ConcepTest 26.3b Wires II

A wire of resistance *R* is stretched uniformly (keeping its volume constant) until it is twice its original length. What happens to the resistance?

1) it decreases by a factor 4
2) it decreases by a factor 2
3) it stays the same
4) it increases by a factor 2
5) it increases by a factor 4

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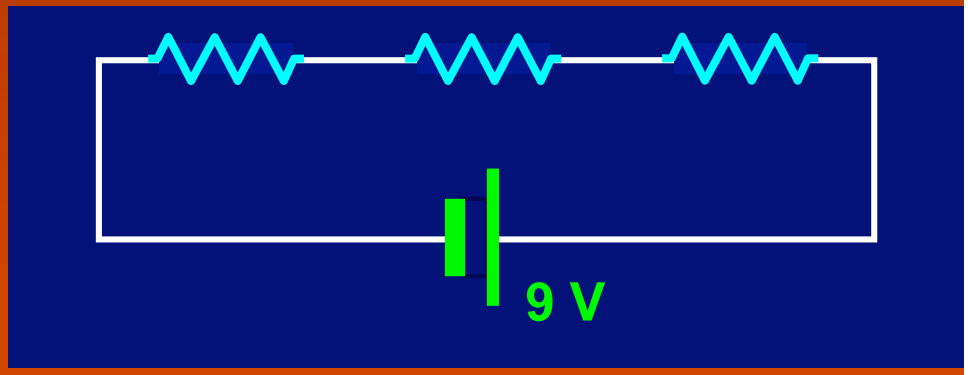
Keeping the volume (= area x length) constant means that if the length is doubled, the area is halved.

Since $R = \rho \frac{L}{A}$, this increases the resistance by four.

ConcepTest 26.4a Series Resistors I

Assume that the voltage of the battery is 9 V and that the three resistors are identical. What is the potential difference across each resistor?

1) 12 V
2) zero
3) 3 V
4) 4 V
5) you need to know the actual value of *R*



ConcepTest 26.4a Series Resistors I

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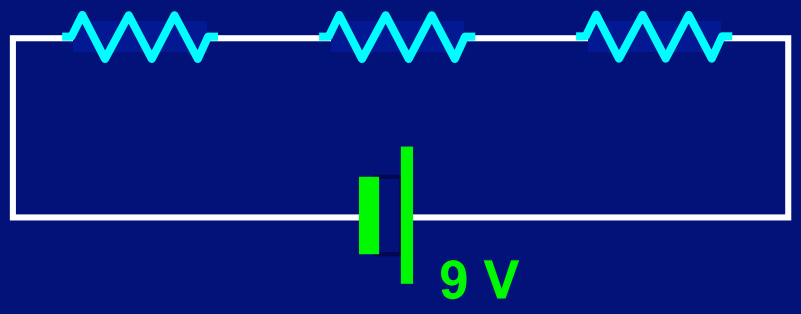
1) 12 V
2) zero
3) 3 V
4) 4 V
5) you need to know the actual value of *R*

Since the resistors are all equal, the voltage will drop evenly across the 3 resistors, with 1/3 of 9 V across each one. So we get a 3 V drop across each.

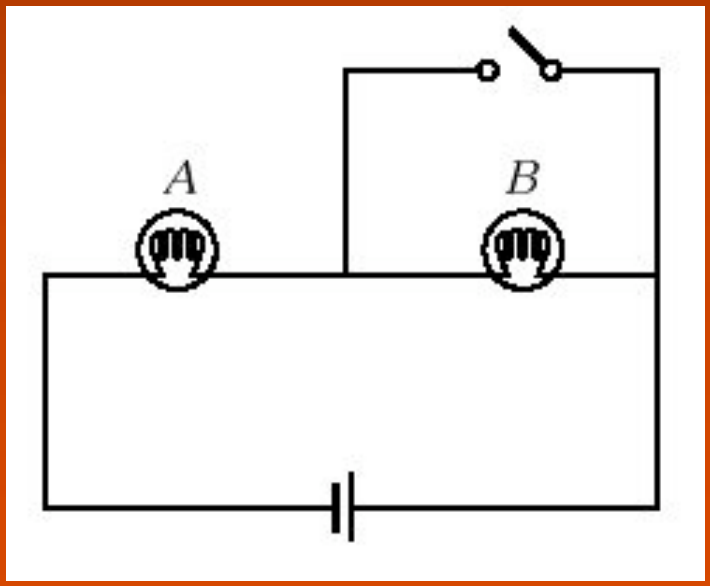


Follow-up: What would be the potential difference if $R = 1\,\Omega, 2\,\Omega, 3\,\Omega$

ConcepTest 26.6b Short Circuit II

Two lightbulbs A and B are connected in series to a constant voltage source. When a wire is connected across B, bulb A will:

1) glow brighter than before
2) glow just the same as before
3) glow dimmer than before
4) go out completely
5) explode



ConcepTest 26.6b Short Circuit II

Two lightbulbs A and B are connected in series to a constant voltage source. When a wire is connected across B, bulb A will:

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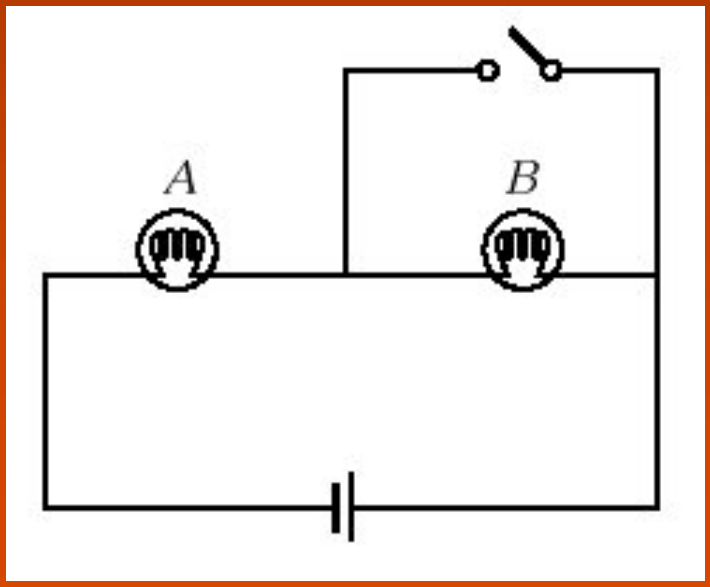
5) explode

Since bulb B is bypassed by the wire, the total resistance of the circuit decreases. This means that the current through bulb A increases.

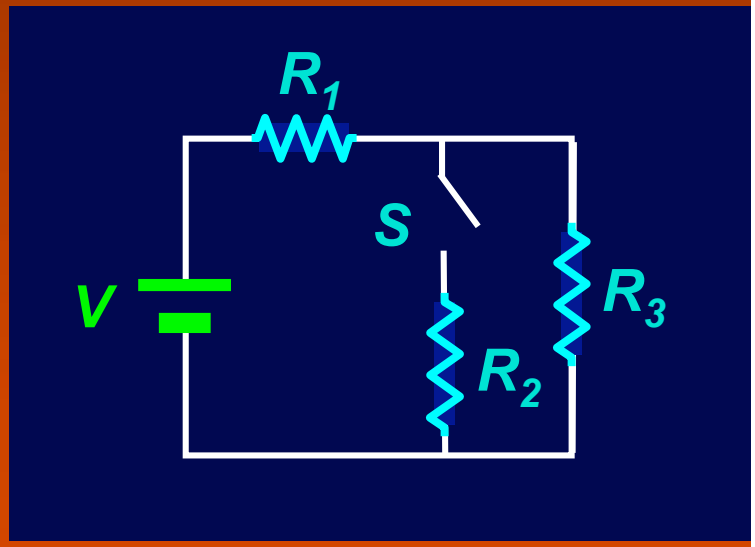


Follow-up: What happens to bulb B?

ConcepTest 26.8a More Circuits I

What happens to the voltage across the resistor R_1 when the switch is closed? The voltage will:

1) increase
2) decrease
3) stay the same

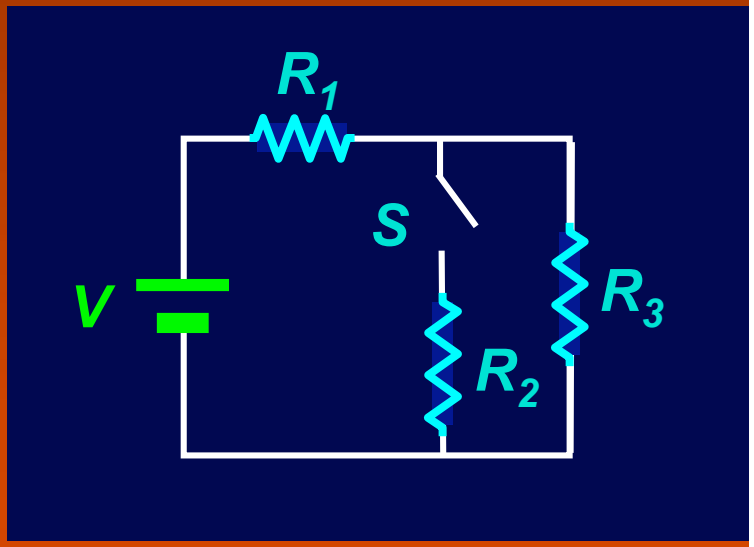


ConcepTest 26.8a More Circuits I

What happens to the voltage across the resistor R_1 when the switch is closed? The voltage will:

1) increase
2) decrease
3) stay the same

With the switch closed, the addition of R_2 to R_3 decreases the equivalent resistance, so the current from the battery increases. This will cause an increase in the voltage across R_1 .



Follow-up: What happens to the current through R_3?