The Power Equation

Electric power is the rate at which energy is converted from electrical engery to some other form such as heat or mechanical energy. When charge moves through a reisistor it loses potential energy. That energy is converted to heat. Power *dissipated* (as heat) by a component in a DC circuit is given by the product of the voltage across the component and the current through the component:

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Watts = Volts * Amps
OR
P = V * I
since V = I * R, by substitution,
P = I^2 * R and P = \frac{V^2}{R}
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For example, in the circuit below, how much power is dissipated in the 1.5 ohm resistor?

Solving for current first:	I = V/R = 1.5/1.5 = 1
therefore,	P = 1.5 * 1 = 1.5 Watts
alternatively,	$P = I^2 * R$, so
	P = 1 * 1 * 1.5 = 1.5 Watts

In each case the power is dissipated as heat in the resistor. Resistors can only dissipate power. They convert electrical energy to heat.



Since the resistor *dissipated* 1.5 watts of power, the batter must have *supplied* 1.5 Watts of power. We can also say that the battery *dissipated* -1.5 Watts.

