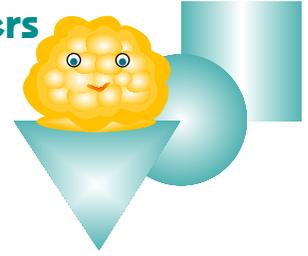


STUDENT Information Card: Multimeters as Ammeters

How to Use an Analog Multimeter to Detect the Presence of Current



What's a Multimeter?

1. A multimeter is a combination of three different tools. The first is called an *ammeter*. Ammeters measure how many charged particles are passing a given point in a circuit (current). For this activity we will use the multimeter only as an ammeter.
2. The second tool is called a *voltmeter*. The voltmeter measures the potential difference (voltage) between two points. The potential difference is what drives the charged particles from the negative terminal of a battery to the positive terminal.
3. The third tool is called an *ohmmeter*. An ohmmeter measures the resistance of a component of a circuit such as a buzzer. Resistance can be considered something like friction. Friction being a force that slows down movement.

What Does a Multimeter Look Like?

Analog multimeter (Radio Shack 18-Range analog *Multimeter* – Part #22-223 suggested)
<http://www.radioshack.com>

Safety Precautions

The *multimeter* you may be using has 18 different ranges. For your *safety* and for the *maintenance* of the meter:

1. Make sure you rotate the dial to the **OFF** position when you not using it.
2. Never connect the meter to a source of voltage when you select the resistance measurement. Keep the *multimeter* dry.
3. Handle the *multimeter* gently and carefully.
4. If you have problems using the meter and/or reading the meter speak to your teacher immediately.
5. Electrical readings you will be taking are for DC (*direct current*). *Never set the dial on AC (alternating current)*, AC appears in red both on the dial and on the scale portion of the meter.

Note: DC current is current that flows in one direction. Charged particles leave the negative end of the battery and travel toward the positive end of the battery through the wires and resistances within the circuit.

6. Know what you are doing before you do it. The *multimeter* is not a **TOY!**

(Continued on back)



LESSON 3
ACTIVITY 3C

Getting Started



1. The meter comes with two test leads – one red and one black. Place the black test lead's right-angled end into - **COM** (common) on the front of the meter. Plug the red test lead's right-angled end into + **V. Ω . A**.
2. Rotate the dial (function selector) so that it is pointing to the function you want to measure. i. e. **ohms (Ω)** to measure resistance, **DC amps** to measure current or **DCV** to measure voltage.
3. Always set the dial (function selector) to start on the largest possible value for that function. If you take a reading and the needle barely moves on the scale then reset the dial to the next smallest value. For example, to measure voltage, start at the 1K value. If the needle barely moves across the scale switch it to 500 dial setting in the same function area. The chart below will help you to decide where to start.

Sample Metric Measurements

Prefix	Abbreviation	Exponent	Fraction	Example	Sample
kilo	k	10 ³	1 thousand	1000 meters	1 km
hecto	h	10 ²	1 hundred	100 meters	1 hm
deka	da	10 ¹	1 ten	10 meters	1dam
deci	d	10 ⁻¹	1 tenth	1 meter/10	1 dm
centi	c	10 ⁻²	1 hundredth	1 meter/100	1 cm
milli	m	10 ⁻³	1 thousandth	1 meter/1000	1 mm
micro	μ	10 ⁻⁶	1 millionth	1 meter/1,000,000	1 μ m

How to Use the Multimeter as an Ammeter to Measure Current:

1. Look for the **DCA function** surrounding the center dial at the bottom half of the meter face.
2. Rotate the function selector until it points to the **largest possible** DCA value.
3. Place some electrode gel on your thumb and index finger on both hands. One in each hand, pick up the metal parts of each of the probes and squeeze. Look for **any** motion of the needle.
4. If there is no noticeable motion of the needle on the scale on the top, set the function selector to the **lower** DCA position and try again. You have to look closely to see if anything changes. You might need to repeat this step several times to notice any changes and to become familiar with using the multimeter.

