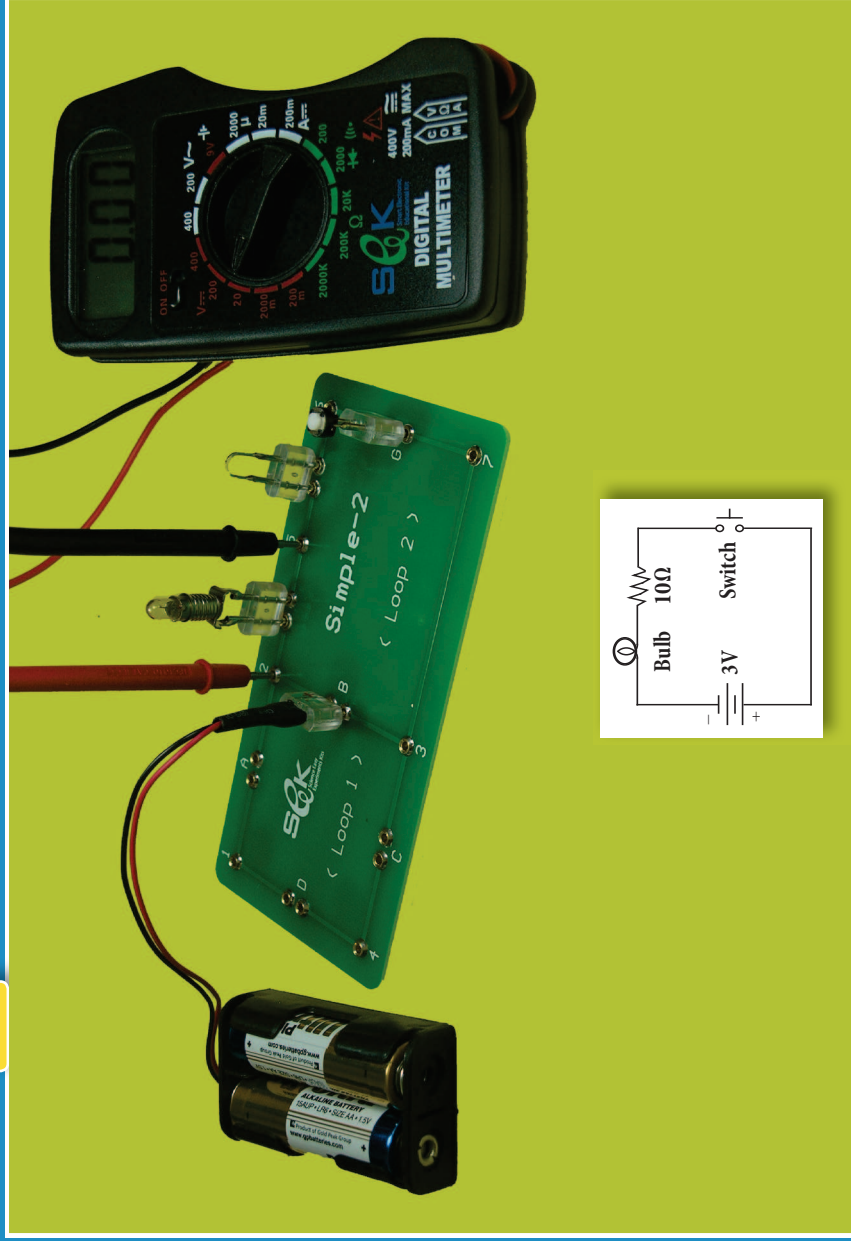


## Experiment

### 15 Bulb and Resistor in series circuit



## Objectives

1. The student will investigate the effect of connecting a resistor in series with a bulb on its brightness.
2. The student will investigate the effect of connecting a resistor in series with a bulb on the voltage drop across the bulb.

## Apparatus

- Experiments Board (Simple-2)
- 2xAA Battery Holder w/AA batteries
- Fixed Carbon Resistors:  $10\Omega$ ,  $20\Omega$ ,  $33\Omega$ ,  $100\Omega$
- DMM
- Bulb
- Switch
- Jumpers

## Procedure & Conclusions

1. Build a simple circuit as shown in the photo.
2. Press the switch button and see if the bulb glows.
3. Set the mode of the DMM to (DVC) (range 20), then insert it's probes at the points (2) & (5) to measure the voltage drop across the the bulb.
  - The voltage drop across the bulb is .....

4. Insert a resistor  $10\Omega$  at the pair (F) instead of the jumper.
5. Press the switch button and see the bulb brightness & the DMM reading.
  - As we connect a fixed resistor  $10\Omega$  in series with a bulb in a simple circuit, we notice that the brightness of the bulb ... **increases / decreases ...** , and the voltage drop across the bulb becomes ..... volt.
  - The decrease in the brightness of the bulb indicates that the value of the resistor connected in series with the bulb ... **increases / decreases ...**
6. Insert the DMM probes at the points (5) & (6), press the switch button to measure the voltage drop across the resistor, write down the DMM reading in the below table.
7. Insert the DMM probes at the points (2) & (3), press the switch button to measure the voltage difference of the batteries in this case, write down the DMM reading in the below table.
8. Repeat steps 6 to 7 using different resistors ( $20\Omega$ ,  $33\Omega$  &  $100\Omega$ ) by inserting them at the pair (F) instead of the resistor  $10\Omega$ , watch the changes in the bulb brightness and the the voltage drop across the the bulb. Write down the measured values in the below table.

Resistance (Ohm)	Change in the brightness of the bulb (Brighter/Dimmer)	Voltage across the Batteries (V) (Volts)	Voltage across the Bulb $V_1$ (Volts)	Voltage across the Resistor $V_2$ (Volts)	$(V_1) + (V_2)$ (Volts)
0					
10					
20					
33					
100					

From the above table we conclude that:

- The voltage between the voltage source terminals in a closed circuit = voltage across the ..... + voltage across the .....
- As the value of the resistor connected in series with a bulb in a simple circuit increases, the bulb ... gets brighter / gets dimmer / stay the same brightness ..., and the voltage across the bulb ... increases / decreases ...

**Note: Connecting a resistor in series with a bulb decreases the voltage across the bulb, this is called drop voltage.**