

# What is a Series Circuit?...

How many light bulbs are there in your house? How many other electrical devices are there in your house? Why should they ALL be turned on and working if you only need to use one? Should they ALL stop working if you turn off just one?

OF COURSE NOT!!!! Homes are not, and should not, be wired that way. But there ARE electrical hookups that work so all electrical devices on the circuit are either turned ON or turned OFF. **This kind of electrical circuit is called a SERIES CIRCUIT.**

There are 2 important things to remember about a Series Circuit:

1. ***Electrons only have one path to follow.***

Each electrical device is connected along this one path. Because of this, the electricity cannot just go to one device...it must move through all of the devices in the circuit.

If you turn off any electrical device in a series circuit, you will turn them all off. If you turn that device back on, you will turn on all the other devices.

2. ***The electrical devices, or resistors/appliances share the electrical pressure in a Series Circuit.***

If you add electrical appliances, each one will get less electrical pressure. For example, suppose you have light bulbs along a series circuit...then you add a few more bulbs. Each bulb would give off less light because they are all sharing the same power source equally.

A **GOOD** definition of a Series Circuit is...

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# "Series, Schmeeries... Give Me a PARALLEL Circuit!!!"

You walk into your home and switch on the TV...yes, that's right, you switch on **ONLY** the TV. You don't have to switch on the toaster, microwave, radio and computer, or the hair dryer - you don't have to because your home is not wired in a series circuit. There is a reason why you can pick and choose what electrical devices you are using at any given time...it's because your home is wired in a **PARALLEL CIRCUIT**.

There are two important facts you need to know about parallel circuits:

1. ***In a Parallel Circuit, the electrons have more than one path to follow.*** Each appliance, or load (anything that uses electricity) has it's own path, or "loop". This lets you use one appliance at a time, or any combination of appliances at any time, ***as long as each loop has its own switch to turn the device on/off.***
2. ***In a Parallel Circuit, appliances DO NOT share electrical pressure.*** Each appliance gets the full voltage that it needs in order to function. Adding more loads does not weaken the force of electricity; each load will still work to its full potential. For example, adding more light bulbs to a parallel circuit does not make each bulb give off less light.

A **GOOD** definition of a Parallel Circuit is...

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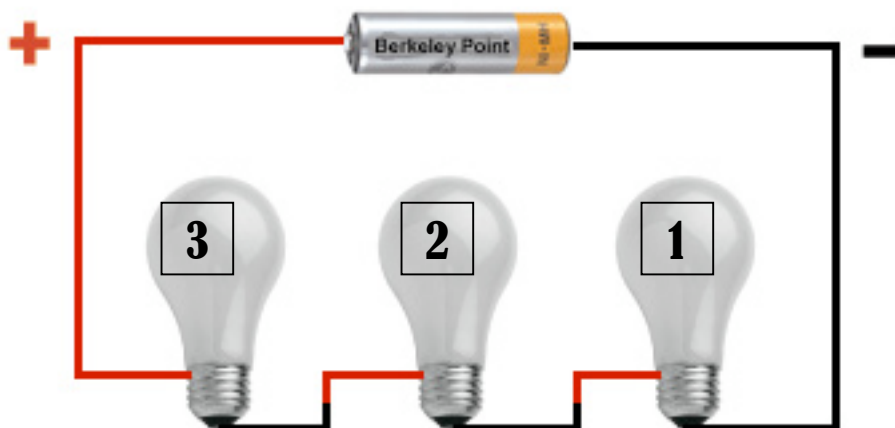
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# A Typical Series Circuit...

Use the diagram below to answer the following questions:

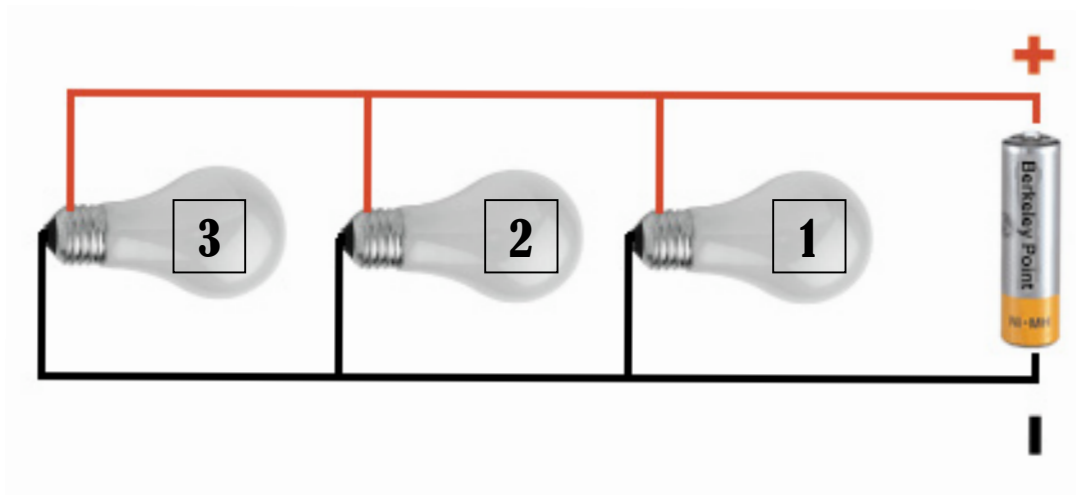
1. Draw arrows to show the path of electrons in this series circuit
2. In this circuit, the electricity has \_\_\_\_\_ path(s) to follow
3. This circuit is: incomplete / complete
4. How many light bulbs are in each loop? \_\_\_\_\_
5. Where does the electricity have to go before it reaches bulb #3?
6. If bulb #1 were to go out, bulb #2 would \_\_\_\_\_.
7. If bulb #3 were to go out, bulb #2 would \_\_\_\_\_.
8. In this circuit, each bulb is / isn't getting full power from the battery.
9. If you added more bulbs to the circuit, each bulb would give off more / equal / less light.



# A Typical Parallel Circuit...

Use the diagram below to answer the following questions:

10. Draw arrows to show the path of electrons in this parallel circuit
11. In this circuit, the electricity has \_\_\_\_\_ path(s) to follow
12. This circuit is: incomplete / complete
13. How many light bulbs are in each loop? \_\_\_\_\_
14. The electricity does / doesn't have to pass through bulb #1 before bulb #2 can light up? \_\_\_\_\_
15. If bulb #2 were to go out, what would happen to bulb #1?
16. If you added a 4<sup>th</sup> bulb, on a 4<sup>th</sup> loop, what would happen to bulb #1 and bulb #2?
17. In this circuit, each bulb is / isn't getting full power from the battery.
18. If you added more bulbs to the circuit, each bulb would give off more / equal / less light.
19. How much of the battery's voltage is each light bulb getting? Explain using a fraction and a percent.



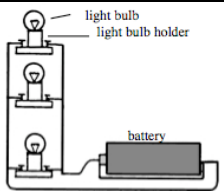
# Complete the Chart

Use your list of electrical symbols to draw the following circuits...

<p>A complete series circuit:</p> <ul style="list-style-type: none"><li>• 1 battery</li><li>• 1 switch</li><li>• 2 light bulbs</li></ul>	
<p>A complete parallel circuit:</p> <ul style="list-style-type: none"><li>• 1 battery</li><li>• 1 main switch</li><li>• 2 light bulbs</li></ul>	
<p>An incomplete parallel circuit:</p> <ul style="list-style-type: none"><li>• 3 batteries</li><li>• No switches</li><li>• 4 light bulbs<ul style="list-style-type: none"><li>○ Each on own loop</li></ul></li></ul>	
<p>A complete parallel circuit:</p> <ul style="list-style-type: none"><li>• 2 batteries</li><li>• 3 loops, each with:<ul style="list-style-type: none"><li>○ 1 switch</li><li>○ 2 light bulbs</li></ul></li></ul> <p><b>Bonus:</b> Make 1 of the loops an incomplete circuit.</p>	

# Comparing Apples and Oranges...

Each phrase in the chart below describes either a **parallel circuit** or a **series circuit**. Which one is it? Put a checkmark in the proper box...

	Parallel Circuit	Series Circuit
1. Only one path, or loop, for the electricity to follow		
2. All the loads are turned on, or off, at the same time		
3. Adding an extra bulb does not change the brightness of the others		
4. This is not a good way to wire homes or schools		
5. More than one path, or loop, for the electricity to follow		
6. All of the loads can be turned on or off one-at-a-time		
7. All of the loads share the electrical pressure from the power source, making them weaker		
8. Adding an extra light bulb makes the rest of the loads weaker		
9. 		
10. 