UNIT: Electrical Circuits

Circuit Layout Garage – Series vs. Parallel Design

Objective:

Build and compare series vs. parallel circuits.

Materials:

* Breadboard or cardboard
* 2-3 LEDs
* Battery + holder
* Jumper wires
* Switch
* Resistors

STUDENT DIRECTIONS:

**Step 1: Build a Series Circuit**

1. Connect LEDs in a single path with resistors.
2. Test brightness and functionality.

**Step 2: Build a Parallel Circuit**

1. Wire each LED on its own branch to the power source.
2. Observe and record differences.

**Compare:**

|  |  |  |
| --- | --- | --- |
| **Configuration** | **LED Brightness** | **What Happens If 1 LED Fails?** |
| Series |  |  |
| Parallel |  |  |

**Reflection Prompts:**

* Which layout is more energy-efficient? Why? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* How do real homes use parallel circuits for safety and efficiency? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Standards Alignment

NGSS: HS-PS3-5 STEL: STEL 1E, STEL 2E, STEL 3E, STEL 4E, STEL 5E, STEL 6E, STEL 7E CCSS: CCSS.MATH.CONTENT.HSN.Q.A.1–3, CCSS.MATH.CONTENT.HSA.CED.A.1, CCSS.MATH.CONTENT.HSA.REI.B.3, CCSS.MATH.PRACTICE.MP2, CCSS.MATH.PRACTICE.MP4, CCSS.MATH.PRACTICE.MP5