KEY - LESSON 3: Meters

Activity 1: Amp Meter & Volt Meter

Build Project 323 – 3mA Meter

a. Turn on slide switch (S1) with the meter (M2) on low. The meter reads 9.5 (approximately) mA.
b. The resistor that is in parallel with the meter is 100 Ω.
c. 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

a. Set the meter (M2) to low. Insert the battery holder between points A and B. The reading on the meter is 3.
b. 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

a. The meter (M2) reading at the lowest point is 2.5 (approximately). Highest point 9.5 (approximately).
b. 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)

a. Set the variable resistor (VR) to the far left. Turn on the slide switch (S1). The meter (M2) reading is 10.
b. 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.
c. Move the variable resistor (VR) to the far right. Turn on the slide switch (S1). The meter (M2) reading is 2.5.
d. 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.

<table>
<thead>
<tr>
<th>Type of Resistor</th>
<th>Meter Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speaker (SP)</td>
<td>10</td>
</tr>
<tr>
<td>5.1K Ω resistor (R3)</td>
<td>7.5-9</td>
</tr>
<tr>
<td>Music IC (U1)</td>
<td>7.5-9</td>
</tr>
<tr>
<td>100K Ω resistor (R5)</td>
<td>1-2</td>
</tr>
<tr>
<td>LED (D1) arrow pointing to right</td>
<td>6-7.5</td>
</tr>
</tbody>
</table>