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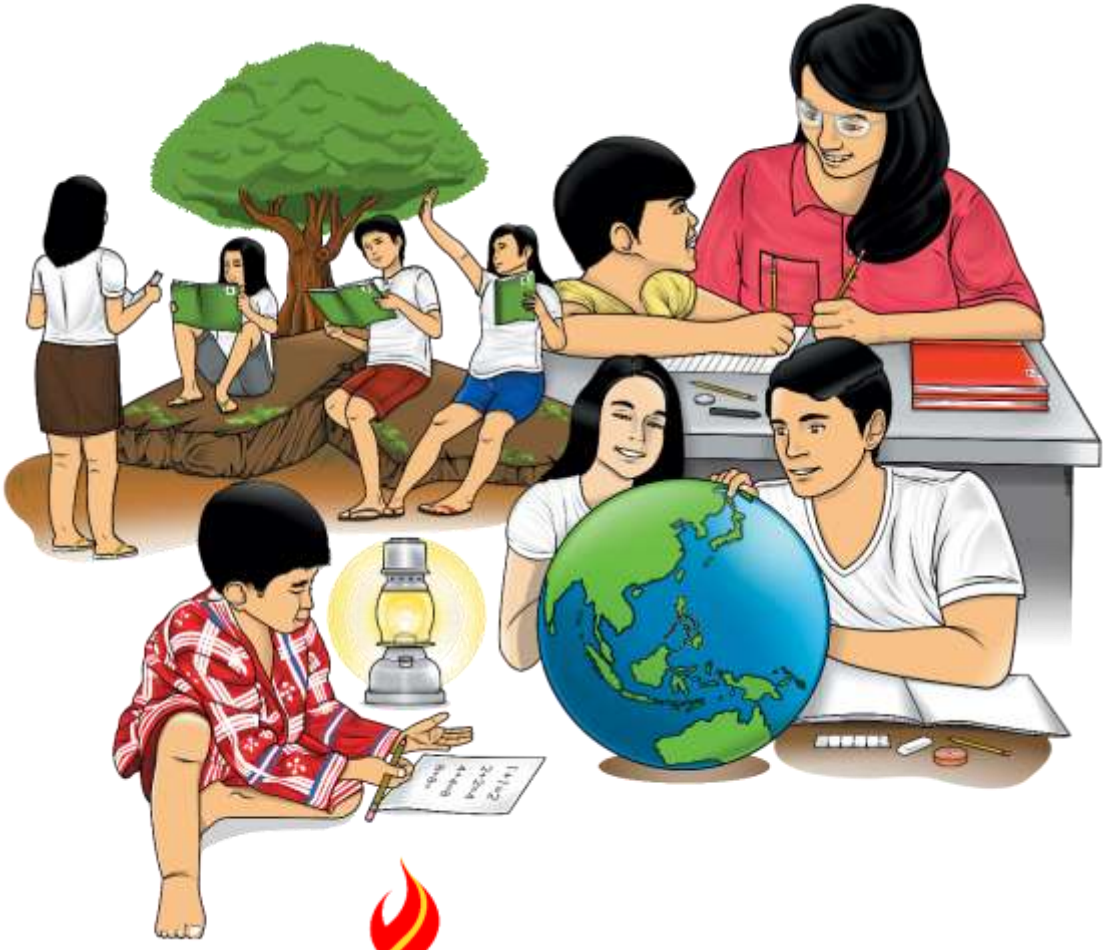
DEPARTMENT OF EDUCATION

Science

Quarter 3 – Module 1:
Effects of Force on Objects



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Quarter 3 – Module 1:
Effects of Force on Objects

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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

Force is important in our daily life. We use it in all of our activities like walking on the road, lifting objects, throwing a ball, or moving objects to a particular direction. We use force in order for us to live and we apply it to different objects around us.

In this module, you will learn more about force and will know what happens to objects as force is applied to them. For you to learn these concepts, you will be performing exercises and activities which will enable you to explain the effects of force when applied to objects.

The lesson focuses on:

Lesson 1 – Explain the Effects of Force when applied to an Object **(S4FE-III a-1)**

After going through this lesson, you are expected to be able to:

1. determine the changes that happen to objects when force is applied to them; and
2. explain the effects of force on the shape, size and movement of objects.

What I Know

A. Directions. Examine the table below. The first column shows activities wherein force is applied to different objects. Copy the table in your Science notebook. Then you will determine what changes or what happens to the object as shown by the activity. Put a check mark (✓) in the appropriate column that best shows your answer.

Activity	What change/s happen/s to the object?		
	Size	Shape	Movement
1. cutting a piece of paper			
2. molding clay			
3. throwing a ball			
4. blocking a moving toy car			
5. folding a table napkin			
6. tearing a biscuit wrapper			
7. chopping firewood			
8. slicing bananas			
9. rolling a marble on the floor			
10. squeezing a lemon			

B. Directions: Read and understand each statement. Write **True** if it is correct and **False** if it is not. Write your answer in your Science notebook.

1. Force is a push or a pull.
2. Without force, a moving object will stop.
3. Without force, an object at rest will not move.
4. A force can change the size and shape of an object.
5. Force can cause an object to move, stop, or to change direction.

Now, pause for a while and see if you got the correct answers found at the last page of this module. If you got 13 to 15 correct answers, congratulations, you are already on the right track. If not, it's okay, the next activities will help you learn more about the lesson.

Lesson 1 Effects of Force when Applied to an Object

People and other living things cannot live without force. Force allows us to move our bodies and do our daily activities. We also apply force when we use different objects around us. A force acting on an object causes it to change in different ways. Do you want to know the changes that happen to objects when force is applied to them?

In this module, you will be familiarized with and be able to explain the changes that happen to different objects due to the application of force.

What's In

A. Directions: Identify the type of interaction among living organisms described in each statement. Choose your answer from the words in the box below. Write your answers in your notebook.

competition	mutualism	commensalism
predation	parasitism	

1. It exists when two different organisms benefit from one another.
2. It is a relationship wherein one organism thrives at the cost of the host.
3. It happens when two organisms fight for limited food resources for survival.
4. It is a relationship wherein an organism survives by killing and eating another organism.
5. It happens when an organism benefits from the other without harming the other organism.

B. Directions: Describe the effects of the interaction among organisms in their environment. In your notebook copy and complete the table below.

Organisms	Effects of interaction to the environment
1. bees and flowers	
2. bird and tree	
3. aphids and string beans	
4. snake and rats	
5. water plant and fish	

Very good! Now, be ready for more activities. Have fun!

What's New

Note to Parent/Learning Facilitator: Guide your children in doing this activity. Remind them of the precautionary measures. Tell them to be more careful in handling the materials while performing the activity**.**

For the Learner:

Directions: Perform the activities below and answer the guide questions. Write your answers in your Science notebook.

Activity 1. Oops, I Did It Again!

Problem: What is the effect of force on the size and shape of an object?

What you need: rubber ball, can, eggshell, stone, candy wrapper, box, rubber band, chair, bottle cap, paper, hair, biscuit, folder, wire

Directions: Prepare the materials. What actions can you do on the objects in order to change their shape, size, or both? Copy and fill out the table below in your Science notebook. The first object was done for you.

Objects	What action have I done to the object?	What happened to the object?	
		Changed in size?	*Changed in shape?*
rubber ball	*squeezed*	✓	✓
can			
egg shell			

stone			
candy wrapper			
box			
rubber band			
chair			
bottle cap			
paper			
hair			
biscuit			
folder			
wire			

Guide Questions:

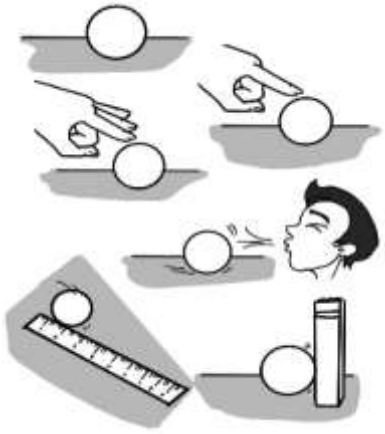
1. What do you think helped you made changes on the different objects?
2. What happened to the shape of some objects when force was applied to them?
3. What happened to the size of some objects when force was applied to them?
4. Is it possible that an object's shape and size will be affected by the application of the force at the same time? Cite an example.
5. Aside from humans, are there other things that could apply force on an object? Give some examples.
6. How will you describe the effect of force on objects based on the activity?

Activity 2. Look What You Made Me Do!

Problem: What is the effect of force on the movement of an object?

What you need: rubber ball, table or any flat surface

What to do: Demonstrate the following situations using the rubber ball on a table or any flat surface.



a. From at rest, make the object move.
b. Make the moving object move faster.
c. Make the moving object move slower.
d. Make the moving object change its direction.
e. Make the moving object stop.

Guide Questions:

1. What did you apply on the object in all situations?
2. Without force, will the object at rest move?
3. Without force, will the object in motion stop?
4. Without force, will the moving object change direction?
5. What did you do to make the object move faster? slower?
6. How does force affect the motion or movement of the object?

Congratulations!
You're done with the activities about the effects of force.

What is It

Points to Remember:

- A **force** is a **push or pull**, which occurs when two or more objects interact with each other.
- A force has amount and direction.
- **Effects of Force on Objects**

The **shape** of an object may change when force is applied on it. Kneading a dough, pounding pepper, compressing cotton, bending wire, twisting rope, stretching rubber band, or squeezing rubber ball are some ways of changing the shape of an object.

Also, when force is applied to an object, the object's **size** may change. Some situations where force is applied and changed the size of objects are the following: dropping a glass, pounding garlic, cutting a paper, sharpening a pencil, and grinding papaya.

The force applied on an object also affects its **movement**.

Force can change the state of rest or motion of an object. An example is when your hand pushes a marble gently on top of a table. The ball then sets into motion. Now, if you keep your hand on the opposite side of the moving ball, the moving ball comes into a state of rest.

Force can change the direction of movement of an object. An example is when a football player applies force by kicking the ball in different directions.

Force can change how fast or slow the movement of an object is. The ball travels farther when the force applied to it is stronger and the ball travels nearer when lesser force is applied to it.

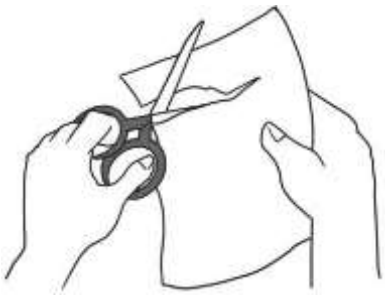
Now, I am glad you knew already that when a force is applied to an object, the object may change its size, shape, or movement.

What's More

Activity 1: What's the action?

Directions: Choose the word from the box that describes the action shown in these pictures. Write your answers in your notebook.

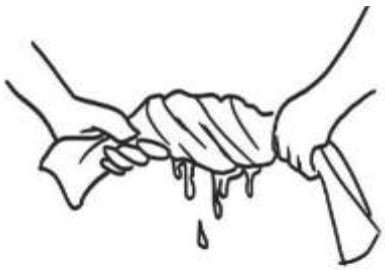
cutting	pulling	pushing	twisting	pounding

1. 

2. 

3. 

4. 

5. 

Activity 2: Push or Pull?

Directions: Determine whether the actions involve pushing, pulling or a combination of both by putting a check mark (✓) on the proper column of the table below. Copy the table and write the answers in your notebook.

Actions	Pushing	Pulling	Both pushing and pulling
1. bending			
2. lifting			
3. crumpling			
4. tearing			
5. throwing			

Activity 3: Changes in Size and Shape

Directions: Explain the changes that will happen to the size or shape of the given objects if force will be applied. Write your answers in your notebook.

1. sharpening a pencil
2. dropping a flower vase
3. pounding a Styrofoam cup
4. cutting a piece of cardboard
5. a bar soap dropped on the floor

Activity 4: True or False

Directions: Write **TRUE** if the statement is correct and **FALSE** if it is not, and then change the part of the sentence that makes it incorrect. Write your answer in your notebook.

1. Without force, an object at rest will move.

2. Without force, a moving object will not stop.

3. Force can cause an object to be in continuous motion only.

4. The stronger the force applied, the farther the distance of the toy car travelled.

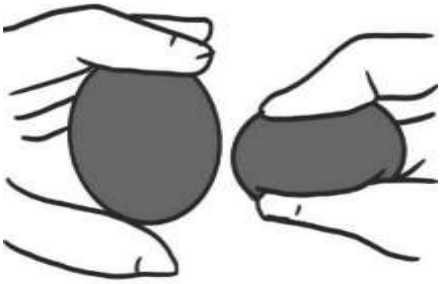
5. The amount of force does not affect how fast or slow the motion of the object is.

It seems like it's easier for you now. If not, it's okay. Review again your answers, stay positive and keep trying.

What I Have Learned

Directions: Complete the statement using the pictures below as clues. Write your answers in your notebook.

I have learned that force is a _____ or a _____. Applying force can change the object's _____, _____, and _____.



Very good! Now, it's time to apply what you have learned.

What I Can Do

Directions: Explain the effect on the objects when you apply force on them as shown in the given pictures. Write your answers in your notebook.

Object	What do you think a force can do to the object shown?
1. 	I think the force . . .
2. 	I think the force . . .
3. 	I think the force . . .
4. 	I think the force . . .
5. 	I think the force . . .

Wow! You did it! It is time to have a test of what you have learned from this lesson. Ready? Best of luck!

Assessment

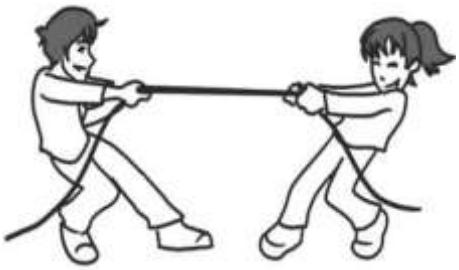
Directions: Write the letter of the best answer. Write your answers in your notebook.

1. It is a push or pull.
   a. force
   b. gravity
   c. mass
   d. speed

2. What is the effect of force when you slice a cake?
   a. Force changes the taste of the cake.
   b. Force changes the color of the cake.
   c. Force changes the shape of the cake.
   d. Force changes the shape and size of the cake.

3. What changes when you stretch a rubber band?
   a. chemical property
   b. color
   c. size
   d. movement

4. The picture shows that two players are pulling a rope with the same amount of force. What will likely happen?
   a. Both will fall.
   b. The girl will win.
   c. The boy will win.
   d. They will not move at all.



5. Which of the following is **TRUE** about force?
   a. Force can change the shape or size of an object.
   b. Force can only change the direction of an object.
   c. Force cannot change the speed of a moving object.
   d. Force can change the chemical properties of objects.

6. Which statement is **NOT** true about force?
   a. Slicing a banana changes its shape and size.
   b. A rolling ball on a surface will continue moving unless a force is applied on it.
   c. A ball moving on top of the table stops when you apply force opposite to the direction of its motion.
   d. In order to slow down or stop a heavy object, the force applied must be lesser than the mass of that given object.

7. It is an act of applying force to move something towards you.
   a. a pull
   b. a push
   c. a push and a pull
   d. none of the above

8. What do you think will happen to the speed of the object when the force is applied in the opposite direction to the direction of motion?
   a. increases
   b. decreases
   c. remains the same
   d. none of the above

9. If you are to push a cart, a big box, and a bicycle to a certain distance from the starting line, which do you think will require greater force?
   a. bicycle
   b. big box
   c. cart
   d. all of them

10. The greater the mass of an object, the greater is the force needed to _____ the object.
    a. move
    b. push
    c. stop
    d. all of them

11. Suppose you push a door and your friend on the other side of the same door is also pushing it. How will you describe the force and the effect of your actions to the door?
    a. The door pushes you and your friend.
    b. The door pushes your friend away from you.
    c. The force is unbalanced and the door may break.
    d. The force is balanced and the door does not move.

12. Which among the following objects will require a greater force to move?
    a. refrigerator
    b. television
    c. study table
    d. monoblock chair

13. A marble that is standing still will move when _____.
    a. touched by a person
    b. there is a strong wind
    c. bumped by a small slow moving marble
    d. more or stronger force is applied on the marble

14. Why do you need to use force in moving a ball up a ramp?
    a. to add force to the ball
    b. to let the ball roll on the ramp
    c. to allow the ball to stay on the ramp
    d. to move the ball away from the ramp

15. If an object is in motion and more force is applied to it, the object will begin moving _____.
    a. slower
    b. at a constant speed
    c. faster
    d. at a lesser speed

Additional Activities

Directions: In your notebook write 2-3 sentences citing the importance of the effects of force on the size, shape, and movement of objects.

_____
_____
_____
_____
_____
_____

Congratulations! You did great! Now, you may proceed to the next module. Good luck, keep learning and have fun!

Answer Key

What's In

A.

1. mutualism		4. predation
2. parasitism		5. commensalism
3. competition		

B.

Organisms	Effects of interaction to the environment
1. bees and flowers	-bees will feed on the nectars and help in pollination process
2. bird and tree	-bird nests on the tree, eats the fruits and help propagate seeds
3. aphids and string beans	-aphids affect the growth of the string beans
4. snake and rats	-snake eats the rats and the rats' population will decrease
5. water plant and fish	-water plant gives off oxygen to the fish while the fish gives off carbon dioxide needed by the water plant

What I Know

A.

Activity	What change/s happen to the object?		
	size	shape	movement
1. cutting a piece of paper	✓	✓	
2.molding clay	✓	✓	
3. throwing a ball			✓
4. blocking a moving toy car			✓
5. folding a table napkin	✓	✓	
6. tearing a biscuit wrapper	✓	✓	
7. chopping firewood	✓	✓	
8. slicing bananas	✓	✓	
9. rolling a marble on the floor			✓
10. squeezing a lemon	✓	✓	

B.

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

What's New

Activity 1: Oops I did it Again!

Objects	What action has been done?	What happened to the object?	
		Changed in size?	*Changed in shape?*
rubber ball	squeezed	✓	✓
can	squeezed	✓	✓
eggshell	crushed/pounded/ cracked	✓	✓
stone	crushed/pounded	✓	✓
candy wrapper	tore	✓	✓
box	cut/ folded	✓	✓
rubber band	stretched	✓	✓
chair	broke/cut	✓	✓
bottle cap	flatten/ cut	✓	✓
paper	cut/folded/tore/ crumpled	✓	✓
hair	cut	✓	✓
biscuit	broke/ crushed	✓	✓
folder	folded/cut/tore	✓	✓
wire	bent/cut	✓	✓

Answers to Guide Questions:
1. force
2. changed
3. The size changed.
4. Yes/ examples are pounding, breaking, or cutting objects
5. Yes/ things like tools and machines, animals, and other natural forces like wind and water
6. Force can change the size and shape of an object.

Activity 2: Look What You Made Me Do!

Answers to Guide Questions:
1. force
2. no
3. no
4. no
5. Applying greater amount of force/ lesser amount of force
6. Force can change the movement of the object. It can make things move or stop moving. It changes the direction of a moving object. It also makes the movement faster or slower.

What's More

Activity 1- What's the action?

1. cutting
2. pounding
3. pushing
4. pulling
5. twisting

Activity 2- Push or Pull?

Actions	Pushing	Pulling	Both pushing and pulling
1. bending			✓
2. lifting		✓	
3. crumpling	✓		
4. tearing			✓
5. throwing	✓		

Activity 3- Changes in Size and Shape

1. Pencil changes in size and shape.
2. The vase will be broken down into smaller pieces, changing its size and shape.
3. The Styrofoam cup changes in size and shape.
4. The cardboard changes its size and shape.
5. The bar soap will be broken or might be deformed, changing its size and shape.

Activity 4- True or False

1. FALSE

Without force, an object at rest **will not move.**

2. TRUE
3. FALSE

Force can cause an object to be in continuous motion. (remove "only")

4. TRUE
5. FALSE

The amount of force **affects** how fast or slow the motion of the object is.

What I Have Learned

I have learned that force is a push or a pull. Applying force can change the object's size, shape, and movement.

What I Can Do

1. Force changes the movement of the push cart.
2. Force changes the size and shape of the cloth.
3. Force changes the size and shape of the mango.
4. Force changes the movement of the soccer ball.
5. Force changes the movement of the toy car.

Assessment

1. a
2. d
3. c
4. d
5. a
6. d
7. a
8. b
9. b
10. d
11. a
12. a
13. d
14. b
15. c

Additional Activities

Possible Answers:
Importance of changing size, shape, or movement of objects:

- It is used in preparing ingredients for cooking food.
- Changing the size and shape of hardware materials is important in construction of buildings.
- Changing the movement of objects can help in driving vehicles.

References

Abutay, L., Bonao, D., Crucis, E., Eslabra, J., Gramaje, E., Guadamor, M., Hernandez, A., Ilagan, L., Llamera, F., Manawatao, R., Panganiban, H., Rojo, J., Tosco, R. R., & Zape, J. (2015). *Science grade 4: Learner's material* (1st ed) (pp. 171-175). Department of Education.

Abutay, L., Bonao, D., Crucis, E., Eslabra J., Gramaje, E., Guadamor, M., Hernandez, A., Ilagan, L., Llamera, F., Manawatao, R., Panganiban, H., Rojo, J., Tosco, R. R., & Zape, J. (2015). *Science grade 4. Teacher's guide* (1st ed) (pp. 215-219). Department of Education.

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