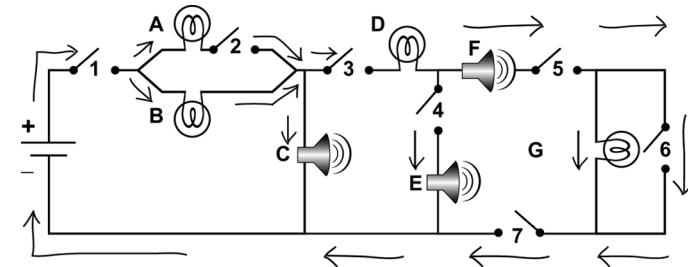
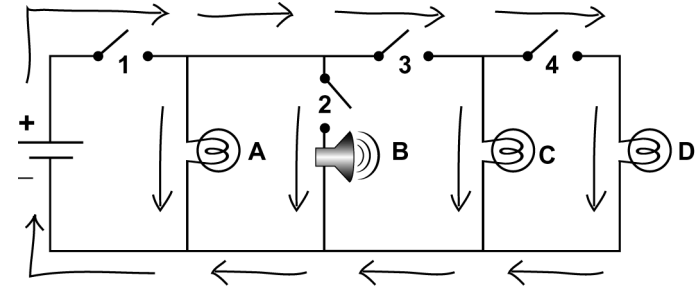


Skill and Practice Sheet Answers

12A Open and Closed Circuits

1. Answers are:
 - a. A, B
 - b. A, C, D
 - c. A, B, C
 - d. no current
 - e. A, B, D
 - f. B, C, D
 - g. A, C
 - h. A
 - i. A
 - j. no current
2. Answers are:
 - a. A, B, C, D, E
 - b. A, B, C, D, E, F, G
 - c. A, B, C, D, E
 - d. A, B, C, D, F, G
 - e. A, B, C
 - f. B, C, D, E, F, G
 - g. no current
 - h. B, C, D, F, G
 - i. A, B, C, D, F, G
 - j. A, B, C
 - k. A, B, C, D, E
 - l. B, C
 - m. A, B, C
 - n. no current
 - o. B, C

3. Diagrams:



4. diagram #1: 4 paths; diagram #2: 8 paths
5. Student drawings will vary. If time permits, allow students to build and test their circuits

12B Voltage, Current, and Resistance

Reading section answers:

1. A battery with a larger voltage can create a greater energy difference. A 9-volt battery gives a greater “push” to the charges and creates a larger current.
2. You could increase the number of batteries, which would increase the total voltage in the circuit. You could replace the light bulb with a bulb of lower resistance. You could also use thicker wires, shorter wires, or wires made from a material with a higher conductivity. These changes to the wires would decrease the total amount of resistance in the circuit.
3. If the circuit used a 9-volt battery, you could try replacing it with five (or less than five) 1.5-volt batteries to lower the voltage in the circuit.



You could replace the bulb with a bulb of higher resistance. Or, you could use thinner wires, longer wires, or wires made from a material with a lower conductivity. These changes to the wires would increase the total resistance in the circuit. To stop the current completely, you could simply open the switch.

4. You could simply cut each piece of wire in the circuit as short as possible. A shorter wire has less resistance than a longer wire. To make a more significant decrease in resistance, you would need to replace the wire with a thicker gauge wire or a wire made from a material with greater conductivity.
5. Ohm's law states that, in a circuit, the amount of current is directly related to voltage, and inversely related to the resistance in the circuit.

Problem section answers:

1. 1.5 amps
2. 0.75 amps
3. 50 volts
4. 12 ohms

12C Ohm's Law

1. 3 amps
2. 0.75 amp
3. 0.5 amp
4. 1 amp
5. 120 volts
6. 8 volts
7. 50 volts
8. 12 ohms
9. 240 ohms
10. 1.5 ohms
11. 3 ohms
12. Answers are:
 - a. Circuit A: 6 V; Circuit B: 12 V

- b. Circuit A: 1 A; Circuit B: 2 A
 - c. Circuit A: 0.5 A; Circuit B: 1 A
 - d. It is brighter in circuit B because there is a greater voltage and greater current (and more power is consumed since power equals current times voltage).
13. The current becomes 4 times as great.
14. If resistance increases, the current decreases. The two are inversely proportional.
15. If voltage increases, current increases. The two are directly proportional.
16. Remove one of the light bulbs. This decreases the resistance and increases the current.
17. Remove one of the batteries. This decreases the voltage and decreases the current.
18. Answers are:
 - a. 2 batteries and a 3 ohm bulb (or 4 batteries and all 3 bulbs)
 - b. 4 batteries and a 3 ohm bulb
 - c. 2 batteries and a 1 ohm bulb (or 4 batteries and a 2 ohm bulb)
 - d. 4 batteries and a 1 ohm bulb