

Name _____

Class _____

LESSON 3: Meters

Activity 1: Amp Meter & Volt Meter

- The meter has a + and - polarity marking to indicate which direction the current will move the pointer.
- Always keep the switch on LOW unless told to do so in the instructions.
- The meter will measure current (amps) when connected in a series circuit.
- If the current is higher than $300\mu\text{A}$ in the low setting, the higher current may be measured by connecting a low value resistor in parallel.

Build Project 323 – 3mA Meter

- Turn on slide switch (S1) with the meter (M2) on low. The meter reads _____ mA.
- The resistor that is in parallel with the meter is _____ Ω . Placing the $100\ \Omega$ resistor in parallel with the meter increases the meter's range 10 times.
- Extension: Remove the vertical 3-snap connector (first layer-left side of the board) linking the $1\text{K}\ \Omega$ resistor to the horizontal 3-snap connector (second layer-bottom of the board). Replace it with the red LED (D1-arrowing pointing toward the bottom of the grid.) The reading on the meter (M2) is now _____ mA. Why? _____

Build Project 324 – 0-3V Voltmeter

The meter will measure voltage when connected in parallel in a circuit. It can measure voltages up to .3V, but higher voltages may be measure by connecting it with a high value resistor.

- Set the meter (M2) to low. Insert the battery holder between points A and B. The reading on the meter is _____. If you use new batteries, you can use this reading for a comparison
- Find an old set of batteries and repeat the project.

Activity 2: Meters with Adjustable Resistors & Photoresistors

Build Project 325 – Function of Adjustable Resistor

An adjustable resistor is a normal resistor with an additional arm contact. The arm moves along resistive material and stops at the desired resistance. It controls the amount of current (amps) flowing through the circuit.

- The meter (M2) reading at the lowest point is _____. Highest point is _____.

- b. Describe what happens to the meter (M2) as you change the position of the slider on the variable resistor (RV). In this circuit, as the _____ increases the _____ decreases.

Build Project 486 – Simple Illumination Meter (Light Meter)

The amount of light changes the resistance of the photoresistor, which affects the current through the meter.

- a. Set the variable resistor (VR) to the far **left**. Turn on the slide switch (S1). The meter (M2) reading is _____
- b. The photoresistor (RP) is very sensitive to light. Describe what happens to the needle on the meter (M2) as you wave your hand over the photoresistor. _____
- c. Move the variable resistor (VR) to the far **right**. Turn on the slide switch (S1). The meter (M2) reading is _____
- d. Describe the difference in the meter (M2) reading when you wave your hand over the photoresistor (RP). _____

Activity 3: Measuring the Resistance of Different Loads

Build Project 494 – Resistor Measurement

- a. Set the meter (M2) to the **low** setting. Attach **one** jumper wire to points A & B. Adjust the slide on the variable resistor (VR) so the meter points to 10. Remove the wire.
- b. Test the 100 Ω resistor. The meter (M2) reading is _____.
- c. In a circuit, any load also acts as a resistor. Test other resistors from your kit and record results in the table below.

Type of Resistor	Meter Reading
Speaker (SP)	
5.1K Ω resistor (R3)	
Music IC (U1)	
100K Ω resistor (R5)	
LED (D1) arrow pointing to right	