Applied Science - Technology (4A)
Post Lab

OBJECTIVES:

- Comparing parallel and series circuits.
- Designing parallel and series circuits.

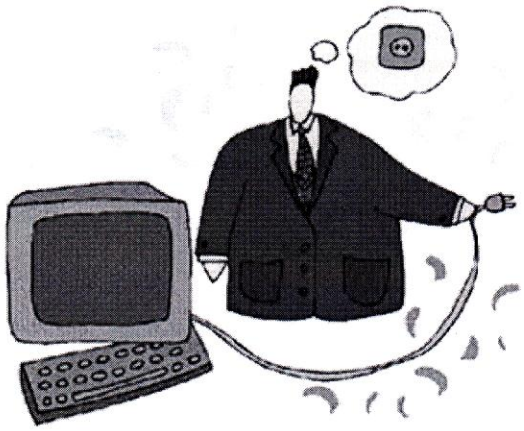
VOCABULARY:

- circuit
- current
- parallel
- series
- static

MATERIALS:

- light bulbs
- wire
- lamp bulbs
- or 3-4 circuit set ups with battery holder
- Electricity Slideshow

Students look at the electric circuit at home.



BACKGROUND:

Students should be aware of the importance of an electric circuit, especially in their everyday life. However, the circuits that they experimented with are not quite the same circuits that they use in their home. There are two types of current electricity, series and parallel. This was introduced in the third grade activities.

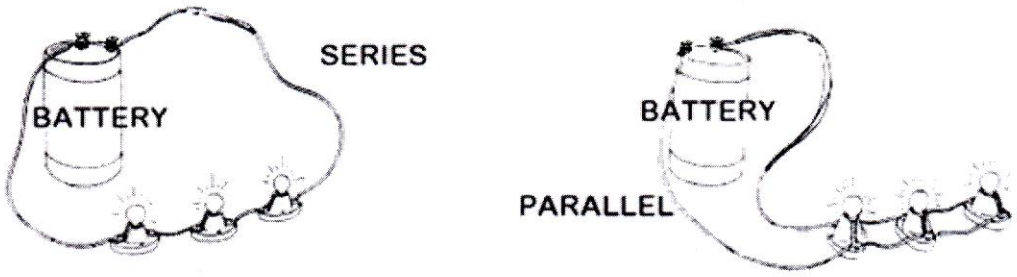
When a simple series is connected, a single pathway is formed through which current flows. A parallel circuit, forms branches, each of which is a separate path for the flow of electrons. Both series and parallel connection have their own distinctive characteristics.

In a series circuit, when one of the bulbs or one of the wires is left open or is broken, the entire circuit ceases. The break opens the circuit. Less expensive Christmas lights are usually of this type, and you have to search for the defective bulb. A parallel circuit is designed so that if one branch is defective, the flow of electricity will not be broken to the other branches.

PROCEDURE:

1. Using the alligator clips, lamp holders, and lamps, erect a series and parallel circuit as in the diagrams below. The more bulbs you put on the

series circuit, the more voltage you will need. Go over the difference between the circuits. Point out that the lights get dimmer on a series circuit, the lights are all illuminated the same on a parallel circuit.



2. Ask students why simple circuits might not be appropriate in their house. Give them clues. Are the appliances all on the same wire? If they are, what happens when one is turned off? Is the circuit broken? If it is broken, will a circuit work? If available, show 2 types of Christmas lights (the ones that will light up even if one is out is a parallel circuit; the ones that won't light up if one is out is a series circuit). Demonstrate by removing the bulbs and see what happens. If it is parallel the lights will stay on, if it is series all the lights will go out.

3. Ask students which one they would want in their house. Discuss that the circuit board they made was a simple series circuit. Almost all electrical circuits in homes are parallel. Use the enclosed worksheet to emphasize that parallel circuits are used in our home. Students can add appliances on the picture to represent their house. Have them write a paragraph of the different uses of electricity in their house.

[Dictionary]
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NAME _____ DATE _____ PERIOD _____

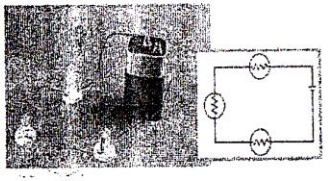
SERIES AND PARALLEL CIRCUITS

ELECTRIC CIRCUITS

- An electric circuit provides a complete, closed path for an electric current.
- Electricity can only flow through a closed circuit; it **cannot** flow through an open circuit.
- Every circuit MUST have the following parts:
  1. energy source: battery, electric generator, etc.
  2. load or resistance: device that uses the electric energy
  3. wires
  4. switch: opens and closes the circuit

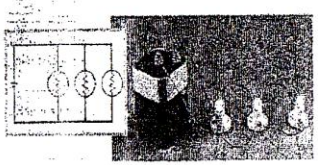
SERIES CIRCUIT

- All parts are connected one after another.
- **If one part fails to operate properly, the current can not flow to the other parts.**



PARALLEL CIRCUIT

- Different parts of circuit are on different branches.
- **If one part does not operate properly, current can still flow through the others.**

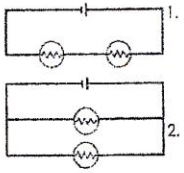


FILL IN THE CHART WITH THE PHRASES:

	SERIES CIRCUIT	PARALLEL CIRCUIT
Definition		
Paths		
Resistance		
Examples		

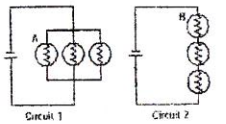
USE THESE TO FILL IN TABLE:

home circuits | one path | device and switch
all parts connected in a row | several paths | decreased with added branches
different paths on separate branches | increases with added branches



1. What happened to the remaining light bulbs when you unscrewed the first bulb?
   FOR A _____
   FOR B _____
2. Explain WHY this happened. _____

3. Which circuit is a series circuit? (1 or 2) _____
4. Which circuit is a parallel circuit? (1 or 2) _____



How many paths can electricity take in Circuit 1? _____

How many paths can electricity take in Circuit 2? _____

If bulb A burns out, what happens to the light in the other two bulbs in that circuit?

_____

If bulb B burns out, what happens to the light in the other two bulbs in that circuit?

_____

If a fourth bulb were added in a similar way to the three existing bulbs in Circuit 1, what would happen to the resistance in the circuit?

_____

If a fourth bulb were added in a similar way to the three existing bulbs in Circuit 2, what would happen to the resistance in the circuit?

_____

REVIEW OF VOLTAGE, CURRENT, AND RESISTANCE: Write I for current, V for voltage, and R for resistance.

11. _____ Measured in amperes
12. _____ Measured in ohms
13. _____ A flow of charge
14. _____ Depends on length and width of a wire
15. _____ The rate at which charge passes a given point
16. _____ Measured in volts
17. _____ Describes potential difference
18. _____ Opposition to the flow of electric charge.