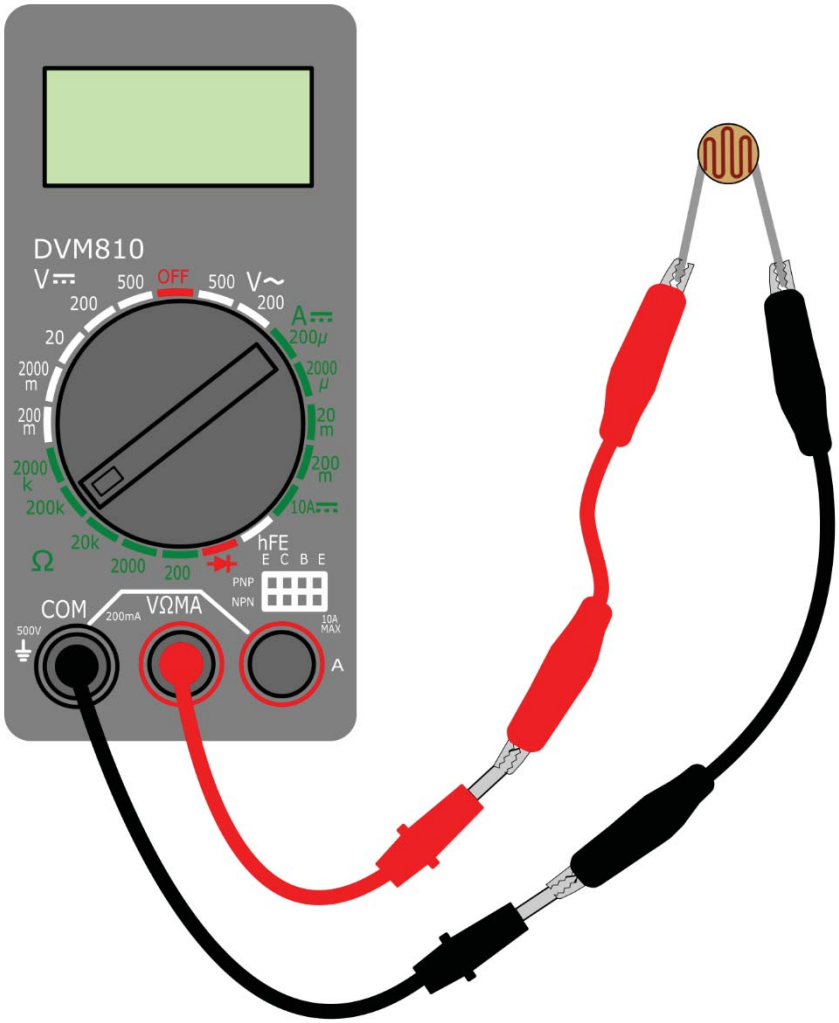
Light Sensor

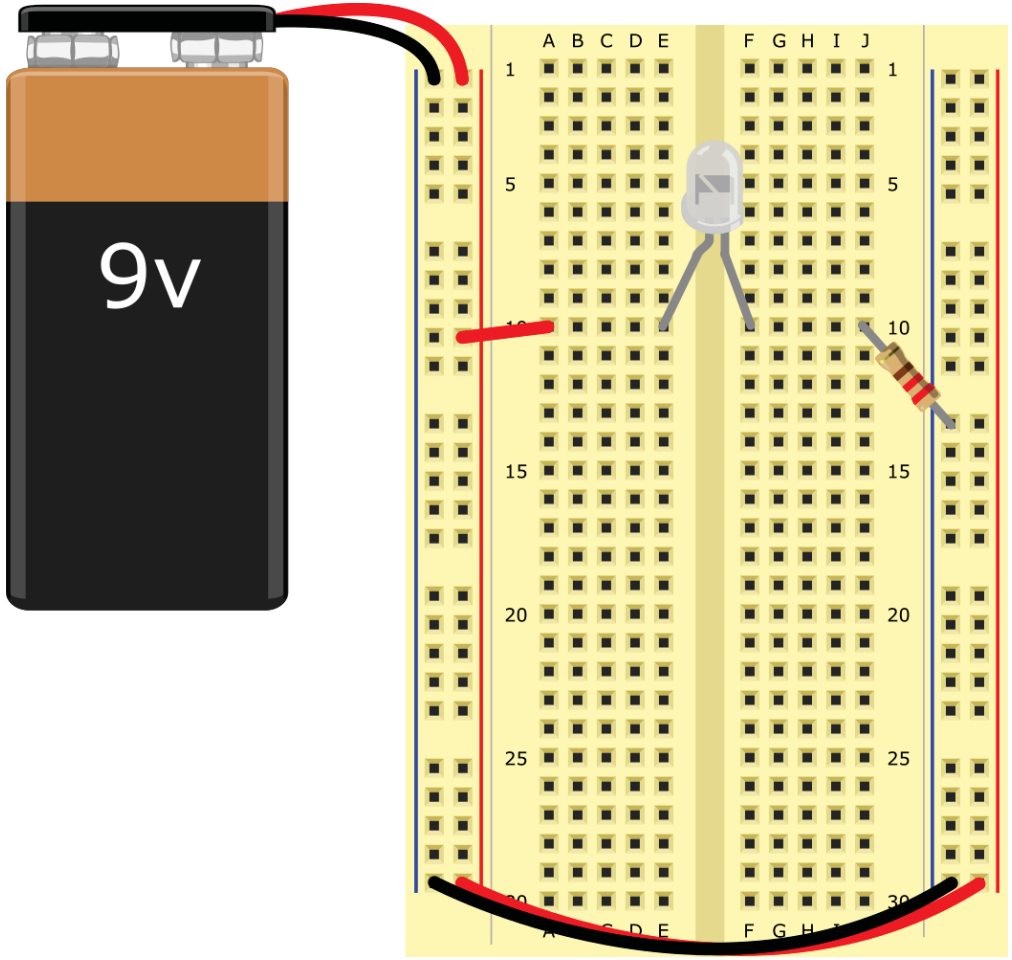
- Connect red probe to VΩMA port
- Connect black probe to COM port
- Use alligator clips to connect probes to leads of photoresistor
- Set dial to measure resistance (Ω)
- Resistance should change as light levels change
- What happens to the resistance if you cover the sensor with your hand or hold it up to a bright light?
- Change the scale on the dial if necessary, (min 200Ω, max 2000kΩ)



LED

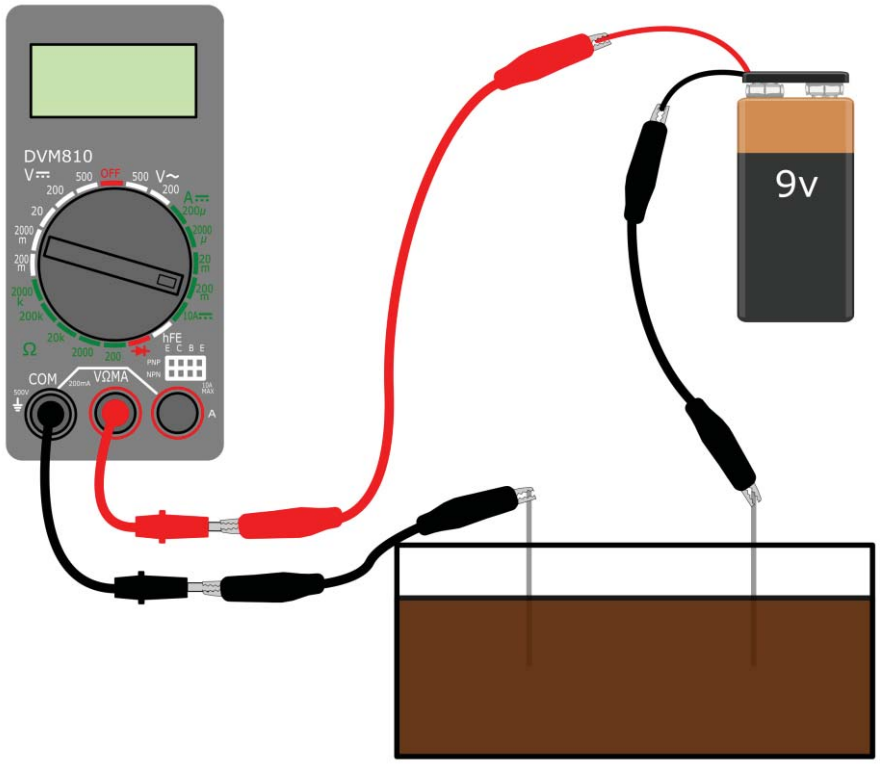
- LED stands for Light-Emitting Diode
- Not a sensor, but can be used as a constant source of illumination (useful for light sensor projects)
- There is more than one way to connect the circuit to get the LED to light up. Reading about breadboards can help you understand other ways. Here's one:

Part	Notes
9V battery	Red lead to (+) bus Black lead to (-) bus
White LED	Long lead to E10 Short lead to F10
220Ω resistor (red, red, brown, gold stripes)	J10 to (-) bus
Jumper wires (3)	A10 to (+) bus Connect left and right (+) buses Connect left and right (-) buses



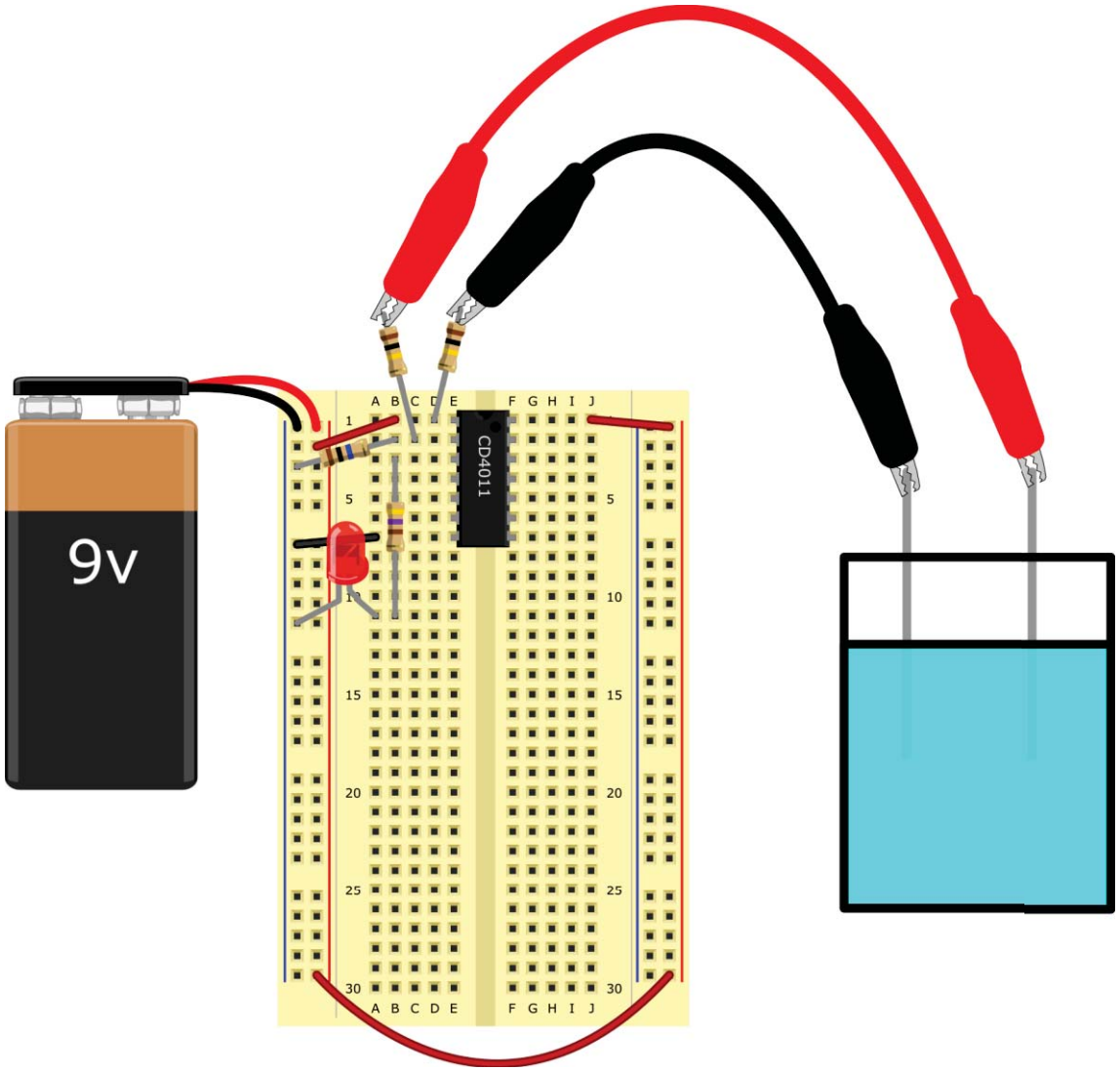
Conductivity Sensor

- Connect red probe to VΩMA port
- Connect black probe to COM port
- Connect battery clip to 9V battery
- Use alligator clips to connect:
  - Red multimeter probe to red battery lead
  - Black multimeter probe to metal moisture probe
  - Black battery lead to metal moisture probe
- Set multimeter to measure current (A)
- **Important: do not let the moisture probes touch each other! This will blow the multimeter's fuse!**
- What happens if you put the probes in dry soil vs. wet soil?
- Keep the distance between probes and their depth constant
- Change the scale on the dial if necessary (2000µA min/200mA max; do not use 10A setting, that requires putting red probe in the A port)



Water Sensor

- Assemble circuit on breadboard (see next page)
- LED should light up
- Use alligator clips to connect 100kΩ resistors to metal probes
- Place probes in water
- LED should turn off



Water Sensor

Part	Picture	Breadboard Symbol	Location
4011 NAND gate			Rows 1–7, straddling the middle of the breadboard, with semicircular notch facing up
10 MΩ resistor			B2 to (-) bus
470 Ω resistor			B3 to B11
Red LED			Long lead to A11 Short lead to (-) bus
100 kΩ resistor			C2, other lead free
100 kΩ resistor			D1, other lead free
9 V battery and snap connector			Red lead to (+) bus Black lead to (-) bus
Jumper wires (4)			B1 to (+) bus J1 to (+) bus A7 to (-) bus Left (+) bus to right (+) bus