

KEY - LESSON 3: Meters

Activity 1: Amp Meter & Volt Meter

Build Project 323 – 3mA Meter

- Turn on slide switch (S1) with the meter (M2) on low. The meter reads **9.5 (approximately)** mA.
- The resistor that is in parallel with the meter is **100 Ω** .
- Extension: Remove the vertical 3-snap connector (first layer-left side of the board) linking the 1K Ω 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 **6 (approximately)** mA. Why? **A 3rd resistor (the LED) has been introduced to the circuit which causes the current to go down.**

Build Project 324 – 0-3V Voltmeter

- Set the meter (M2) to low. Insert the battery holder between points A and B. The reading on the meter is **3**.
- Find an old set of batteries and repeat the project. **Responses vary.**

Activity 2: Meters with Adjustable Resistors & Photoresistors

Build Project 325 – Function of Adjustable Resistor

- The meter (M2) reading at the lowest point is **2.5 (approximately)**. Highest point **9.5 (approximately)**.
- Describe what happens to the meter as you change the position of the slider on the variable resistor (RV). In this circuit, as the **resistance** increases the **current** decreases.

Build Project 486 – Simple Illumination Meter (Light Meter)

- Set the variable resistor (VR) to the far **left**. Turn on the slide switch (S1). The meter (M2) reading is **10**.
- The photoresistor (RP) is very sensitive to light. Describe what happens to the needle on the meter as you wave your hand over the photoresistor. **The needle moves rapidly between 0 and 10.**
- Move the variable resistor (VR) to the far **right**. Turn on the slide switch (S1). The meter (M2) reading is **2.5**.
- Describe the difference in the meter (M2) reading when you wave your hand over the photoresistor (RP). **The needle moves slowly between 0 and 2.5.**

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 reading is **10**.
- 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) | 10 |
| 5.1K Ω resistor (R3) | 7.5-9 |
| Music IC (U1) | 7.5-9 |
| 100K Ω resistor (R5) | 1-2 |
| LED (D1) arrow pointing to right | 6-7.5 |