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2016

3.0.C Hands-on Liquid Nitrogen

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- Manager: Read the brief procedure to your group.
Review safety precautions.
It is important for your group to talk about what you see, why you think it's happening, and compare with other experiences.
- Recorder: Record observations and comments as well as answer to questions.
- Spokesperson: May be asked to report out something.
- Safety monitor: Monitor the actions of group members to make sure that everyone stays safe.
-

SAFETY CAUTION:

- **The temperature of liquid nitrogen is - 196 °C.**
- **Wear eye protection. Avoid direct skin contact. Avoid splashing.**
- **The Dewar bowls are made of glass. Because of their design, rough handling may cause implosion and ejection of glass shards.**

Procedure

Obtain a Dewar bowl, several balloons, a ladle, a pair of tongs, and gloves. When you're ready, have me pour out some liquid nitrogen for you.

1. Use the ladle to dip and gently pour the nitrogen back into the Dewar bowl (as if you were preparing soup).
2. Use the ladle to dip and gently pour some onto the bench top. Watch and listen.
3. Use the ladle to dip and gently pour some onto the floor. Watch and listen.
4. Blow up a balloon.
Immerse a balloon in the liquid nitrogen in the Dewar bowl.
Hold the balloon at the knot with gloved hand, or use the ladle or tongs to help.
Push the balloon down until it stops changing. It does not need to be submerged; just in full contact.

Pick up the balloon with the tongs. Set it down on table. Watch and listen.

You can repeat this as many times as you like.
5. If you have something else you'd like to place into the liquid nitrogen, you **MUST** clear it through me first.

DISCUSSIONS QUESTIONS ARE ON THE BACK

Discussion

1. In what ways was the liquid nitrogen like or unlike other materials with which you are familiar? What is your evidence?
2. Describe what happens (what you heard or saw) when the liquid nitrogen was poured on the table and floor. Propose tentative explanations for what you observed. Relate these to personal experiences.
3. Describe what happens as the balloon sits in contact with the liquid nitrogen and when it is removed from contact. Propose tentative explanations for what you observed.
4. What happened with the other things immersed in liquid nitrogen? Propose a tentative explanation for what you observed.
5. Develop at least two good questions for the Question Bank that would extend our inquiry regarding your observations. These questions could go in ANY direction.

RECORDER REPORT, Chem 444A "Fire & Ice"

Group Member Name

Role

Date: 01/29/15

Marisa Recorder

NICK N/A

Miriam Mandator

Emily Safety

Sean Spokesperson

OK

Observations:

Step 1: LOOKS bubbly + boiling, it sizzle s

Step 2: Breaks off into bubbles that run off the table

Step 3: Picked up dirt on the ground

Step 4: Balloon shrinks, crinkles. Inflates again after taking it out, crinkling noise

Step 5: (Tennis) squeezed ball, froze into squeezed shape

Step 6: (Banana)

Step 7: couldn't get ping pong to shatter on floor, smashed with hand

Step 8: Hand sanitizer → bubbles + boils, gurgling noise, chunk came out

RECORDER REPORT, Chem 444A "Fire & Ice"

Group Member Name

Role

Date: 1/29

<u>Tim</u>	<u>safety</u>
<u>Jamantua</u>	<u>recorder</u>
<u>Eliza</u>	<u>manager</u>
<u>Jon</u>	<u>spokesperson</u>
<u>Cali</u>	

OK

Observations + comments:

- "when it spreads out on table "bench" the liquid "beads" and moves everywhere"
 - when it hits paper, some rolls off, some left a mark
 - smoke comes off it as it rolls around
 - overall, very cool
 - balloon goes in - makes noise, deflates on portion immersed
 - becomes hard and the air enters back slightly when it is placed on the table
 - back like a balloon again
 - ping pong ball - makes fizzles noise, nothing really happens
 - gum - rock hard
 - tennis ball - fizzles, put on floor
- tries to break but can't
- smashed - very cold
ball - shattered

RECORDER REPORT, Chem 444A "Fire & Ice"

Group Member Name

Role

Date: 1-29-15

Emma Addison Recorder

Taylor Witkiewicz _____

Amanda Jones _____

Kaleigh Zukowski _____

Heather Prze _____

OK

The tide pod froze and then after a couple minutes it went back to normal consistency.

The balloon shrank on the liquid nitrogen and then expanded once it was in the air.

The oreo just froze and didn't really do much.

The mint also just froze and didn't shatter when we dropped it.

The tennis ball froze and then when we dropped it, it didn't bounce.

The pingpong ball also froze and when we hit it, it smashed.

The photo didn't really do much either except the texture wasn't as "sticky" as before.