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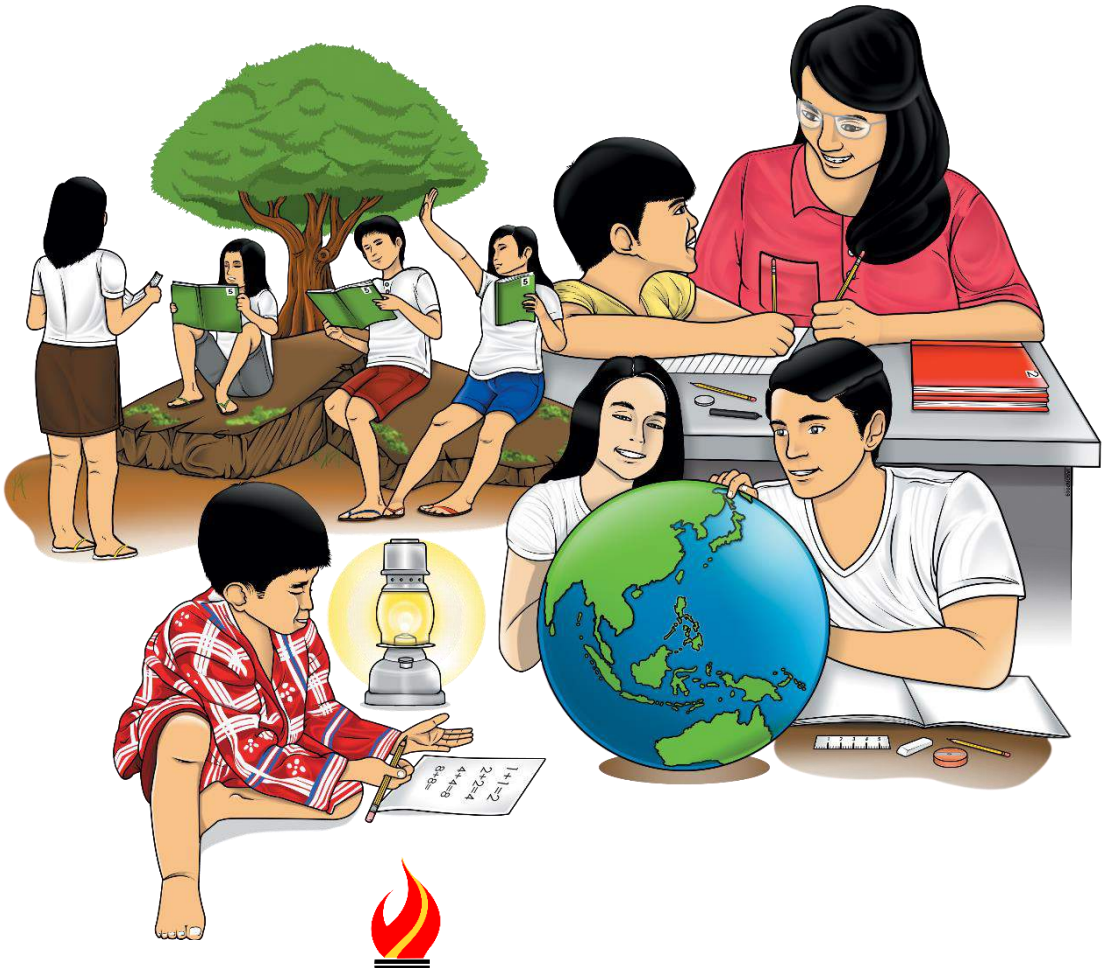
Science

Quarter 3 – Module 1:
Friction



ALTERNATIVE DELIVERY MODE
ADM

Science – Grade 6
Alternative Delivery Mode
Quarter 3 – Module 1: Friction
First Edition, 2020

Published by the Department of Education
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Undersecretary: Diosdado M. San Antonio

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Printed in the Philippines

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Science

Quarter 3 – Module 1:
Friction

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

This module was designed and written with you in mind. It is here to help you infer how friction and gravity affect movements of different objects (S6FE-IIIa-c-1). 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.

The module is divided into two lessons, namely:

- **Lesson 1** – Describe Friction
- **Lesson 2** – How Friction Affects Movement of Objects

After going through this module, you are expected to:

1. describe friction;
2. explain how friction affect the movement of different objects;
3. identify the factors affecting the motion of sliding or rolling objects;
4. explain how friction affects the motion of objects around you; and
5. demonstrate how the movement of moving objects are affected by friction.

What I Know

Directions: Infer how friction affects movements of different objects. Read and answer the questions below. Write your chosen letter on a separate sheet of paper.

1. Which of the following statements about friction is TRUE?
   A. Friction opposes motion of objects.
   B. Friction occurs between non-rubbing surfaces.
   C. Friction causes moving objects to move faster.
   D. Friction acts in a direction similar to the direction of an object's motion.

2. Will it be easier for a person to push a table on a carpeted floorthan on tiled floor?
   A. No, because the carpeted floor is rough, so friction is lesser.
   B. No, because the carpeted floor is rough, so friction is greater.
   C. Yes, because the carpeted floor is smooth, so friction is lesser.
   D. Yes, because the carpeted floor is smooth, so friction is greater.

3. When can we say that friction on a floor is greater?
   A. If the floor is wet.
   B. If the floor is tiled.
   C. If the floor is rough.
   D. If the floor is smooth.

4. Which force causes a rolling ball to stop after a few seconds?
   A. friction
   B. gravity
   C. magnetic
   D. motion

5. Why is difficult to move heavy objects on a rough surface?
   A. rough surface is slippery
   B. there is no friction on a rough surface
   C. there is lesser friction on a rough surface
   D. there is greater friction on a rough surface

6. When you are travelling along a road, how does the wet road affect friction?
   A. It increases friction.
   B. It decreases friction.
   C. It maintains friction.
   D. It increases and decreases friction.

7. Which of the following forces causes objects to slowdown and eventually stop?
   A. air resistance
   B. friction
   C. gravity
   D. magnetic

8. What is the direction of friction between a moving object and a surface?
   A. toward the direction of object's motion
   B. similar to the direction of object's motion
   C. opposite to the direction of object's motion
   D. perpendicular to the direction of object's motion

9. Which activity below needs least friction?
   A. grinding
   B. skating
   C. climbing
   D. writing

10. Which activity is a way of reducing friction?
   A. applying lubricant
   B. using rubber shoes
   C. putting spikes on tires
   D. removing wheels on heavy cabinets

Lesson 1

Describe Friction

Friction plays a vital role in our everyday life. Whatever we do, wherever we go, friction is present. Even when we are sitting down, standing or holding a bottle or any object, friction affects us. Friction occurs between the surfaces of two objects in contact, rubbing or sliding against one another. It is sometimes considered undesirable, yet it plays an important role in our daily activities.

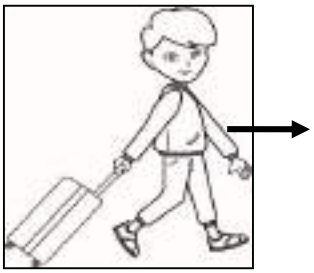
What's In

Study the pictures below. Identify whether the illustrations show a PUSH or a PULL to move the given objects or persons. Write your answers on your answer sheet.

_____

_____

_____



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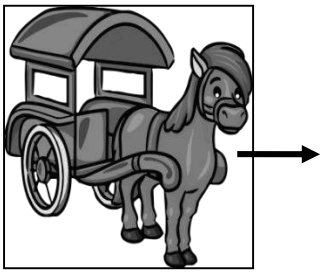
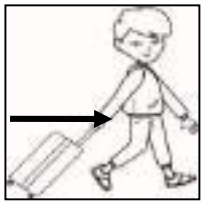


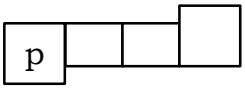
_____

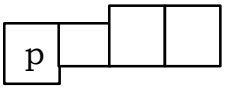
Illustrated by Ryan Oliver Arellano and Orencio D. Estrera

"Force is a _____ or a _____."

Clue 1: Force is a  or a  .

Illustrated by Ryan Oliver Arellano and Orencio D. Estrera

Clue 2: Force is a 

or a 

.

Write the complete sentence you formed on your answer sheet.

What's New

Friction is always present everywhere. It affects our daily activities. "What is friction? How does friction occur?" are just some common questions that you may want to ask. You will better understand and describe friction by doing the following activity.

Activity: Roll and Stop

In this activity, you will need any round object available at home like a ball, a tin can, or a tomato and the floor.

Get the ball or any available round object and put it on the floor. Push the ball gently to allow it to roll on the floor, as shown in the figure below. Observe the movement of the ball.

Figure 1. A boy pushes a ball to roll on the floor

Illustrated by Orencio D. Estrera

Based on your observations, answer the following questions.

1. What happened to the ball after it was pushed?

To answer this question, arrange the following events according to which happened first to last. Put the numbers 1 (first), 2, and 3 (last) on the blank before the sentence.

_____The ball slows down.
_____The ball stopped.
_____The ball rolled on the floor.

2. What caused the stopping of the ball?

F			c	t			n

3. Which of the following statements is/are TRUE about friction? Choose from the given statements below. Write the letter/s of your choice on your answer sheet.

A. Friction is produced by a single object.
B. Friction is a force that opposes motion.
C. Friction is an energy that moves the object.
D. Friction acts opposite to the direction of an object's motion.
E. Friction exists between the surfaces of two objects rubbing against each other.

What is It

Friction is a force that opposes an object's motion resulting in the slowing down or even stopping the moving object.

In the activity, when the ball was pushed, it rolled on the floor and stopped after a few seconds. It is the friction between the ball and the floor that caused the stopping of the ball. But how does friction occur? While the ball is rolling on the floor, the surface of the rolling ball rubs against the surface of the floor. Friction always acts opposite the direction of an object's motion. The floor exerts a frictional force opposite the ball's motion as shown in the figure below.

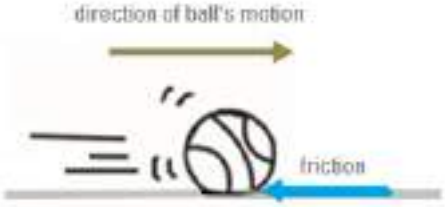


Figure 2. Frictional force acting on a rolling ball.

Illustrated by Orencio D. Estrera

Friction does not only occur on the surfaces of solid objects rubbing against one another, but it also occurs when air particles rub against objects falling down, thrown upward and flying airplanes and kites. The force that opposes the movement of objects in air is called **air friction** or **air resistance**. You will learn more about it in the next lesson.

What's More

Directions: Read the following items carefully and tell whether the statements are True or False. On your answer sheet, write **True** if the statement is correct and **False** if the statement is incorrect.

_____1. Friction acts in a direction the same as the direction of the object's motion.
_____2. Friction occurs when the surfaces of the two objects rub against each other.
_____3. Friction causes moving objects to stop.
_____4. Friction is produced by a single object.
_____5. Friction opposes motion of objects.

What I Have Learned

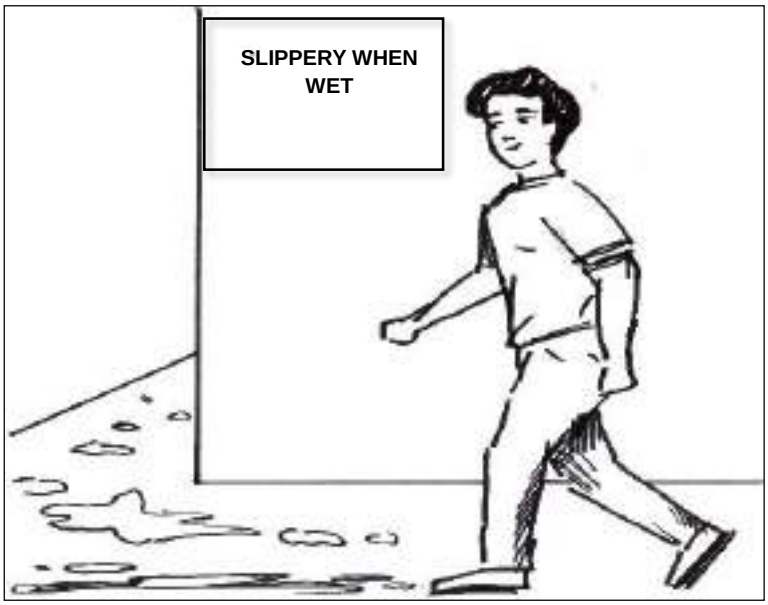
Directions: Complete the following statements by choosing the word that best completes the following sentences. Write the words you have chosen on your answer sheet.

I have learned that:

1. Friction is a (force, energy) that opposes the motion of objects.
2. When two surfaces of two objects rub against each other, (friction, mass) exists.
3. Friction always acts (opposite, the same) the direction of the object's motion.
4. With friction we can do many things like: (choose as many correct examples)
   - ☐ speaking on a phone
   - ☐ holding an apple
   - ☐ sitting on a chair
   - ☐ walking properly
   - ☐ listening to a radio

What I Can Do

Study the picture and answer the questions below. Write your answers on your answer sheet.



Illustrated by Orencio D. Estrera

1. What accident do you think might happen if the boy walked on the wet floor?

_____
_____
_____

2. How can you prevent the possible accident from happening? Why?

_____
_____
_____

Assessment

Directions: Answer the following questions carefully by choose the letter of your choice. Write your chosen letter on your answer sheet.

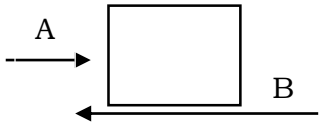
1. A ball rolled after being kicked and slowed down until it stopped. Which of the following forces caused the ball to slow down?
   A. electrical
   B. friction
   C. gravity
   D. magnetic

2. Is friction between the floor and a cabinet present when a person pushes the cabinet?
   A. Yes, because the bottom surface of the cabinet is in contact with the floor.
   B. Yes, because the bottom surface of the cabinet does not rub against the floor.
   C. No, because the bottom surface of the cabinet has nothing to do with the floor.
   D. No, because the bottom surface of the cabinet is only rubbing against the floor.

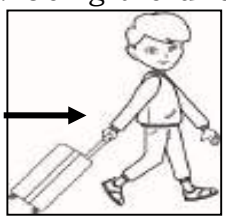
3. Which of the following is NOT TRUE about friction?
   A. Friction opposes motion of objects.
   B. Friction occurs between non-rubbing surfaces.
   C. Friction causes moving objects to slow down and stop.
   D. Friction acts in a direction opposite to the direction of an object's motion.

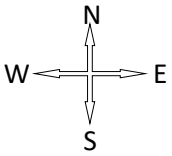
4. Which of the following can friction do to a glass of water on a table?
   A. It moves the glass.
   B. It allows the glass to slide.
   C. It does not affect the glass.
   D. It prevents the glass from sliding.

5. Study the diagram, which force does B represents?
   A. friction
   B. gravity
   C. magnetic
   D. motion



6. The boy in the illustration pulls a stroller. Using the directions shown, which direction does the frictional force act?





   A. East
   B. North
   C. South
   D. West

7. Which of the following actions is difficult to do with friction?
   A. writing on a paper
   B. holding a banana
   C. playing basketball
   D. pushing a heavy cabinet

8. Which of the following statements is TRUE?
   A. Friction makes objects move.
   B. Friction stops moving objects.
   C. Friction has no effect on moving objects.
   D. Friction allows moving object to continue moving.

9. Which of the following statements describe friction?
   A. It slows down motion.
   B. It pulls objects downward.
   C. It does not oppose motion.
   D. It moves along with the object.

10. Which force is present when two objects rub against each other?
   A. friction
   B. gravity
   C. magnetic
   D. motion

Additional Activities

Directions: Describe friction by completing the following graphic organizer. Fill in the blanks with the words listed inside the box to complete the given sentences. Write your answers on your answer sheet.

rub	***opposes***	***opposite***	***stop***

FRICTION

1. is a force that _____ motion of an object.

2. acts _____ to the direction of moving objects.

3. exists when two surfaces _____ against each other.

4. can cause moving objects to _____.

Lesson 2 How Friction Affects Movement of Objects

Friction is a force that occurs between the surfaces of two objects in contact or rubbing against each other. It may vary depending on the type of surface an object comes in contact with. With this, friction brings advantages and disadvantages to moving and non-moving objects. Let us learn and discover how friction affects moving objects.

What's In

Directions: Read the following items carefully and tell whether the statements are True or False. On your answer sheet, write **True** if the statement is correct and **False** if the statement is incorrect.

_____1. Friction is an energy that moves objects.

_____2. Friction causes moving objects to stop.

_____3. Friction occurs when two surfaces rub against each other.

_____4. Friction allows objects to continue moving.

_____5. Friction acts in a direction opposite the direction of an object's motion

What's New

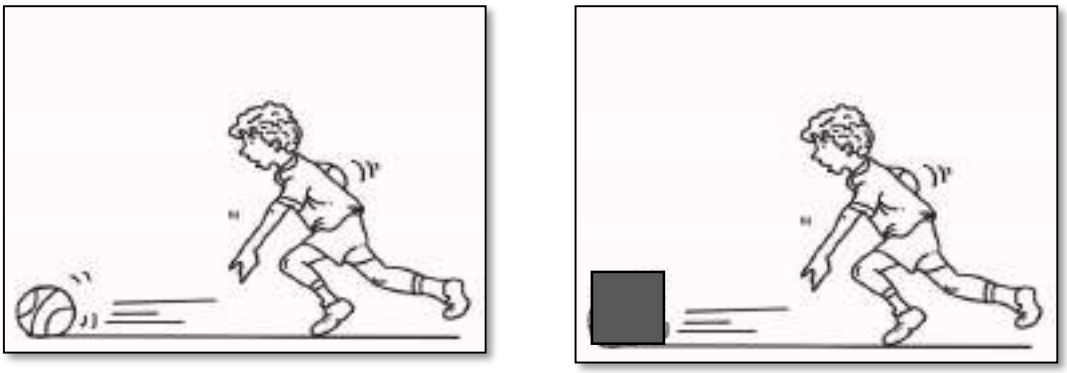
Activity 1. Rolling and Sliding

In this activity, you will observe how friction affects the movement of objects. You will also identify the factors affecting it.

You will need a ball and a box with almost the same mass as the ball.

Instruction:

1. Perform this activity on a floor or on a long table.
2. Put a mark on the floor. Place the ball on the mark.
3. Push the ball gently, as shown in Figure 1 below. Mark the point where the ball stopped. Repeat the steps two more times.
4. Replace the ball with a small box. Place it on the same mark where the ball was initially placed.
5. Apply the same amount of push to the box as was given to the ball, as shown in Figure 2. Put a mark on the point where the small box stopped. Repeat the steps two more times.



Illustrated by Ryan Oliver Arellano and Orencio D. Estrera

Answer the following questions by choosing between the ball and the box. Write your answers on your answer sheet.

Questions	Write BALL or BOX
1. Which object has the longer distance traveled?	
2. Which object has bigger surface area in contact with the floor?	
3. Which object was acted on by greater friction?	

Based on the activity, complete the following statements by choosing the word that best completes the following sentences. Write the words you have chosen on your answer sheet.

1. Why does the ball and the box travel at different distances?
   The ball and the box travelled different distances because of the difference in their (shape/surface area, push applied).

2. How does friction affect the movement of objects with big or small surface areas?
   An object with a bigger surface area, experiences a(greater, lesser) friction while an object with a smaller surface area has a(greater, lesser) friction.

3. How does friction affect the movement of objects such as the ball and the box? Friction makes moving objects (slowdown, get faster). It can also (stop, move) moving objects.

4. In this activity, what is the factor affecting friction? (shape/surface area, distance travelled)

Activity 2. Falling Objects

Does air affect the movement of falling objects? In this activity, you will be able to observe how air affects the movement of falling objects.

You will need 2 identical sheets of paper.

Instruction:

1. Perform the activity in your room.
2. Prepare two sheets of identical papers. Crumple one of the papers.
3. Raise the two pieces of paper to the same height, as shown in the figure below.
4. Drop the papers at the same time. Observe which object reached the floor first. This will be your first trial. Repeat dropping the papers two more times and observe. These will be your second and third trials.

Figure 3. Raising two pieces of paper, one crumpled, to the same height
Illustrated by Ryan Oliver Arellano

Fill in Table1 by writing the word "**First**" or "**Last**" according to the order the paper fell on the ground per trial.

Table 1

Object	Observation (Write First or Last)		
	Trial 1	Trial 2	Trial 3
Crumpled Paper			
Plain Paper			

Answer the questions below. Write your answers on your answer sheet.

1. Based on your answer in Table 1, between the crumpled paper and the uncrumpled one, which object reached the floor first?
   A. crumpled paper
   B. plain paper

2. Does air affect the falling of the two papers? Why?
   A. Yes, the air opposes the movement of the two papers.
   B. No, the air does not oppose the movement of the two papers.

3. Which object experienced the greater opposing force of the air? Why?
   A. The crumpled paper because it has a small surface area in contact with the air.
   B. The plain paper because of its wide or big surface area in contact with the air.

4. How does air friction affect the movement of falling objects? Choose the correct answer inside the parenthesis.

   Air friction (slows down, increases) the motion of falling objects.

What is It

In the two activities that you have conducted, you have observed that friction affects the movement of the ball, box, and falling pieces of paper. You were also able to identify the factors affecting it.

In Activity 1, the ball and the box covered different distances. The ball traveled longer distance than the box. It is because of their different shapes or surface area in contact with the floor. The surface area of the ball in contact with the floor is smaller, while the box has a bigger or greater surface area.

Objects with bigger surface areas, like a box, are easier to stop; thus, it travels a shorter distance because greater friction acts on it. Objects with smaller surface areas, like a ball, are harder to stop; thus, it travels a longer distance because lesser friction acts on it. Therefore, surface area of contact affects friction. The bigger or greater the surface area of objects in contact with the floor, the greater the friction. The smaller surface area of objects in contact with the floor, the lesser the friction.

In Activity 2, air resists the movement of the falling pieces of paper. This air resistance is also known as **air friction** or **air resistance** introduced in lesson 1. It acts opposite the direction of motion of falling objects as shown in the figure below

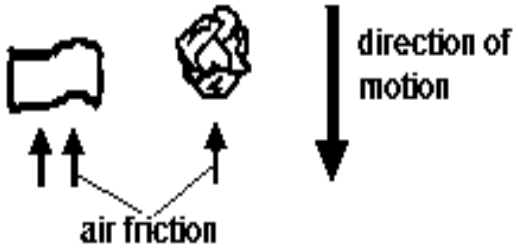


Figure 4. Air friction acting on the crumpled and plain paper
Illustrated by Ryan Oliver Arellano

The bigger or greater the surface area of falling objects, the greater the air friction. The smaller the surface area of falling objects, the lesser the air friction.

What's More

Activity 3. Rough and Smooth

Friction also varies on the type of surfaces of the two objects rubbing against each other. To observe how objects' different textures of surfaces affect friction, do the activity below.

You will need any round object like a ball, a marble, or a tomato and a piece of cloth (like towel).

Instruction:

1. Perform this activity on a long table or the floor.
2. Set up all the materials, as shown in Figure 5 below.
3. Cover one side of the table with a cloth (like towel). The covered portion will represent rough surface and the uncovered portion, a smooth surface.
4. Place the ball at the starting line of the smooth surface.
5. Push the ball gently. Mark the point where the ball stopped. Repeat two more times.
6. Do the same for the rough surface this time. Repeat two more times.

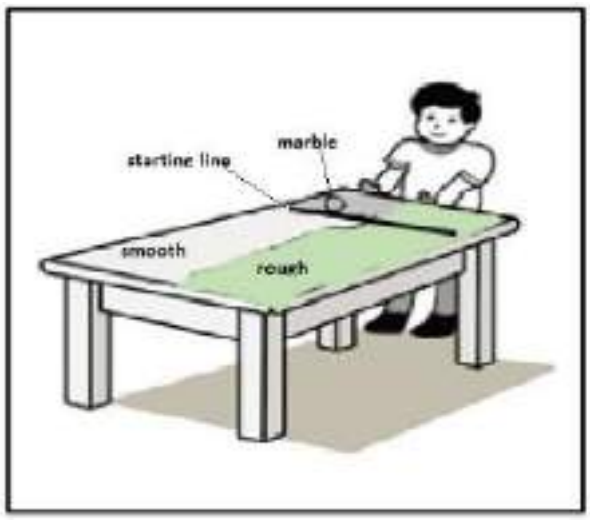


Figure 5. A boy pushes the ball on an uncovered and covered table.
Illustrated by Orencio D. Estrera

Answer the following questions by completing Table 2.Write your answers on your answer sheet.

Table 2

Questions	Answer (Smooth or Rough)		
	Trial 1	Trial 2	Trial 3
1. In which surface did the ball travel a longer distance?			
2. In which surface did the ball travel a shorter distance?			
3. Which surface has a greater friction?			
4. Which surface has a lesser friction?			

Based on the activity, Answer the following questions by choosing the word that best complete the following sentences. Write the words you have chosen on your answer sheet.

1. How does friction differ in a smooth surface from a rough surface?

"Friction is (greater, lesser) in smooth surface, while friction is (bigger, smaller) in rough surface.

2. How does friction affect the movement of objects in smooth and rough surfaces?

Objects move (faster, slower) in smooth surface. Object moves (faster, slower) in rough surface.

3. In this activity, what is the factor affecting friction? (surface texture, mass).

What I Have Learned

Directions: Complete the following statements by filling in the blanks with the appropriate words listed inside the given box. Write your answers on your answer sheet.

friction	***greater***	***slows***	***lesser***

I have learned that:

1. _____ affects the movement of objects.
2. Friction _____ the movement of objects in motion.
3. Friction is _____ in rough surface and object with bigger surface area.
4. Friction is _____ in smooth surface and object with smaller surface area.

What I Can Do

I. Directions: Write "**MF**" if more friction or "**LF**" if less friction is needed on the following activities or objects. Write your answers on your answer sheet.

_____1. walking a smooth surface
_____2. writing on a paper-covered surface
_____3. skating
_____4. grinding
_____5. sliding door
_____6. holding a glass of water
_____7. pushing a heavy cabinet
_____8. rotating gears of bicycle
_____9. pole climbing
_____10. setting of glass and plates on top of a table

II. Directions: Answer the question below. Write your answer on your answer sheet.

Cristy wants to move her heavy cabinet, what do you think must she do to easily move the heavy cabinet on her own?

_____
_____
_____
_____

Assessment

Directions: Infer how friction affects movement of objects by analyzing and answering the following questions. Write your answers on your answer sheet.

1. Why do drivers drive their car slowly during rainy days?
   A. Drivers drive slowly because the windshield is blurred.
   B. Drivers drive slowly because they are afraid of the rain.
   C. Drivers drive slowly because the road is wet so there is less friction.
   D. Drivers drive slowly because the road is wet so there is more friction.

2. Which is NOT a way of reducing friction?
   A. applying lubricant
   B. putting spikes on tires
   C. making the floor smooth
   D. putting grease on bicycle gears

3. Why do you need to put rollers under the cabinets when you want to move them?
   A. to apply more force
   B. to stop the movement of the cabinet
   C. to slow down the movement of the cabinet
   D. to minimize friction through the small surface of contact of the rollers.

4. Why do badminton players use rubber shoes while playing?
   A. to slide since the badminton court is slippery
   B. to glide faster since the badminton court is slippery
   C. to have lesser friction between their shoes and the floor.
   D. to have greater friction between their shoes and the floor.

5. Which of the following situations shows that friction is increased?
   A. Ana uses rubber shoes while jogging.
   B. Ruben puts rollers on heavy cabinets.
   C. Naldo puts grease on his bicycle gears.
   D. Belle puts floor wax to make the floor smooth.

6. In which of the following situations would friction most likely pose a problem?
   A. holding a pen to write
   B. striking a match to cook
   C. walking on a slippery floor
   D. rubbing your hands to warm them

7. Which of the following shows that friction could be harmful?
   A. writing on the board
   B. holding a piece of paper
   C. tearing out of bicycle gears
   D. using breaks when stopping

8. How do you describe the friction between a surface and an object with greater surface area?
   A. greater
   B. equal
   C. smaller
   D. the same

9. A crumpled and an uncrumpled paper were dropped at the same height and time, which paper will reach the ground first?
   A. The crumpled paper because it has a smaller surface area.
   B. The uncrumpled paper because it has a bigger surface area.
   C. Crumpled paper because it is heavier compared to the uncrumpled paper.
   D. None, because both the crumpled and uncrumpled paper have same masses.

10. A boy is playing with a toy car. In which surface will it travel faster?
   A. cemented floor
   B. carpeted floor
   C. grassy surface
   D. polished floor

Additional Activities

I. Directions: Determine which activities o features of objects below illustrate a benefit or harm of friction. Draw a smiley face ☺ if the given shows a potential benefit and a sad face ☹ if it shows potential harm.

Activities / Features	**Draw: ☺ If potential benefit ☹ If potential harm**
1.  bicycle brakes	

2.  striking a match for cooking	
3.  no oil in a car engine	
4.  rusty padlock	
5.  holding a soda can	

Illustrated by Ryan Oliver Arellano and Orencio D. Estrera

II. Directions: Identify the activities below that show a way of reducing friction. Put a tick mark (✓) in the box if it shows reducing friction and cross (**X**) if not.

☐ 1. Nestor puts rollers under his heavy cabinet.

☐ 2. Erol uses rubber shoes while playing basketball.

☐ 3. Andrea applies floor wax to make the floor smooth.

☐ 4. Nelmar puts grease on his bicycle gears.

☐ 5. Rose mops the wet floor

Answer Key

Lesson 1: Describe Friction

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

What's In
1. PUSH
2. PULL
3. PUSH
4. PULL
5. PULL

Define "force" based on the examples above.
Force is a push or pull
Write the complete sentence.
Force is a push or a pull.

What's New
Activity 1: Roll and Stop

1. 2
   3
   1
2. Friction
3. B
   D
   E

What's More
1. False
2. True
3. True
4. False
5. True

What I Have Learned
1. force
2. friction
3. opposite
4. holding an apple
   sitting on a chair
   walking properly

What I Can Do
(Possible Answers):
1. He might slip and hurt himself.
2. Mopping the floor to make it dry might prevent the possible accident to happen. Since, there is greater friction on dry floor possible accidents might be prevented.

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

Additional Activities

1. opposes
2. opposite
3. rub
4. stop

Lesson 2: How Friction Affects Movement of Objects

What's In
1. False
2. True
3. True
4. False
5. True

What's New
Activity 1: Rolling and Sliding
I. Fill in the table
1. Ball
2. Box
3. Box

II. Questions
1. shape/surface area
2. greater
   lesser
3. slowdown
   stop
4. shape/surface area

Activity 2: Falling Objects
I. Fill in the table
Crumpled paper – <u>first</u>
Plain Paper – <u>last</u>

II. Questions
1. A. crumpled paper
2. A. Air opposes the movement of the two papers.
   smaller
3. B. The plain paper, because of its wide or big surface area
4. slows down

What's More
Activity 3: Rough and Smooth
I. Fill in the table (same answers for all trials)
1. Smooth
2. Rough
3. Rough
4. Smooth

II. Questions
1. smaller
   bigger
2. faster
   slower
3. surface texture

What I Have Learned
1. Friction
2. slows
3. greater
4. lesser

What I Can Do
I. More Friction or Less Friction
1. LF
2. MF
3. LF
4. MF
5. LF
6. MF
7. LF
8. LF
9. MF
10. MF

II. Answer the question (Possible Answers):
<u>She should put rollers under her cabinet to easily move it.</u>

<u>She should put floor wax on the floor to make it slippery and to easily move the cabinet</u>

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

Additional Activities
I. Advantage and Disadvantage
1. ☺
2. ☺
3. ☹
4. ☹
5. ☺

II. Ways of Reducing Friction
1. ✓
2. **X**
3. ✓
4. ✓
5. **X**

References

NOTE: All texts and illustrations in this SLM were originally developed and created.

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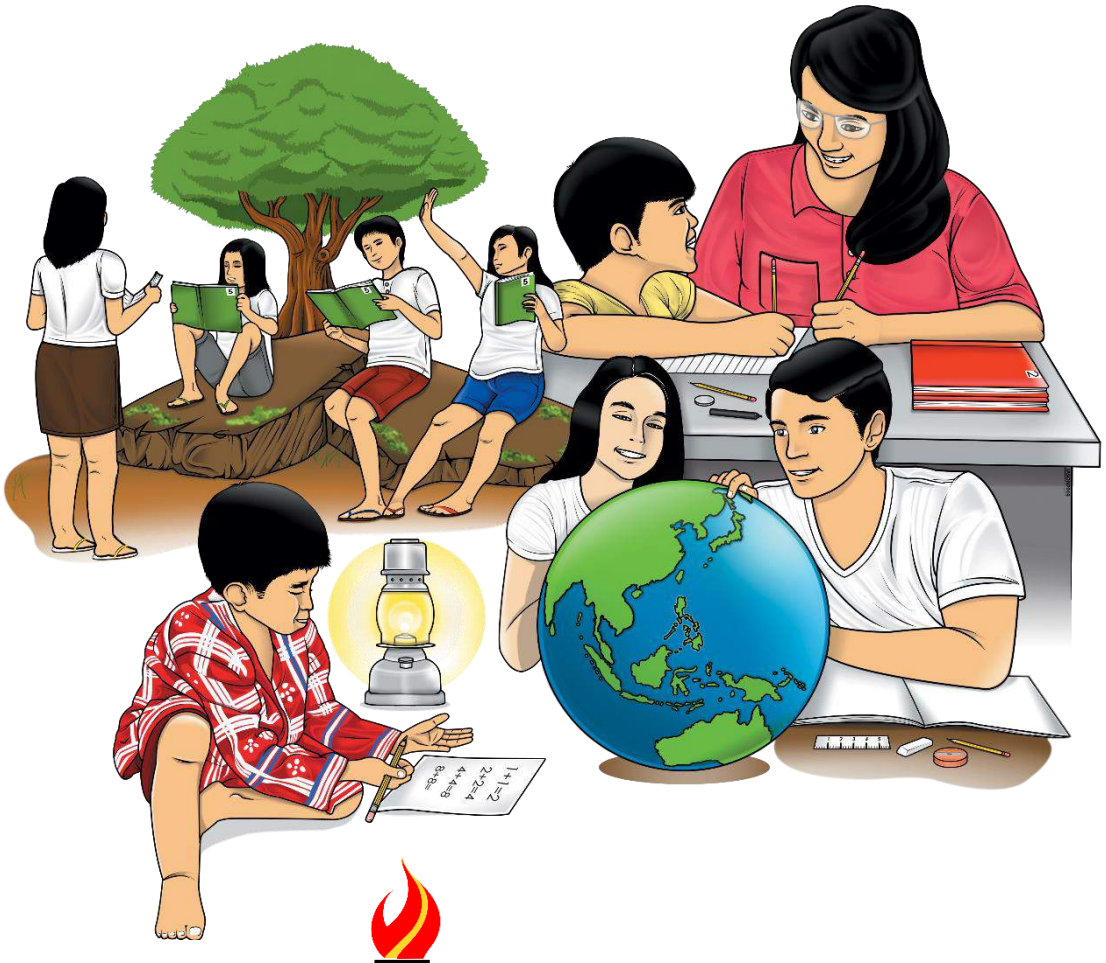
Science

Quarter 3 – Module 1A:
Gravity



ALTERNATIVE DELIVERY MODE
ADM

Science – Grade 6
Alternative Delivery Mode
Quarter 3 – Module 1A: Gravity
First Edition, 2020

Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

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Printed in the Philippines by _____

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6

Science

Quarter 3 – Module 1A:
Gravity

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

This module was designed and written with you in mind. It is here to help you to infer how gravity affects movements of different objects (S6FE-IIIa-c-1). The scope of this module permits it to be used in different learning situations. The language used recognizes the diverse vocabulary level of learners. 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 is divided into the following lessons:

- **Lesson 1** – Describe Gravity
- **Lesson 2** – How Gravity Affects Movement of Objects

After going through this module, you are expected to:

1. describe gravity;
2. explain how gravity affects movement of different objects;
3. identify the factors affecting the motion of falling objects;
4. demonstrate how the movement of moving objects are affected by gravity; and
5. explain how gravity affects the motion of objects around you.

What I Know

Directions: Infer how gravity affects movements of different objects. Read and answer the questions below. Write the letter of your answers on a separate sheet of paper.

1. Which force does NOT act on falling leaves?
   A. friction
   B. gravity
   C. magnetic
   D. air resistance

2. Which effect does gravity have on how high a person jumps?
   A. The weaker the gravity, the lower the jump.
   B. The weaker the gravity, the higher the jump.
   C. The stronger the gravity, the higher the jump.
   D. Gravity does not influence how high a person jumps.

3. Which of the following objects would have the greatest gravitational pull exerted on another object on earth?
   A. sun
   B. moon
   C. stone
   D. earth

4. Which of the following is an example of resisting gravity?
   A. a rock rolling down a hill
   B. a coconut falling from a tree
   C. pouring water into the glass
   D. an airplane taking off from the ground

5. What is the direction of gravity between two objects?
   A. sideways
   B. toward each other
   C. away from each other
   D. perpendicular to each other

6. What happens to the gravitational attraction between objects when the distance between them is increased?

   A. lesser
   B. nearer
   C. farther
   D. greater

7. In which heavenly body will an object hit its surface last when dropped at the same height and the same time?
    A. Earth
    B. moon
    C. Jupiter
    D. Saturn

8. Three 1-kg stones are thrown upward at the same height and the same time in different places, moon, earth, and Jupiter. In which place will the stone hit the ground first?
    A. moon
    B. Earth
    C. Jupiter
    D. meteor

9. Which action opposes gravity?
    A. skating downhill
    B. dropping a stone into a pond
    C. hammering a nail into a wooden plank on the floor
    D. lifting a box from the floor and placing it on top of the table

10. Which object has the weakest gravitational pull?
    A. fist-sized rock
    B. piece of paper
    C. huge truck
    D. the moon

Lesson 1

Describe Gravity

The theory of gravity was proposed by Sir Isaac Newton in 1687 in his book *Principia Mathematica*. He saw an apple falling from a tree, and it got him thinking about the mysterious force that pulls objects to the ground. Newton named this mysterious force "gravity".

Gravity puts all things on Earth and the universe in order. Cars, water in the ocean, rocks, houses, tables, chairs, plates, appliances, and other things stayed on its place. They do not float away. Gravity helps keep the planets orbiting around the sun and moons revolving around the planets. Objects that are thrown upward on Earth eventually fall down. This is because the Earth is exerting an attractive force on us and to all things around us.

Without gravity, everything on the Earth's surface will float in the atmosphere, just like astronauts floating in their spaceship. While traveling in the outer space, sun, planets and other heavenly bodies in the solar system will bump at each other. Stones thrown upward will never fall down.

Thank you, gravity!

What's In

Determine if gravity is acting on the object from the pictures. Analyze them carefully. Answer the questions that follow.

Figure 1. A car falls from a cliff.

Figure 2. An astronaut experiencing weightlessness in space.

Photo credit to https://www.canva.com

1. Is gravity acting on the car that falls off a cliff (Figure 1)? _____
2. Is gravity acting on the astronaut experiencing weightlessness in space (Figure 2)? _____

What's New

Activity 1: THE FALL

After this simple activity, you will be able to describe gravity.

You will need any handy object (ball/notebook/small stone or crumpled paper).

Instructions:

1. Get any handy object near you. Raise the object at a certain height, as shown in Figure 3 below.

Figure 3. Raising an object to a certain height

Illustrated by Ryan Oliver S. Arellano

2. Quickly release the object. Observe what happens to the object. Repeat the step two more times and observe.

3. Using the same object, throw it upward, as shown in Figure 4 below. Observe what happens to the object. Repeat the step two more times and observe.

Figure 4. Throwing an object up

Illustrated by Ryan Oliver S. Arellano

Answer the questions below by writing the letter of the correct answer. Write the letter of your answers on a separate sheet of paper.

1. In Figure 3, what happened to the object when it was released?

   A. It fell to the ground.

   B. It floated in the air.

2. In Figure 4, what happened to the object after it was thrown upward?

   A. It flew up and eventually falls after some time.

   B. It flew all the way into the air and never fell back.

3. Based on the two activities, what was common in what happened to the objects?

   A. The objects fell to the ground.

   B. The objects stayed in the air.

4. Why did the objects behave the way they did in the two activities?

   A. Gravity pulls the object downward.

   B. Air pulls the object downward.

5. How do you describe gravity?

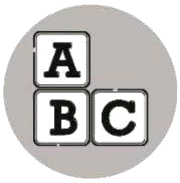
   A. Gravity is a force that pulls objects towards each other.

   B. Gravity is a force that keeps objects float in the air.

What is It

In **Activity 1**, whether the object is dropped or thrown upward, the object tends to go back to the ground. There is a force that pulls all objects towards the ground. This force is called gravity or also known as the **gravitational force.**

Gravity is a force of attraction that exists between any two objects. This gravitational force between the two objects acts towards each other. The two objects are attracting or pulling one another towards each other. Also, there is a gravitational force between Earth and us, between two people, between two marbles, and even between two atoms or particles.



What's More

Directions: Read the following items carefully and tell whether the statements are True or False. On your answer sheet, write **True** if the statement is correct and **False** if the statement is incorrect.

Statements	True or False
1. All objects on Earth fall towards the center of the Earth.	
2. Gravity is the attraction of two objects towards each other.	
3. Gravitational force on Earth pulls all things on Earth downward.	
4. An Object remains on air when it is thrown upward.	
5. Gravity only affects solid objects.	

Activity 2: Towards or Against Gravity

Directions: Examine the following pictures. Write Against if the picture illustrates moving *against* gravity and Towards, otherwise. Write your answers on your answer sheet.

Illustration	Moving ***against*** or towards Gravity
1. 	
2. 	
3. 	
4. 	
5. 	

Illustrated by Raymond Michael A. Gayatin

What I Have Learned

Directions: Complete the following statements by choosing the word that best completes the following sentences. Write the words you have chosen on your answer sheet.

I learned that:

1. (**Gravity, Air**) is a force that pulls all objects downward or towards the center of the Earth.

2. Gravity is a force of (**attraction, repulsion**) that exists between two objects which act towards each other.

3. Earth's (**mass, gravity**) keeps us and all objects on the ground.

4. Gravity is a (**force, energy**) that affects all objects in the universe.

What I Can Do

Directions: Draw a simple illustration of what will happen around us if there is no gravity. Write your answers on your answer sheet.

Assessment

Directions: Infer how gravity affects movements of different objects. Read and answer the questions below. Write the letter of your answers on a separate sheet of paper.

1. Why does a ball thrown into the air tend to fall back to the ground?
   A. Gravity causes the ball to fall.
   B. The air pulls the ball to the ground.
   C. Acceleration causes the ball to move faster.
   D. The mass of the ball causes the ball to drop.

2. What is the direction towards which objects on Earth are pulled by the Earth?
   A. back
   B. center
   C. front
   D. side

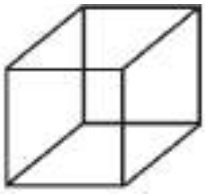
3. In order to jump, what force do we need to overcome?
   A. friction
   B. gravity
   C. mass
   D. wind

4. Which will happen if a ball is thrown upward?
   A. The ball remains in the air.
   B. The ball moves in a curve path.
   C. The ball will go back to the ground.
   D. The ball continues to move upward.

5. Based on the figure below, to which direction should the force be applied to overcome the force of gravity?

A. 

B. 



C. 

Illustrated by Raymond Michael A. Gayatin

D. 

6. Imagine the Earth lost its gravity. What will happen to objects on it?
   A. All objects will float in the air.
   B. All objects will fall on the ground.
   C. Everything will just stay in place.
   D. Only the lighter objects will float in the air.

7. Which of the following keeps all objects on Earth stay on the ground?
   A. energy
   B. gravity
   C. mass
   D. speed

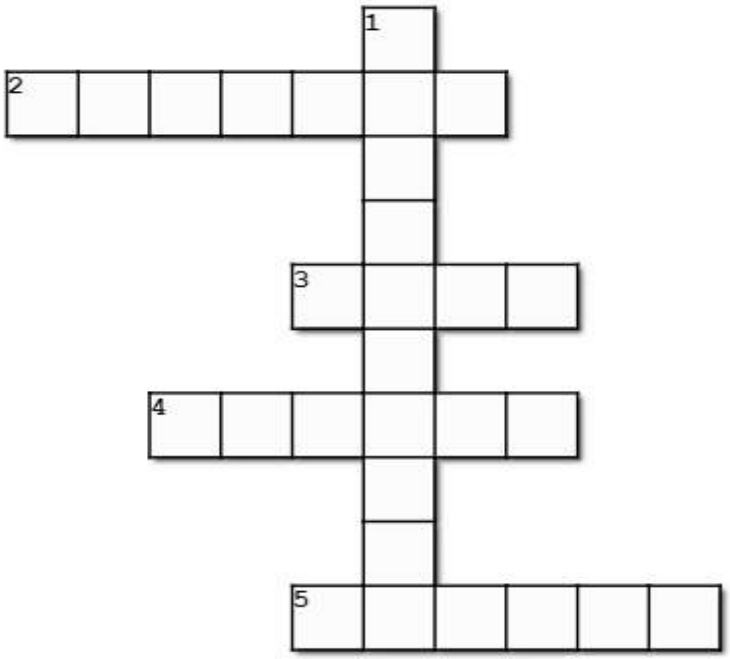
8. How will planets move if there is no gravity in the universe?
   A. Nothing will happen.
   B. Planets will stay in orbit.
   C. Planets will not be attracted to each other.
   D. All planets will move to the eastern direction.

9. Who discovered gravity when he saw an apple falling to the ground?
   A. Albert Einstein
   B. Galileo Galilei
   C. Isaac Newton
   D. Nicholas Copernicus

10. Gravity affects all objects in the universe.
   A. true
   B. false
   C. maybe
   D. it depends

Additional Activities

Directions: Read the clues in the box and fill in the puzzle below. Write only one letter of the word per box.Write your answers on a separate sheet of paper.



Down

1. Gravity is an _____ force.

Across

2. The force of _____ causes objects on earth to fall to the ground.
3. Anything that has _____ possesses gravity.
4. Gravity pulls objects toward the _____ of the earth.
5. He discovered gravity when he saw a falling apple.

Lesson 2 How Gravity Affects Movement of Objects

In the previous lesson, you have learned that gravity is a force of attraction that exists between any two objects. These two objects are pulling one another towards each other. Does gravity affect moving objects?

In this lesson, you will learn how gravity affects the movement of objects.

What's In

Directions: Read the following items carefully and tell whether the statements are True or False. Write **TRUE** if the statement is correct and **FALSE** if it is wrong. Write your answers on your answer sheet.

_____1. Gravity is a force pulling two objects towards each other.

_____2. Gravity keeps all objects on Earth on the ground.

_____3. An object thrown upward flies upward and never comes back.

_____4. Only bigger objects have gravity.

_____5. Gravitational force is always an attractive force.

What's New

In the activity on Lesson 1, you have observed that when an object is thrown upward, after reaching a certain height, it goes down. You have learned that gravity pulls the object down until it reaches the ground. In this activity, you will observe and describe motion of an object thrown upward.

Activity 1: A Great Come Back

You will need a crumpled paper (or any light object).

Instruction:
1. Prepare a crumpled paper.
2. Throw it upward. Please see Figure 1.
3. Observe the movement or motion of the crumpled paper while going up and down.
4. Repeat the procedure until you get a clear observation of the paper's motion.

Figure 1. Throwing an object up

Illustrated by Ryan Oliver S. Arellano

Answer the questions below. Choose the correct answer.

1. What can you say about the movement or motion of the crumpled paper as it goes up?
   A. The crumpled paper moves faster as it goes up.
   B. The crumpled paper slows down as it goes up.

2. What did you observe about the movement or motion of the crumpled paper as it goes down?
   A. The crumpled paper moves faster as it goes down.
   B. The crumpled paper slows down as it goes down.

3. How does gravity affect the movement or motion of the crumpled paper as it goes upward?
   A. Gravity increases the motion of crumpled paper as it goes up.
   B. Gravity slows down the motion of crumpled paper as it goes up.

4. How does gravity affect the movement or motion of the crumpled paper as it goes down?
   A. Gravity increases the motion of crumpled paper as it goes down.
   B. Gravity slows down the motion of crumpled paper as it goes down.

What is It

Earth's gravity pulls all objects down towards its center regardless of the objects' position or state of motion. Thus, gravity affects the movement of all objects on Earth and the universe as a whole.

In the activity, gravity affects the movement or motion of the crumpled paper as it moves up and down. As the object goes up, the movement of the crumpled paper slows down because gravity pulls it towards the ground. The direction of the gravitational force is towards the ground opposite the direction of the paper's motion, which is upward. As the object goes down, the movement or motion of the crumpled paper increases or becomes faster because the Earth pulls the paper in the same direction of the paper's motion.

As a summary, if the object moves opposite the direction of gravity, it slows down, but if the object moves in the same direction of gravity, it moves faster.

What's More

Activity 2: Big and Strong

Gravity is the universal force that affects all objects in the universe. It holds together the entire solar system, the Milky Way galaxy and other galaxies. It is the same force that keeps the planets revolving around the sun and the moon orbiting the earth.

Study Table I below.

Table I: Values of Mass and Acceleration due to gravity, Gravitational Force of Moon, Earth, and Jupiter, and Object's Motion

Heavenly Body	Mass (x 10^{24} kg)	Acceleration Due to gravity (m/s^2)	Gravitational Force (x10^{23} N)	Movement of Object A on the heavenly body
Moon	0.0736	1.62	1.1776	Slow
Earth	5.9720	9.80	585.2560	Fast
Jupiter	1900.0000	25.95	493,050.0000	Fastest

I. Based on **Table I**, answer the questions below by choosing the heavenly body from the heavenly bodies listed in the box. Write your answers on your answer sheet.

Moon	Earth	Jupiter

1. Which heavenly body has the smallest mass?
2. Which heavenly body has the greatest mass?
3. Which heavenly body has the smallest value of gravitational force?
4. Which heavenly body has the biggest value of gravitational force?
5. On which heavenly body does object move slowest?
6. On which heavenly body do objects move fastest?

II. **Directions**: Answer the following questions. Write your answers on your answer sheet. For numbers 1 to 4, choose your answers from the word list in the given box.

fast	slow	strong	weak

1. If the mass of the object is small, the gravitational force is _____.
2. If the mass of the object is big, the gravitational force is _____.
3. If the gravitational force on a heavenly body is weak, the movement or motion of object dropped is _____.
4. If the gravitational force on a heavenly body is strong, the movement or motion of the object is _____.

For numbers 5 and 6, choose the correct word from the parentheses.

5-6. What is the effect of mass on the gravity or gravitational force of an object?

5. If the mass of an object is (**bigger, smaller**), the gravity or gravitational force is (**stronger, weaker**).
6. **Conclusion:** Make your conclusion by choosing the correct word from the parentheses. If the gravity or gravitational force between two objects is (**stronger, weaker**), the movement or motion of the object is (**faster, slower**).

What I Have Learned

Directions: Complete the following statements by choosing the word that best completes the following sentences from the parenthesis per item. Write the words you have chosen on your answer sheet.

Choose the correct answer.

I learned that:

1. Gravity (**increases, decreases**) the motion of objects going down.

2. Gravity (**increases, decreases**) the motion of objects going upward.

3. Gravity is (**greater, lesser**) if the mass of the object is (**bigger, smaller**).

4. If gravity between two objects is (**greater, lesser**), the movement or motion of the object is (**faster, slower**).

What I Can Do

Activity 3: Gravity in Action

A. **Directions:** Read and analyze the scenario given below. Answer the question and write your answer on your answer sheet.

A stone is dropped from a height of 20 meters on the Earth's surface, and an identical stone is dropped from the same height at the same time on the moon. Which stone will hit the ground first - the stone on Earth or the stone on the moon? Select your answer below.

a. The stone dropped on the Earth will fall faster because the Earth has bigger gravity than the moon.

b. The stone dropped on the moon will fall faster because the moon has smaller gravitation or gravity than the Earth.

B. **Directions:** Read the following items carefully and tell whether the statements are True or False. On your answer sheet, write True if the statement is correct and False if the statement is incorrect.

_____1. Gravity is a force that pulls all objects on Earth, towards the Earth's center.

_____2. Objects with greater gravitational pull slow down the movement or motion of another object near it.

_____3. Objects with more mass have greater gravity (or gravitational pull) than those of less massive objects.

_____4. An object that is thrown up and moves away from the Earth, slows down.

_____5. An object that is dropped from the top of a building and moves towards the Earth, speeds up.

Assessment

Directions: Infer how gravity affects movements of different objects. Read and answer the questions below. Write the letter of your answers on a separate sheet of paper.

1. How do you describe the gravity that an object on earth experiences if its mass is greater?
   A. farther
   B. greater
   C. lesser
   D. smaller

2. Which of the following keeps all objects on the ground?
   A. acceleration
   B. friction
   C. gravity
   D. inertia

3. Which characteristic of an object affects its gravity?
   A. color
   B. mass
   C. position
   D. shape

4. How does gravity affect the movement of falling objects?
    A. It increases the movement of falling objects.
    B. It slows down the movement of falling objects.
    C. It does not affect the movement of falling objects.
    D. It neither slows down nor increases the movement of falling objects.

5. Which of the following is NOT true about gravity?
    A. It is an attractive force.
    B. It slows down the movement of falling objects.
    C. It pulls the two objects toward each other.
    D. It is the force that keeps all planets on its orbits.

6. How does gravity affect the motion of objects moving upward?
    A. It slows down the motion of objects.
    B. It increases the motion of the objects.
    C. It does not affect the motion of objects.
    D. It neither slows down nor increases the motion of objects.

7. When a rock is dropped on different planets, which of the following will most likely happen to the rock?
    A. The rock's movement will be the same on all planets.
    B. The rock will move slowest on the planet nearest to the sun.
    C. The rock will move fastest on the planet farthest from the sun.
    D. The rock's movement will vary due to the different masses of the planets.

For items 8-10, refer to the table below.

Heavenly Body	**Mass (x 10^{24} kg)**	**Acceleration Due to gravity (m/s^2)**	**Gravitational Force (x10^{23} N)**
Moon	0.0736	1.62	1.1776
Earth	5.9720	9.80	585.2560
Jupiter	1900.0000	25.95	493,050.0000

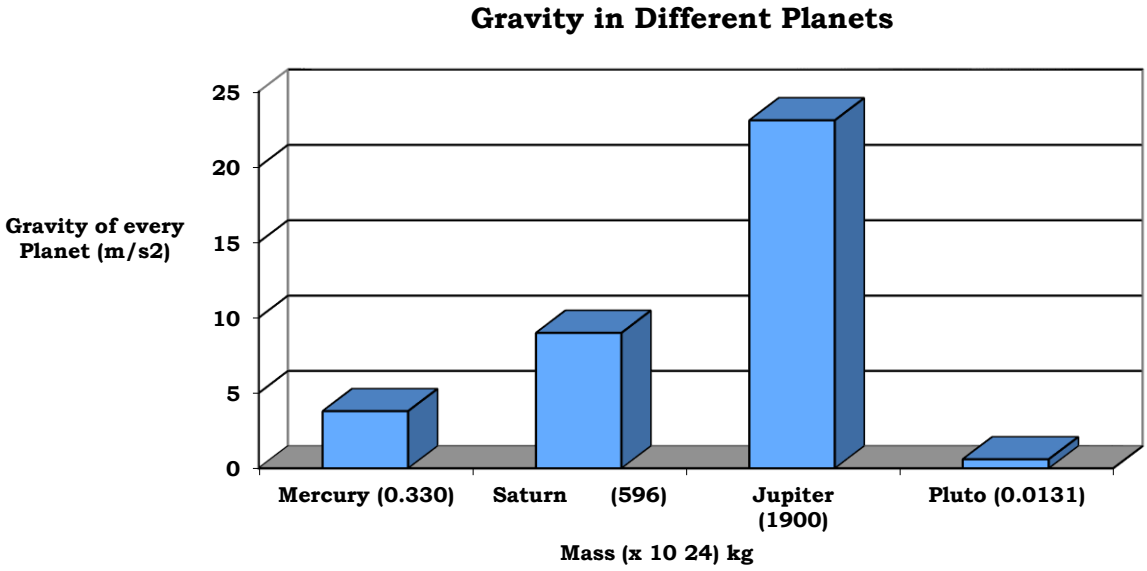
8. If you drop an object, on which heavenly bodies listed in the table above will the object hit the ground last?
    A. Earth
    B. moon
    C. Jupiter
    D. none of the above

9. On which heavenly body will the object move fastest?
    A. moon
    B. Jupiter
    C. Earth
    D. none of the above

10. On which heavenly body will an object on earth when released, move slowest?
    A. Earth
    B. Jupiter
    C. moon
    D. none of the above

Additional Activities

Study the graph below. The graph shows the gravity versus mass of different planets.



Mercury	Saturn	Jupiter	Pluto

Answer the questions based on the graph above**. Choose your answer from the options in the box.**

1. Which planet has the strongest gravitational force?
2. Which planet has the weakest gravity?
3. Which heavenly body has the biggest mass?
4. Which heavenly body has the smallest mass?
5. In which heavenly body do objects move fastest?
6. In which heavenly body do objects move slowest?

Answer Key

Lesson 1: Describe Gravity

What I Know

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

What's In

1. Yes
2. Yes

What'sNew

Activity 1

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

What's More

Activity 1.1

1. true
2. true
3. true
4. false
5. false

Activity 1.2

1. Against
2. Against
3. Towards
4. Against
5. Towards

What I have Learned

1. Gravity
2. Attraction
3. Gravity
4. Force

Assessment

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

Additional Activities

Down

1. ATTRACTIVE

Across

2. GRAVITY
3. MASS
4. CENTER
5. NEWTON

Lesson 2: How Gravity Affects Movement of Objects

What's In

1. true
2. true
3. false
4. false
5. true

What's New

1. B
2. A
3. B.
4. A

What's More

I.

1. Moon
2. Jupiter
3. Moon
4. Jupiter
5. Moon
6. Jupiter

II.

1. *weak*
2. *strong*
3. *Slow*
4. *Fast*
5. Bigger, stronger/ smaller, weaker

Conclusion:
Stronger, faster/ weaker, slower

What I have Learned

1. increases
2. decreases
3. greater, bigger/lesser, smaller
4. greater, faster/ lesser, slower

What can I do

A.

a. The stone dropped on Earth will fall faster because the Earth has bigger gravitation or gravity than the moon.

B.

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

Assessment

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

Additional Activities

1. Jupiter
2. Pluto
3. Jupiter
4. Pluto
5. Jupiter
6. Pluto

References

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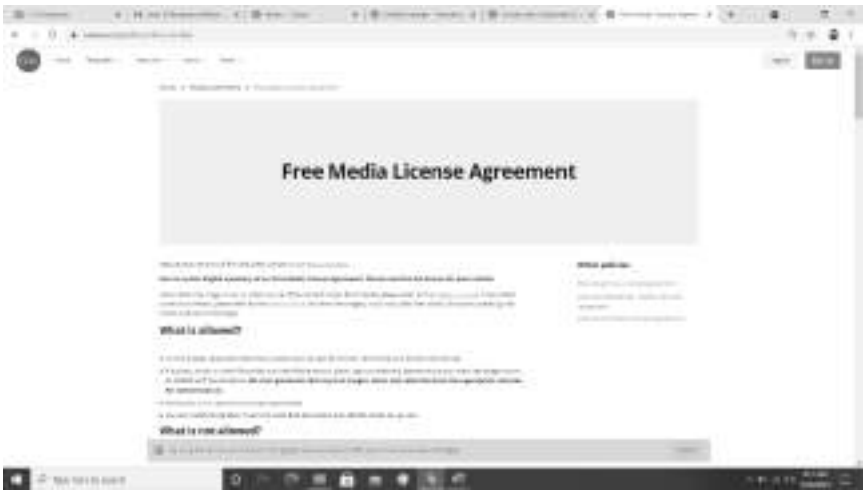

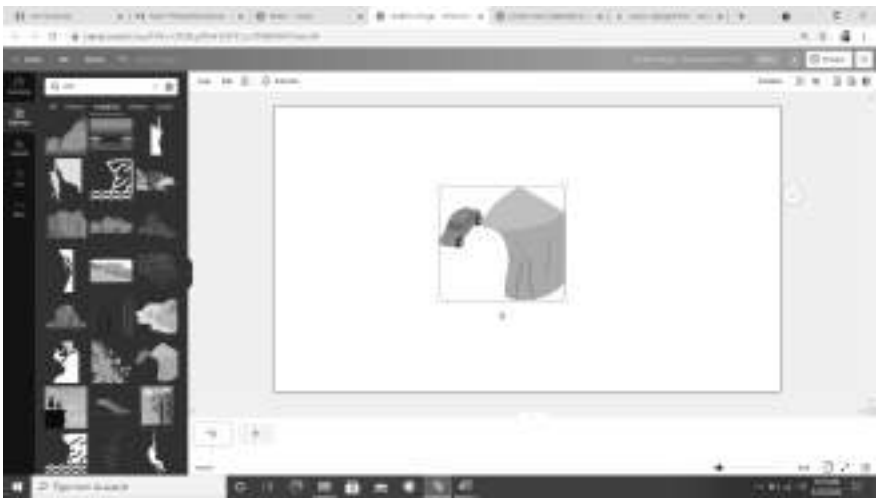

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6

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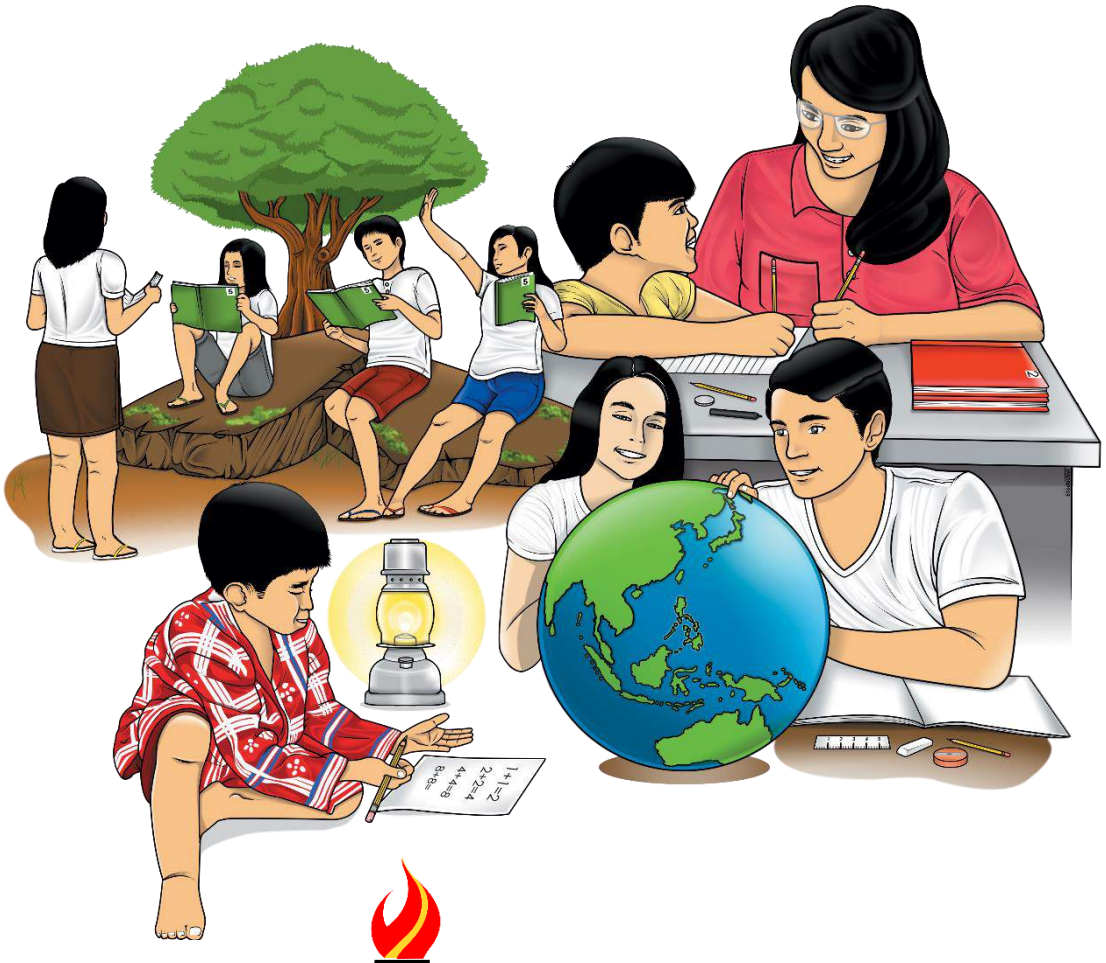
Science

Quarter 3 – Module 2:
Energy Transformation



ALTERNATIVE DELIVERY MODE
ADM

CO_Q3_Science6_Module2

Science – Grade 6
Alternative Delivery Mode
Quarter 3 – Module 2: Energy Transformation
First Edition, 2020

Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

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Printed in the Philippines by _____

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6

Science

Quarter 3 – Module 2:
Energy Transformation

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

This module was designed and written with you in mind. It is here to help you demonstrate how sound, heat, light, and electricity can be transformed **(S6FEIIId-f-2)**. The scope of this module allows you to use it 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 is divided into the following lessons:

- Lesson 1: Forms of Energy
- Lesson 2: Energy Transformation

After going through this module, you are expected to

1. describe the different forms of energy;
2. cite some forms of energy present in various activities;
3. trace energy transformation; and
4. realize the importance of the different forms of energy in daily living.

What I Know

Direction: Read each item carefully. Write the letter of the correct answer.

1. Which form of energy does a moving object possess?
   A. light energy
   B. sound energy
   C. chemical energy
   D. mechanical energy

2. Which form of energy is transferred from one object to the other?
   A. Heat energy
   B. light energy
   C. sound energy
   D. mechanical energy

3. Which device uses chemical energy to produce sound?
   A. generator
   B. television
   C. radio
   D. microwave oven

4. Which example has chemical energy present in it?
   A. electric circuit
   B. light bulb
   C. medicine
   D. television

5. What form of energy can travel through a vacuum or an empty space?
   A. electrical energy
   B. light energy
   C. mechanical energy
   D. sound energy

6. Which of the following shows that electrical energy is changed to light energy?
   A. hot iron
   B. lighted fluorescent bulb
   C. switching on the radio
   D. a boy running after drinking water

7. Which energy transformation occurs in a flat iron?
   A. electrical energy to heat
   B. mechanical energy to light
   C. chemical energy to sound energy
   D. chemical energy to electrical energy

8. How does energy transform when strumming a guitar?
   A. electrical energy to light energy
   B. chemical energy to light energy
   C. chemical energy to sound energy
   D. mechanical energy to sound energy

9. Which of the following gives the correct order of energy transformation in a burning candle?
   A. chemical – light– light
   B. chemical – light – heat
   C. heat – chemical – light
   D. heat – light – chemical

10. What is always produced when there is energy transformation?
   A. chemical
   B. electricity
   C. heat
   D. light

Lesson 1 Forms of Energy

Energy is everywhere and it can do a lot of things. Energy is invisible. But, how can we tell when energy is there? If you see children running on the street and a light from the lampshade, hear a sound from the radio, or feel the heat of the sun, you can be sure that energy is in action.

All living and non-living things need energy. It warms our planet enough to make life possible. It enables people to do household chores or work in school. It illuminates every home, operates appliances, and moves cars.

In Physics, energy is described as the ability to do work or make changes in certain conditions. Energy can be classified in two types: kinetic and potential energy. Potential energy is energy stored in an object at rest while Kinetic energy is an energy in motion.

In this lesson, you will learn the different forms of energy such as mechanical energy, heat energy, light energy, sound energy, and electrical energy.

What's In

Study the illustrations below. Identify which activity involves the use of energy.

Jogging

Cleaning

Sitting

Walking

Cooking

Sleeping

Which activities involve the use of energy? Explain why.

Photo credit to https://www.canva.com

What's New

Activity 1: FORMS OF ENERGY

Energy is everywhere. It comes in many forms such as mechanical energy, heat energy, thermal energy, light energy, chemical energy, sound energy, and electrical energy. Let us learn the different forms of energy by doing the activity below.

A. Prepare the materials listed below and follow the steps to understand more about energy.

Materials: Pail of water, Stone

Procedures:

1. Fill the pail with water until almost full.
2. Throw the stone into the pail of water.
3. Observe what form of energy is present when you threw the ball and when it hit the water.

Analysis Questions:

1. What gave you ability to throw the stone in the pail?
   _____
2. What form of energy is present when you threw the stone and it moved?
   _____
3. What happened when the stone fell into the water? What form of energy is it?
   _____
4. If you kept on throwing the stone into the pail several times, how would that make you feel? What form of energy would it be?
   _____

B: Picture Analysis

Analyze and describe what you would see, hear, and feel based on the picture below.

Figure 1: Television set turned on
Photo Credit to https://www.publicdomainpictures.net

Answer the questions below.

1. Use the picture above or the actual TV. What can you see and hear when the TV is switched on?

_____

2. Touch the back part of the TV. What can you feel?

_____

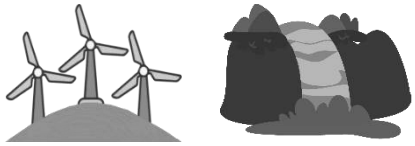
3. What forms of energy are present in watching TV? Choose the answers from the list inside the box.

chemical energy	electrical energy
heat (thermal energy)	light energy
mechanical energy	sound energy

What is It

Forms of Energy

The activity that you just performed represents different forms of energy. You got the energy you needed to perform the activity from the chemical energy in food. You were able to throw the stone into the water because your body converts chemical energy into energy for movement (mechanical energy). You probably heard a sound of splash when the stone hit the water. This is called the sound energy. Had you kept doing the activity, you would notice that your body feels hot which would make you sweat. This is heat or thermal energy. Read about the different forms of energy, their characteristics and examples below.

Form of Energy	Characteristics	Examples
Mechanical Energy (ME)	It is the sum of energy in motion and stored motion by an object. All moving objects possess mechanical energy.	windmills, falling water, dancing, playing, doing exercises, and moving cars, etc.  *Illustrated by Ryan Oliver S. Arellano*

Electrical Energy (EE)	It is the energy possessed by moving electrons that lights the bulb, works all appliances.	electric circuit, lightning, transmission lines, turned on appliances   
Chemical Energy	It is an energy stored in bonds of chemical compounds, like atoms and molecules.	batteries, food, fuel, matchsticks, fireworks, medicines  
Heat Energy	It is an energy in transit (transferred from one body to another).	 The spoon becomes hot when put in hot soup.  The pork becomes cooked after placing near the fire.
Thermal Energy	It is an energy due to the movement of molecules.	 Sun  hot stove
Sound Energy	It is an energy produced by vibrating objects	radio, television, cell phones, musical instruments  
Radiant or Light Energy	It is a form of electromagnetic radiation produced by hot objects that can be seen by the human eye. It travels through a medium or empty space.	sun, lighted bulb ,candle, laser, fire, and flashlight  

Photo credit to https://www.canva.com

Illustrated by Ryan Oliver S. Arellano

What's More

Activity 1: Forms of Energy

Match the form of energy in column **A** with the examples in column **B**. Write the letters only.

Form of Energy	**Objects which possess Energy**
_____1. Mechanical Energy	A. 
_____2. Electrical Energy	B. 
_____3. Chemical Energy	C. 
_____4. Light Energy	D. 
_____5. Sound Energy	E. 
_____6. Heat Energy	F. 

Illustrated by Ryan Oliver S. Arellano and Raymond Michael A. Gayatin

What I Have Learned

Choose the answer for each item from the words inside the box.

Energy	Chemical	Electrical	Heat
Sound	Light	Mechanical	Thermal

I learned that:

1. _____ is the ability to do work.
2. _____ energy is the sum of energy in motion and stored energy in objects.
3. _____ energy is possessed by moving electrons.
4. _____ energy is stored in molecules or atoms.
5. _____ is an energy in transit (transferred from one body to another).
6. _____ is the energy due to the movement of molecules.
7. _____ energy is produced by vibrating objects.
8. _____ energy is a form of electromagnetic radiation that travels through empty space.

What I Can Do

Thomas Alva Edison invented the electric light bulb. Think about what life was before the invention of the light bulb. How does this invention make our life convenient today? How would your life be if the light bulb was not invented? Write your answer in a paragraph form.

_____
_____
_____
_____

Assessment

Direction: Write the letter of the correct answer.

1. Which of the following possesses mechanical energy?
   A. a flat iron
   B. a dancing girl
   C. a glass of water
   D. a lighted bulb

2. Which forms of energy is/are produced by a candle?
   I. Heat II. Electrical III. Light IV. Sound

   A. I and II
   B. I and III
   C. II and III
   D. III and IV

3. Which form of energy is present when the television is turned on?
   A. light
   B. electrical energy
   C. sound energy
   D. all of the above

4. Which form of energy is stored in medicines?
   A. light
   B. sound energy
   C. chemical energy
   D. electrical energy

5. Which of the following are forms of energy?
   I. Heat II. Light III. Shadow VI. Atom V. Electrical

   A. I and III
   B. I, II, and V
   C. II, III, and IV
   D. III, IV, and V

6. A form of energy that moving bodies possess.
   A. heat
   B. sound energy
   C. electrical energy
   D. mechanical energy

7. Which form of energy is stored in a battery?
   A. Light energy
   B. Sound Energy
   C. Chemical Energy
   D. Mechanical Energy

8. Which of the following does NOT possess mechanical energy?
   A. pushing a cart
   B. pedalling a bike
   C. tapping the drums
   D. a lighted bulb

9. How is light energy different from sound energy?
   A. Light energy moves slower than sound.
   B. Light helps you see while sound lets you hear.
   C. Light energy uses vibrations while sound does not.
   D. None of the above.

10. All the following objects produce sound. Which one does not?
   A. drum
   B. guitar
   C. light bulb
   D. radio

Additional Activities

Sources of Energy

In the previous activity, you have learned that you can obtain energy from the food you eat. Food, however, is not the only source of energy. The table below shows the different forms of energy. Write at least 2 possible sources of each form of energy. An example is given as your guide for this task.

Forms of Energy	Possible Sources
1. Light	Candle
2. Sound	
3. Heat	
4. Electrical	
5. Mechanical	
6. Chemical	

Lesson 2 Energy Transformation

The food that you eat provides you the energy to do work. You can run, walk, swim, or do your homework and chores because of the chemical energy you get from food. Even sleeping, breathing, and eating require some energy from your body. It is important to note that the chemical energy that you get from food is not lost or used up when you do those activities. It is simply changed into another form of energy. The cells in your body break down the chemical bonds in the food and release the energy from those bonds. You then use this energy to keep your body organs working, move your muscles, ride your bike, or toss a ball. You might have observed that you feel hot and start sweating after running, biking, or playing. This is because some of the energy is transformed into heat.

The Law of Conservation of Energy states that energy cannot be created or destroyed. It may be transformed from one form into another, but the total amount of energy never changes. Energy can be changed from one form to another such as chemical energy into mechanical energy, heat energy, and many more.

Energy transformation occurs everywhere always. It can be observed at sunrise. As the light of the sun reaches the Earth, plants absorb it to make their own food. Light energy from the sun is transformed into chemical energy stored in plants. In cooking, the chemical energy of the Liquefied Petroleum Gas (LPG) is transformed into light and heat to cook food. Other examples where energy conversion takes place are in a battery-operated car, waterfalls, roller coaster, cleaning the house, walking, running, watching television, eating or chewing food, calling through cellular phones, driving a car, and many more.

What's In

Tell what form of energy is illustrated in the following pictures. Choose from the options provided

Thermal Energy	Heat Energy	Chemical Energy
Light Energy	Mechanical Energy	Sound Energy
Electrical Energy		

1. 

_____

2. 

_____

3. 

_____

4. 

_____

5. 

_____

Illustrated by Ryan Oliver S. Arellano
Photo credit to https://www.canva.com

What's New

Activity: Not wasted, Just transformed.

Energy transformations occur everywhere. Let us find out more about energy transformation in this activity.

Option A: Do This Activity

1. Get a flashlight. Make sure the battery is placed in it as shown in Figure 1.
2. Turn on the flashlight. See Figure 2.
3. Observe the flashlight using your different senses.

Option B: Picture Analysis

Without a flashlight, analyze and describe what you would see and feel based on the picture below.

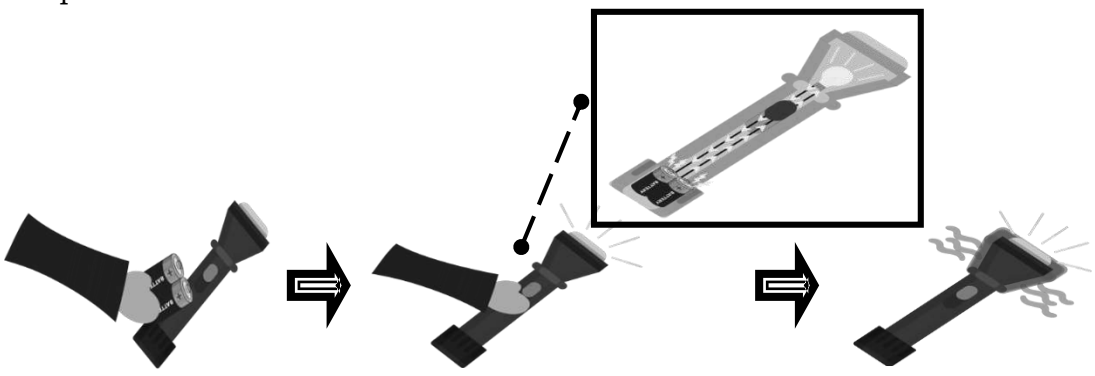


Figure 1. Battery is placed inside the flashlight.

Figure 2. Flashlight is turned on.

Figure 3. Flashlight lights and warms up minutes after it was turned on.

Illustrated by Ryan Oliver S. Arellano

Answer the questions below.

1. When the flashlight is turned on, what energy transformation happened from the battery to the bulb? Fill in the blanks with forms of energy.

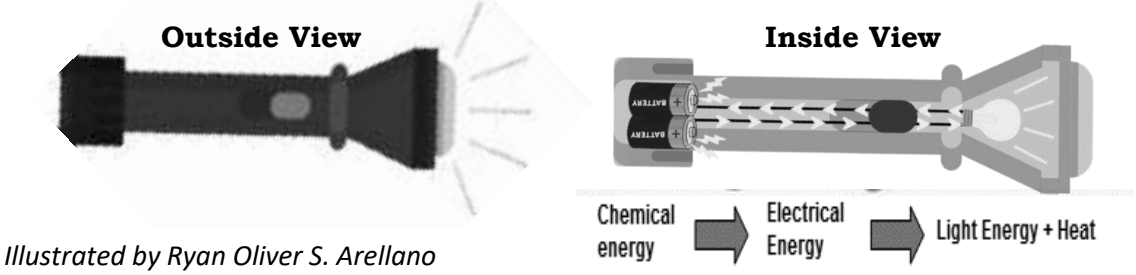
_____ energy *to* _____energy *to* _____ energy and _____ energy

Based on the activity, what is energy transformation?
_____
_____
_____

What is It

In the activity, you have observed how energy is transformed from one form to another. Transformation of energy occurs in the flashlight. The illustration below shows the outside and inside view of the flashlight.

Figure 4: The outside and inside view of the flashlight.



Illustrated by Ryan Oliver S. Arellano

When the flashlight is switched on, the chemical energy from the battery is transformed into electrical energy through the circuit, and then transformed into light energy and heat released to the surroundings.

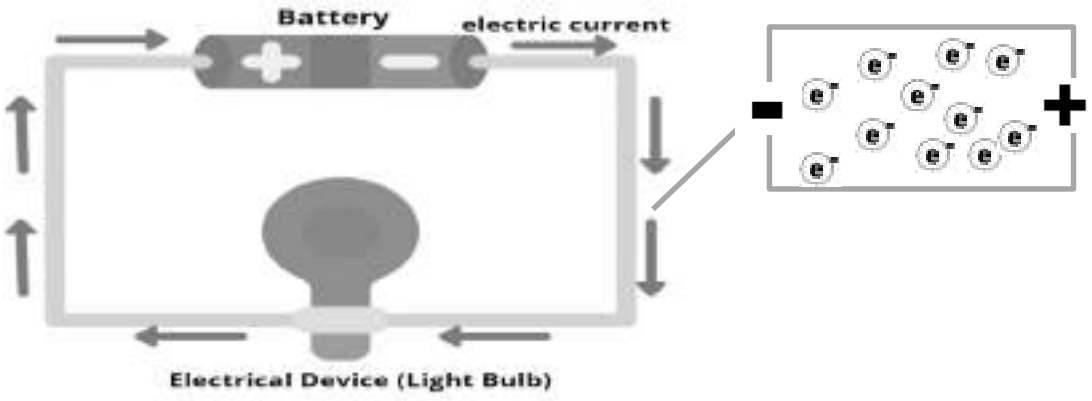


Figure 5. Flow of electric current in a circuit.

Modified from https://www.canva.com

In a simple circuit, the source of energy is the chemical energy from a battery. Chemical energy present in a battery generates electricity as shown in figure 5. The electrons are allowed to flow through the wire that creates an electric current. Electric current that carries electric energy flows from the negative terminal towards the positive terminal of the battery thus giving energy to the load (light bulb).

Fossil fuels (coal, natural gas, petroleum) are all derived from of the bodies of plants and/or animals. In a power plant, these carbon-based fuels are burned to generate steam or heat that turn the turbines. Turbines are large wheels that rotate when pushed by steam, water, wind, or pressure. The turbines then drive the generators to produce electrical energy. The electrical energy produced by the generators is distributed to homes which is used to power our electrical appliances. Hence, energy is not produced or made in power plants. Instead, it is simply an energy that transforms from **chemical** (plants and animals) to **heat** to **mechanical** (turbines and generators) to **electrical** to **sound** when we turn on our radio or TV, **heat** when we use the flat iron, or **mechanical** energy when we switch on the electric fan.

Aside from carbon-based fuels, there are other alternative sources of energy. These are classified as either *renewable* or *non-renewable* energy sources (Table 1). It is important to conserve energy because the fossil fuels that we use are limited and emit harmful pollutants.

Table 1. Sources of Energy

Renewable Energy	Nonrenewable Energy
Wind Energy	Fossil Fuel (coal, petroleum, natural gas, oil)
Water	
Geothermal Energy	
Biomass Energy (Biomass Fuel)	Nuclear energy
Tidal Energy (Tides)	
Solar Energy	

Transformation of energy may also be observed by simply doing household chores. When hammering the nail, mechanical energy is turned into sound energy and heat energy as you continue hitting the nail. When ironing clothes, the electrical energy from the source or outlet is transformed into heat that makes the iron hot. In a boiling water, the chemical energy from the LPG tank is transformed into light energy and heat that makes the water boil. At home, we use different appliances like TV, electric fan, air condition, refrigerator, electric lamp, etc. All these devices transform one energy to another form and release heat to the surroundings. The end product of energy transformations is heat wasted. Heat is collected in the surroundings and results in the warming of the environment.

What's More

Name the energy transformations for each illustration below. You may use the words in the box as many times as needed.

chemical	electrical	heat
light	mechanical	sound

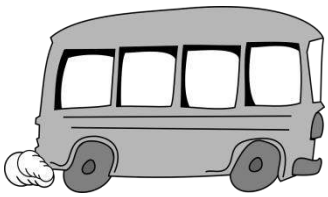
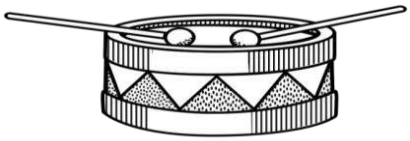
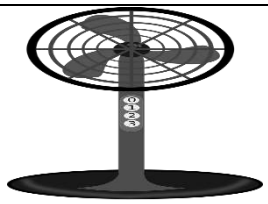
Activity	Energy Transformation Taking Place
Example: 	Electrical Energy to Light + sound energy + heat
1. 	
2. 	
3. 	
4. 	
5. 	

Photo Credit to https://www.publicdomainpictures.net and https://pixabay.com/

What I Have Learned

I learned that energy transformation is _____

_____.

What I Can Do

A. Conserving Energy

Electricity plays a significant role in everyday life. Some of the sources of electrical energy currently used are fossil fuels. Burning the fossil fuels to provide electricity causes air pollution or landscapes to be changed or destroyed. It is important to conserve electricity to lessen the bad effects it brings upon the environment. Put a check on the items below which show (/) the different ways to conserve energy and (x) to those that do not.

_____1. Use a large heating pan at all times when cooking.
_____2. Turn off unnecessary appliances when not in use.
_____3. Avoid frequent opening of the refrigerator.
_____4. Refrain from using air conditioner during cool or rainy season.
_____5. List down all things needed before going to the grocery story.

B. Scenario

Car, buses, motorcycles. and other fuel-powered vehicles are our means of going to school or work, buying food and supplies, and many others that require us to go to distant places. But these vehicles are also the primary cause of air pollution around the world. They give off toxic materials that can harm our health and environment. They also release carbon dioxide gases which cause the warming of the earth's atmosphere.

Imagine that you live in the near future when fossil fuels are no longer available. Can you suggest other sources of electrical energy? What would be the consequences of using those other (alternative) sources of energy? You can draw your vision of an alternative energy source of electrical energy.

_____

_____

Assessment

Write the letter of the correct answer.

1. Which shows that chemical energy is changed to mechanical energy?
   A. tapping the drum
   B. plucking the guitar
   C. switching on the light bulb
   D. a horse running after eating grass

2. Which energy transformation takes place when running?
   A. mechanical energy to light
   B. mechanical energy to sound energy
   C. chemical energy to electrical energy
   D. chemical energy to mechanical energy

3. How does energy transform when tapping a drum?
   A. electrical energy to light energy
   B. chemical energy to heat energy
   C. chemical energy to sound energy
   D. mechanical energy to sound energy

4. Which is always produced when there is energy transformation?
   A. heat
   B. light energy
   C. chemical energy
   D. electrical energy

5. What form of energy is transformed to electrical energy if the powerplant uses wind as its resource?
   A. light energy
   B. sound energy
   C. chemical energy
   D. mechanical energy

6. Maria used her cell phone to call her mother. After a few minutes, she felt the phone getting warm. Which diagram correctly shows the energy transformation that took place?
   A. chemical $\longrightarrow$ light and sound
   B. chemical $\longrightarrow$ electrical and heat
   C. chemical $\longrightarrow$ light $\longrightarrow$ sound
   D. chemical $\longrightarrow$ electrical $\longrightarrow$ sound and heat

7. Which of the following energy conversions occur in a solar-powered light?
   A. heat to chemical energy
   B. heat to electrical energy
   C. light energy to electrical energy
   D. light energy to chemical energy

8. It is the conversion of energy from one form to another.
   A. Energy Saving
   B. Energy Formation
   C. Energy Conservation
   D. Energy Transformation

9. Which energy transformation takes place when gasoline is burned in a car?
   A. chemical → heat and sound
   B. chemical → mechanical and heat
   C. heat → electrical and mechanical
   D. mechanical → chemical and electrical

10. Which energy transformation takes place when you light a candle?
   A. chemical → light and heat
   B. electrical → light and heat
   C. mechanical → light and heat
   D. chemical → electrical and heat

Additional Activities

Arrange the pictures in the correct order to show energy transformation. Write numbers 1 to 3.

1.

Sound Energy ☐

Thermal energy ☐

Chemical Energy ☐

2.

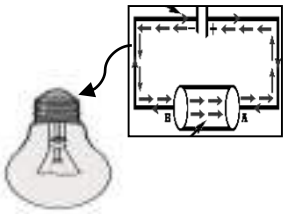
Electrical Energy ☐

Chemical Energy ☐

Light Energy ☐

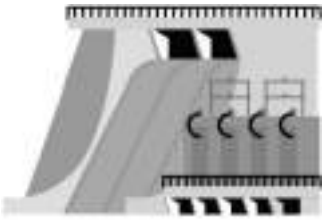
Illustrated by Ryan Oliver S. Arellano *Photo credit to https://www.canva.com*

3.



Electrical Energy ☐

Light Energy ☐



Mechanical Energy ☐

4.

Chemical Energy ☐

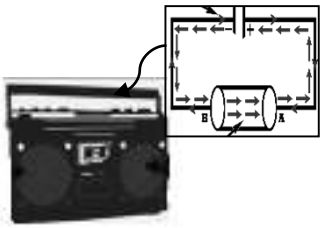
Mechanical Energy ☐

Chemical Energy ☐

5.

Chemical Energy ☐

Sound Energy ☐



Electrical Energy ☐

Illustrated by Ryan Oliver S. Arellano and Raymond Michael A. Gayatin

Photo credit to https://www.canva.com

Answer Key

Lesson 1: Forms of Energy

What I know

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

What's In

Jogging, cleaning, walking and cooking are activities that use energy because it involves movement of muscles. It can be observe when you usually get tired, sweat out or heat up after engaging in these activities.

What's New

Activity 1: Forms of Energy

A.

1. Energy gave me the ability to move.
2. Mechanical energy
3.When the stone fell into the water, it moved and made a sound. This form of energy is sound energy.
4. Doing the activity repeatedly made me feel hot and sweaty. It is heat or thermal energy.

B.

1. Light comes out of the screen with moving pictures in it and sound comes out of the speakers.
2. The back of the television feels warm.
3. Electrical energy, light energy, sound energy, heat (thermal energy)

What's More

Activity 1

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

What I have Learned

1. Energy
2. Mechanical
3. Electrical
4. Chemical
5. Heat
6. Thermal
7. Sound
8. Light

Assessment

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

Additional Activities

Act. 1

A. (in no particular order and other possible answers could be given)

1. Sun, light bulb, candle
2. Radio, guitar, drums, violin, television
3. Candle, bon fire, sun
4. Nuclear power plants, fossil fuels, solar energy, biomass, geothermal, hydroelectric energy
5. Water falls, wind mill, flowing river
6. Wood, coal, gasoline

Lesson 2: Energy Transformation

What's In

1. Heat Energy
2. Chemical Energy
3. Sound Energy
4. Electrical energy
5. Mechanical Energy

What's New

Activity

1. chemical energy to electrical energy to light and heat energy

Energy transformation is a process of changing energy from one form to another.

What's More

1. Chemical + light + heat
2. Chemical+electrical+mechnical+heat
3. Mechanical+sound+heat
4. Electrical+light+heat
5. Electrical+mechanical+heat

What I have Learned

I have learned that energy transformation is a process of changing energy from one form to another.

What Can I Do

A.
1. x
2. /
3. /
4. /
5. /

B. *(there are other possible answers)*
Other sources of energy are hydroelectric, geothermal, wind, tidal, solar and biomass energy. However using these alternative sources are costly to set up, also requires big amount of spaces to put up and may not be enough for the demand of increasing population.

Assessment

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

Additional Activities

1. 3,2,1
2. 2,1,3
3. 2,3,1
4. 2,3,1
5. 1,3,2

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6

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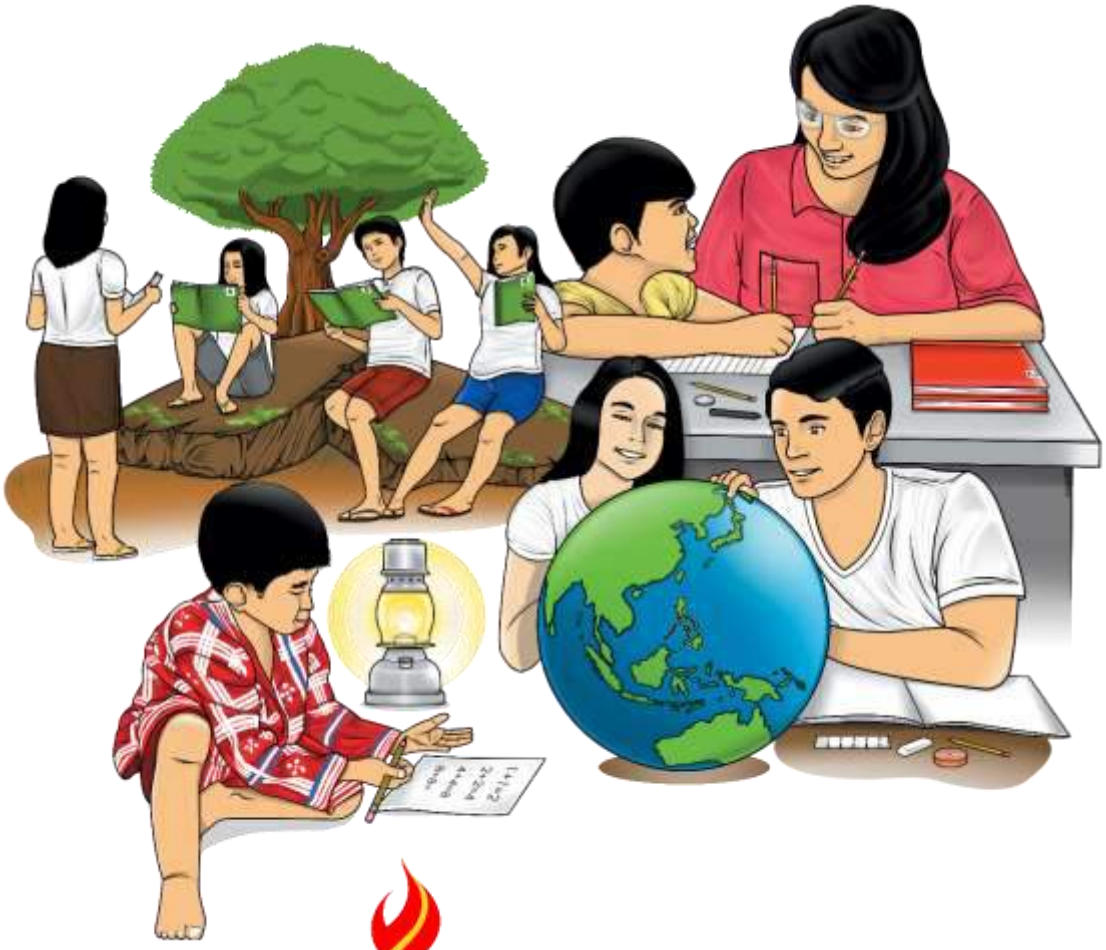
Science

Quarter 3 – Module 3: Characteristics and Uses of Simple Machines



ALTERNATIVE DELIVERY MODE
ADM

Science – Grade 6
Alternative Delivery Mode
Quarter 3 – Module 3: Characteristics and Uses of Simple Machines
First Edition, 2020

Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

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Printed in the Philippines by

Department of Education – Region VI – Western Visayas

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6

Science

Quarter 3 – Module 3: Characteristics and Uses of Simple Machines

DepED
DEPARTMENT OF EDUCATION

Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson.

At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and test and read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

This module was designed and written with you in mind. It is here to help you manipulate simple machines to describe their characteristics and uses (**S6FE-IIIg-i-3)**. 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.

The module has only one lesson:

- **Lesson 1** – Characteristics and Uses of Simple Machines

After going through this module, you are expected to:

1. describe the characteristics and uses of simple machines;
2. manipulate the different simple machines; and
3. show appreciation on the importance of simple machines to daily life.

What I Know

Directions: Read carefully each question or situation then answer based on your experience in manipulating simple machines. Write the letter of your answer on a separate sheet of paper.

1. Which of the following helps people do work which requires less effort?
   A. device
   B. equipment
   C. gears
   D. simple machines

2. During the flag ceremony, Karl is in charge of raising the flag. The simple machine Karl uses to raise the flag is called _____.
   A. lever
   B. pulley
   C. inclined plane
   D. wedge

3. Cindy uses a can opener to open the can of tomatoes. A can opener is an example of a _____.
   A. lever
   B. pulley
   C. inclined plane
   D. wheel and axle

4. To close a bottle of jam, Trixie uses a lid cover. Which kind of simple machine is lid cover?
   A. lever
   B. pulley
   C. screw
   D. wedge

5. Allan uses the ramp to help his sick friend on a wheelchair to move up the building. A ramp is an example of a/an _____.
   A. inclined plane
   B. pulley
   C. screw
   D. wheel and axle

6. Eva helps her mother to slice the vegetables using a knife. A knife is an example of a _____.
   A. lever
   B. pulley
   C. screw
   D. wedge

7. Errol wants to hang the picture frame on the wall. Which simple machine will Errol use?
   A. lever
   B. pulley
   A. inclined plane
   C. screw

8. Gemma is trying to open the doorknob. Which type of simple machine is a doorknob?
   A. inclined plane
   B. lever
   C. pulley
   D. wheel and axle

9. Which type of simple machine consists of a rope that passes over a grooved wheel?
   A. inclined plane
   B. lever
   C. pulley
   D. wedge

10. Which type of simple machine has bars that turn or pivot on a fixed point?
   A. inclined plane
   B. lever
   C. screw
   D. wheel and axle

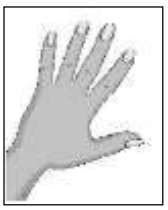
Lesson 1 Characteristics and Uses of Simple Machines

Hundreds of years ago, when churches, houses, and many structures were built in many places in the Philippines and all over the world, no sophisticated machineries were used. These structures were built only with the help of **simple machines.** Simple machines served as practical solutions to our ancestor's daily struggles before. These were not meant to replace or eliminate work; instead, they were made to make work easier and faster. For example, moving a heavy object a long time ago was a burden to our ancestors; thus, men thought of ways on how to lessen this difficulty. With the help of machines, tasks are done faster and with ease.

In the field of Physics, a **simple machine** is any of several devices with no moving parts that are used to modify motion and force in order to perform work. There are six basic types of simple machines, lever, wheel and axle, inclined plane, pulley, wedge and screw. Simple machines help people do their work easier and faster. It multiplies force and speed and changes the direction of the force applied.

What's In

Directions: Match the tools needed to do the task in **Column A** with the objects in **Column B**. Write your answer on a separate sheet of paper.

	Column A	Column B
_____1.		
	scissors	slicing an apple
_____2.		
	knife	sweeping of waste
_____3.		
	broom	roll of cloth
_____4.		
	nail cutter	collecting of garbage
_____5.		
	wheelbarrow	cutting nails

Illustrated by Raymond Michael A. Gayatin and Francis A. Gonzales

What's New

Activity 1: Simple Machines in Action

Simple machines are tools that we use every day in school, at the park, and at home. These tools make our work easier and faster. In this activity, you will learn how to use these simple machines and be able to identify their characteristics and uses.

Instructions:

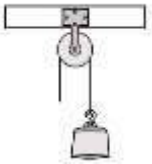
1. Look for any of the following materials available at your home such as tweezers, scissors, stairs, doorknob, knife, bolt, pulley, broom, nail cutter, and faucet.
2. Manipulate each tool. Caution: Be careful with sharp objects. Have your parents supervise you when performing this task. Observe and analyze their characteristics and uses.
3. Answer the following by choosing the correct characteristic and use of each simple machine. Write the letter of your answer on a separate sheet of paper.

Simple Machines		Characteristics	Uses
1. tweezers		a. spiral b. rounded shape c. with handle	d. to pull out e. to cut f. to move
2. stairs		a. flat and inclined b. long and sharp c. round with groove	d. to connect a lower to higher level e. to carry objects f. to fasten things
3. knife		a. round b. sharp c. spiral	d. to cut e. to pull out f. to move

Illustrated by Raymond Michael A. Gayatin and Francis A. Gonzales

4. bolt 

a. spiral
b. round
c. long
d. to open
e. to fasten
f. to move load

5. pulley 

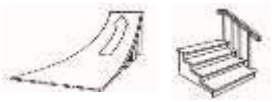
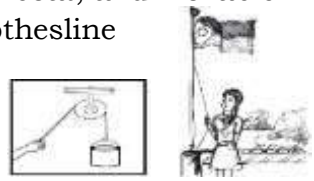
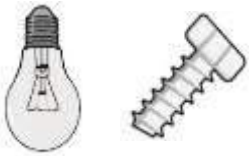
a. round shape with rope
b. long and sharp
c. round and spiral
d. to move objects
e. to cut objects
f. to raise a load

Illustrated by Raymond Michael A. Gayatin and Francis A. Gonzales

What is It

Read and Learn More.

Below are the six types of simple machines, its examples, characteristics, and uses.

Type	Characteristics	Tool	Use/s
Inclined Plane	A flat surface raised at an angle (sloping or slanting) surface, looks like a ramp.	Stairs, slide, and wood ramp 	Lift or raise a heavy object by moving up a slope.
Wedge	Objects with two inclined planes positioned back to back that tapers to a thin edge.	Nails, axes, pins, and knives 	Cutting or splitting certain materials apart.
Wheel and axle	Made up of a circular frame (wheel) that revolves on a shaft or rod (axle).	Rolling pin, doorknob, and steering wheel. 	Raising weights and carrying or transport loads over land and travel a long distance.
Pulley	A wheel carries a flexible rope, cord, cable, chain, or belt on its rim.	Flagpole, ropes on a sailboat, and movable clothesline 	Lifting or raising and lowering a load easier.
Screw	A long inclined plane wrapped around a shaft. *A circular cylindrical thing with a continuous winding or spiral rib.	Jar lid, bolt, and bottom end of a bulb 	Fastens or hold fastened things and used to hold lifted objects.
Lever	A long beam or bar that rests or turns or lifts on support (fulcrum). The lever has three parts: fulcrum, load, and effort.	can opener, tweezers and wheelbarrow 	Lifting, removing, or pulling out objects easily.

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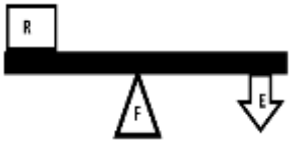
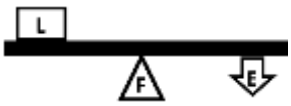
	 • **Fulcrum** is the supporting point of the lever. • **Effort** is the force used to cause movement. • **Load** is the weight being move or lifted. There are three classes of lever based on the positions of the effort, load, and fulcrum.		

Classes of Lever	Description	Tools
First Class Lever 	Fulcrum is located between the load and effort.	Scissors, crowbar, seesaw  
Second Class Lever 	Load is located between the fulcrum and effort.	wagon, bottle opener, nutcracker  
Third Class Lever 	Effort is located between the fulcrum and load.	broom, stapler, fishing rod  

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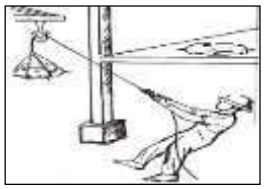
What's More

Activity 2: Describing Simple Machine

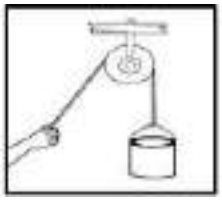
Directions: Match the simple machines in Column A with its characteristics and uses in Column B. Write your answer on a separate piece of paper.

Column A	Column B
_____1.  saw	A. It is a round frame revolving on a shaft or rod and used to transport loads over land.
_____2.  broom	B. It has a sharp edge and used for cutting and slicing.
_____3.  steering wheel	C. It is an inclined plane with a spiral rib used to hold or fasten lifted objects.
_____4.  slide	D. It is long with a handle and is used to remove dirt.
_____5.  jar lid	E. It is round with a rope and is used to raise and lower loads easier.
_____6.  pulley	F. It is flat and has a sloping surface and is used to connect a lower level to a higher level.

Illustrated by Raymond Michael A. Gayatin and Francis A. Gonzales

Activity 3: Identifying Simple Machine

Directions: Identify the type of simple machine shown on each illustration. Write LEVER, PULLEY, WEDGE, INCLINED PLANE, SCREW, or WHEEL AND AXLE. The first number is done for you.

1. 

PULLEY

2. 

_____

3. 

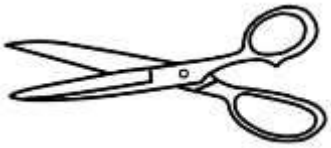
_____

4. 

_____

5. 

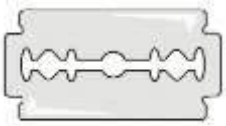
_____

6. 

_____

7. 

_____

8. 

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9. 

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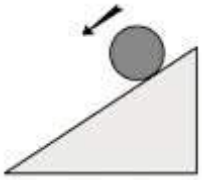
10. 

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Illustrated by Raymond Michael A. Gayatin and Francis A. Gonzales

What I Have Learned

Directions: Fill in the blanks to complete the sentences below by choosing the appropriate word/s found in the box.

simple machines	pulley	lever	wedge
wheel and axle	inclined plane	screw	

I have learned that:

1. _____help makes work easier and faster.
2. _____is a bar that turns or lifts against a “fulcrum” or support.
3. _____is a sloping surface used to raise heavy objects from a lower level to a higher level.
4. _____is made up of a circular or round frame that revolves on a shaft or rod.
5. _____is made up of two inclined planes placed back to back.
6. _____is an inclined plane wrapped in a cylindrical post.
7. _____uses wheels and a rope to raise, lower, or move a load easier.

What I Can Do

Directions: Cite at least five (5) activities at home using simple machines. Identify the simple machine/s used. Write your answers on a separate sheet of paper.

Activities	Simple machine/s used

Assessment

Directions: Analyze carefully the following questions. Write the letter of your answer on a separate sheet of paper.

1. When Mary cooks fried chicken, she uses tongs to remove the chicken from the pan. Which of the following simple machines do tongs belong?
   A. inclined plane
   B. lever
   C. pulley
   D. wheel and axle

2. Which simple machine should you use to slice the cake?
   A. ax
   B. blade
   C. knife
   D. scissors

3. The carpenter will put the hinges of the door. Which type of simple machine will the carpenter use?
   A. lever
   B. pulley
   C. inclined plane
   D. screw

4. Jamie uses a wheelbarrow to move the pile of garbage. Which type of simple machine is a wheelbarrow?
   A. inclined plane
   B. lever
   C. pulley
   D. wheel and axle

5. Which type of simple machine is an inclined plane with a spiral rib?
   A. lever
   B. pulley
   C. screw
   D. wheel and axle

6. Mark wanted to go sailing. Which of the following simple machines will be used in raising a sail of a boat?
   A. lever
   B. pulley
   C. wedge
   D. wheel and axle

7. The bottom part of a bulb is spiral. Which type of simple machine is it?
   A. inclined plane
   B. screw
   C. wedge
   D. wheel and axle

8. To control a car, one should use a wheel and axle. Which of the following is the right tool to use?
   A. breaks
   B. rolling pin
   C. steering wheel
   D. shift gear

9. Virgel wanted to load heavy boxes at the back of his truck. Which simple machine should Virgel use?
   A. pulley
   B. inclined plane
   C. stairs
   D. wheelbarrow

10. Which simple machine is a double inclined plane and has a sharp edge?
   A. pulley
   B. lever
   C. screw
   D. wedge

Additional Activities

Directions: Classify the following simple machines listed inside the box according to its type.

bolt	bottle opener	broom	bulb
doorknob	flagpole	ladder	
knife	ax	steering wheel	

Lever	Inclined Plane	Wedge	Screw	Pulley	Wheel and Axle

Answer Key

Lesson 1: Characteristics and Uses of Simple Machines

What I Know

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

What's In

1. roll of cloth
2. slicing an apple
3. sweeping of waste
4. cutting of nails
5. collecting of garbage

What's New

Activity 1: Simple Machines in Action

1. with handle; to pull out
2. flat and inclined; to connect a lower to higher level
3. sharp; to cut
4. spiral; to fasten
5. round shape with rope; to raise load

What's More

Activity 1.1 Describing Simple Machine

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

Activity 1.2 Identify Simple Machines

1. pulley
2. lever
3. inclined plane
4. wedge
5. wheel and axle
6. lever
7. screw
8. wedge
9. wedge
10. inclined plane

What I Have Learned

1. Simple machines
2. Lever
3. Inclined plane
4. Wheel and axle
5. Wedge
6. Screw
7. Pulley

What I Can Do

Possible Answers:

1. Sweeping – broom (lever)
2. slicing vegetables – knife (wedge)

Assessment

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

Additional Activities

Lever (bottle opener, broom)
Inclined Plane (ladder)
Wedge (ax, knife)
Screw (bolt, bulb)
Pulley (flagpole)
Wheel and axle (steering wheel, doorknob)

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