UNIT: FIRST AID

“Build-A-Bandage” – DIY Burn Wrap Design Sprint

CONCEPT:

Design and test your own cooling wrap to simulate real-world first aid solutions. Explore how different materials affect thermal energy transfer and how chemical/physical properties contribute to healing performance.

Materials:

* Aluminum foil
* Paper towels
* Plastic wrap
* Cotton rounds or pads
* Fabric scraps (cotton, fleece, etc.)
* Medical or masking tape
* Resealable plastic bags (pre-filled with warm water ~40–45°C)
* Ice cubes
* Stopwatch
* Thermometer
* Ruler (optional, to measure wrap thickness)

STUDENT DIRECTIONS:

**Step 1: Set Up the “Burn Site”**

* Fill a resealable plastic bag with warm water (~40–45°C) to simulate burned skin. Seal tightly.
* This will be your *test surface*. Place it flat on the table.

**Step 2: Design Your Wrap**

* Choose 2–3 materials from the bin to build a custom cooling bandage.
* You may **layer** materials (e.g., paper towel under foil, or cloth + plastic wrap) to combine comfort and heat-shielding.
* Use tape to hold the design together if needed.
* OPTIONAL: Use a ruler to measure or record the **thickness** of your wrap.

**Step 3: Test Cooling Efficiency**

* Wrap your DIY bandage around the plastic bag.
* Place an **ice cube on top** of the bandage.
* Start the stopwatch.
* Measure the **internal temperature** of the water in the bag **once every minute for 5 minutes.**
* Record your results.

**Data Table:**

|  |  |
| --- | --- |
| **Time (min)** | **Internal Temp (°C)** |
| 0 (start) |  |
| 1 min |  |
| 2 min |  |
| 3 min |  |
| 4 min |  |
| 5 min |  |

**Analyze & Reflect:**

1. Did your design lower the temperature by at least 10°C within 3 minutes?  
   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Which material(s) do you think helped most with cooling? Why?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Was your wrap comfortable to the touch? Could it be used on real skin?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. If you had to improve this design for field use (limited supplies, fast action), what would you change?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Which properties (absorbency, insulation, flexibility) mattered most in your final design?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Wrap-Up Reflection:**

Have students reflect in journals or in small groups:

* What makes an ideal first aid wrap?
* How does temperature impact chemical and biological reactions?
* Why is measurement and testing essential in designing real medical products?

Standards Alignment

NGSS: HS-PS1-3, HS-PS3-4 STEL: STEL 1H, STEL 2H, STEL 4H, STEL 8H, STEL 9J CCSS: CCSS.MATH.CONTENT.HSS.ID.B.6, CCSS.MATH.CONTENT.HSF.IF.C.7, CCSS.MATH.PRACTICE.MP2, CCSS.MATH.PRACTICE.MP4, CCSS.MATH.PRACTICE.MP5