Answer Key: Lesson 3 Your First Circuit

This exercise provides consistent results regardless of the actual voltage put to the circuit. Why is the voltage from a power source that says "9 volts" not exactly 9 volts?

(A) Reasons for the difference if you are using a battery.

- A new alkaline battery will give a different value than a new "general purpose" battery.
- The general purpose battery has a shelf life of 6 to 8 months. It loses voltage as it sits on the shelf.
- An alkaline battery has a shelf life of over two years. During that time, the voltage remains very high.

(B) Reasons for the difference if you are using a wall adapter.

- If it is a "regulated" power supply, it will provide 9 volts almost exactly.
- If it is an "unregulated" wall adapter, it will provide between 9 volts to nearly 13 volts, depending on the amount of strain put on it.

4. A new 9 volt battery will provide between 9.3 volts to 9.6 volts. If the voltage is below 5 volts, get a fresh battery.

5. The voltage used across the diode from TPA to TPB should be .7 volts to .8 volts. The voltage used across the LED (TPC to TPD) should be between 1.9 volts to 2.3 volts. The differences of voltage across the LED can be caused by

- the color of the LED
- the brightness of the LED
- the size of the LED

Add voltages of 6, 7 and 8 together. Compare them to the original battery voltage. They should be very close. Most differences are explained away by the quality of the multimeter. The multimeter becomes part of the circuit and effects the reading.