



Basic Electronics and Telephony

Lesson One

1. Copper wire – the basic building block to channel electrons for productive work
 - a. Use copper wire to connect a small battery to an incandescent flashlight bulb
 - b. Discuss how the electron force is instantaneous, but how an individual electron moves from the battery to the light bulb very slowly
 - c. Discuss other types of conductive wire like silver, tungsten, steel, Nichrome, and why copper is the least expensive and best choice for telephone wiring
 - d. Discuss and measure resistance of copper alternatives
2. Basic coil – the inductor and its uses
 - a. Use a bobbin and coil winder to wind copper wire to make a coil
 - b. Insert an iron rod, energize the coil, and pick up pieces of iron with the electro-magnet
 - c. Introduce using coils in L-C circuits, relays, switches, etc.
3. Resistor – how resistors affect current flow
 - a. Discuss resistor color code and sizing
 - b. Ohm's Law
 - c. Connect resistor between battery and incandescent flashlight bulb and feel how heat is produced through resistance
 - d. Build a Voltage Divider with a series of resistors, connect a battery, measure voltage at each node
4. Capacitor – how capacitors are made
 - a. Build a capacitor using a cardboard tube, wax, and foil
 - b. Discuss capacitor values related to Farads
 - c. Use a non-polar capacitor as a simple bandpass filter using an audio oscillator and speaker
 - d. Introduce using capacitors in L-C circuits by using an audio oscillator, a two-way speaker crossover, and two speakers to demonstrate how the L-C circuit functions as a band-pass and band-stop filter