STEM 101
Powered by THE STEM ACADEMY

Name: _____
Period: _____

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?

   _____

   _____

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

   _____

   _____

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

   _____

   _____

5. 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