

## **IEEE's Hands on Practical Electronics (HOPE)**

### **Week 2: Voltage, Current, Resistance**

#### **Definitions:**

Voltage: Difference of electrical potential between two points of an electrical circuit

Current: Flow (movement) of electric charge

Resistance: The resistor provides opposition to the current. The energy the electrons have are changed to heat

Floating: Having unknown voltage

Electron: The negative charge carrier particle

Hole: The "positive" charge carrier particle. (It is literally an absence of an electron, not an elementary particle with a positive charge, hence why we call it a hole)

#### **Units:**

Voltage (V) is measured in volts (V)

Current (I) is measured in amps (A)

Resistance (R) is measured in ohms ( $\Omega$ )

#### **Putting it all Together**

Battery **provides electrical potential energy** to the charges so that they can travel through the circuit

The charges **flow** through the circuit doing work

The resistor limits the amount of current by **opposing the flow of current**

#### **Using the Multimeter:**

To measure voltage:

- Turn on multimeter by turning dial to "20V"

- Touch one of the probes to the first point in the circuit to measure

- Touch the other probe to a point across the circuit element

To measure current:

- Turn dial to 20mA

- OPEN** the current circuit

- Complete the circuit with the two probes of the multimeter

To measure resistance:

- Turn dial to 2K

- Touch the 2 probes of the multimeter to the two ends of the resistor

#### **Things to remember and know:**

Never leave anything floating. It is a serious design flaw. Having floating voltages means you cannot predict the behavior of a circuit which is the worst thing to have from an engineering stand point.