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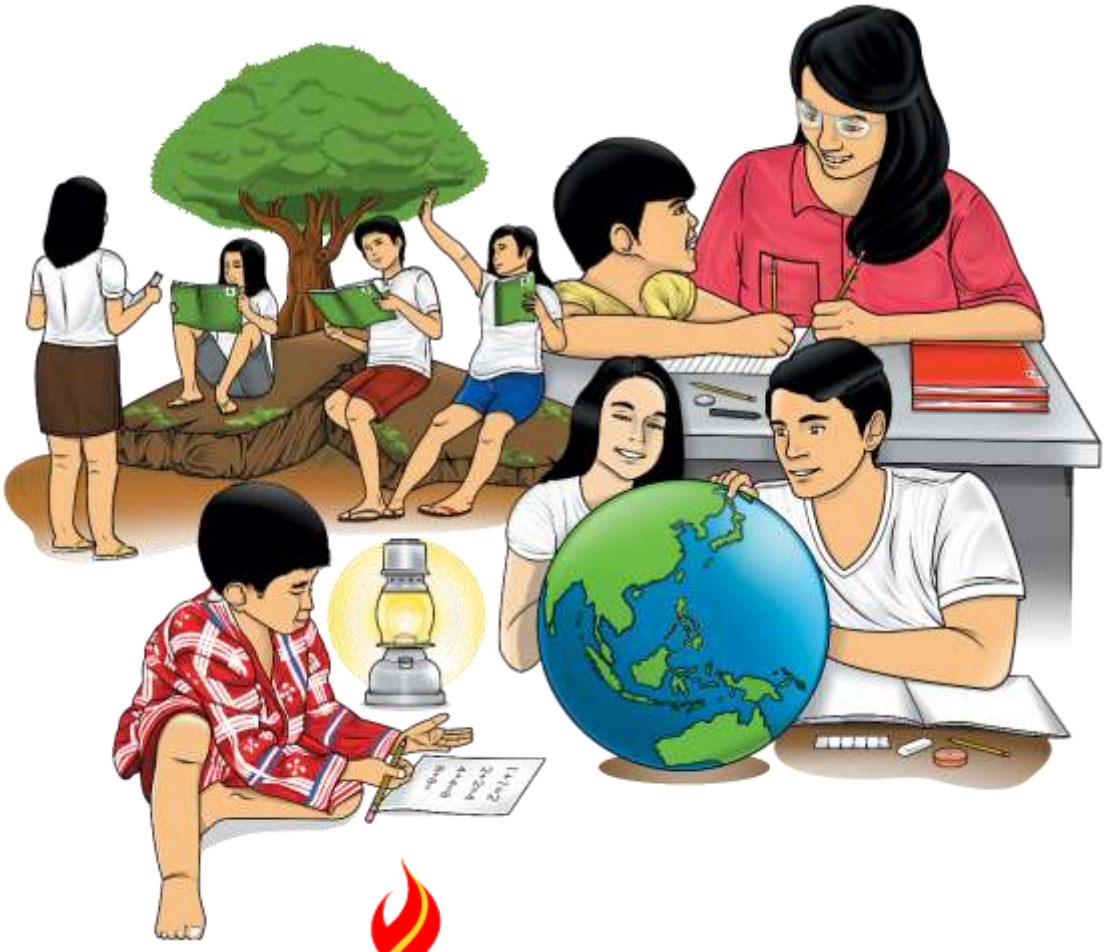
Science

Quarter 3 – Module 5:
Series and Parallel Circuits



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Science

Quarter 3 – Module 5:
Series and Parallel Circuits

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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 master series and parallel circuits. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

This module will help you determine the effects of changing the number or type of components in a circuit.

The module is divided into two lessons, namely:

- Lesson 1- Series Circuit
- Lesson 2- Parallel Circuit

After going through this module, you are expected to:

1. describe current electricity and electric circuit;
2. identify the parts/ components of an electric circuit;
3. construct a series and parallel circuit;
4. differentiate series and parallel circuits; and
5. cite the advantages and disadvantages of series and parallel circuits.

What I Know

Directions: Read and understand the sentences well. Write **True** if the sentence is correct. Write **False** if the statement is incorrect. Write your answers in your notebook/answer sheets.

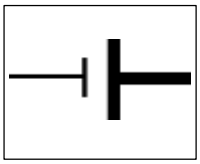
1. An electrical circuit encompasses a closed-loop that gives a return way for the current.
2. A series circuit allows electric current to flow through a single path.
3. In a series circuit with many bulbs, when a bulb is spent, busted, or loosely connected, the other bulbs will still light.
4. Current electricity is electricity that does not move.
5. In a simple electric circuit, the source of electricity is the bulb.
6. There are many wiring connections in a parallel circuit.
7. The electric current in the parallel circuit remains the same to all its paths.
8. One of the advantages of the parallel circuit is that the appliances or the bulbs operate independently.
9. If more bulbs will be added to the parallel circuit, the light of the bulbs will dim.
10. In a parallel circuit using a dry cell, all wires for the positive terminal should be connected to the positive terminal of the dry cell.

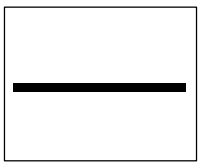
Lesson 1 Series Circuit

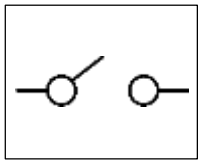
What's In

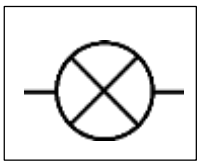
Directions: Study the figures. Identify the names of the electrical symbols below by choosing your answers from the box. Write your answers in your notebook/answer sheet.

lamp/bulb	switch	dry cell	connecting wire

1. 

2. 

3. 

4. 

Notes to the Teacher

- Always remind the learners to be careful when doing the activities that require physical manipulation of materials. They can ask assistance from their elders.
- Activity materials may be provided by you if the learners to cannot provide such, or modify the activity, if needed.

What's New

Energy has many forms. One of these is electricity. Electrical energy is one of the energies that's most valuable to us. It makes life more comfortable and convenient for all of us.

At night, we can see and do things. Thanks to electricity. For our appliances to work and for our homes to be lighted, electricity must travel in a circuit.

A circuit is a path in which electrons can move.

Directions: Find at least ten (10) words that can be associated with the word ELECTRICITY. Write the words that you have found in a separate sheet of paper.

V	A	M	O	X	V	L	Z	W	K	W	U	Y	Z	Y	V	N	H	Y	C
S	A	D	S	A	I	I	X	U	C	L	C	A	H	N	X	L	I	Z	L
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F	F	X	Z	C	H	E	G	V	K	X	N	N	X	D	O	S	K	M	J
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L	E	L	L	A	R	A	P	P	T	F	D	Q	U	R	Y	O	T	Y	W
G	W	C	L	R	U	T	T	A	N	Y	A	Q	S	C	V	C	M	D	Z
C	Q	K	I	E	F	L	A	S	K	S	Q	T	U	F	T	S	A	I	I
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G	C	K	H	B	K	R	I	Q	V	X	U	R	V	N	C	E	R	T	Y
X	I	D	L	F	R	C	N	T	F	X	U	R	Q	Z	R	I	O	R	D
C	M	Z	F	E	B	E	W	O	C	X	Y	A	E	I	U	L	O	V	M
Z	N	Q	N	U	X	B	K	Q	R	U	Y	K	E	C	W	I	M	I	D
P	A	T	B	H	H	T	C	Y	D	T	T	S	B	J	N	P	A	X	F
D	L	N	O	X	U	W	D	B	H	J	C	V	Q	B	S	U	X	C	Z
F	Q	O	Y	Y	J	F	B	I	H	W	B	E	Z	V	P	T	D	W	D
R	L	K	X	W	I	T	F	J	H	M	K	D	L	C	E	X	X	G	U
V	Q	E	L	E	C	T	R	I	C	A	L	E	N	E	R	G	Y	H	C

What is It

The word "electricity" is derived from the Greek word "elektron," which means "amber." Electricity is thought to have been discovered in ancient Greece when someone rubbed a piece of amber and it picked up light materials such as feathers and hair. Of course, this is possible due to the fact that friction can generate electricity.

Static and current electricity are the two kinds of electricity. **Static electricity** is produced when electrical charges build up on the surface of a material, usually as a result of friction or rubbing of materials together. The electricity produced by the continuous flow of electrons is known as **current electricity.**

Alessandro Volta, an Italian scientist, discovered current electricity. It is made up of moving electrons that flow through electrical wires connected to lights, machines, or appliances to make these devices work. Current electricity is the kind of electricity that we often use in many activities. It flows through a complete circuit.

An electric circuit is a network that has a closed-loop, giving a return path for the current. There are two types of circuits, namely: series circuit and parallel circuit.

As we go on with our discussion on series and parallel circuits, let us first go over some basic terms that we need to familiarize with:

- **Current –** The flow of electrons. Electricity has work to do, and when the electrons are flowing around a circuit, that's current at work.
- **Circuit –** A closed continuous path for electricity to flow. Composed of power source, connecting wires, load, and switch.
- **Resistance –** The restriction or opposition to the flow of electric current. This is what electricity encounters when it flows along with physical material.
- **Voltage –** It is the measure of work required to move a unit charge from one location to another, against the force which tries to keep electric charges balanced. In the context of electrical power sources, voltage is the amount of potential energy available (work to be done) per unit charge, to move charges through a conductor.

Parts of an Electric Circuit

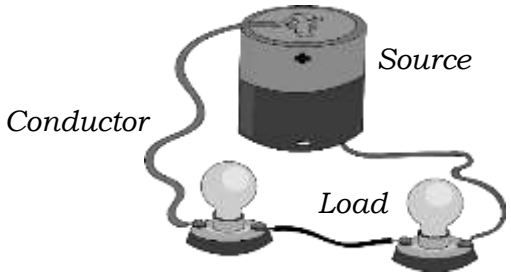
A circuit has parts or components. These are the conductor, the source, and the load.

1. The **conductor** (ex. connecting wires) serves as the pathway for the electrical current to pass from the source to the different parts/components in a circuit.
2. The **source** (ex. dry cell, battery) contains positive and negative electrons. It is the source of electrical energy in the circuit.
3. The **load** (ex. bulb) determines if the electricity that flows in the circuit is closed or complete.

There are three kinds of electric circuits based on the connections: 1) series circuits, 2) parallel circuits, and 3) combination circuits. For our lesson, we will focus on the first two circuits.

A **series circuit** is a circuit that allows electric current to flow through a single path. The available electric current flows through each load but there is only one complete path.

If one bulb is loose or does not work, the circuit is open, and the current does not flow. The rest of the bulbs will not light. The defective bulb has to be replaced, or the loose bulb should be screwed tight for the current to flow again. Remember that current is a rate at which electric charge flows past a point in a circuit.



Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

Figure 1. Series Circuit

For the devices in a series circuit to work, each device must work. If one goes out, they all go out.

Changing the number or type of components in a series circuit has an impact on the circuit's overall performance. When it comes to how current and resistance operate in a series circuit, there is a universal rule to remember: the more work (resistance) a series circuit does, the more its current will decrease.

As you add more resistance to a circuit, like a few bulbs or even resistors, at that point the more work for your power source or battery. Let's say you take the circuit presented above that had two light bulbs. What do you think would happen in the event that you add another light bulb to this circuit? Will the bulbs shine as bright? No. Once you plug in the third bulb, all light bulbs will get equally dim since you have added more resistance to your circuit which decreases the flow of current. Adding another light bulb in arrangement decreases the current since our battery now has more work to do.

Advantages and Disadvantages of Series Circuit

Advantages	Disadvantages
• More power source (ex. batteries/ dry cells) can be added to increase the voltages • Does not require lots of wiring connections	• Only one pathway for an electric current to flow through • When one bulb burns out, the other bulbs will not function anymore. • Increasing the number of loads, decreases the current that passes through each bulb.

What's More

Activity 1. Constructing a Series Circuit

Materials Needed:

- two (2) 1.5 V AA dry cells

Photo taken by Joel Christian R. Salentes

- three (3) pieces 6 V bulbs (used in flashlights)

Photo taken by Joel Christian R. Salentes

- three (3) pieces bulb sockets

Photo taken by Joel Christian R. Salentes

- 1-meter copper wire or connector wires

Photo taken by Joel Christian R. Salentes

- electrical tape

Photo taken by Joel Christian R. Salentes

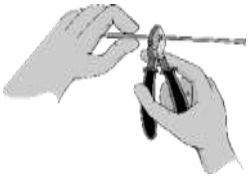
- pliers

Photo taken by Joel Christian R. Salentes

What to Do:

Note: *Be careful in handling your materials, especially the bulbs. Ask help from an elder in conducting the activity.*

1. Gather all the materials needed.



Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

2. Cut the wire into four pieces (6 inches long).

Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

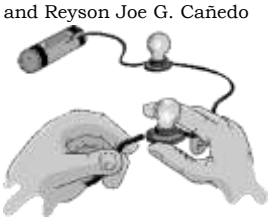
3. Carefully remove approximately ½ inch of the insulation from both ends of all your wire pieces.

Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

4. Attach one (1) of the wires to the positive terminal of the dry cell. Connect the other side of the wire to the either side of the bulb socket.

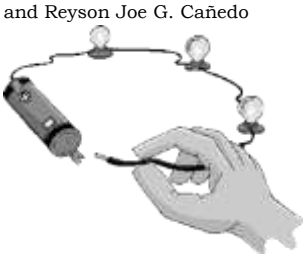
Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

5. Attach another wire to the other side of the bulb socket to connect another bulb socket.



Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

6. Attach another wire to connect either side of the last bulb socket.



Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

7. Attach another wire to connect the other side of the bulb socket to the negative terminal of the dry cell.

8. Observe and study the light of the three bulbs.

Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

9. Detach any of the bulbs from a socket. Observe what will happen to the other bulb.

10. Without disconnecting the bulbs, connect another dry cell to the first dry cell. Observe the flow of energy when another dry cell was added.

Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

Guide Questions 1

Directions: Based on the activity, answer the following questions. Write your answers in your notebook/ answer sheet.

1. Were you able to construct a series circuit? How?
2. Was electricity flowing in the circuit? How did you know?
3. Of the three bulbs connected in the circuit, which bulb was the brightest? Why do you think so?
4. What happened when a bulb was detached from the circuit? Why did it happen?
5. What do you notice with the light of the three bulbs when another dry cell was added?

Activity 2. Series Circuit on Paper

Directions: Draw the actual set-up of the series circuit that you have constructed in Activity 1. Label/name its parts. Do this in your notebook/answer sheet.

Guide Questions 2.

Directions: Answer the following questions correctly based on your drawing. Write your answers in your notebook/ answer sheet.

1. In your drawing of the series circuit, which is the source of electrical energy?
2. Write/list down one of the components/ parts of a circuit that when changed, affects the total performance of the circuit.
3. What component of the series circuit serves as a pathway for electrical energy?

Lesson 2 Parallel Circuit

What's In

Directions: Read and understand the sentences well. Write **True** if the sentence states truthfulness. Write **False** if the statement does not reflect the truth. Write your answers in your notebook/ answer sheets.

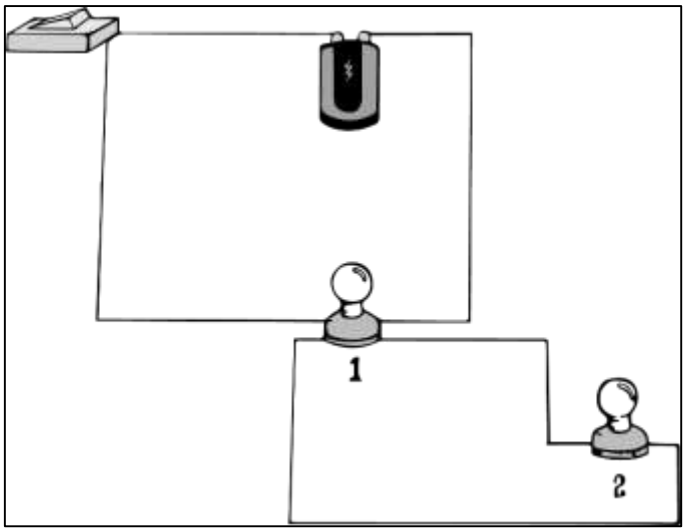
1. A parallel circuit has similarities with a series circuit.
2. A parallel circuit requires many wiring connections.
3. In a parallel circuit, individual devices can be controlled.
4. A parallel circuit allows electric current to flow through two or more pathways.
5. When one bulb burns out in the parallel circuit, the other bulbs will continue to glow.

What's New

Parallel wires carry energy from the power source to our homes. Lamps, flat irons, radios, television sets, and electric fans are all wired in parallel. The circuit is closed or broken by the switch on each appliance. Since the appliances are self-contained, this is advantageous. If one fails, the others will continue to work.

However, unlike in a series circuit, the voltage in a parallel circuit remains the same at all points in a parallel circuit.

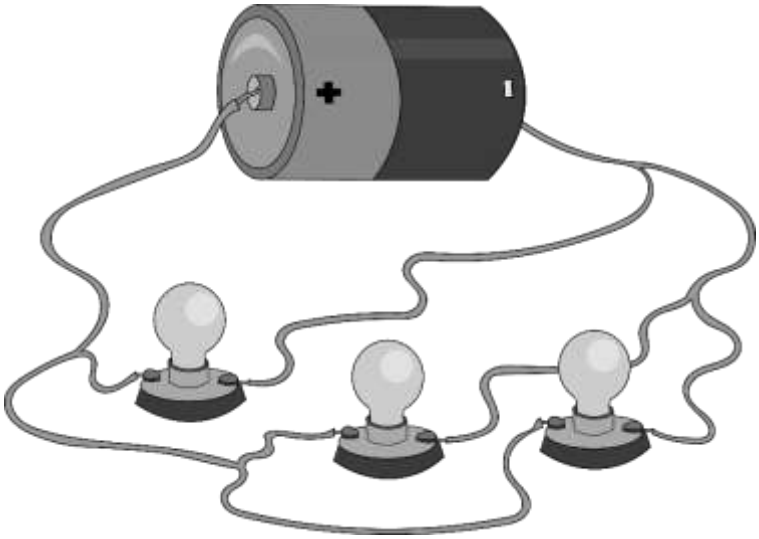
Observe the illustration below. If we turn the switch on, which bulb will light first? Why?



Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

What is It

A **parallel circuit** is a circuit that contains two or more paths for an electric current to flow through. The electrical devices are connected in a branched manner making each one independent from all other connections in the circuit.



Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

Figure 2. Parallel Circuit

Even if there are three bulbs, there are three complete circuits. None of them is affected by the others. The addition of more bulbs to the set does not dim the light of the bulbs.

If an individual bulb in a parallel branch is unscrewed from its socket, there is still current in the overall circuit and the other branches. In a three (3) bulb parallel circuit, removing the third bulb from its socket has the effect of transforming the circuit from a three-bulb parallel circuit to a two-bulb parallel circuit.

All negative terminals are connected in a parallel connection using dry cells, and all positive terminals are similarly connected. The bulb is then attached to the free ends. The circuit's total voltage is the same as a single dry cell.

When you add more resistors to a parallel circuit, the total current increases while the overall resistance decreases. When you add more light bulbs to your circuit, you'll need to draw more current to power them all.

Advantages and Disadvantages of Parallel Circuit

Advantages	Disadvantages
• Two or more pathways for an electric current to flow through • When one bulb burns out, the other bulbs will continue to glow. • Individual devices can be controlled	• Requires many wiring connections

What's More

Activity 1. Constructing Parallel Circuit

You Will Need:

- two (2) 1.5 V AA dry cells

Photo taken by Joel Christian R. Salentes

- three (3) pieces 6 V bulbs (used in flashlights)

Photo taken by Joel Christian R. Salentes

- three (3) pieces bulb sockets

Photo taken by Joel Christian R. Salentes

- 1 ½ meter copper wire or connector wires

Photo taken by Joel Christian R. Salentes

- electrical tape

Photo taken by Joel Christian R. Salentes

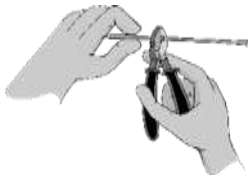
- pliers

Photo taken by Joel Christian R. Salentes

What to Do:

Note: *Be careful in handling your materials, especially the bulbs. Ask help from an elder in conducting the activity.*

1. Gather all the materials needed.
2. Cut the wire into six pieces (8 inches long).



Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

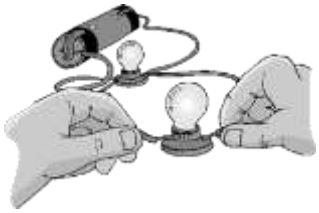
3. Carefully remove approximately ½ inch of the insulation from both ends of all your wire pieces.

Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

4. Attach one (1) end of the wire to the positive end of the dry cell. Then, put and coil the other end of the wire to either side (metal part) of the 1st bulb socket. Attach one (1) end of another wire to the negative end of the dry cell. Then, put and coil the other end of the wire to the other side (metal part) of the 1st bulb socket.

Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

5. Get another wire piece and put and coil its one end on either side (metal part) of the 1st bulb socket while the other end of the wire must be put and coiled to either side (metal part) of the 2nd bulb socket. Moreover, get another wire piece. Put and coil its one end on the other side (metal part) of the 1st bulb socket. Then, put and connect the other end of the wire to the other side (metal part) of the 2nd bulb socket.



Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

6. Finally, use the last two remaining wires to connect the 2nd bulb socket and the third one. To connect the two bulb sockets, put and coil one end of the wire on either side (metal part) of the 2nd bulb socket while the other end of the wire must be put and coiled to either side (metal part) of the 3rd bulb socket. In addition, for the last wire piece, put and coil its one end on the other side (metal part) of the 2nd bulb socket. Then, put and connect the other end of the wire to the other side (metal part) of the 3rd bulb socket.

Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

7. Detach each of the bulbs from their respective socket one at a time. Observe what happens to the other bulbs that were not removed from their sockets.

Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

8. Without removing the bulbs and wires from the bulb sockets, add another dry cell to the set-up. Connect the second dry cell in parallel with the first.

Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

9. Observe once again the lights of the bulbs.

Illustrated by Ryan A. Machate and Reyson Joe G. Cañedo

Guide Questions 1

Directions: Based on the activity, answer the questions below. Write your answers in your notebook/answer sheet.

1. Were you able to construct a parallel circuit? How?
2. Was electricity flowing in the circuit? How did you know?
3. Was there a difference in the brightness of light among all light bulbs with only one dry cell? Why or why not?
4. Was there a change in the brightness of light when another dry cell was added? Why or why not?

Activity 2. Parallel Circuit on Paper

Directions: Draw the actual set-up of the parallel circuit you have constructed in Activity 1. Label/name each part. Do this in your notebook/ answer sheet.

Guide Questions 2

Directions: Answer the following questions correctly based on your drawing. Write your answers in your notebook/answer sheet.

1. In a parallel circuit with three dry cells as a source of energy, how are the wires connected to the dry cell? Why?
2. Based on your drawing, give one advantage of the parallel circuit.

What I Have Learned

A. Directions: Read and understand the sentences well. Identify the ideas/ concepts being described. Choose the correct answer from the choices provided in the box below. Write your answers in your notebook/answer sheet.

series circuit	increase	number of resistors	work
decrease	current electricity	bright	is the same

1. A circuit that allows electric current to flow through a single path is known as _____.
2. In a parallel circuit with constant voltage or the same power source, the _____ of the number of bulbs increases the total current.
3. The kind of electricity that is made up of moving electrons flowing through a complete circuit is called _____.
4. In a series circuit, the electric current that passes through each bulb _____.
5. In order for the devices in a series circuit to work, each device must _____.

B. Directions: Read and understand the sentences well. Identify the ideas being described to form generalizations. Choose the correct answers from the box below. Write the answers in your notebook/answer sheets.

electrical devices	parallel circuit	operate
Voltage	series circuit	

1. A _____ contains two or more paths for an electric current to flow through.
2. In a parallel circuit, _____ are connected in a branched manner making each one independent from all other connections in the circuit.
3. _____ in a parallel circuit remains the same regardless of the number of paths of the same resistance given a constant number of dry cells or source is present.
4. One of the advantages of a parallel circuit is that appliances _____ independently.

What I Can Do

A. Directions: Read and understand the given situation. Choose the appropriate action that corresponds to each situation by putting a (✓) before each statement and (**x**) if otherwise. Write your answers on your answer sheet.

Your mother requested you to check the Christmas lights before it will be hanged in the window as a sign of hope during the COVID-19 pandemic to show that darkness cannot beat the light. When you plugged in the connection, you found out that all the red-colored bulbs in the circuit did not light. Which of the following statements should you do to make the Christmas lights work?

1. add more red-colored bulbs to the set-up
2. find out which of the red bulbs are burnt up by testing each
3. check/ inspect the wire for possible wear and tear
4. buy a new set of Christmas lights
5. ensure that each bulb is screwed tight to its receptacle

B. Directions: Read and understand the situation below. Answer the question in the last part of it. Write your answer in your notebook/ answer sheets.

One late afternoon, Mrs. Reyes was in the kitchen preparing their evening meal. Suddenly, the light in the kitchen went out. Mrs. Reyes checked the switch, but the light remained out, so she concluded that the bulb is burnt/spent. She observed though that the other parts of their house are lighted. What could be the reason why the lights in the other parts of the house were functioning even if the light in the kitchen was out? Explain briefly.

Assessment

A. Directions: Read and understand the sentences well. Identify the ideas being described by choosing the correct answers from the box provided below. Write the answers in your notebook/ answer sheets.

home lightings	resistance	electrical circuit
series circuit	spent or loose	retained

1. The wire connection in the _____ is an example of parallel circuit.
2. The _____ has a closed-loop that gives a return path for the current.
3. A _____ allows electric current to flow through a single path.
4. In a series circuit, when a bulb is _____, the other bulbs will not light.
5. As you add more _____ to a circuit, like some bulbs or resistors, then there will be more work for your power source to give.

B. Directions: Read and understand the sentences well. Choose the letter of the correct answer to each of the questions. Write the answers in your notebook or answer sheets.

1. Which circuit contains two or more paths for an electric current to flow through?
   A. parallel circuit
   B. series circuit
   C. close circuit
   D. open circuit

2. What will happen to the voltage across the paths in a parallel circuit if more independent bulbs are added and the number of dry cells or source is the same?
   A. the voltage will remain the same
   B. the voltage will decrease
   C. the voltage will increase
   D. the voltage will fluctuate

3. In a parallel circuit, why is it that when a bulb burns out or is loose, the other bulbs still light up?
   A. because each connection in the circuit is independent from the others
   B. because electric current is allowed to pass through a single path
   C. because electric current can be stopped from flowing
   D. because the electric current does not flow

4. Below are advantages of the parallel circuit, except one. Which is it?
   A. Parallel circuit requires many wiring connections.
   B. Two or more pathways allow electric current to pass through
   C. Individual devices can be controlled
   D. When a bulb burns out, other bulbs continue to glow

5. Which of the following statement is true about parallel circuit at home?
   A. when the electric fan is switched off, the TV set will not function
   B. when a light is switched on, other lights will also glow
   C. appliances at home cannot function simultaneously
   D. appliances at home can function/operate independently from other appliances

Additional Activities

A. Differentiate series from parallel circuit through the total performance of each circuit when the number of the identified part or component is changed.

1. Series circuit – another dry cell was added to the three dry cells in the set up
2. Parallel circuit – another bulb was added to the three bulbs connected in the set up

B. Give at least one of the items asked below:
1. Advantage of series circuit
2. Disadvantage of parallel circuit

Answer Key

LESSON 1

What's In

1. dry cell 2. Connecting wire 3. Switch 4. Lamp/bulb

What's New

V	A	M	O	X	V	L	Z	W	K	W	U	Y	Z	Y	V	N	H	Y	C
S	A	D	S	A	I	I	X	U	C	L	C	A	H	N	X	L	I	Z	L
U	Z	L	E	X	Y	S	G	M	I	O	W	S	J	R	X	U	D	U	S
F	F	X	Z	C	H	E	G	V	K	X	N	N	X	D	O	S	K	M	J
P	Z	I	V	T	N	G	U	I	R	H	B	D	K	C	N	O	H	T	G
L	E	L	L	A	R	A	P	P	T	F	D	Q	U	R	Y	O	T	Y	W
G	W	C	L	R	U	T	T	A	N	Y	A	Q	S	C	V	C	M	D	Z
C	Q	K	I	E	F	L	A	S	K	S	Q	T	U	F	T	S	A	I	I
M	F	V	E	R	B	O	G	N	I	C	O	B	Q	T	G	O	L	U	G
E	R	V	Y	V	C	V	X	C	M	S	X	W	V	K	L	R	R	W	Y
D	D	H	O	B	N	U	U	P	K	M	E	M	C	F	T	H	S	Z	X
G	C	K	H	B	K	R	I	Q	V	X	U	R	V	N	C	E	R	T	Y
X	I	D	L	F	R	C	N	T	F	X	U	R	Q	Z	R	I	O	R	D
C	M	Z	F	E	B	E	W	O	C	X	Y	A	E	I	U	L	O	V	M
Z	N	Q	N	U	X	B	K	Q	R	U	Y	K	E	C	W	I	M	I	D
P	A	T	B	H	H	T	C	Y	D	T	T	S	B	J	N	P	A	X	F
D	L	N	O	X	U	W	D	B	H	J	C	V	Q	B	S	U	X	C	Z
F	Q	O	Y	Y	J	F	B	I	H	W	B	E	Z	V	P	T	D	W	D
R	L	K	X	W	I	T	F	J	H	M	K	D	L	C	E	X	X	G	U
V	Q	E	L	E	C	T	R	I	C	A	L	E	N	E	R	G	Y	H	C

SERIES
CURRENT
RESISTANCE
ELECTRICAL ENERGY
PARALLEL
ELECTRON
CONDUCTOR
CIRCUIT
VOLTAGE
LOAD

What I Know

1. True 2. True 3. False 4. False 5. False
6. True 7. False 8. True 9. False 10. True

LESSON 2

What's In

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

Guide Questions 2

1. The source of the electric energy in the series circuit is the **dry cell.**
2. The part of the circuit that affects its total performance when changed is the number of **dry cells.**
3. The pathway for the electrical energy in the circuit is the **wire.**

What's More

Guide Questions 1

Note: *Learner's answers may vary.*

1. Were you able to construct a series circuit? How?
   - ✓ Yes. I was able to construct a series circuit by following the instruction or the procedure correctly.
   - ✓ No. I was not able to construct a series circuit. I did not follow the instruction correctly.
2. Was electricity flowing in the circuit? How did you know?
   - ✓ Yes. Electricity was flowing in the circuit because the bulbs lit when the wires were connected to the dry cell.
   - ✓ No. Electricity was not flowing in the circuit because the bulbs did not light when the wires were connected to the dry cell.
3. Of the three bulbs connected in the circuit, which bulb was brightest? Why do you think so?
   - ✓ The bulbs glow with the same brightness since current is the same everywhere in a series circuit.
4. What happened when a bulb was detached from the circuit? Why did it happen?
   - ✓ When a bulb was detached from the circuit, all the other remaining bulbs did not light anymore since there is only one pathway for the current to flow.
5. What did you notice with the light of the three bulbs when another dry cell was added?
   - ✓ When another dry cell was added to the circuit, the lights of the bulbs became brighter.
   - ✓ like when a single bulb was used.

What I Have Learned

A. 1. series circuit	B. 1. parallel circuit
2. increase	2. Electrical devices
3. Current electricity	3. Voltage
4. is the same	4. Operate
5. Work	

Guide Questions 2

1. In a parallel circuit with three dry cells as the source of energy, how are the wires connected to the dry cells? Why?
   ✓ In a parallel circuit with three dry cells as the source of electricity, the wires are connected in such a way that all negative terminals are connected together, and all positive terminals are similarly linked to the positive and negative terminals of the dry cells.
2. Based on your drawing, **give at least one** advantage of parallel circuit.
   ✓ (The answer of the learners could be **any one** of these.)
   ➢ Each bulb has its own complete circuit from the source and back.
   ➢ Each bulb/appliance operates independently.
   ➢ There are two or more pathways for an electric current to pass through.
   ➢ When one bulb burns out, the other bulbs will continue to glow.
   ➢ Individual devices can be controlled.

What's More Guide Questions 1.

Note: *Learner's answers may vary.*

1. Were you able to construct a parallel circuit? How?
   ✓ Yes, I was able to construct a parallel series circuit by following the instruction or the procedure correctly.
   ✓ No. I was not able to construct a parallel series circuit. I did not follow the instruction correctly.
2. Was electricity flowing in the circuit? How did you know?
   ✓ Yes. Electricity was flowing in the circuit because the bulbs lit when the wires were connected to the dry cell.
   ✓ No. Electricity was not flowing in the circuit because the bulbs did not light when the wires were connected to the dry cell.
3. Was there a difference in the brightness of light among all light bulbs with only one dry cell? Why or why not?
   ✓ Yes. There was a difference in the light of each bulb because some glowed bright while others lit dimly.
   ✓ No. There was no difference in the light of each bulb because all the bulbs have the same degree of brightness.
4. Was there a change in the brightness of light when another dry cell was added? Why or why not?
   ✓ No. There was no change in the light of the bulbs when another dry cell was added because even if there are three or more dry cells connected in parallel, a total voltage will still be equal to that of a single dry cell.

Additional Activities

A. Differentiate series from parallel circuit through the total performance of each circuit when the number of the identified part or component is changed.

1. Series circuit – another dry cell was added to the three dry cells in the set up
   ANSWER: When another dry cell was added to the set-up, the total performance of the bulbs in the series circuit changed. They glowed brighter (but differently from one another) compared to when there were only 3 bulbs in the set-up.
2. Parallel circuit – another bulb was added to the three bulbs connected in the set up
   ANSWER: When another bulb was added to the parallel circuit, its total performance did not change because all the bulbs still lit up. Meaning, the electric current was distributed evenly to the bulbs in the circuit.

B. Write at least one of the items asked for below:

1. Advantage of series circuit --- Series circuit does not require many wiring connections and circuit components
2. Disadvantage of parallel circuit --- Parallel circuit requires many wiring connections and components

Assessment

A. 1. Home lightings
2. electric circuit
3. series circuit
4. Spent/ loose
5. resistance

B.

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

What I Can Do

A. 1. X 2. ✓ 3. ✓ 4. X 5. ✓

B. Lights in the house are connected in parallel, they can be controlled individually.

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