

Answers to gizmo student exploration circuits

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How does changing the battery's voltage affect the current gizmo? How does changing the battery's voltage affect the current? The higher the battery voltage, the greater the flow of current in the circuit.

How will a single burned out bulb affect the string of lights if each light is attached to its own wire? It would not affect the string of lights because each light is attached to its own wire. Gizmo Warm-up The Circuits Gizmo shows a circuit board and a variety of components. Create a circuit with a battery, a light switch, a wire, and a light bulb, as shown. (Click the light switch to turn it to OFF .)

How do you think increasing the resistance in a circuit will affect the current in the wire? An increase in resistance would result in a decrease in current. And the factor by which the resistance increases is the same factor by which the current decreases. So if the resistance becomes 10 times greater, the current would become 1/10th of its original value.

Why would it be a problem if too many appliances are turned on at once? Plugging in too many appliances or electronics in the same socket can lead to power surges and electrical fires. If you are experiencing power surges, have an electrician check to see if all of the outlets in a room might be operating on the same circuit. If so, overloading one outlet might not be the problem.

How does a fuse make the circuit safer? A fuse is a small, thin conductor designed to melt and separate into two pieces for the purpose of breaking a circuit in the event of excessive current. A circuit breaker is a specially designed switch that automatically opens to interrupt circuit current in the event of an overcurrent

condition.

What happens to the voltage if you add more batteries? By connecting two or more batteries in either series, series-parallel, or parallel, you can increase the voltage or amp-hour capacity, or even both; allowing for higher voltage applications or power hungry applications.

What happens when you disconnect one of the light bulbs from the circuit? In a series connection when a bulb is removed, it will be creating a open circuit. Since circuit is series and is open at a point - current will not flow and hence the other bulb will not glow.

Is the current the same in a parallel circuit? A parallel circuit has two or more paths for current to flow through. Voltage is the same across each component of the parallel circuit. The sum of the currents through each path is equal to the total current that flows from the source.

Which circuit will stop producing light if one bulb burns out? In a series circuit, every device must function for the circuit to be complete. One bulb burning out in a series circuit breaks the circuit. In parallel circuits, each light has its own circuit, so all but one light could be burned out, and the last one will still function.

How does decreasing the length of a wire affect a circuit? As resistance is directly proportional to the length of the conductor, the resistance will decrease with the decrease in the length of the wire.

What is the formula to calculate current using Ohm's law? Ohm's Law Equation : $V = IR$, where V is the voltage across the conductor, I is the current flowing through the conductor and R is the resistance provided by the conductor to the flow of current.

What happens to the current in a circuit if the voltage is increased? The current is directly proportional to the voltage and inversely proportional to the resistance. This means that increasing the voltage will cause the current to increase, while increasing the resistance will cause the current to decrease.

Can a bad breaker cause power surges? A bad breaker can indeed cause low voltage or power surges in your home. A malfunctioning breaker may not be able to

regulate the flow of electricity properly, leading to voltage fluctuations and potential damage to your appliances and electronics.

How to prevent overloaded circuits in a circuit? Unplug major energy-draining appliances. If you have multiple household members using energy-draining appliances at the same time, ensure the appliances are on separate circuits (more common in newer houses) or creating an alternating schedule for use of these appliances to avoid overloading your circuit.

Do all the bulbs have the same brightness? Doesn't that mean they all have the same brightness? No. The brightness of a lightbulb is given by its power. $P = I^2R$, and so brightness depends on current and resistance.

In which way safety fuse is connected in a circuit? Fuses are always connected in series with the live wire.

Is a fuse a safety device which prevents damage to electrical circuits? It is connected in series with the appliance in a circuit. Whenever there is high electric current, more heat will be produced and it leads to the melting of fuse wire. When fuse wire melts, the circuit is broken and in this way, it prevents damage to electrical appliances and avoids fire.

What are industrial fuses made of? Fuse bodies may be made of ceramic, glass, plastic, fiberglass, molded mica laminates, or molded compressed fibre depending on application and voltage class. Cartridge (ferrule) fuses have a cylindrical body terminated with metal end caps.

What is Ah in a battery? AH is basically Ampere Hour. An Ampere Hour is the amount of energy charge in a battery that allows one ampere/1000 mAh of current to flow in one hour.

Why run two batteries in parallel? Batteries last longer in parallel, because the voltage remains the same, but the amps increase. If you connect two 12v 50ah batteries in parallel, it will still be a 12 volt system, but the amps will double to 100ah, so the batteries will last longer.

Which is black and red on a battery? The red one is positive (+), the black one is negative (-). Never connect the red cable to the negative battery terminal or a vehicle

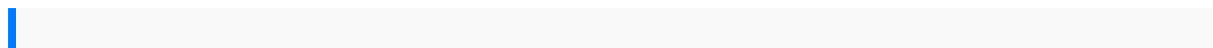
with a dead battery.

How does changing the voltage affect the current in a circuit? This equation, $i = v/r$, tells us that the current, i , flowing through a circuit is directly proportional to the voltage, v , and inversely proportional to the resistance, r . In other words, if we increase the voltage, then the current will increase.

How does changing the battery voltage affect your results? If the voltage is too low the battery will not reach full charge or if low enough not charge at all. If the voltage is too high it boils the electrolyte and will fail the battery.

What effect does the voltage of a battery have on the amount of current? The greater the battery voltage (i.e., electric potential difference), the greater the current. And the greater the resistance, the less the current. Charge flows at the greatest rates when the battery voltage is increased and the resistance is decreased.

What is the effect of changing the voltage? So, an increase in the voltage will increase the current as long as the resistance is held constant. Alternately, if the resistance in a circuit is increased and the voltage does not change, the current will decrease.



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