UNIT: Measurement

Material Detective

GOAL:

Use tools and tests to investigate thickness, magnetism, and electrical conductivity of different materials. Learn how physical properties help us choose the right material for a job!

Materials:

* Ruler or caliper
* Samples: metal, plastic, wood, paper (labeled or numbered)
* Magnet
* Multimeter (set to continuity or resistance mode)

STUDENT DIRECTIONS:

#### **Step 1: Measure the Thickness**

1. Use a **ruler or caliper** to measure how thick each material sample is (in **mm or cm**).
2. Record it in your chart.

#### **Step 2: Test Magnetism**

1. Gently touch the **magnet** to each material sample.
2. Does the sample **stick to the magnet**?
   * Check the box: ☐ Yes or ☐ No

#### **Step 3: Test Electrical Conductivity**

1. Turn the **multimeter** to continuity mode (or resistance, if instructed).
2. Touch the two probes to opposite sides of the sample.
3. Watch the screen or listen for a beep:
   * Beep or low number? ✅ It **conducts electricity**
   * No beep or high number? ❌ It **does NOT conduct**

### **Record Your Findings:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Material** | **Thickness (cm or mm)** | **Magnetic?** | **Conducts Electricity?** |
| Metal |  | ☐ Yes ☐ No | ☐ Yes ☐ No |
| Plastic |  | ☐ Yes ☐ No | ☐ Yes ☐ No |
| Wood |  | ☐ Yes ☐ No | ☐ Yes ☐ No |
| Paper |  | ☐ Yes ☐ No | ☐ Yes ☐ No |

**Think & Reflect:**

* Which materials might be most useful in building a circuit or structure? Why?

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* How does knowing the physical properties of a material help engineers?

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**Challenge Question (Wrap-Up):**

* Imagine you're designing a race track or a robotic arm. How would accurate measurement help you? How does energy or mass affect how it works?

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Standards Alignment

NGSS: MS-PS1-2, 2-PS1-1 STEL: STEL 3E, STEL 4E, STEL 5F, STEL 6E, STEL 7F CCSS: CCSS.MATH.CONTENT.6.SP.B.4, CCSS.MATH.CONTENT.6.RP.A.3, CCSS.MATH.CONTENT.7.EE.B.3, CCSS.MATH.PRACTICE.MP5, CCSS.MATH.PRACTICE.MP6