UNIT: Electrical Circuits

Pit Crew Voltage Check – Ohm’s Law in Action

Objective:

Use Ohm’s Law to calculate current and resistance in a functioning circuit.

Materials:

* Breadboard or circuit tray
* 9V battery + holder
* Assorted resistors (100Ω, 330Ω, 470Ω, 1kΩ)
* 2 LEDs
* Multimeter
* Jumper wires

STUDENT DIRECTIONS:

**Step 1: Build Your Test Circuit**

1. Connect the 9V battery to your breadboard.
2. Place two LEDs in series with one resistor.
3. Use jumper wires to connect the complete circuit.

**Step 2: Measure Current and Voltage**

1. Use the multimeter to measure voltage across the resistor.
2. Use the multimeter to measure current flowing through the circuit.
3. Record your results.

**Step 3: Use Ohm’s Law**   
Use **V = IR** to calculate the unknown value in your circuit:

* If you know V and R, solve for I.
* If you know V and I, solve for R.

**Record Your Data:**

|  |  |  |
| --- | --- | --- |
| **Voltage (V)** | **Resistance (Ω)** | **Current (A)** |
|  |  |  |
|  |  |  |
|  |  |  |

**Reflection Prompts:**

* What happens to current if you increase the resistance? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* How does this relate to energy flow in a real race bike’s system? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Standards Alignment

NGSS: HS-PS3-1 STEL: STEL 1E, STEL 2E, STEL 3E, STEL 4E, STEL 5E, STEL 6E, STEL 7E CCSS: CCSS.MATH.CONTENT.HSN.Q.A.1, CCSS.MATH.CONTENT.HSN.Q.A.2–3, CCSS.MATH.CONTENT.HSA.CED.A.1, CCSS.MATH.CONTENT.HSA.REI.B.3, CCSS.MATH.PRACTICE.MP4, CCSS.MATH.PRACTICE.MP5