

Electric Power

Lesson 2.5

Key Concepts

- How do you calculate electric power?
- What factors are used to determine how people pay for electrical energy?

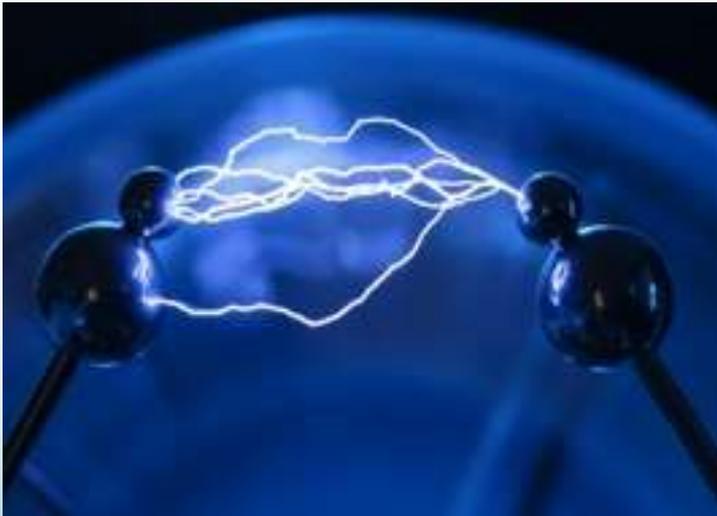
Energy Transformation

- An electric appliance transforms electrical energy into another form.
- The energy transformation enables the appliance to perform its function.



Appliances

- For example, a hair dryer transforms electrical energy to thermal energy for drying hair.



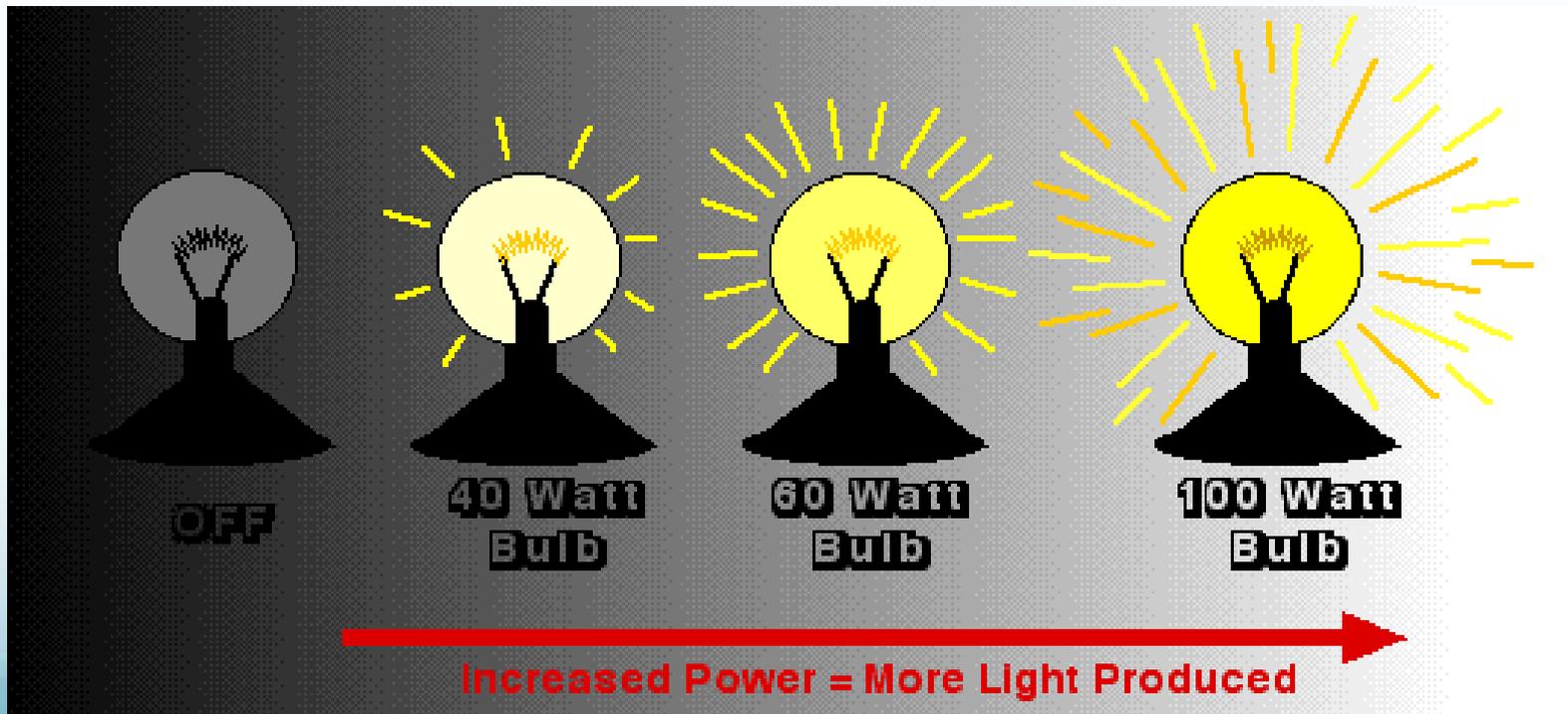
Power (W)

- The rate at which energy is transformed from one form to another is known as **power**.
- The unit of power is the watt (W).



Power Ratings

- A bright light bulb transforms (or uses) electrical energy at a faster rate than a dimmer bulb.



Power Ratings



- Appliances used in the home vary greatly in their power ratings. New appliances are sold with labels that show the power rating for each product.



Power Calculation

- The power of a light bulb or appliance depends on two factors: voltage and current.
- **You can calculate power by multiplying voltage by current.**



Power Calculation

- The units are watts (W) = volts (V) x amperes (A).
- Using the symbols P for power, V for voltage, and I for current, this equation can be rewritten...

Power = Voltage x Current

$$P = V I$$

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Electrical Bill

- The electrical bill that comes to your home charges for energy use, not power.
- Energy use depends on both power and time.



Energy

- The total amount of energy used by an appliance is equal to the power of the appliance multiplied by the amount of time the appliance is used.

$$\text{Energy} = \text{Power} \times \text{Time}$$



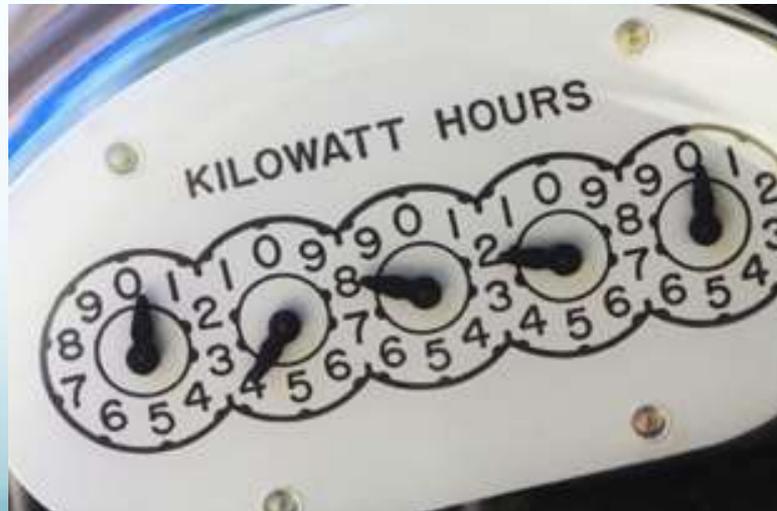
Kilowatt-hours

- Electric power is usually measured in thousands of watts, or kilowatts (kW), and time is measured in hours.
- The unit of electrical energy is the kilowatt-hour (kWh).

Kilowatt-hours = Kilowatts x Hours

Electric Meter

- The amount of electrical energy used in your home is measured by a meter.
- The electric company uses the meter to keep track of the number of kilowatt-hours used.



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Skill Check 2.5

1. The rate at which energy is transformed from one form to another is known as...
 - a) power
 - b) voltage
 - c) current

Skill Check 2.5

2. You can calculate power by...
 - a) Voltage / Current
 - b) Kilowatts x Hours
 - c) Voltage x Current

Skill Check 2.5

3. The total amount of energy used by an appliance is equal to...
- a) Voltage / Current
 - b) Kilowatts x Hours
 - c) Power x Time

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