UNIT: circuitry game

material matchup – conductors vs. insulators

Your Mission:

You’ve been hired as a Thermal Detective! Your job is to investigate how fast heat sneaks into different materials and melts ice. Test two cups—one plain and one insulated—and observe how the materials affect the melt-down speed. Ready to chase that thermal energy? Let’s go!

Focus: Electrical Properties of Materials – Identifying Conductors and Insulators

Materials:

* Copper tape or wire
* Coin cell battery or AA battery pack
* LED light
* Testing materials: paper clip, foil, plastic, rubber band, pencil lead (graphite), wood, etc.
* Tape (if needed to hold materials in place)
* Worksheet or notebook for recording results

STUDENT DIRECTIONS:

**STEP 1:Build a Simple Circuit**

* Create a basic circuit using copper tape or wires, battery, and LED.
* Leave a small open gap in the circuit where you will test each material.

**STEP 2: Test Materials One at a Time**

* Place one test material across the gap.
* Observe: Does the LED turn on?
  + Yes? → The material is a conductor (electricity flows).
  + No? → The material is an insulator (electricity does not flow).

**STEP 3: Repeat for Each Item**

* Be sure to test at least 5 materials.
* Record your observations in the table below.

DATA TABLE TEMPLATE:

| **Material** | **LED On? (Yes/No)** | **Conductor or Insulator?** | **Notes (How well did it work?)** |
| --- | --- | --- | --- |
| Paper Clip |  |  |  |
| Aluminum Foil |  |  |  |
| Plastic Strip |  |  |  |
| Rubber Band |  |  |  |
| Pencil Lead (Graphite) |  |  |  |
| (Add your own) |  |  |  |

**Challenge Question**:

Which material worked best to “patch” the broken wire, and why do you think it worked so well?  
→ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
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**Discussion Prompt:**

* What do conductors have in common?
* Why are insulators important in real circuits and electronics?

Standards Alignment

NGSS: HS-PS2-6 STEL: STEL 1H, STEL 3G, STEL 4J, STEL 8H, STEL 11G CCSS: CCSS.MATH.CONTENT.HSN.Q.A.1, CCSS.MATH.CONTENT.HSS-IC.B.6, CCSS.MATH.CONTENT. HSS-ID.A.1