UNIT: FIRST AID

Cool It! – Burn Treatment Engineering

Apply scientific principles to design, test, and refine a device that minimizes the transfer of thermal energy.

Investigation Goal:

Test how well different first aid materials (like aloe gel, ice, and cloth) remove heat from a simulated skin burn.

Background:

When someone gets a minor burn, cooling the area quickly helps stop further skin damage. You’ll act like an engineer testing different cooling materials to see which one works best.

MATERIALS:

* 3 small cups (or water balloons or plastic bags with warm water to simulate “skin”)
* Hot water (~40–45°C, safe to handle)
* Aloe vera gel
* Ice pack or frozen sponge in a bag
* Clean cloth (dry or slightly damp)
* Thermometer (or your hand if safe and instructed by your teacher)
* Timer or stopwatch
* Paper towel (to wipe and clean between trials)

STUDENT DIRECTIONS:

1. **Prepare your “burn site”:**  
   Fill 3 cups with warm water to simulate a mild skin burn. Make sure all cups are at about the same starting temperature. Record the **starting temperature** of one cup.

* Start Temp: \_\_\_\_\_\_ °C

1. **Apply the treatments (one per cup):**
   * Cup 1: Cover the surface with **aloe vera gel**
   * Cup 2: Place the **ice pack or frozen sponge** on top
   * Cup 3: Drape with a **clean cloth**
2. **Wait for 2 minutes.**  
   Use a stopwatch or timer. Do not stir the water.
3. **After 2 minutes**, measure the **end temperature** of each cup using a thermometer (or carefully use the back of your hand to feel warmth if approved). Wipe the thermometer between uses.

* End Temps:
  + Aloe: \_\_\_\_\_\_ °C
  + Ice Pack: \_\_\_\_\_\_ °C
  + Cloth: \_\_\_\_\_\_ °C

1. **Record your data** and compare the results. Which material cooled the “burn” fastest?

### **Record It:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Treatment** | **Start Temp (°C)** | **End Temp (°C)** | **Temperature Drop (°C)** |
| Aloe Gel |  |  |  |
| Ice Pack |  |  |  |
| Cloth |  |  |  |

**Reflect Questions:**

1. Which material helped cool the water the fastest?  
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2. Which material would you recommend for burn treatment and why?  
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3. Why is it important to cool a burn quickly in first aid?  
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4. What are the pros and cons of each material (comfort, availability, effectiveness)?

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**Wrap-Up Discussion Questions:**

* What kinds of chemical reactions happen during first aid?  
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* Why are synthetic materials helpful for treating injuries?  
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* How can we use energy transfer to help heal burns?  
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Standards Alignment

NGSS: MS-PS3-3 STEL: STEL 1F, STEL 2E, STEL 4E, STEL 7E, STEL 8F, STEL 11F CCSS: CCSS.MATH.CONTENT.6.SP.B.5, CCSS.MATH.CONTENT.7.RP.A.2, CCSS.MATH.PRACTICE.MP4, CCSS.MATH.PRACTICE.MP2, CCSS.MATH.PRACTICE.MP6