STEM 101
Powered by THE STEM ACADEMY

Name: _____
Period: _____

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 | | |

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**Reflection Prompts:**

- Which layout is more energy-efficient? Why?

  _____

  _____

- How do real homes use parallel circuits for safety and efficiency?

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  _____

**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