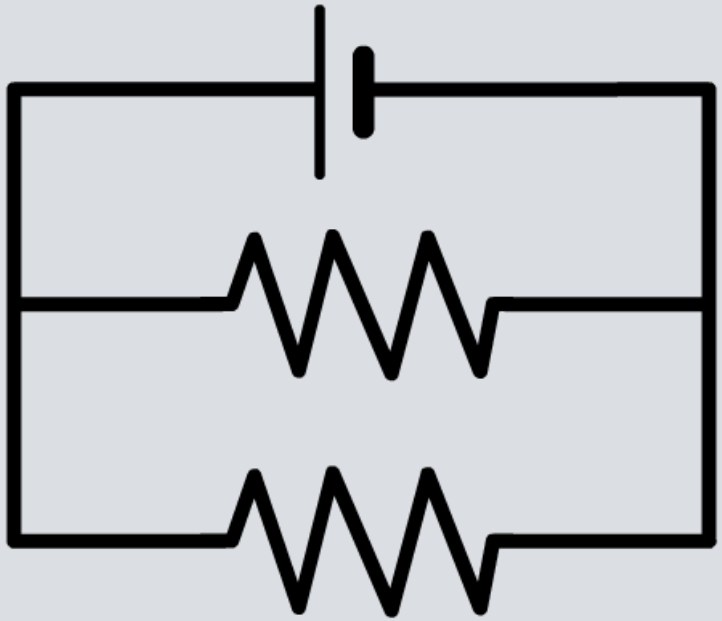
Factors Affecting Resistance 2



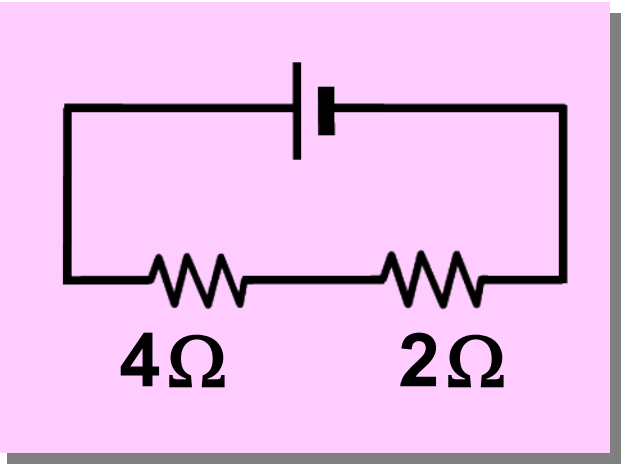
How is resistance affected in a series circuit?

When two (or more) resistors are connected in series, the combined resistance is **higher** than the individual resistors.

There is only one path for the current to travel, which means that it flows through the resistors one after the other.

This has the same effect as using a longer piece of wire.

total resistance in series
$= R_1 + R_2$



Total resistance

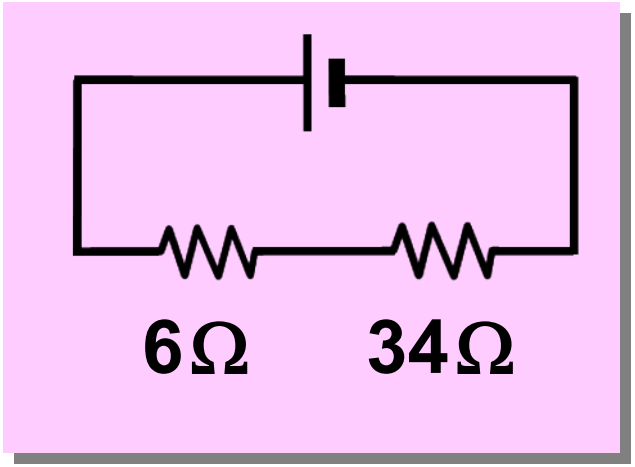
$= R_1 + R_2$

$= 4\Omega + 2\Omega$

$= 6\Omega$

Calculating resistance in series

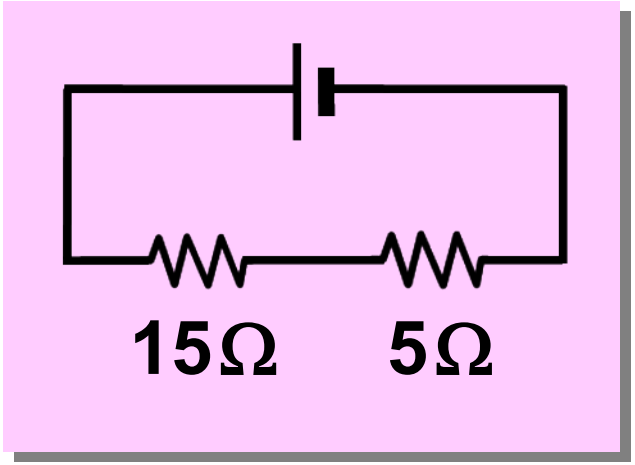
What is the total resistance for each of these circuits?



Total resistance $= R_1 + R_2$

$= 6\Omega + 34\Omega$

$= 40\Omega$



Total resistance $= R_1 + R_2$

$= 15\Omega + 5\Omega$

$= 20\Omega$

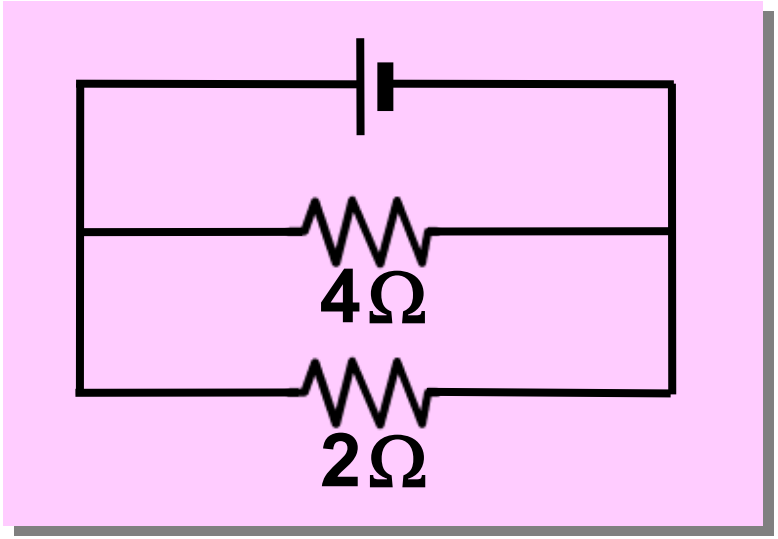
How is resistance affected in a parallel circuit?

When two (or more) resistors are connected in parallel, the current splits at the branches and does not go through each resistor.

This means the total combined resistance is less than any of the individual resistors.

This has the same effect as using a thicker piece of wire.

$$\frac{1}{\text{total resistance in parallel}} = \frac{1}{R_1} + \frac{1}{R_2}$$



Total resistance

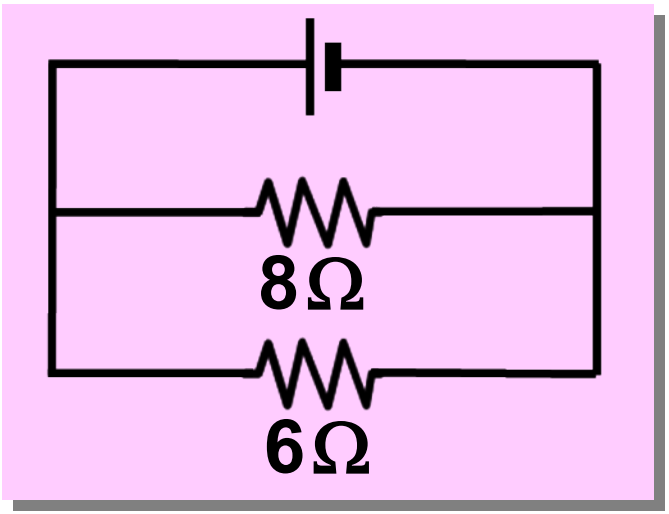
$$= \frac{R_1 \times R_2}{R_1 + R_2}$$

$$= \frac{4\Omega \times 2\Omega}{4\Omega + 2\Omega}$$

$$= 1.33\Omega$$

Calculating resistance in parallel

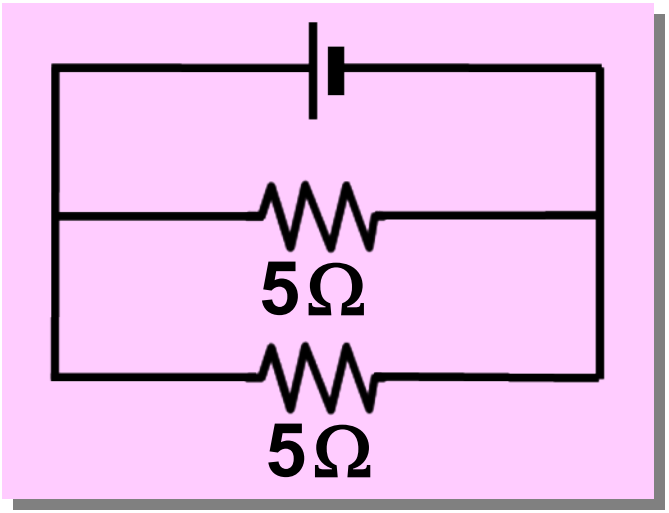
What is the total resistance for each of these circuits?



$$\text{Total resistance} = \frac{R_1 \times R_2}{R_1 + R_2}$$

$$= \frac{8\Omega \times 6\Omega}{8\Omega + 6\Omega}$$

$$= 3.4\Omega$$



$$\text{Total resistance} = \frac{R_1 \times R_2}{R_1 + R_2}$$

$$= \frac{5\Omega \times 5\Omega}{5\Omega + 5\Omega}$$

$$= 2.5\Omega$$

Resistors in a circuit

You will need these equations to answer the following questions about resistance.

resistors in series

$$\text{total resistance} = R_1 + R_2$$

resistors in parallel

$$\text{total resistance} = \frac{R_1 \times R_2}{R_1 + R_2}$$

Click "**start**" to begin.

start