



## Objectives

1. The student will investigate the basic operation of a semiconductor Diode.
2. The student will differentiate between the terminals of a Diode.
3. The student will use a Diode in a simple circuit.
4. The student will investigate the Light Emitting Diode (LED).

## Apparatus

- Experiments Board (Simple-2)
- DMM
- Switch
- 2xAA Battery Holder w/AA batteries
- Diode
- Jumpers
- Light Emitting Diode (LED)
- Bulb

## Procedure & Conclusions

1. Build a simple circuit by inserting 2xAA battery holder at the pair (B), a bulb at the pair (E), a switch at the pair (G) and a jumper at the pair (F).
2. Close the circuit by pressing the switch button and watch if the bulb glows.
3. Insert a diode at the pair (F) instead of the jumper.
4. Repeat step 2
  - When you press the switch button to close the circuit, the bulb ...glows / doesn't glow ...

5. Reverse the Diode at the pair (F). Repeat step 2
  - We notice that the bulb glows when the diode positive terminal is connected to the ... positive / negative ... terminal of the voltage source, and hence we conclude that the diode allows current to flow through it in one direction and blocks current from the opposite direction.
- Note1:** A diode has two terminals: The positive side is called the anode, and the negative one is called the cathode.
- Note2:** When the Current flow is permitted (when the bulb glows), the diode is said to be forward-biased, in this case positive terminal of the diode is connected to the positive terminal of the voltage source. When the Current flow is prohibited, the diode is said to be reverse-biased, in this case positive terminal of the diode is connected to the negative terminal of the voltage source.
6. Turn the selection dial of the DMM to the Ohm mode (range 2000), insert its probes at points (5) & (6) in away that the red probe is connected with the positive terminal of the diode and the black probe is connected with the negative terminal of the diode. Record the DMM reading.
  - The DMM reading is .....
7. Reverse the DMM probes at points (5) & (6) in away that the red probe is connected with the negative terminal of the diode and the black probe is connected with the

- positive terminal of the diode. Record the DMM reading.
- The DMM reading in this case is ....., this would give an indication that the reverse resistance of the diode is very ... **high / small ...**

### **Light Emitting Diode (LED):**

8. Based on the previous photo, insert a jumper at the pair (E) instead if the bulb.
9. Insert a LED at the pair (F) instead if the diode.
10. Press the switch button to close the circuit and watch if the LED emits light.
  - **The LED is this case ... emits / doesn't emit light...**
11. Reverse the LED at the pair (F), press again the switch button and watch if the LED emits light.
  - **The LED is this case ... emits / doesn't emit light...**
  - We conclude that the LED allows current to flow through it in one direction and blocks current from the opposite direction.

**Note: LED has two terminals. The positive side is called the anode, and the negative one is called the cathode.**

- The LED must be ... **forward / reverse ...** biased to allow current to pass through it, in other words, the LED emits light when its positive lead is connected to the positive terminal of the voltage source.