

**Concept-Development  
Practice Page****34-2****Electric Power**

Recall that the rate energy is converted from one form to another is *power*.

$$\text{power} = \frac{\text{energy converted}}{\text{time}} = \frac{\text{voltage} \times \text{charge}}{\text{time}} = \text{voltage} \times \frac{\text{charge}}{\text{time}} = \text{voltage} \times \text{current}$$

The unit of power is the *watt* (or *kilowatt*). So in units form,

$$\text{Electric power (watts)} = \text{current (amperes)} \times \text{voltage (volts)},$$

where 1 watt = 1 ampere x 1 volt.



THAT'S RIGHT--- VOLTAGE =  $\frac{\text{ENERGY}}{\text{CHARGE}}$ , SO ENERGY = VOLTAGE  $\times$  CHARGE ---  
AND  $\frac{\text{CHARGE}}{\text{TIME}} = \text{CURRENT} \Rightarrow \text{HEAT}$

1. What is the power when a voltage of 120 V drives a 2-A current through a device?

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2. What is the current when a 60-W lamp is connected to 120 V?

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3. How much current does a 100-W lamp draw when connected to 120 V?

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4. If part of an electric circuit dissipates energy at 6 W when it draws a current of 3 A, what voltage is impressed across it?

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5. The equation
- $$\text{power} = \frac{\text{energy converted}}{\text{time}}$$

rearranged gives

$$\text{energy converted} = \underline{\hspace{2cm}}$$

6. Explain the difference between a kilowatt and a kilowatt-hour.

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7. One deterrent to burglary is to leave your front porch light on all the time. If your fixture contains a 60-W bulb at 120 V, and your local power utility sells energy at 8 cents per kilowatt-hour, how much will it cost to leave the bulb on for the whole month? Show your work on the other side of this page.

A 100-WATT BULB CONVERTS ELECTRIC ENERGY INTO HEAT AND LIGHT MORE QUICKLY THAN A 25-WATT BULB. THAT'S WHY FOR THE SAME VOLTAGE A 100-WATT BULB GLOWS BRIGHTER THAN A 25-WATT BULB!



WHICH DRAWS MORE CURRENT --- THE 100-WATT OR THE 25-WATT BULB?



WATT'S HAPPENING ?

