

An Open and Short Case [Activity]

To understand how electric circuits work, it is important to understand how electric circuits don't work. In this activity, open circuits and short circuits are investigated. Both are considered faulty circuits, but they are very different in nature.

Answers to Procedure Questions

1. Student predictions will vary, but should address the bulb and the ammeter.
2. The bulb goes out; the ammeter drops to zero.
3. Student predictions will vary, but should address the bulb and the ammeter.
4. The bulb goes out (or dims significantly) and the ammeter shoots up to a very high (if not its maximum) reading.
5. The open circuit.
6. The short circuit.
7.
 - a. When point c is connected to point d, bulb 1 remains lit and bulb 2 remains lit.
 - b. When point d is connected to point e, bulb 1 remains lit and bulb 2 goes out.
 - c. When point e is connected to point f, bulb 1 remains lit and bulb 2 remains lit.
 - d. When point f is connected to point a, bulb 1 goes out and bulb 2 goes out.
 - e. When point a is connected to point c, bulb 1 goes out and bulb 2 remains lit.
 - f. When point a is connected to point d, bulb 1 goes out and bulb 2 remains lit.
 - g. When point a is connected to point e, bulb 1 goes out and bulb 2 goes out.
 - h. When point b is connected to point d, bulb 1 goes out and bulb 2 remains lit.
 - i. When point b is connected to point e, bulb 1 goes out and bulb 2 goes out.
8.
 - a. When point c is connected to point d, bulb 1 goes out and bulb 2 goes out.
 - b. When point d is connected to point e, bulb 1 remains lit and bulb 2 goes out.
 - c. When point e is connected to point f, bulb 1 remains lit and bulb 2 remains lit.
 - d. When point f is connected to point a, bulb 1 goes out and bulb 2 goes out.
 - e. When point a is connected to point c, bulb 1 goes out and bulb 2 goes out.
 - f. When point a is connected to point d, bulb 1 remains lit and bulb 2 remains lit.
 - g. When point a is connected to point e, bulb 1 goes out and bulb 2 goes out.
 - h. When point b is connected to point d, bulb 1 remains lit and bulb 2 remains lit.
 - i. When point b is connected to point e, bulb 1 goes out and bulb 2 goes out.

Answers to Summing Up Questions

1. The bulb doesn't light in either circuit.
2. In open circuits, no current flows; in short circuits, a large amount of current flows.
3. There is a path from one terminal of the battery to the other terminal of the battery that doesn't require current passing through a bulb.