UNIT: Electrical Circuits

Engineering Optimization Challenge

Objective:

Improve one of your circuits to reduce energy loss and increase performance.

Materials:

* Any previously used circuit
* Optional: buzzer, motor, second battery
* Multimeter
* Stopwatch (for timing response)

STUDENT DIRECTIONS:

**Step 1: Choose a Circuit to Improve**

1. Pick one of your designs from a previous activity.
2. Identify problems like dim lights, overheating, or low power.

**Step 2: Make Modifications**

Try one or more of the following:

* Reduce resistance
* Use parallel layout
* Add a more powerful battery
* Add a motor or buzzer for multifunctional output

**Test & Record Results:**

|  |  |  |
| --- | --- | --- |
| **Change Made** | **Outcome** | **Better/Worse?** |
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**Reflection Prompts:**

* How did your design change improve circuit performance?

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* What trade-offs did you have to consider (e.g., cost, heat)?

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**Wrap-Up Challenge: Circuit Speedway Blueprint**

Create a blueprint for a racing garage system that uses at least **two energy conversions**.

* Label input energy, output energy, components used.
* Optional: Add switches, sensors, or safety features.

**Sketch & Describe Below:**

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Standards Alignment

NGSS: HS-ETS1-3 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