UNIT: FIRST AID

“Cream Chemistry” – Temperature and Healing Reactions

CONCEPT:

Investigating how temperature affects the rate of chemical reactions — like those involved in healing creams or medicines.

Materials:

* 2 clear plastic or glass cups
* Alka-Seltzer tablets **(or baking soda + vinegar)**
* Room-temperature water (~20–22°C)
* Warm water (~35–40°C — body temp range)
* Thermometer
* Stopwatch or timer
* Measuring cup (for equal water amounts)

STUDENT DIRECTIONS:

**Step 1: Measure and Pour Water:**

* Pour **equal amounts** (e.g., 100 mL) of water into two separate cups.
* Use the thermometer to check and label each:
	+ One should be room temperature (~20–22°C)
	+ One should be warm (~35–40°C, similar to body temp)

**Step 2: Prepare the Reaction:**

* Get **two tablets** of Alka-Seltzer (or prepare equal scoops of baking soda for vinegar test).
* Have your stopwatch ready.

**Step 3: Start the Experiment:**

* Drop one tablet into each cup **at the same time**.
* Immediately start your stopwatch.
* Observe and **record the time** it takes for each tablet to fully dissolve.

**Step 4: Record Observations:**

* Note how quickly bubbles appear and disappear.
* Write down how long it takes for bubbling to mostly stop.

**Step 5: Repeat if Needed:**

* Try again using slightly different water temps (cool, warm, hot) if time allows.
* Compare results to confirm your findings.

**Data Table:**

|  |  |  |
| --- | --- | --- |
| **Water Temperature** | **Time to Dissolve (sec)** | **Bubbling Intensity (low/med/high)** |
| Room Temp (°C) |  |  |
| Warm (Body Temp) |  |  |

**Analyze & Reflect:**

1. What does a faster reaction (more bubbles, less time) tell you about how temperature affects chemical reactions?
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2. Which cup showed the fastest and most intense reaction? Why do you think that happened?

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1. If a healing cream needed body heat to activate its ingredients, which water temp represents the best condition for fast healing?

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1. How is this experiment similar to what happens inside your body during healing?

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Standards Alignment

NGSS: HS-PS1-5 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.CONTENT.HSS.ID.C.9, CCSS.MATH.PRACTICE.MP2, CCSS.MATH.PRACTICE.MP4