

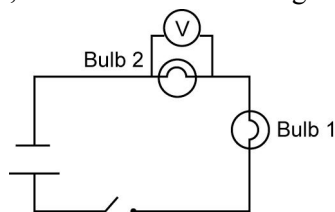
# BLM Answers

## BLM 5–1 Understanding Electric Energy

1. electric circuit
2. series circuit
3. parallel circuit
4. electric current
5. volts (V)
6. amperes (A)
7. load
8. source
9. conductor
10. switch
11. potential difference

## BLM 5–3 Voltage in a Circuit

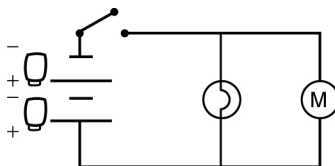
2. Predictions will vary, but should be less than 3 V, which is the total voltage of the circuit.
- 3.



5. 1.5 V or less
6. Answers will vary depending on students' predictions. If students assumed the voltage across each bulb would be the same as the voltage across the battery, their predictions will be too high. If students assumed the first bulb would use up all the energy in the current, their predictions will be too low.
7. a) and b) Students should write an "M" next to the positive end of the battery symbol, and an "L" between the second bulb in the circuit and the negative end of the battery symbol.  
c) The amount of current is the same throughout the circuit. However, the current loses energy as it passes through each load in the circuit.

## BLM 5–4 All Kinds of Energy

6.



7. Students should check across the batteries. (In theory, the potential difference will be the same across the two batteries in series and either load in parallel. In practice, the potential difference will

likely be greater across the two batteries than across either load.)

8. Electric current flowed from the batteries to the LED and the fan motor. Each load used some of the electric energy from the current.
9. a) electric energy  $\rightarrow$  LED  $\rightarrow$  light  
b) electric energy  $\rightarrow$  fan motor  $\rightarrow$  movement

## BLM 5–5 Calculate the Power Used

1. **STEP 1:** Power = ?, Energy = 4500 J, Time = 120 s,

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

**STEP 2:** How much power is produced.

$$\text{STEP 3: Power} = \frac{\text{Energy}}{\text{Time}} = \frac{4500 \text{ J}}{120 \text{ s}} = 37.5 \text{ W}$$

**STEP 4:** The power rating of the computer screen is 37.5 W.

$$2. \text{ Power} = \frac{12\,000 \text{ J}}{11 \text{ s}} = 1091 \text{ W}$$

$$3. \text{ Power} = \frac{9000 \text{ J}}{4 \text{ s}} = 2250 \text{ W}$$

$$4. \text{ Power} = \frac{800 \text{ J}}{3 \text{ s}} = 267 \text{ W}$$

## BLM 5–6 Calculate Your Cost

1. a) **STEP 1:** Energy used = ?, Power = 210 W, Time = 4 h, 1 kW = 1000 W,  
Energy used = Power  $\times$  Time

**STEP 2:** How much energy is used.

$$\text{STEP 3: } 210 \text{ W} \div 1000 = 0.21 \text{ kW}$$

$$\text{STEP 4: Energy used} = 0.21 \text{ kW} \times 4 \text{ h} = 0.84 \text{ kWh}$$

b) **STEP 5:** How much 0.84 kWh of energy costs.

$$\text{STEP 6: Total cost} = 0.84 \text{ kWh} \times$$

$$8.0\text{¢/kWh} = 0.84 \times 8.0 = 6.72\text{¢}$$

**STEP 7:** It cost 6.72¢ to leave the LCD TV on for 4 h.

2. a)  $2500 \text{ W} = 2.5 \text{ kW}$ , Energy used =  $2.5 \text{ kW} \times 3 \text{ h} = 7.5 \text{ kWh}$

$$\text{b) Total cost} = 7.5 \text{ kWh} \times 9.0\text{¢/kWh} = 67.5\text{¢}$$

3. a)  $3500 \text{ W} = 3.5 \text{ kW}$ , Energy used =  $3.5 \text{ kW} \times 12 \text{ h} = 42 \text{ kWh}$

$$\text{b) Total cost} = 42 \text{ kWh} \times 8.5\text{¢} = \$3.57$$

## BLM 5–8 Chapter 5 Practice Test

1. d) volts (V)
2. b) amperes (A)
3. e) circuit, a) current

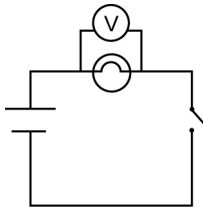
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**BLM 5-10**

(continued)

4. **f)** parallel circuit  
 5. **c)** potential difference  
 6. **g)** series circuit  
 7. **a)** False. An electric current has more energy when it enters a load. The amount of current in amperes will be the same throughout the circuit.  
**b)** False. If an electric circuit has two loads, the voltage across each load will be less than the voltage across the source.  
**c)** True.  
 8. Answers will vary. Look for two different uses for LEDs, such as indicator lights, digital displays, and reading lamps or flashlights.  
 9. **a)** and **b)**



10. **a)** electric energy  $\rightarrow$  light bulb  $\rightarrow$  light  
**b)** electric energy  $\rightarrow$  light bulb  $\rightarrow$  heat  
 11. **a)**  $\text{Power} = \frac{\text{Energy}}{\text{Time}} = \frac{3000 \text{ J}}{60 \text{ s}} = 50 \text{ W}$   
**b)**  $50 \text{ W} = 0.05 \text{ kW} \times 30 \text{ h} = 1.5 \text{ kWh}$   
**c)**  $1.5 \text{ kWh} \times 9.0\text{¢/kWh} = 13.5\text{¢}$

4. **b)** amperes (A)  
 5. **f)** electric current  
 6. **g)** energy  
 7. **a)** F. LEDs convert most of the electric energy they use into light.  
**b)** T  
**c)** F. Most energy companies measure electric energy in kilowatt hours (kWh).  
**d)** F. An electric current is the same on either side of a load, although it has more energy when it enters a load.  
 8. **a)** series circuit  
**b)** parallel circuit  
**c)** Students should circle “one”.  
**d)** Students should circle “different”.  
**e)** You need to close the switches.  
 9. **a)** Answers will vary. Accept any electric device that produces heat, such as:  
 electric energy  $\rightarrow$  *hair dryer*  $\rightarrow$  heat  
**b)** *electric energy*  $\rightarrow$  indicator LED on power bar  $\rightarrow$  *light*  
**c)** *electric energy*  $\rightarrow$  subway  $\rightarrow$  *movement*  
 10. **a)**  $10 \text{ W} = 0.01 \text{ kW}$ ,  
 Energy used =  $0.01 \text{ kW} \times 5.0 \text{ h} = 0.05 \text{ kWh}$   
**b)** Total cost =  $0.05 \text{ kWh} \times 11\text{¢/kWh} = 0.55\text{¢}$

**BLM 5-9 Chapter 5 Test**

1. **e)** electric circuit  
 2. **d)** potential difference  
 3. **c)** volts (V)