Name: _____ Group: _____ Date: _____

Tech labs

TECH 14

Circuit protection

PROGRAMS: ST, EST, AST
LAB TYPE: Observation
CONCEPT: Protection
STUDENT BOOK: Chapter 14, page 466
TOOLBOX: Pages 77 and 79

GOAL

Observe how a protective device operates in an electrical circuit.

OBSERVATION CRITERIA

1. What purpose do protective components serve in electrical circuits?

_____

_____

_____

2. In the table below, write the names of two types of protective devices and explain how they work.

Protective device	How it works
	_____ _____ _____
	_____ _____ _____

3. Identify the following symbols:

a)

_____

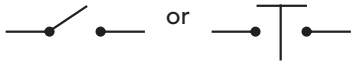
_____

b)

_____

_____

c)



_____

_____

d)

_____

_____

e)

_____

_____

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4. What is the difference between an open circuit and a closed circuit?

_____

_____

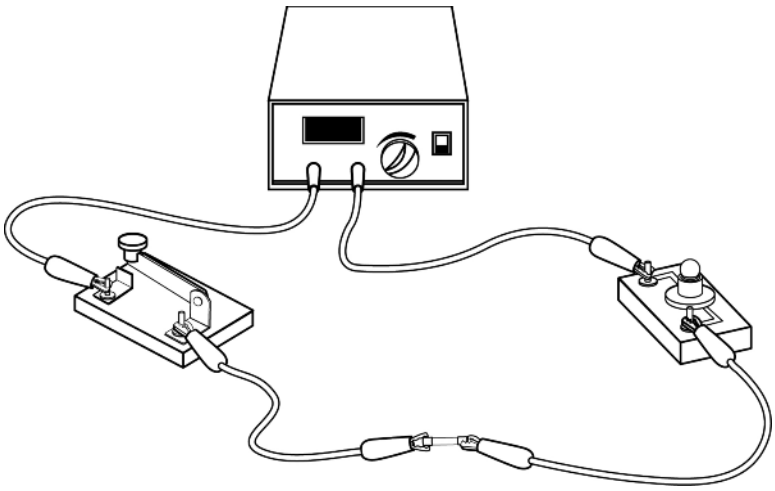
_____

MATERIALS

- variable-intensity direct-current (DC) power supply
- 2.5-V light bulb with socket and contacts
- 4 electrical wires with alligator clips
- 300-A fuse
- switch

PROCEDURE

1. Make sure the switch is open, which means that current will not be able to flow through the circuit once the switch is connected to it.
2. Switch on the DC power supply and set the voltage to 2.5 V.
3. Switch off the DC power supply.
4. Connect the DC power supply, the switch, the fuse and the light bulb with the electrical wires, as shown below.



5. Switch on the DC power supply and close the switch.
6. Observe any changes to the filament in the fuse and to the intensity of light emitted by the bulb. While doing this, gradually increase the voltage of the DC power supply to 6 V. Record your observations.
7. Once again, observe changes in the fuse filament and the intensity of light emitted by the bulb. Continue observing the fuse and the bulb as you gradually increase the voltage of the DC power supply to 9 V. Record your observations.
8. Place your hand above the fuse, but DO NOT TOUCH it. Record the sensation you experience.
9. Open the switch and switch off the DC power supply.
10. Take the electrical circuit apart and put away the materials.

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OBSERVATIONS

Record your observations in the table below. Give your table a title.

Title: _____

_____

Voltage variation	Changes in fuse filament	Changes in luminous intensity
From 2.5 V to 6 V		
From 6 V to 9 V		

Sensation experienced when you placed your hand above the fuse:

_____

REFLECTING ON YOUR OBSERVATIONS

1. You already know that when the potential difference (voltage) in a circuit is increased, without a change in resistance, the current intensity also increases. In light of this relationship, explain the effect of increasing the voltage on each of the following components:

a) the fuse filament _____

_____

b) the intensity of light emitted by the bulb _____

_____

2. Keeping in mind the relationship mentioned in question 1, explain what happened to the fuse filament.

_____

_____

3. Name the electrical function of the fuse in the circuit.

_____

_____

4. If the bulb had been connected directly to the electrical circuit, without the fuse, what could have happened when the voltage was increased?

_____

_____

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5. Draw a diagram of the electrical circuit you assembled to light the bulb.