

What is a series circuit?

21



series circuit: an electrical hook-up in which the current has only one path

LESSON | What is a series circuit?

21

How many light bulbs are there in your home? How many other electrical devices do you have?

Must they all be working if you want to use just one?

Do they all stop working if you shut off just one?

Of course not! Homes are not wired that way. But there are electrical hook-ups that work so that all electrical devices on the circuit are either on or off. This kind of electrical hook-up is called a series circuit.

There are two important things to remember about a series circuit:

1. Electrons have only one path to follow in a series circuit. Each electrical device is connected along this one path. Because of that, the electricity cannot go to just one device. It must move through all. If you turn off any electrical device, you will turn them all off. If you turn that device back on, you will turn on all the devices.
2. The electrical devices, or appliances, share the electrical pressure in a series circuit. If you add electrical appliances, each one gets less electrical pressure. For example, suppose you have light bulbs along a series circuit. Then you add more bulbs. What would happen? Each bulb would give off less light.

Why bother with series circuits? They don't make sense for homes, schools, or factories! But there are special uses for series circuits. Parts of computers, radios, and television sets are wired in series. Parts of space rockets are too!

AN EXAMPLE OF A SERIES CIRCUIT

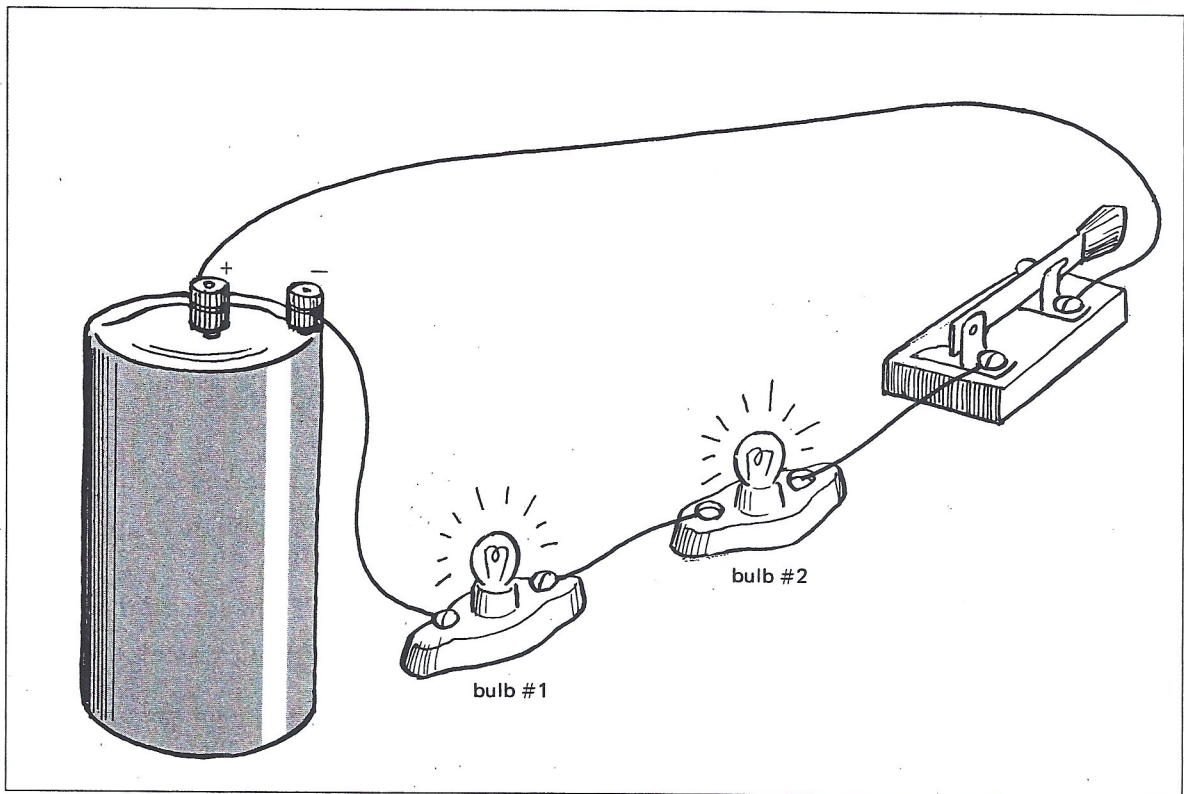


Figure A

1. Trace the path of the electrons in this series circuit. (Draw in arrows along the circuit.)
2. In this circuit, the electricity has _____ path(s) to follow.
one, two
3. This circuit is _____.
complete, incomplete
4. Where does the electricity have to go before it reaches bulb #2? _____
5. If bulb #1 were to go out, bulb #2 would _____.
stay lit, go out
6. If bulb #2 were to go out, bulb #1 would _____.
stay lit, go out
7. In this circuit, each bulb _____ getting the full electrical pressure.
is, is not
8. If more bulbs were added to this circuit, each bulb would give off
_____ light.
more, less
9. If this circuit had only one bulb, it would give off _____ light.
more, less

FILL IN THE BLANK

Complete each statement using a term or terms from the list below. Write your answers in the spaces provided.

go off
less
one

moving electrons
series
share

switched on
are not

1. The circuit you are learning about in this lesson is the _____ circuit.
2. In a series circuit, electrons have only _____ path to follow.
3. In a series circuit, when one appliance is shut off, all other appliances _____.
4. In a series circuit, when one appliance is switched on, all other appliances must be _____.
5. In a series circuit, the appliances _____ the electrical pressure.
6. In a series circuit, when you add more appliances, each appliance gets _____ power.
7. Homes, factories, and schools _____ wired in series.
8. Electric current comes from _____.

MATCHING

Match each term in Column A with its description in Column B. Write the correct letter in the space provided.

Column A

- _____ 1. charged atoms that are not moving
- _____ 2. moving electrons
- _____ 3. series circuits
- _____ 4. minus terminal
- _____ 5. plus terminal

Column B

- a) only one path for electrons to move
- b) ending point of a circuit
- c) static electricity
- d) starting point of a circuit
- e) electric current

UNDERSTANDING SERIES CIRCUITS

Four series circuits are shown below. Use arrows to show the path of the electricity in each one.

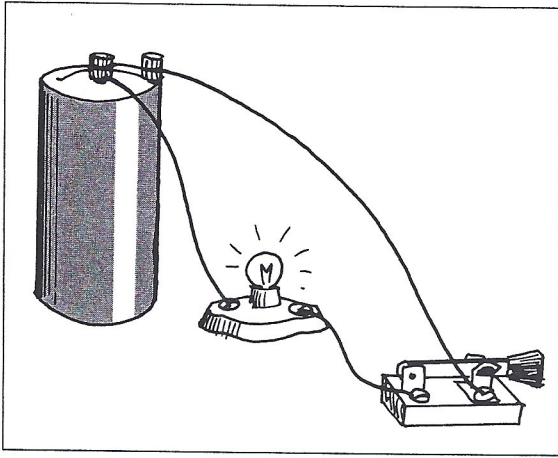


Figure B

How many paths are there in this circuit?

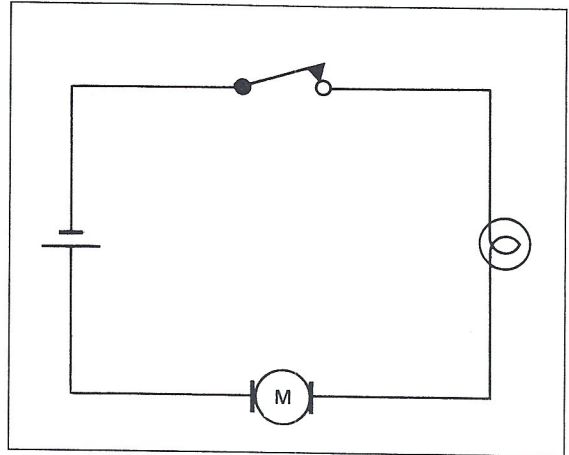


Figure C

How many paths are there in this circuit?

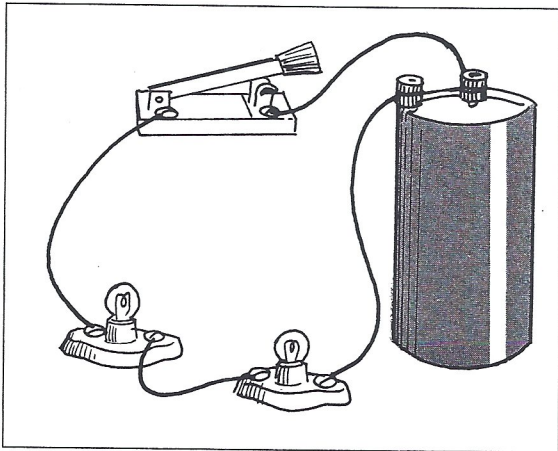


Figure D

How many paths are there in this circuit?

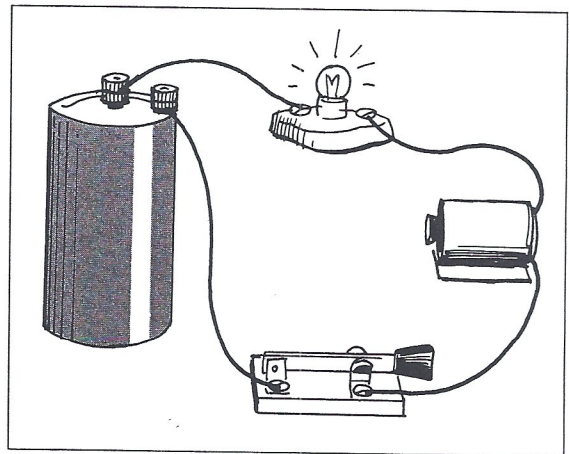


Figure E

How many paths are there in this circuit?

COMPLETE THE CHART

Use electrical symbols to draw these series circuits.

- | | |
|---|--|
| 1. one dry cell
one open switch
two motors | |
| 2. two dry cells
one closed switch
three light bulbs | |
| 3. one dry cell
no switch
three loads (your choices) | |
| 4. two dry cells
one open switch
one motor
two light bulbs | |