UNIT: CIRCUITRY GAME

POWER UP! POTENTIAL ENERGY IN BATTERIES

Your Mission:

Batteries store chemical potential energy. Your job is to measure and compare how much energy is stored in different batteries and observe how it powers a light.

Focus: Energy Storage and Transfer – How Batteries Release Potential Energy to Power a Circuit

Materials:

* 1 AA battery (1.5V)
* 1 9V battery
* Multimeter or voltage tester
* Battery holders (for each battery type)
* LED (with resistor to prevent burn-out)
* Breadboard or jumper wires (optional, for easy setup)

STUDENT DIRECTIONS:

**STEP 1: Measure Voltage**

* Use the multimeter or voltage tester to read the voltage of each battery.
* Place the red probe on the positive (+) side and the black probe on the negative (–) side.
* Record the reading for each battery in volts (V).

**STEP 2: Build a Simple Circuit**

* Insert the AA battery into its holder.
* Connect the positive and negative wires from the battery holder to the LED circuit (use a breadboard or clip wires).
* Observe the brightness of the LED and describe it as Low, Medium, or High.
* Repeat the same setup with the 9V battery.

 *Hint: Make sure to use the same LED each time for a fair comparison!*

**STEP 3: Fill in the Data Table**

| Battery Type | Voltage Reading (V) | Brightness of LED (Low, Med, High) |
| --- | --- | --- |
| AA | \_\_\_\_\_\_\_ V | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 9V | \_\_\_\_\_\_\_ V | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Think & Record:**

Which battery stored more energy, and how can you tell?
→ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
→ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How does the voltage relate to how much energy is available to power the LED?
→ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

In real life, why might someone choose a higher-voltage battery?
→ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Standards Alignment

NGSS: MS-PS3-2 STEL:STEL 1E, STEL 4D, STEL 7E, STEL 8D CCSS: CCSS.MATH.CONTENT.6.SP.B.5, CCSS.MATH.CONTENT.6.EE.B.6, CCSS.MATH.CONTENT.7.EE.B.3