UNIT: Measurement

Energy Explorer

GOAL:

Explore how electrical energy is transferred from a battery to a device, like a motor or LED, and how voltage relates to how much energy is being delivered.

Materials:

* 1 AA battery
* Multimeter
* Small motor *or* LED light
* Alligator clip wires (2–3)

STUDENT DIRECTIONS:

#### **Step 1: Build Your Circuit**

1. Connect one wire from the **positive (+) end of the battery** to one end of the **motor or LED**.
2. Connect another wire from the **negative (–) end of the battery** to the **other side of the motor or LED**.
3. Observe: Does the device **turn on, spin, or light up?**

#### **Step 2: Measure Voltage with a Multimeter**

1. Set the multimeter to **DC volts (V)**, in the 20V or 2V range.
2. Touch the black probe to the **negative (-)** battery terminal.
3. Touch the red probe to the **positive (+)** battery terminal.
4. Write down the number on the screen — that’s the **voltage**!

#### **Step 3: Reverse the Battery**

1. Carefully switch the wires — connect the battery **backward**.
2. Observe what happens to the motor or LED.
   * Did it **spin the other way**?
   * Did the **light turn off or dim**?
3. Try measuring the voltage again.

### **Record Your Results:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Test** | **Voltage Reading (V)** | **Motor/Light Reaction** | **What Happened When Reversed?** |
| Try 1 |  |  |  |
| Try 2 (Reversed) |  |  |  |

**Think & Reflect:**

* How does electrical energy change when transferred to the motor or light?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Bonus Question: What form of energy does the motor or light give off?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Standards Alignment

NGSS: MS-PS3-5, 3-PS2-4, 4-PS3-4 STEL: STEL 1E, STEL 2E, STEL 6E, STEL 7F, STEL 11E CCSS: CCSS.MATH.CONTENT.6.SP.B.4, CCSS.MATH.CONTENT.6.EE.C.9, CCSS.MATH.CONTENT.7.RP.A.2, CCSS.MATH.PRACTICE.MP2, CCSS.MATH.PRACTICE.MP5