pc. Of: used paper (any kind of paper), small cardboard (any karton), used cloth (any kind), pair of scissors
- 2 pcs. Of candy wrapper, leaves

**What to do:**

1. Using the pair of scissors, cut each of the given materials. Observe what happens to the material.
2. Record your observations in your science notebook using the table below.

| Material | happened to the material when cut? |
|---|---|
| Piece any kind of paper | |
| Piece small cardboard (karton) | |
| Candy wrapper | |
| Leaves | |
| Piece of cloth | |

Guide Questions:

1. Describe what happens to solid materials when they are cut.
2. Was there a new material formed when the solid material was cut?

## *What is It*

Physical change is one of the changes that matter undergoes. It is a change in size, shape or state without changing their composition. Different kinds of physical change are brought about by different factors. Force, pressure and heat are the factors that can cause a material to undergo physical change.

Solid Materials can be changed through many ways.

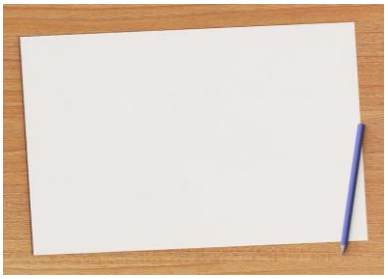

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*Figure 1. Picture showing different ways solid materials can be changed.*

Changing of solid materials through cutting, tearing, folding, twisting, bending, stretching, pressing, coloring, crumpling, melting and others can change the material's size, shape, texture, color, color, and other characteristics/properties.

Solid materials can be bent. When bent, these materials may change their size and shape. No new material is formed. Only the physical appearance of the materials is changed. Bending of solid material is applied in situations like: bending of steel bars/iron in industry, etc.

Solid materials can be pressed. When pressed, these materials may change their size and shape. Other solid materials may also change their texture when pressed. However, no new material is formed because only the physical appearance of the material is changed.

Solid materials can be hammered. When hammered, these materials may change their size and shape, and even the texture. However, no new material is formed because only the physical appearance of the material is changed.

Solid materials can be cut. When cut, these materials may change their size and shape, but no new material is formed. Hence, only the physical appearance of the solid material is changed when cut. Not all solid materials can be cut using simple scissors. Some solid materials, like iron, steel, etc., can be cut using sophisticated cutters (i.e. metal cutters/machine cutters).

## *What's More*

**Activity 1: "How materials change?"**

**What You Need:**

1 pc. rubber band,1 pc. stick, 1 pc. candle, piece of paper, wire, stone or hammer.

**What To Do:**

1. Stretch the rubber band without breaking it.
2. Break the stick into three pieces.
3. Tear the paper into four squares.
4. Pound the candle with a stone or hammer.
5. Bend a piece of wire to form a circle.
6. Record your observation by using the table below.

**Assessment:**

**Directions:** Based from the activity conducted. Read and answer the following questions. Write your answer on a separate sheet of paper.

1. After stretching the rubber band, is it still a rubber band?
2. After breaking the stick, is it still a stick?
3. After tearing the paper, is it still a paper?
4. After pounding the candle, is it still a candle?
5. After bending the wire, is it still a wire?
6. What changes brought about by what matter has undergone?
7. What factors brought about by such changes?

**Activity 2**

**Directions:** Box the materials that can be pressed.

| | | | |
|---|---|---|---|
| doughnut | hollow blocks | plastic cup | modeling clay |
| rocks | orange fruit | wood | pillow |

## *What I Have Learned*

**Directions:** Answer the following questions. Write your answer on a separate sheet of paper.

1. What are some ways of changing solid materials?
2. What changes may happen to solid when heat/pressure is applied?

## *What I Can Do*

Look at the picture below.

https://www.google.com/search?q=illegal+logging&sxsrf=ALeKk02fLWx6IRpDjXTpeqgcv8FbMRPMNQ:1593326112749&source=lnms&tbm=isch&sa=X&ved=2ahUKEwi3pNin8qPqAhXKad4KHYYmDbgQ_AUoAXoECBUQAw&biw=1366&bih=657#imgrc=279LiVv9_581VM

**Directions:** Read and answer the questions below. Write your answer on a separate sheet of paper.

1. What happened to the trees?
2. Aside from trees, what other living things live in a forest? What happen to the other animals if the trees are cut?
3. You have learned that the roots of trees help in holding the soil when it rains. What do you think will happen when the trees are cut and it rains very hard?

# *Assessment*

**Directions:** Answer the following questions. Choose the letter of the best answer. Write your answer on a separate sheet of paper.

1. Cassandra Bernice cuts a piece of writing pad. Describe what changes happened in the property of the piece of paper when it was cut.
   a. Physical appearance of the solid material
   b. New material is formed
   c. The color of the material is changed
   d. The texture of the paper changes

2 Claudia bought several pieces of tie wire from the hardware. Accidentally, on her way home some pieces of the tie wire bent. Describe what changed happened in the properties of the tie wire when it is bent.
   a. Materials change their size and shape
   b. No new material is formed
   c. Physical appearance of the materials is changed
   d. All of the above

3. Which of the following describes what happen to the modeling clay when it was pressed?
   a. The clay changed its size and color
   b. The clay changed its size and shape
   c. The clay changed its volume and odor
   d. The clay changed its volume and size

4. What changes may happen to solid materials when change in temperature and/or surrounding pressure is applied?
   a. Such action may change the materials size, shape, and texture
   b. Change its characteristics or properties
   c. No changes will happen
   d. Both A and B

5. What happened to the solid materials when they are pressed?
   a. Materials change their size, shape and texture
   b. Physical appearance of the material is changed
   c. The color may change
   d. Both A and B

6. Which is a condition that tells if an object is matter?
   a. It has mass and occupies space.
   b. It has definite shape.
   c. It can be seen.
   d. It can be heard.
7. What is the characteristic that only solids have?
   a. They have weight.
   b. They have definite shape.

c. They have no definite shape.
d. They can flow easily.

8. Liza cuts a chocolate bar into 2. Which of the following describes what changes happened to the chocolate bar?
   a. The chocolate bar changed its taste and odor.
   b. The chocolate bar changed its texture and odor.
   c. The chocolate bar changed its weight and odor.
   d. The chocolate bar changed its size and shape.

9. What can you do to change the size and shape of a piece of paper?
   a. color  b. cut  c. melt  d. press

10. Which of the following changes in the materials is useful to the environment?
    a. Throwing garbage in the canal.
    b. Using paper bags when shopping.
    c. Using detergents in washing clothes in the river
    d. Throwing hospital wastes in the river.

## *Additional Activities*

**A. Directions:** Put √ on the space provided if the material undergoes physical change and X if it does not undergo a physical change. Write your answer on a separate sheet of paper.

1. rotten cabbage
2. crushed garlic
3. grated coconut
4. rusted iron nail
5. cutting mat
6. pounding chocolate cube
7. chopped onion
8. bended wire

**Directions:** Choose inside the box five (5) materials that can be hammered. Write your answers on a separate sheet.

| | | | |
|---|---|---|---|
| paper | ice cube | tie wire | modeling clay |
| rocks | metal | wood | glass |

1.
2.
3.
4.
5.

## *Answer Key*

### *What I know*

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

### What's In

| (1)<br>Material | (2)<br>What can I do to change the material? | (3)<br>What change happened in the material? |
|---|---|---|
| *candle* | *By applying heat (may vary)* | *it melted* |
| *Crepe paper* | *By cutting/ crumpling (may vary)* | *Changed in shape/ size/ texture* |
| *Aluminum foil* | *By crumpling it/ cutting/ folding (may vary)* | *It changed into a ball of foil paper/ changed in size and shape* |
| *Plastic cup* | *By pressing (may vary)* | *Changed in shape and size* |
| *Drinking straw* | *By cutting (may vary)* | *Changed in size* |
| *Ice cube* | *By applying heat (may vary)* | *It changed to liquid* |
| *Chocolate bar* | *By cutting (may vary)* | *Changed in size and shape* |
| *wooden stick* | *By cutting(may vary)* | *Changed in size and shape* |
| *Rubber band* | *By cutting/ stretching (may vary)* | *Changed in size* |

Answers:

1. by applying heat, crumpling, cutting, stretching, folding, and pressing.
2. they change in shape, size, texture
3. by applying temperature and outside pressure

## What's New

**Activity 1**

| Material | What happened to the material when bent? |
|---|---|
| Plastic ruler | The ruler slightly changed it shape |
| Electric wire | It changed its shape |
| Paper clip | It changed its shape |
| Metal spoon | It changed its shape |
| Rubber slippers | It slightly changed its shape |

Answers:

1. they changed their shapes
2. No
3. Solid materials can be bent but it will not change to a new material

**Activity 2**

| Material | Observation |
|---|---|
| Modelling clay | It flattened |
| pandesal | It flattened |
| Paper cup | It was crumpled |
| banana | It flattened |

Answers:

1. Solid materials flattened when pressed
2. No
3. solid materials changed its size and shape when pressed but no new material was formed

**Activity 3**

| **Material** | **Observation** |
|---|---|
| Block of wood | It deformed |
| Empty tin can (lata) | It was flattened |
| Piece of hollow block | It was broken into several pieces |
| Sheet of galvanized iron | It was flattened |

Answers:

1. solid materials changed their shapes when hammered
2. No
3. some materials deformed, some was flattened and some was broken into several pieces

**Activity 4**

| Material | happened to the material when cut? |
|---|---|
| | |
| Piece of paper | It turned into small pieces |
| Piece of cardboard (karton) | It turned into small pieces |
| Candy wrapper | It turned into small pieces |
| Leaves | It turned into small pieces |
| Piece of cloth | It turned into small pieces |

Answers:

1. It turned into small pieces
2. No, they changed their sizes and shapes but the same materials

## What's More

1. After stretching the rubber band, is it still a rubber band? – Yes it is

2. After breaking the stick, is it still a stick? - Yes it is

3. After tearing the paper, is it still a paper? - Yes it is

4. After pounding the candle, is it still a candle? – Yes it is

5. After bending the wire, is it still a wire? - Yes it is

6. What changes brought about by what matter has undergone? It undergone physical change

7. by applying temperature or pressure

**Activity 2**

doughnut hollow blocks plastic cup

modeling clay rocks

orange fruit wood pillow

## What I Have Learned

1. Temperature can be applied; pressure can be applied.
2. physical change/change in appearance but not in composition

## What I Can Do

Answers:

1. The trees were cut.

2. There are animals in the forest. Some animals will die because they lost their homes and their source of foods

3. The place will be flooded because there are no roots to hold the water

## Assessment

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

## Additional Activities

1. rotten cabbage - /
2. crushed garlic - /
3. grated coconut - /
4. rusted iron nail - /
5. cutting mat - /
6. pounding chocolate cube - /
7. chopped onion - /
8. bended wire - /

1. ice cube
2. rocks
3. metal
4. wood
5. glass