UNIT: FIRST AID

“Rescue Wraps” – Testing Cooling Efficiency of First Aid Materials

CONCEPT:

Investigating how different materials transfer thermal energy and protect injured skin.

Materials:

* Resealable plastic bag (filled with warm water — this is your “burned skin”)
* Warm water (40–45°C)
* Ice cubes (1 per trial)
* Test materials:
  + Wet paper towel
  + Aloe gel
  + Gauze
  + Foil
  + Cloth
* Digital thermometer
* Stopwatch or timer
* Ruler (optional: measure material thickness)

STUDENT DIRECTIONS:

**Step 1: Prepare Your Simulated Burn:**

* Fill a resealable bag with warm water (~40–45°C).
* Seal the bag tightly — no leaks!
* This simulates burned skin.

**Step 2: Apply the Cooling Material:**

* Wrap one test material completely around the bag.
* If using aloe gel, spread a layer over the bag before wrapping.
* Optional: measure and record thickness of the material with a ruler.

**Step 3: Add the Ice Cube:**

* Place a single ice cube on top of the wrapped “burn.”
* Start the stopwatch as soon as the ice is placed.

**Step 4: Measure Temperature Over Time:**

* Use the thermometer to measure the temperature **inside the bag** every **minute** for **5 minutes**.
* Record your data in the table below. (Slide the thermometer in carefully without opening the bag too much.)

**Step 5: Repeat with Other Materials:**

* Empty and refill the bag with warm water each time.
* Test all materials using the exact same process.

**Data Table:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Material Tested** | **Start Temp (°C)** | **Temp @ 1 min** | **2 min** | **3 min** | **4 min** | **5 min** |
| Wet Paper Towel |  |  |  |  |  |  |
| Aloe Gel |  |  |  |  |  |  |
| Gauze |  |  |  |  |  |  |
| Foil |  |  |  |  |  |  |
| Cloth |  |  |  |  |  |  |

**Analysis & Reflection:**

1. Which material cooled the “burn” the fastest (largest temp drop in 1–2 minutes)?  
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2. Which material kept the temperature more stable over time (slower changes)?

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1. What physical properties made a material better at transferring or insulating heat? (e.g., thickness, texture, moisture)

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1. If you were designing a real burn treatment, which material would you recommend and why?

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Standards Alignment

NGSS: HS-PS3-4 STEL: STEL 1H, STEL 4H, STEL 7J, STEL 8H, STEL 11H CCSS: CCSS.MATH.CONTENT.HSS.ID.A.1, CCSS.MATH.CONTENT.HSS.ID.B.6, CCSS.MATH.CONTENT.HSA.CED.A.2, CCSS.MATH.PRACTICE.MP4, CCSS.MATH.PRACTICE.MP2