8 SCIENCE

Quarter 1

PIVOT 4A LEARNER'S MATERIAL

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Science

Grade 8

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SCIENCE Grade 8
PIVOT IV-A Learner's Material
Quarter 1
First Edition, 2020

Published by: Department of Education Region IV-A CALABARZON
Regional Director: Wilfredo E. Cabral

Guide in Using PIVOT Learner's Material

For the Parents/Guardian

This module aims to assist you, dear parents, guardians, or siblings of the learners, to understand how materials and activities are used in the new normal. It is designed to provide the information, activities, and new learning that learners need to work on.

Activities presented in this module are based on the Most Essential Learning Competencies (MELCs) in Science as prescribed by the Department of Education.

You are expected to assist the child in the tasks and ensure the learner's mastery of the subject matter. Be reminded that **learners have to answer all the activities in their own notebook**

For the Learners

The module is designed to suit your needs and interests using the IDEA instructional process. This will help you attain the prescribed grade-level knowledge, skills, attitude, and values at your own pace outside the normal class-room setting.

The module is composed of different types of activities that are arranged according to graduated levels of difficulty—from simple to complex. You are ex-pected to **answer all activities on separate sheets of paper** and submit the out-puts to your respective teachers on the time and date agreed upon.

PARTS OF PIVOT LEARNER'S MATERIAL

	Parts of the LM	Description
Introduction	What I need to know	The teacher utilizes appropriate strategies in presenting the MELC and desired learning outcomes for the day or week, purpose of the lesson, core content and relevant samples. This allows teachers to maximize learners awareness of their own knowledge as regards content and skills required for the lesson.
	What is new	
Development	What I know	The teacher presents activities, tasks , contents of value and interest to the learners. This shall expose the learners on what he/she knew, what he /she does not know and what she/he wanted to know and learn. Most of the activities and tasks must simply and directly revolved around the concepts to develop and master the skills or the MELC.
	What is in	
	What is it	
Engagement	What is more	The teacher allows the learners to be engaged in various tasks and opportunities in building their KSA's to meaningfully connect their learnings after doing the tasks in the D. This part exposes the learner to real life situations /tasks that shall ignite his/ her interests to meet the expectation, make their performance satisfactory or produce a product or performance which lead him/ her to understand fully the skills and concepts .
	What I can do	
	What else I can do	
Assimilation	What I have learned	The teacher brings the learners to a process where they shall demonstrate ideas, interpretation, mindset or values and create pieces of information that will form part of their knowledge in reflecting, relating or using it effectively in any situation or context. This part encourages learners in creating conceptual structures giving them the avenue to integrate new and old learnings.
	What I can achieve	

Changes in the Motion of Objects

I Lesson

In this lesson, you will learn the concepts that you can use to ***investigate the relationship between the amount of force applied and the mass of the object to the amount of change in the object's motion.***

An object may be acted upon by several forces weather object is at rest or in motion. An object may be pushed and pulled in different directions at the same time. For you to identify the forces which cause the change in the motion of an object, it is important to determine all the forces acting on the object. Examine Figure 1 below. Is there a motion? Why do you think so?

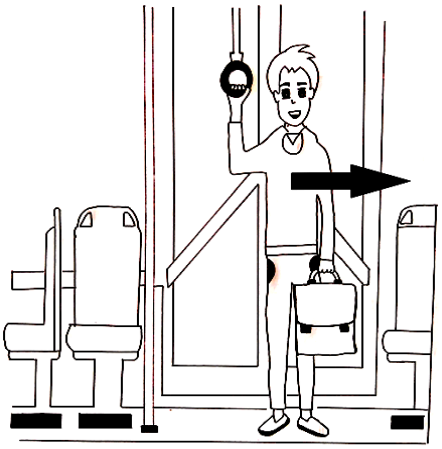


Figure 1.

Motion is a phenomenon in which an object changes its position over time. Motion is described in terms of displacement, distance, velocity, acceleration, speed and time. In the above illustration, the bus is moving from its reference point of its place of origin. THe bus moves with certain speed, at a rate by which it accelerates at specific time. With regards to the man, there is no motion as there is no change in his position nor displacement.

What will happen to the man as he is standing still and the bus move forward? How about when the bus suddenly stops?

Dynamics is the study of forces that cause objects and systems to move. Force is simply defines as the push or a pull of an object with a specific magnitude and direction. There is a need for a standard force when representing a vector quantity (either push or pull). The push or pull on an object can vary considerably in either magnitude or direction.

The man's body has inertia, and so a force is needed to change its velocity, the man's body moves backward as the bus moves forward. As the man's hold on to the grips handle, the force exerted by the bus through the handle makes the man's body forward velocity.

Law of Inertia or Newton`s First Law of Motion

The illustration in Fig. 1 demonstrates the property of an object to resist any change in its state of motion. This is known as inertia. A body at rest remains at rest or, if in motion, remains in motion at constant velocity unless acted on by a net external force. All objects have the tendency to resist changes in their state of motion or keep doing what the objects are doing. However, changing a body's state of motion depends on its inertia. A more massive object which has more inertia is more difficult to move from rest, slow down, speed up or change its direction. This is illustrated in fig. 1 that when the bus suddenly stops, then there will be change in motion. Inertia is exhibited when the body moves forward as if to continue moving. Sudden acceleration will make the body moves backward. Have you experienced this kind of motion when riding a bicycle or in a jeepney?

Learning Task No. 1: Fill in the box the correct letter (s) being described in each item. Write your answer in your notebook.

1. The scientist who formulated the laws of motion.

		W			**N**

2. The force needed to stop an object in motion is called?

	R		**C**		**I**		**N**

3. The property of an object that resists change in its state of motion.

		E				**A**

4. The sum of all the forces acting on the object is zero, which is the first condition of it and it has two forms.

E			**I**			**B**				**M**

5. The body will remain at rest or move at constant velocity unless acted upon by an external net force r unbalanced force.

		W		**O**	**F**			**N**			**T**		

Law of Acceleration: Newton`s Second Law of Motion

Study Figure 3 showing acceleration of a large mass of object . The moving truck accelerates at a speed lower than smaller object with smaller mass.

Newton's second law pertains to the behavior of objects if the forces are not balanced or if the external net force is not zero. In the presence of a net force, the object will accelerate (unbalanced force)

Newton's second law of motion can be formally stated as follows: The acceleration of an object as produced by a net force is directly proportional to the magnitude of the net force, in the same direction as the net force and inversely proportional to the mass of the object.

The second law states that the acceleration of an object is dependent upon on two variables: the net force acting upon on the object and the mass of the object. So the acceleration of an object depends directly upon the net force acting upon the object, and inversely upon the mass of the object. As the net increases, so the objects acceleration also increases.

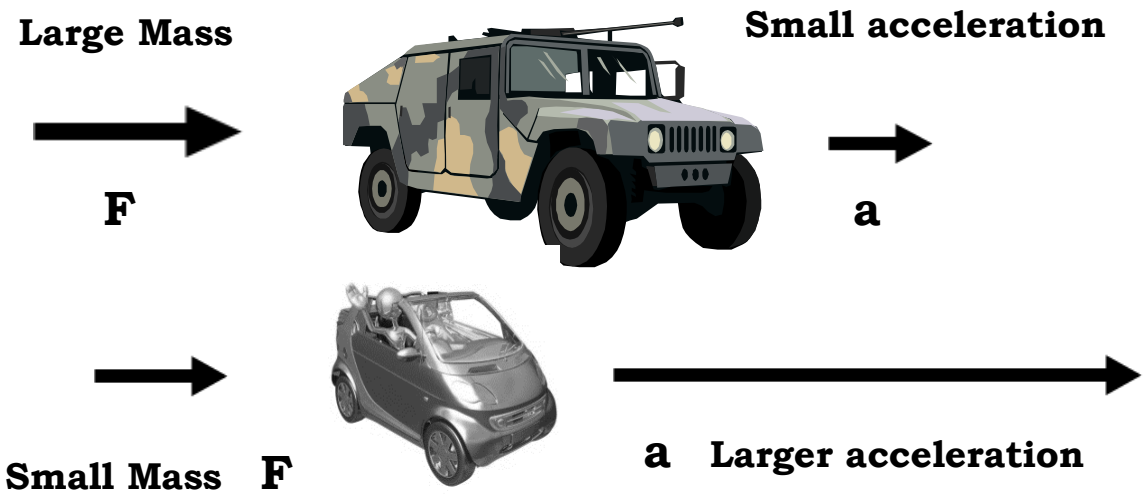
Figure 2. The Law of Acceleration showing the effect of mass of an object to tis acceleration (*Source: Marc Aller Anthony M. Guevarra, San Bartolome National High School,, RTOT 2018)*

So….if you push twice as hard, it accelerates twice as much.

But there is a twist…

Acceleration is INVERSELY related to the mass of an object.

In other words, if the object has large mass, there is small acceleration while small mass of moving object has larger or faster acceleration of moving objects



(Source: Marc Aller Anthony M. Guevarra, San Bartolome National High School, RTOT 2018)

Like any other quantity, force has unit and is expressed in Newton (N). One Newton is defined as the amount of force required to give a 1kg mass an acceleration of 1m/s/s, or 1Newton (N) = 1kg/m². It is also the acceleration of any object due to gravity.

Force is measured by the multiplying the mass of an object to its acceleration. The formula is written as:

f= m x a f= force m=mass of an object a= acceleration

Sample Mathematical Problem :

Suppose a grocery cart has a mass of 0.45kg is push with a force of 90N. What will be the acceleration of the grocery cart? Show your solution using G-R-E-S-A method.

Given: mass – 0.45kg Fnet - 90N
Required: a?
Equation: a = Fnet/m
Solution: a = 90N à 1kg/m/s² /0.45kg
Answer: a = 2 m/s²

D

Learning Task No.2 : Use the GRESA Method in solving the problem below. Show your solutions. Write your answers in your notebook.

1. What is the mass of the cart with a constant net force of 200N is exerted to accelerate from rest to a velocity of 40m/s in 10 s.
   A. 0.5 kg C. 50 kg
   B. 5 kg D. 500 kg

2. What is the acceleration of a ball with a mass of 0.40 kg is hit with a force of 16N?
   A . 0.4 m/s² C. 400 m/s²
   B. 40 m/s² D. 4000 m/s²

3. What is the external net force exerted on a 3.5 kg papaya, which is being pushed across a table and has an acceleration of 2.2 m/s² to the left?
   A. 7.0N to the left C. 7.7N to the left
   B. 7.5N to the right D. 7.7N to the right

4. What is the mass of a crate with a net force of 300N and accelerate it by 0.750 m/s²?
   A. 0.4 kg C. 40 kg
   B. 4 kg D. 400 kg

The Law of Action and Reaction: Newton`s Third law of Motion

Newton's 3rd law of motion deals with the reaction of a body when a force acts on it. Let a body A exerts a force on another body B, body B reacts against this force and exerts a force on body A. The force exerted by body A on B is the action force whereas the force exerted by body B on A is called the reaction force. Newton's 3rd law of motion states that:

"To every action, there is always an equal but opposite reaction."

According to this law, the action is always accompanied by a reaction force and the two forces must always be equal and opposite. Note that action and reaction forces act on different bodies.

Newton's 3rd law of motion tells us four characteristics of forces.

ØForces always occur in pairs (action and reaction forces).

ØAction and reaction are equal in magnitude.

ØAction and reaction are opposite in direction.

ØAction and reaction act on different bodies.

Here are some of the situations that deals practically in understanding the THrid Law of Motion.

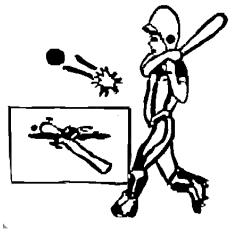
1. Pushing a car

Action force- the man pushes car

Reaction force- the car pushes man

When making a push to a car , a force is exerted in a car, whose reaction will push us directly with the same force in the opposite direction.

2.Hitting a ball

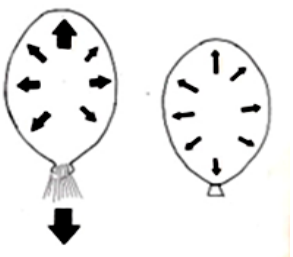


Action force- bat hits ball

Reaction force- ball hits ball

We exert an amount of force against the ball with the bat, which in reaction exert the same force on the wood. This is why the bat can break while the balls are thrown

3.Deflating a balloon



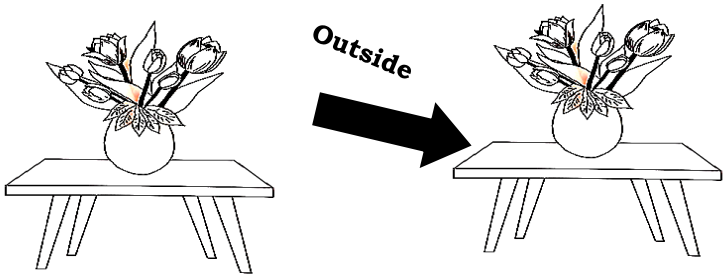
Action force- air inside the balloon rushes down

Reaction force – the balloon moves upward

The air inside rushes down and the balloon moves upward. In this situation, the action is by the balloon that pushes the air out of it when setting free. The reaction of the air which escapes out from the balloon acts on the

E

Learning Task No. 3: Refer to the illustration shown in Picture A and Picture B. Answer the guide questions .



Picture A **Picture B**

Guide Questions:

1. Which picture shows that the object is at rest?
2. Which picture shows that the object is in motion?
3. What keeps the object remain at rest?
4. What makes the object in motion causes changes in its state of ?

A

Learning Task No. 4: Analyze the given activities below. Write the letter that best describes the effect of force in the object in each activity.

A force causing an object to :

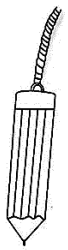
A - start moving
B - stop moving
C - change direction

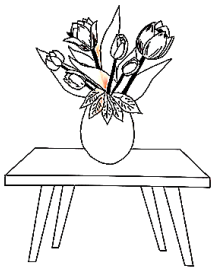
1. pushing a cart
2. catching a ball
3. lifting a sack of rice
4. steering a moving boat
5. throwing darts on a dartboards
6. throwing a ball
7. running in an oval
8. braking of a moving car
9. blowing across rising smoke
10. hitting a baseball with a bat

Balanced and Unbalanced Forces

I Lesson

You learned that all objects fall because gravity pulls on them towards the center of the earth. Examine the pictures below showing the pen and the flower vase. But what makes the pen and the vase stays at rest? The pen stays in place because of another force that acts on it that is supplied by the string which we refer in physics as tension force (T). Tension force is the force which is transmitted through a string, rope, or wire when it is pulled tight by forces acting at each end. The vase on the other hand, stays at rest because of the upward push exerted on it by the table which referred to as normal force. (Fn). Both the tension force and normal force counteract the pull of gravity (Fg) that acts on the objects, which makes them to stay at rest.





In both cases, you can now infer that the objects remained at rest because the forces acting on the pen and on the vase are equal in magnitude and in opposite direction and they lie along the same line of action. The forces are said to be balanced.

What is balance force?

Balanced forces are forces that are equal in magnitude and in opposite direction so there will be no motion in an object. Here are some examples where you can see balanced forces. The arrow is the one that indicate the forces that act on the rope and on the ground.

Combining Forces

For you to determine the net force or unbalanced force, you have to recognize those forces that act along the same line of action. The algebraic sign + and – are used to indicate the direction of forces. Remember your lesson in Mathematics, like and unlike sign. Unlike sign are used for forces acting in opposite direction, like in the case of the ball lying on top of the table. The force of gravity (Fg) and normal force (Fn) are assign opposite signs. Fn is given positive sign (+) while Fg is given (-) sign. If both Fn and Fg are given a magnitude values of 5 units , then the net force along the line will be.

You may follow the G-R-E-S-A method. What is this GRESA method? It is a systematic way of solving a given problem.

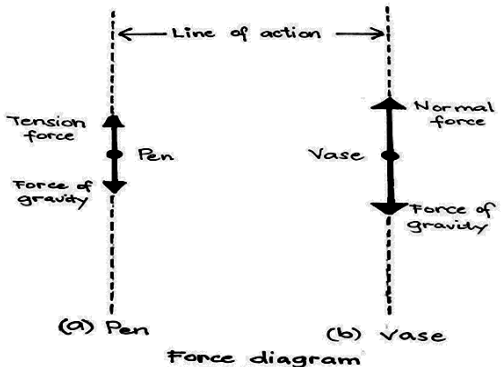
G - given,

R – required,

E –equation,

S –solution and

A – Answer .



Let you go back again in activity 1. The vase on top of the table and on the force diagram illustrated for the vase. The vase stays at rest because it has a normal force of 5units and gravitational force of 5 units also. Lets find out will be the net force of the vase?

(*Photo taken from the LM.)*

Given - Fn(Nornal force) = 5 units, Fg (Gravitational force) = 5 units

Required - F net ?

Equation - Fnet = Fn + Fg

Solution- Fnet = 5 units + (-5 units) = 0

Answer - = **0**

If the sum of the force equate or equal to zero (0), the forces are considered balanced. If the algebraic sum is not equal to zero, the forces are not balanced. The non-zero sum is the net or unbalanced force. This unbalanced or net force would cause a change in a body's state of motion.

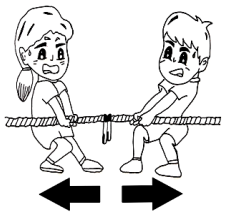
Unbalanced Forces

In a situation when a pen is attached to a sting, and then you cut the string of the hanging pen, it fell down because there is no force acting on the pen to counteract the pull of gravity.

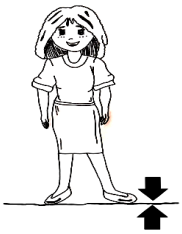
If you push the vase on one side across, the vase will move but it will not continue moving if you don't continuously push it. The vase moves because of the applied force. So the forces acting on these objects are no longer balanced.

If an object initially is at rest is under an unbalanced force, it moves in the direction of the unbalanced force. How about if the object is in motion? How will the unbalanced force affect its motion?

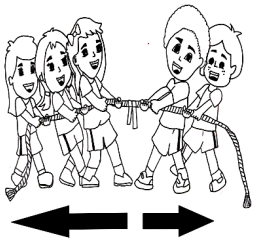
Learning Task No. 1: Identify the situation if it shows balanced or unbalanced force. Write your answer in your notebook.



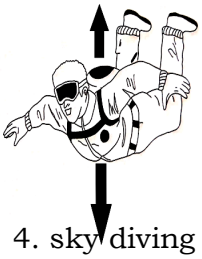
1. pulling a rope



2. standing still



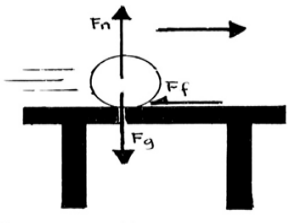
3. tug of war



4. sky diving

However, there is another force that acts on the ball along the horizontal line or along the force that makes the ball in motion. This is called friction force (Ff). Friction is a force that acts between surfaces that are in contact with one another. Friction in general acts opposite the direction of motion. In the case of the rolling ball, the frictional force acts between the surface of the ball and the table and slows down the motion of the ball. As the ball rolls to the right as shown in the illustration friction acts to the left to delay its motion. Since no one did push the ball continuously there is no force present to balance the force of friction so the ball slowed down and eventually stopped.

Again because of the unbalanced force, the object changes its state of motion, so you can say that it accelerates. Take note of this, acceleration is not just an increase in velocity, but also a decrease in velocity.



Forces acting on a rolling ball

D

Learning Task No. 2: Study the diagram above. Answer the guide questions.

Guide Questions:

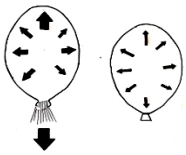
1. What do you call the force acting on the ball along the horizontal line or along the force that makes the ball in motion?
2. What makes the ball stop on rolling after sometime?
3. What makes the ball keep on rolling?

E

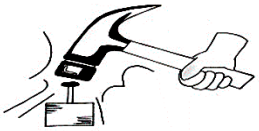
Learning Task No. 3: Examine the pictures below. Tell whether there is balance or unbalanced force in each situation. .

1. A man pushes

2. Boy bats the ball



3. Air rushes down

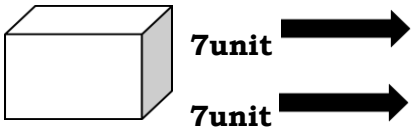


4. Hammer pushes a nail

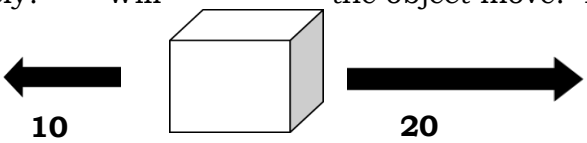
A

Learning Task No. 4: Try to solve this problem about balance and unbalanced forces using G-R-E- S-A method. Write your answer in a separate sheet of paper.

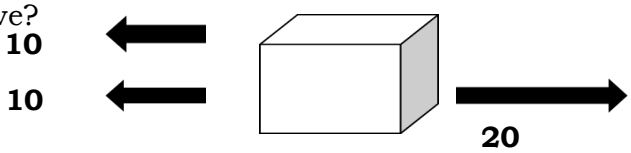
1. A boy and a girl are pulling a heavy crate at the same time with 7 units of force each. What is the net force acts on the object? Is the object balanced or unbalanced?



2. What will be the net force of the object, if a boy and a girl pull the heavy crate at the same time in opposite directions with 20 units and 10 units of force respectively? Will the object move? To what direction will it move?



3. Suppose another girl pulls the heavy crate with 10 units of force in the same direction as the girl, what will be the net force that will act on the object? Will the object move?



A

Learning Task No. 5:

Choose the letter of the correct answer. Write your answer on a separate sheet of paper.

1. What forces act on the vase on top of the table?

   I. Force exerted by the table
   II. Force of gravity
   III. Tension force
   IV. Spring force

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

2. Which of the following vehicle below has greater inertia?

   A. a car
   B. a truck
   C. a bicycle
   D. a motorcycle

3. When forces that act on an object are opposite in direction and equal in magnitude, the forces are said to be?

   A. Friction
   B. Balanced
   C. Gravitational
   D. Unbalanced

4. What causes the rolling ball to stop when there is no one to push it continuously?

   A. Forces acting on the ball are already used up.
   B. The forces acting on the ball were continuously increasing.
   C. Unbalanced force causes the rolling ball to change its motion.
   D. Gravitational force causes the rolling ball to change its motion.

5. What are the forces present on a lantern that is being hang on a tree?

   A. Normal force and tension force.
   B. Frictional force and normal force.
   C. Gravitational force and normal force.
   D. Gravitational force and tension force.

6. When the net force of an object is equal to zero, then the forces are said to be _____.

   A. balanced force
   B. unbalanced force
   C. gravitational
   D. Air –resistance force

Factors Affecting Potential and Kinetic Energy

I Lesson

In this lesson, you learn the different factors that affect potential and kinetic energy. Energy is defined as the ability to do work. When work is being done, we say that it is kinetic energy or energy in motion. The word "kinetic" in English comes from the Greek word kinetikos (moving). Potential energy is present when the work is waiting to be done, or when there is the potential for work to be performed. It is affected by the mass of the objects and gravitational force. The acceleration due to gravity is 9.9 m/s^2 or rounded off as 10 m/s^2. The two objects that are in the same position have potential energy, yet an object with greater mass has greater potential energy, with respect to it position. An object of the same mass that is placed at different position have different potential energy contained. The object at a higher position will have a greater potential energy. Kinetic energy is the energy of motion, potential energy comes from work having been done on an object which was then stored.

Try to get a piece of rubber band. It has potential energy relative to its position when placed in your hands. It has the gravitational potential energy. If you zinged the rubber band from your finger, then the potential energy has been transformed into kinetic energy. While it was stretch waiting for you to release it, it has potential energy again. It was stationary but work was done on it to move it to its present position.

More work means more energy is provided to and stored by the rubber band when it was stretched farther. When you release the rubber band, it has more energy to move. More energy means more work can be done by the rubber band. There is a connectedness between potential and kinetic energy. For moving objects, you can calculate kinetic energy using the formula:

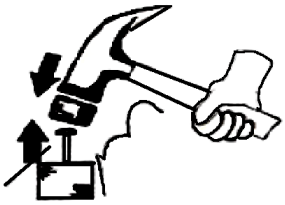
KE = (mass x velocity2)/2 or 1/2 mv2

Although mass and velocity both have great effects on kinetic energy, it is velocity, more significantly, that determines kinetic energy. Observe the picture below. Which picture of the child shows potential energy? Which of them showed kinetic energy?

The kinetic energy of a particle is a single quantity, but the kinetic energy of a system of particles can sometimes be divided into various types, depending on the system and its motion. For example, if all the particles in a system have the same velocity, the system is undergoing translational motion and has translational kinetic energy. If an object is rotating, it could have rotational kinetic energy, or if it's vibrating, it could have vibrational kinetic energy. The kinetic energy of a system, relative to an internal frame of reference, may be called internal kinetic energy. The kinetic energy associated with random molecular motion may be called thermal energy. This various types of energy is associated that for every kind of kinetic energy, it is the same physical quantity.

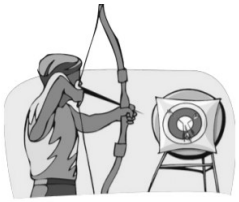
I

Learning Task No. 1: Analyze the picture below. Determine if it shows potential or kinetic energy. Write your answer in your notebook.

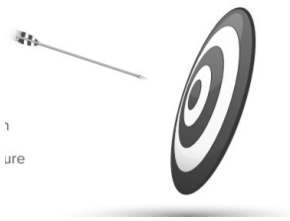


1. pushing the hammer into the nail

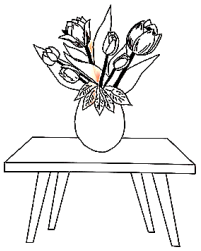
2. a boy walking in the street



3. the man holds the bow and arrow



4. the arrow approaching the dart board



5. the flower vase on top of the table

D

Learning Task No. 2: Compare Picture A and Picture B below. Answer the guide question. Write your answer in your notebook.

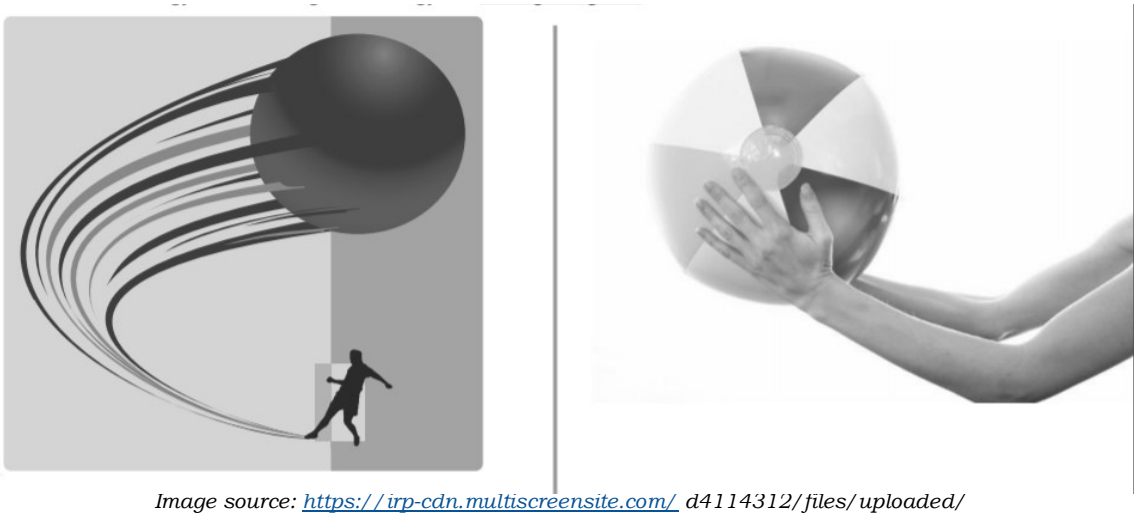


Image source: https://irp-cdn.multiscreensite.com/ d4114312/files/uploaded/ SciGen_8.1_student.pdf

Guide Questions:

1. Which picture shows potential energy?
2. Which picture shows kinetic energy?
3. What factor (s) affect the potential energy?
4. What factor (s) affect kinetic energy?

Although mass and velocity both have great effects on kinetic energy, it is velocity, more significantly, that determines kinetic energy. Study at the sample problem below.

What is the kinetic energy of a 45 kg object moving at 13 m/sec?

1. First we identify the information we are given in the problem:

mass = 45 kg velocity = 13 m/sec

2. Next, we place this information into the kinetic energy formula:

$KE = 1/2\ mv^2$ $KE = 1/2\ (45\ kg)(13\ m/sec)^2$

The kinetic energy value computed is 3802.5 J.

Note: The unit for energy is the same as for work: the Joule (J).

Learning Task No. 3: Look at the things around you. List at least five examples of potential and kinetic energy. Write your answer in your notebook.

Potential Energy	Kinetic Energy
1. _____	1. _____
2. _____	2. _____
3. _____	3. _____
4. _____	4._____
5. _____	5._____

E

Learning Task No. 4: Determine if the given situation shows potential or kinetic energy. Calculate using the formula given below.

P.E. = mass x acceleration due to gravity x height

P.E. = mgh= N x h acceleration due to gravity = 9.8 m/s^2 or 10m/s^2

1 Newton (N) = 1 kg x 1 m/s^2 or 1 kg m/s^2

KE = 1/2 mv^2

1. You throw a ball with a mass of 2.1 kg. The ball leaves your hand at 30m/s. The ball has _____ energy. Calculate it.

2. There is a bell at the top of a tower that is 50 m high. The bell weighs 190N. The bell has _____energy. Calculate it.

3. At what height is an object that has a mass of 56 kg if its gravitational potential energy is 9800 J?

4. There is a blender at the cabinet that is 5 m high. THe blender weighs 50N. The blender has _____ energy. Calculate it.

Effect of Temperature to the Speed of Sound

I Lesson

This lesson to help you master **propagation of sound**. After going through each of the learning tasks, you are expected to investigates the effect of temperature to speed of sound.

Sound waves are examples of longitudinal waves. They also exhibit characteristic features such as frequency, amplitude, wavelength, period and wave speed. The alternate pushing and pulling mechanically exerts force on unit areas of air particles and thus creating pressure waves. This alternating compressions and rarefaction make up the longitudinal waves like sound waves.

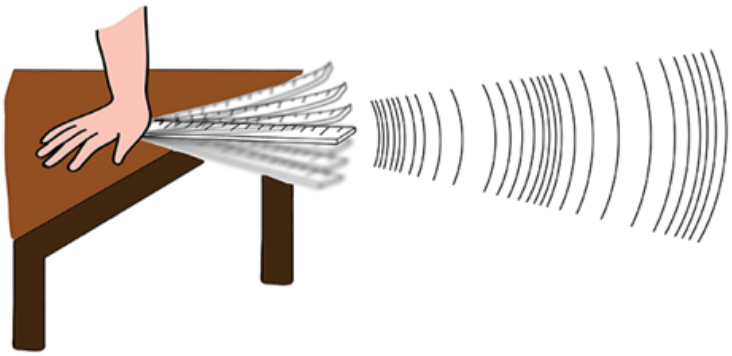
The speed of sound may differ for different types of solids, liquids and gases. For one, the elastic properties are different for different materials. Thus, sound can travel faster in mediums with higher elastic properties than in lower elastic properties. Another, the bond strength between particles also affects the speed of sound. Thus, sound waves travel faster in solids than in liquids and faster in liquids than in gases. While the density of a medium also affects the speed of sound, the elastic properties have a greater influence on wave speed. Another thing, the speed of sound is directly affected by the temperature of the medium.

T**emperature** is also a condition that affects the **speed of sound**. . Molecules at higher **temperatures** have more energy, thus they can vibrate faster. Since the molecules vibrate faster, **sound** waves can travel more quickly. The **speed of sound** in room **temperature** air is 346 meters per second.

The **speed of sound** is the distance travelled per unit time by a sound wave as it propagates through an elastic medium . The **speed of sound** in air is about 343 metres per second (1,235 km/h at 20 °C (68 °F), ; 1,125 ft/s; 767 mph; 667 kn), or a kilometre in 2.9 s or a mile in 4.7 s. It depends strongly on **temperature** as well as the medium through which a **sound** wave is propagating. Given normal atmospheric conditions, the temperature, and thus speed of sound, varies with altitude. Examine the chart below. It is advised that during storms or weather disturbances, the airplanes are given precautions in their schedule of flight. Why do you think so?

Altitude	**Temperature**	**m/s**	**km/h**	**mph**	**mph**
Sea level	15 O C (59OF)	340	1,225	761	661
11,000m-20,000m (cruising altitude of commercial jets and first supersonic flight	-57 OC (-70 OF)	295	1,062	660	573
29,000 m (Flight of X -43A)	-48 OC (-53 OF)	301	1,083	673	585

Learning Task No.1: Study the illustration below. Based on the lustration, describe sound as a form of energy. Write your answer in your notebook.



https://www.physicsclassroom.com/class/sound)

Sound is_____

_____

_____.

Remember:

1. The speed of sound may differ for different types of solids, liquids and gases.
2. Sound waves travel faster in solids than in liquids and faster in liquids than in gases.
3. Sound can travel faster in mediums with higher elastic properties than in lower elastic properties.
4. The speed of sound is directly affected by the temperature of the medium.

D

Learning Task No. 2: Write TRUE if the statement is soundly correct and FALSE if the statement is not correct. Write your answer in your notebook.

1. Sound is the energy things produce when they **vibrate**.
2. As the air moves, it carries energy in only one direction.
3. There are two different aspects to sound: the physical process and physiological process.
4. Sound can travel through solids, liquids, and gases and even in a vacuum.
5. Sound waves are examples of longitudinal waves.

E

Learning Task No. 3: Read the given information about sounds. Answer the guide questions at the end of the lesson. Write your answers in your notebook. Have your parents/guardian sign your work.

Sound is the **energy** things produce when they **vibrate** (move back and forth quickly). If you bang a drum, you make the tight skin vibrate at very high speed (it's so fast that you can't usually see it), forcing the air all around it to vibrate as well. As the air moves, it carries energy out from the drum in all directions. Eventually, even the air inside your ears starts vibrating—and that's when you begin to perceive the vibrating drum as a sound. In short, there are two different aspects to sound: there's a *physical* process that produces sound energy to start with and sends it shooting through the air, and there's a separate *psychological* process that happens inside our ears and brains, which convert the incoming sound energy into sensations we interpret as noises, speech, and music.

Sound is like light in some ways: it travels out from a definite source (such as an instrument or a noisy machine), just as light travels out from the Sun or a light bulb. But there are some very important differences between light and sound as well. We know light can travel through a vacuum because sunlight has to race through the vacuum of space to reach us on Earth. Sound, however, cannot travel through a vacuum: it always has to have something to travel through (known as a **medium**), such as air, water, glass, or metal. (*Reference: Hewitt, P. et al. Conceptual Physical Science Explorations)*

1. What is a sound? _____.
2. How do we produce sounds? _____.
3. Does sound travel/propagate through a medium?
   _____.
4. Describe the transmission of sound through solids, liquids and gases.

_____.

Parent`s Signature:_____

A

Learning Task No. 4: Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. An object that does not vibrate cannot produce what?

A. Sound B. Light C. Heat D. Electricity

2. Which medium will sound travels the fastest?

A. Solid B. Liquid C. Gas D. Vacuum

3. What happens to the sound an object makes when the speed of vibrations decreases (slow down)?

A. Its volume will increase.
B. Its pitch rises.
C. Its pitch becomes lower
D. Its volume decreases.

4. Which of the following statements BEST explains why you can hear noises long distances at night?

A. There are fewer other noises at night.
B. Water conducts sound better at night.
C. Sound bounces off water better at night.
D. Sound waves are bent towards the cool air.

5. Which of the following is **TRUE** about the effect of temperature to the rate of how sound travels?

A. Temperature increases the speed of sound.
B. Temperature decreases the speed of sound.
C. Warmer particles move at a slower rate.
D. Warmer particles move at a constant rate.

6. Which happens to sound when temperature decreases? As temperature decreases:

A. articles vibrate quickly, sound travels fast.
B. particles vibrate slowly, sound travels slow.
C. As the temperature decreases, particles vibrate slowly, sound travels fast.
D. As the temperature decreases, particles vibrate quickly, sound travels slow

7. Which of the following factors greatly affects the pitch of a sound?

A. the amplitude of a sound wave
B. the distance of a sound wave
C. the frequency of a sound wave
D. the loudness of a sound wave

Hierarchy of Colors in Relation to the Energy of Visible Light

Week 5

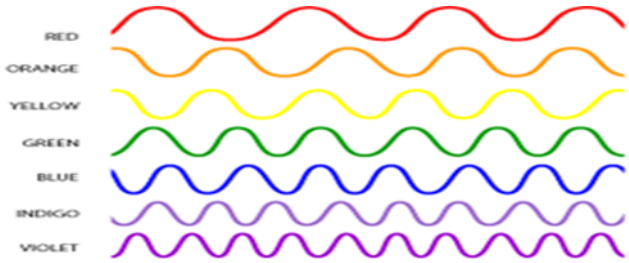
I

Lesson

This lesson will help you to understand concepts about light. After going through this lesson, you are expected to explain the hierarchy of colors in relation to energy of visible light.

Light is composed of colors of different frequencies and wavelength and the arrangement of colors of light shows the order of the color's corresponding energy. ROYGBIV is the only part of the spectrum that can be seen by the naked eye. A ray of white light that passes through a prism is dispersed into the visible spectrum. Red light is refracted the least, and purple light is refracted the most. his is because the speed of the various wavelengths in glass is different, slowest for violet light and fastest for red light. Red light has the lowest frequency and energy but the longest wavelength compare to other visible spectrum. Violet light has the highest frequency and energy but the shortest wavelength compare to other visible spectrum.

Using the diagram and the electromagnetic spectrum, you can see that violet color has the shortest wavelength but highest frequency and the greatest amount of energy while red color has the longest wavelength, lowest frequency and least amount of energy. Can you tell the relationship between frequency and wavelength of light ? Or the relationship between wavelength and the amount of energy?



The electromagnetic spectrum is important to astronomers because celestial objects emit waves in all the different regions of the spectrum. Visible light is very small fraction of the visible spectrum.

At homes, light carries information in many ways. Cell phones use light to send and receive calls and messages. Wireless routers use light to send pictures of your family in Facebook from the internet to your computer. Car radios use light to receive music from nearby radio stations. Even in nature, light carries many kinds of information. Telescopes are light collectors, and everything we know from Hubble is because of light. Since we are not able to travel to a star or take samples from a faraway galaxy, we must depend on electromagnetic radiation — light — to carry information to us from distant objects in space.

The Hubble Space Telescope can view objects in more than just visible light, including ultraviolet, visible and infrared light. These observations enable astronomers to determine certain physical characteristics of objects, such as their temperature, composition and velocity

Learning Task No. 1: Look at the given diagram of the glass prism below. This tells about the dispersion of light. Using the diagram, answer the given questions below.

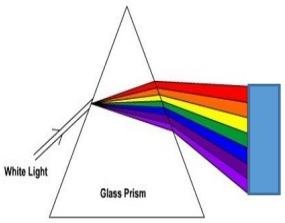
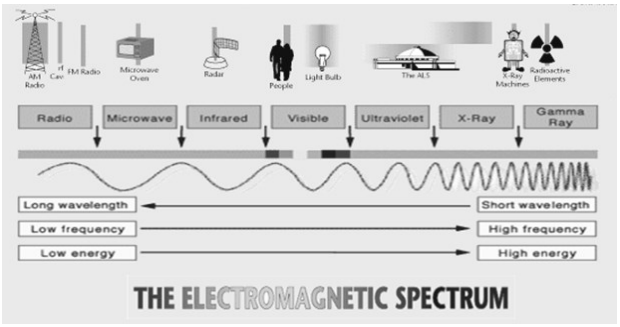


Figure 4: Glass Prism – Dispersion of light (*https://i0.wp.com/passnownow.com/wp-content/uploads/2014/07/glass-prism.jpg)*

1. Based on the figure, what is the arrangement of colors from top to bottom?
2. Based on the concepts learned and by looking at the diagram, what are the colors that have lower energy than the color blue?
3. What are the color/s that have higher energy than the color red?
4. What are the color/s that have higher frequency than the color red?
5. Which of the two colors: green or orange has the higher energy? Higher frequency? Longer wavelength?

D

Learning Task No. 2: Examine the diagram showing the electromagnetic spectrum. Answer the guide questions based on your analysis of the diagram.



Guide Questions:

1. By looking on to the details given above in the diagram, what are the seven identified components of the electromagnetic spectrum?

2. By studying the diagram of the electromagnetic spectrum, what is the "light" that is found at the very middle?

3. By looking at the visible light, what specific color of light has the longest wavelength? How about the shortest wavelength

E

Learning Task No. 3: Do the activity below. Write your answer in a sperate sheet of paper.

1. Turn off the lights to dim your living room.
2. Hold a CD and shine it with a flashlight.
3. Observe what will happen.
4. What did you find out?

Learning Task No. 4: Write your reflection regarding the activity in a separate sheet of paper.

I understand that_____.

I realized that_____.

A

Learning Task No. 5: Choose the letter of the best answer. Write your answer on a separate sheet of paper.

1. Which of the following is TRUE about the colors of light?
A. The shorter the wavelength, the lesser the energy.
B. The lower the wavelength, the lesser the refractive index.
C. The longer the wavelength, the greater the energy.
D. The higher the wavelength, the lesser the refractive index.

2. What happens to the light particles when light hits an uneven surface?
   A. They are reflected off in a straight line.
   B. They are scattered in many directions.
   C. They are absorbed by the surface
   D. They pass through the surface

3. As a ray of white light passes through a prism, dispersion occurs. Which among the color of the visible spectrum refracted the MOST?
A. Yellow
B. Red
C. Green
D. Violet

4. Light is composed of different frequencies and wavelengths. Which among the colors of white light has the shortest wavelength and highest frequency?
A. Blue
B. Indigo
C. Violet
D. Green

5. Which of the following wavelength order of visible light are from shortest to longest?
A. BIV G ROY
B. GIV R YOB
C. ROY G BIV
D. VIB G YOR

Week 6

Heat vs. Temperature

I

Lesson

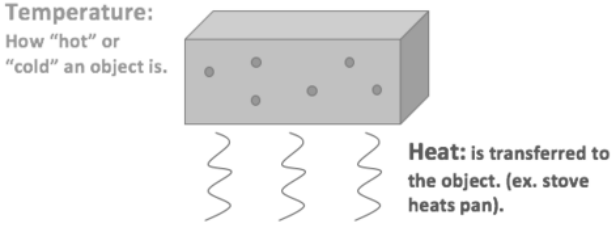
This lesson will give you understanding of the concepts about **heat and temperature**. After going through this lesson you are expected to differentiate heat and temperature at the molecular level. Look at the chart showing the difference between heat and temperature.

Heat	Temperature
Is the quantity of energy absorbed or given off by an object	Is the measure of hotness and coldness of an object
Unit: Calorie	Unit: Degree
Instrument measuring heat: Calorimeter	Instrument measuring temperature: Thermometer

In addition to these, we define heat as a transfer of (thermal) energy between objects or places due to temperature difference. Heat transfers from an object of higher temperature to an object of lower temperature. Length, mass, and temperature are measured quantities. So just like the meter for length and the gram for mass, we need units for temperature. This can be provided by three different **scales**, namely Fahrenheit, Celsius and Kelvin.

Heat is a form of energy and is measured in joules. It takes about 4.2 joules of heat to change 1 gram of water by 1 Celsius degree. A unit of heat still common in the United States is the calorie.

Temperature is measured in degrees; heat is measured in joules. **Temperature** describes the *average* kinetic energy of molecules within a material or system and is measured in Celsius (°C), Kelvin (K), Fahrenheit (°F), or Rankine (R). It is a measurable physical property of an object—also known as a state vaiable. Other measurable physical properties include velocity, mass, and density. THe diagram shows the difference between ehat and temperature at molecular level.



In general, the Second Law of Thermodynamics states that heat will always flow spontaneously from hotter substances to colder ones. This simple statement explains why an ice cube doesn't form outside on a hot day or why it melts when dropped in a bowl of warm water.

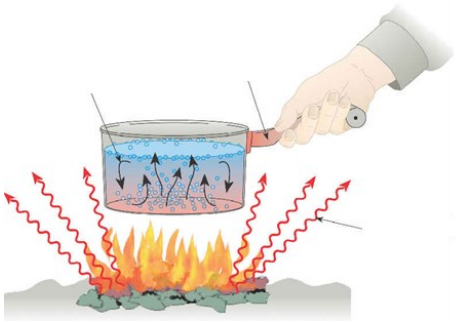
In a thought experiment, an ice cube dropped into a bowl of warm water gained heat (thermal energy) from the water in the bowl . Adding thermal energy leads to an increase in the kinetic energy of the ice molecule, and thus an increase in temperature. This is known because temperature is in fact the measure of the average kinetic energy of the molecules. Furthermore, the ice will continue to gain thermal energy causing its molecules to move faster and eventually break their intermolecular bonds or melt.

In conclusion, the transfer of heat or thermal energy will typically change the temperature of the substance, but not always! For example, at the moment when the ice in the bowl turns to water those water molecules will be at the exact same temperature as when they were ice. In this case, instead of the thermal energy doing work to increase the kinetic energy, it does work to break the intermolecular bonds, causing a change of state. However, as time goes on the temperature of the recently melted ice will increase until everything within the bowl reaches equilibrium—meaning a consistent temperature throughout.

Learning Task No. 1: Look at the illustration, what concepts of heat are being shown in this picture?

_____

_____



Heat and Temperature

(http://www.polytechnichub.com/wp-content/uploads/2015/03/modes-of-heat-transfer.jpg)

D

Learning Task No. 2: Using the same diagram above, state the Second Law of Thermodynamics. Write three sentences on the differences between heat and temperature.

E

Learning Task No. 3: Do the activity . Answer the guide questions. Write your answers in your notebook.

Material: 2 glasses of water

1. Prepare two glasses of water:
2. Label the glasses A-cold and B- warm.
3. Pour cold water on glass A and warm water in Glass B.
4. 3. Dip your finger in each of the glass of water.

4. Describe the heat and temperature of water.

Glass A **Glass**

Figure : Two glasses of water

(http://warriorsofweight.com/images/two_glasses_of_water.jpg)

1. In which glass of water did you feel the water warm? cold?
2. How did you know it is cold? warm?
3. What do you think is the temperature of the water?
4. Why is it we could not tell accurately the temperature of water?
5. What could be the unit used to measure the temperature?

_

A

Learning Task No. 4: Choose the correct word from the box below the terms about heat and temperature. Write your answer in your notebook.

1. It is the quantity of energy absorbed or given off by an object.
2. It is the unit of heat.
3. It is defined as the measure of hotness or coldness of a body.
4. The instrument used to measure temperature. _____
5. The unit of temperature. _____

Degree	Heat	Calorie
Temperature	Thermometer	Calorimeter

Relationship Between Current and Voltage

I Lesson

This lesson will help you master concepts about electricity. After going through the lessons and learning tasks, you are expected to infer the relationship between current and charge. Every bit of matter, wires included, contains enormous numbers of electrons that swarm about in random directions. When they are set in motion in one direction, a *net* direction, we have an electric **current**. The rate of electrical flow is measured in **amperes**.

When water flows in a pipe, there is more pressure on one end than the other. There must be a pressure difference to keep the water flowing. Similarly for electric current. Electrons flow in a wire only when a difference in electrical pressure exists.

The name for electrical pressure is **voltage.** How much current there is depends on the voltage, and also on the electrical resistance of the circuit. Electrical resistance is measured in units called **ohms**.When they are set in motion in one direction, a *net* direction, we have an electric current.

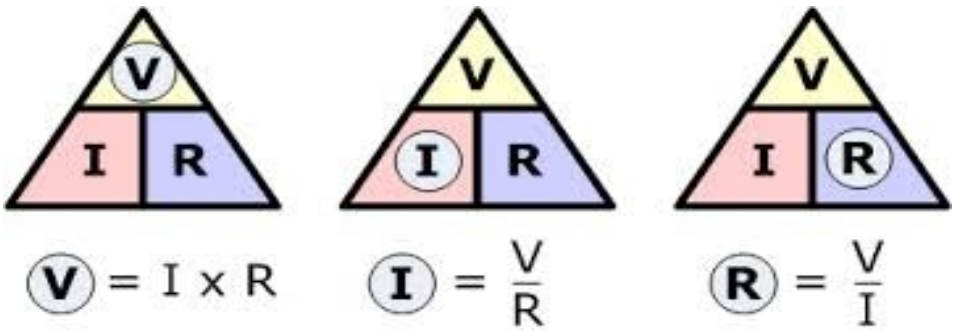
The rate of electrical flow is measured in *amperes* (abbreviation **A**). Electrons flow in a wire only when a difference in electrical pressure exists. The name for electrical pressure is **voltage.** How much current there is depends on the voltage, and also on the **electrical resistance** of the circuit. The relationship between voltage, current, and resistance is **Ohm's law.** Ohm discovered that the amount of current in a circuit is directly proportional to the voltage across the circuit and inversely proportional to the resistance of the circuit:

$$\text{Current} = \frac{\text{Voltage}}{\text{Resistance}}.$$

Or, in units form:

$$\text{Ampere} = \frac{\text{Volts}}{\text{Ohms}}.$$

Many texts use V for voltage, I for current, and R for resistance, and express Ohm's la as I = V/R. It can also be written, V = IR, or R = V/I, so if any two variables are known, the third can be found. Units are abbreviated V for volts, A for amperes and Ω for ohms. The formula to get the amount of voltage, current and resisitance is given in the diagram below.



Learning Task No. 1. Using the concepts you have learned, complete the table with appropriate answers based on the relationship of voltage, current and resistance.

Quantity of Electricity	Symbol	Definition	Unit of Measurement	Unit abbreviation	Instrument to measure
Voltage					
Current					
Resistance					

D

Learning Task No. 2: Read and understand the sample problem using GRESA Method. Solve the problem . Show the solutions in your notebook and encircle the final answer.

Sample Problem:

How much current flows through a lamp with a resistance of 60 ohms when the voltage across the lamp is 12-V?

G: R = 60 ohms

V = 12 volts

R: I = ?

E: $I = \frac{V}{R}$

S: $I = \frac{12 \text{ volts}}{60 \text{ ohms}}$

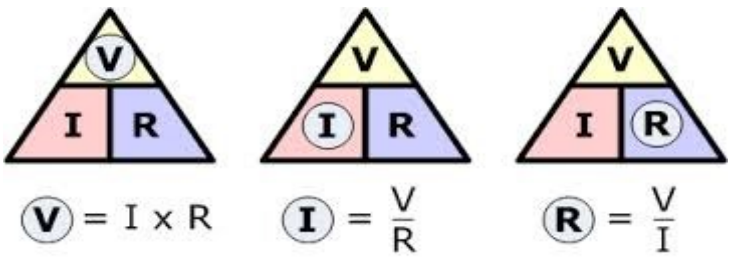
1.Use GRESA Method to solve for the amount of current that will flow in a lamp with a resistance of 40 ohms when the voltage across the lamp is 15 V.

2. Find the voltage if the resistance is 30 ohms and the current is 0.5 amperes.

3. Find the resistance if the current is 1.5 amperes and the voltage is 15-V.

E

Learning Task No. 3: Use the diagram showing the relationship among current, resistance and voltage. Explain the relationship between current and voltage; voltage and resistance; current and resistance. Write your answer in your notebook.



PIVOT 4A CALABARZON

A

Learning Task No. 4: Choose the letter of the best answer. Write your answer on a separate sheet of paper.

1. What happens to the current as the resistance increases?
   A. Current decreases as the resistance increases
   B. Current increases as the resistance increases
   C. Current decreases as the resistance decreases
   D. Current increases as the resistance decreases

2. Which of the following formula **CORRECTLY** represents the relationship of current, voltage and resistance?
   A. V= IR B. I= V/R C. V= I/R D. R= V/I

3. How much voltage would be necessary to generate 10 amps of current in a circuit that has 5 ohms of resistance?
   A. 2 V B. 0.5 V C. 50 V D. 4.9 V

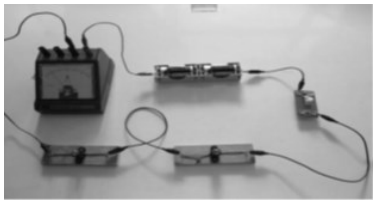
4. How many amps of current flow through a circuit that includes 27-v battery and a bulb with a resistance of 3 ohms?
   A. 9 Amp B. 18 Amp C. 81 Amp D. 0.11 Amp

5. Three LED lamps are connected in parallel across a 220 volt source. If one lamp burns out, _____.
   A. the remaining two will not glow C. the remaining two will glow dimmer
   B. the remaining two will glow brighter D. the remaining two will also burn out

6. Which connection below will make the bulbs glow brightest?
   A. Two bulbs and one dry cell in a series connection
   B. Two bulbs and one dry cell in a parallel connection
   C. Two bulbs and two dry cells in a series connection
   D. Two bulbs and two dry cells in parallel connection

7. Look at the illustration given. What type of circuit is shown?
   A. Alternate C. Simple
   B. Series D. Parallel

8. Which of the following is **TRUE** of electrical forces?
   A. Electrical forces are produced by electrical charges.
   B. Like charges attract, unlike charges repel.
   C. Electrical forces are weaker than gravitational forces.
   D. Positive and negative charges can combine to produce a third type of charge.



Week 8

Advantages and Disadvantages of Series and Parallel Connection

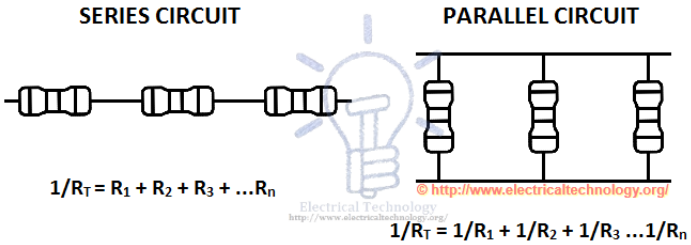
I

Lesson

In this lesson, you will learn the importance of series and parallel circuit connection. The lessons and learning tasks will help you to explain the advantages and disadvantages of series and parallel connections in homes.

Examine the diagram of a series and parallel connection below.

How did the two circuits differ?



A series circuit is a circuit in which resistors or loads are connected end to end so that the circuit will have only one path through which electric current flows. Thus, when a number of resistors are connected in series, the effective resistance (total resistance in the circuit) is gotten by adding the individual resistance algebraically.

In series connections, the same current flows across all the branches of the circuits, but different voltage across it thus making the resistors to have different voltage across them. Each resistor or load will experience a voltage drop. The applied voltage is equal to the sum of the voltage drop across the different parts of the circuit. Voltage drop is proportional to the resistance current being the same throughout the circuit. When loads are connected in series, the loads will tend to have a common switch. This kind of connection is employed in school halls, street lights. The problem with this kind of connection is that when a load develops a problem, the other connected system will fail. It's an all or none type of circuit connection. Till a load gets energy before it delivers it to the other and the one to deliver fails, there will be a black out.

Resistors, loads are said to be connected in parallel when the end of each of the resistors or loads have a common point or junction and the other ends are also connected to a common point or junction. Such circuits are known as parallel circuits. Unlike the series circuit connection, when finding the total (effective) resistance in a parallel circuit, the reciprocal of the individual resistance is taken. Thus, when a number of resistances are connected in parallel, the reciprocal of the effective resistance is given by the arithmetic or algebraic sum of the reciprocal of the individual resistance.

Parallel circuit connection is very common in use. Various lamps and electrical appliances in our homes are connected in parallel so that each of the lamps or bobs and appliances can be operated independently. For us to have control over the individual lamps or loads, they have to be wired in parallel.

Learning Task No. 1: Give examples of appliances at home that are installed using series connection. Draw the circuit in a series connection in your notebook.

D

Learning Task No. 2: Give an example of appliances at home that are installed using a parallel connection. Draw the circuit in a parallel connection in your notebook.

E

Learning Task No. 3: Make a chart that will explain the difference between parallel and series connection in a circuit in terms of current. Voltage, resistance, pathway of flow of electric current, brightness of bulbs, if breaks occur in circuits, battery status, and applications.

Criteria	Series Connection	Parallel Connection
Current		
Voltage		
resistance		
Pathway of flow of electric current		
Brightness of bulbs		
If breaks occur in a circuit		
Battery status		
applications		

A

Learning Task No. 4: Make a list of the advantages and disadvantage of series and parallel connections at home. Complete the chart below.

	Series Connection	**Parallel Connection**
Advantages		
Disadvantages		

I

Lesson

Congratulations! You are now in the last lesson in this module. This lesson will help you to explain the functions of circuit breakers, fuses, earthing, double insulation, and other safety devices in the home.

Electricity has two hazards. A ***thermal hazard*** occurs when there is electrical overheating. A ***shock hazard*** occurs when electric current passes through a person. There are safety devices that will prevent these hazards.

Read the concepts about these safety devices.

Circuit breakers: It functions to break the circuit when the current in the circuit exceeds the maximum value, and is no longer considered safe. To do this there is an electromagnet that will physically break the circuit when it detects that the current has exceeded its maximum.

Fuses: Fuses are like circuit breakers in that they will break a circuit when it detects that it is too dangerous to operate. Fuses use a resistance wire with a low melting point instead of an electromagnet, and when the current is too great the wire melts and the circuit will is broken. As the fuse melts every time the current is too great, it must be replaced, unlike the circuit breaker, which can be reset after it breaks the circuit.

Earthing: There are three wires that supply power to households. These are the active, neutral and earth wires. Earth wires are put in so that electric shocks can be avoided when people come into contact with an active wire that is in contact with the casing of any connected appliances. If there was no earth wire a person would complete the circuit between the appliances and the ground, and would receive an electric shock. To reduce the chance of this happening, the earth wire provides a better conductive path for the current. If the current comes into contact with the casing of an appliance, the earth wire will create a conductive path from the appliance to the earth, and a large current will flow to the earth through this connection. This large current will also blow any fuses or trip any circuit breakers, so that the circuit is not complete, and any person touching the appliance will not receive an electric shock.

Double insulation: Insulation is installed so that wiring and electric appliances are covered so that the current will only go through its intended path. The insulation is made out of an extremely poor conductor in order to create a safe path for the current to flow through. To increase the safety from insulation, a second layer of insulation can be installed, so that if one of the layers fails to properly insulate the circuit, the second layer will still be able to protect it.

Residual current devices: RCDs are designed so that they can stop a current before it becomes harmful to a person. It does this by detecting any leakages from the circuit through a differential current transformer, that will compare the current flowing through the live and neutral conductor, and if there is a differ ence it quickly shuts down the current. It typically shuts it down in 25-40 mill seconds after a leakage conductor, to minimize the damage done to the body.

Learning Task No. 1: Give an example of appliance (s) at home that has safely device. . Explain how it functions in the given appliance.

Example of Appliance (s) at home:_____

Safety devise:_____

How the safety devise functions_____

_____

D

Learning Task No. 2: Enumerate some of the appliances found at home or in your community. Identify if it has safety devices. Explain how each safety device function. Copy the chart below in your notebook.

Name of Appliance/s	Safety Device	How it Functions

E

Learning Task No. 3: Write your reflection about safety devises installed in your home. or in your community. Write it in a separate sheet of paper.

I understand that_____.

I realized that_____.

A

Learning Task No. 4: Draw a simple safety devise. Explain how it works.

Name of safety devise How it works

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Answer Key:

WEEK 1

Learning Task No. 1:
1. NEWTON
2. FRICTION
3. INTERTIA
4. EQUILIBRIUM
5. LAW OF INTERTIA

Learning Task No. 2:
1. B (m = F/a)
2. B
3. C
4. D

Learning Task No. 3:
1. PICTURE A and B
2. None
3. INERTIA
4. External force

Learning Task No. 4:
1. A
2. B
3. C
4. C
5. A
6. A
7. C
8. B
9. C
10. A

WEEK 2

Learning Task No. 1:
1. BALANCED
2. BALANCED
3. UNBALANCED
4. UNBALANCED

Learning Task No. 2:
1. Unbalanced force
2. Frictional force
3. Unbalanced force

Learning Task No. 3:
1. Unbalanced
2. Unbalanced
3. Unbalanced
4. Unbalanced

Learning Task No. 4:
1. F = 14 N / Unbalanced
2. F = 10 N / Unbalanced
3. F = 0 N / Balanced

Learning Task No. 5:
1. A
2. B
3. B
4. B
5. D
6. B

WEEK 3

Learning Task No. 1:
1. Kinetic
2. Kinetic
3. Potential
4. Kinetic
5. Potential

Learning Task No. 2:
1. B
2. A
3. mass, gravity, height
4. mass, velocity

Learning Task No. 3:
Potential: ball on top of the table or any object resting on a flat surface
Kinetic: any object moving

Learning Task No. 4:
1. Kinetic energy / 945 J
2. Potential energy / 9500 J
3. Potential energy 17.5 J
4. Potential energy / 250 J

Answer Key

WEEK 4

Learning Task No. 1:
Sound can explained as to what is heard when sound waves travel through the air. Sound is a form of energy produced by vibration of molecules through which sound travels.

Learning Task No. 2:
1. True
2. False
3. True
4. False
5. True

Learning Task No. 3:
1. The energy things produce when they vibrate.
2. By hitting on an object, speaking etc.
3. Yes.
4. Sound travels slowest through gases, faster through liquids and fastest through solids.

Learning Task No. 4:
1. A
2. A
3. D
4. D
5. A
6. B
7. C

Week 5

Learning Task No. 1:
1.ROYGBIV
2. red, orange, yellow, green
3. orange, yellow, green, blue, indigo, violet
4. orange, yellow, green, blue, indigo, violet

Learning Task No. 2:
1. radio, microwave, infrared, visible, ultra-violet, x-ray, gamma ray
2. visible light/white light
3. radio, gamma ray
4. violet, red

Learning Task No. 3:
The light from the flashlight was reflected onto the wall by the CD.

Learning Task No. 4:
Reflection.

Learning Task No. 5:
1. D
2. B
3. D
4. C
5. C

Week 6

Learning Task No. 1:
Heat transfer, conduction, convection, radiation

Learning Task No. 2:
Law of Entropy. Heat is thermal energy transferred from a hotter system to a cooler system. While temperature is measure of average kinetic energy of atom/molecules in a system (measured in scales such as Celsius, Fahrenheit, Kelvin)
1. A.
2. In the warm glass, the heat can be felt radiating off the water. While in the cold glass, there is not heat radiating from the water.
3. The warm glass is above 40 °C while the cold glass is around 10 °C
4. We need a thermometer to measure the temperature of the water.

Learning Task No. 4:
1. heat
2. calorie
3. temperature
4. thermometer
5. degree

Learning Task No. 5

WEEK 7

Learning Task No. 1:
Voltage - electrical pressure - Volts - V - voltmeter
Current - electric charge in motion - Ampere - A - ammeter
Resistance - quantity that measures how a device reduces the electric flow through it - Ohms - Ω

Learning Task No. 2:

1.
G: R = 40Ω V = 15 V
R: I = ?
E: I = V/R
S: I = 40Ω/15V
A: I = 2.67 A
2.
V = I x R
V = 0.5 A x 30Ω
V = 60V
3.
R = V/I
R = 15V/1.5A
R = 10Ω

WEEK 7

Learning Task No. 3:
A. Current & Voltage - The current is directly proportional to the voltage.
B. Voltage & Resistance - inverse relationship
C. Current & Resistance - inverse relationship

Learning Task No. 4:
1. A
2. A
3. C
4. A
5. B (there is no effect on how bright they glow)
6. D
7. B

WEEK 8

Learning Task No. 1:
Electric fuses and circuit protection devices.

Learning Task No. 2:
Appliances like microwave, dishwasher, lights, toaster, oven, etc.

Learning Task No. 3:

Learning Task No. 4:
Series: can add devices, easy to use, less likely to overheat // if one component fails, the others won't work, the more devices there is in a connection, the greater the resistance is
Parallel: consistent voltage // usually lower voltage for safety

WEEK 9

Learning Task No. 1:
Fuses - they will break a circuit when it detects that it is too dangerous to operate.

Learning Task No. 2:
E.g. Circuit breaker - it breaks the circuit when the current exceeds the maximum value to operate.

Learning Task No. 3:
Reflection.

Learning Task No. 4:
Diagram drawing.

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