

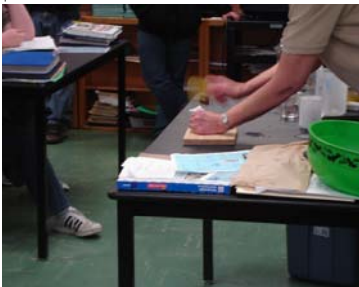
Liquid Nitrogen and Dry Ice

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About a week ago I attended a seminar given by a Purdue University physicist who did a demonstration with liquid nitrogen (N_2) and dry ice (CO_2). 75% of the air that we breathe is already nitrogen, and only about 21% is oxygen. The other 4% is a combination of carbon dioxide, helium, and some other gases that are in our atmosphere. Further in this publishing I will share with you most of what I have learned from this.

First, she got out dry ice. Dry ice sublimates. What this means is it goes straight from a solid to a gas. Dry ice freezes at $-108^\circ F$ or $-78^\circ C$. When she got it out you could see the vapor from the dry ice rising into the air. Eventually you couldn't see it anymore. When she did this demonstration she put some dry ice in a coke bottle and closed the lid not very tightly so it wouldn't fly off. The vapor from the sublimation of the dry ice builds up making the lid fly off of the bottle.

The majority of this demonstration was about liquid nitrogen. Liquid nitrogen boils at about $-320^\circ F$ or $-196^\circ C$. It is a very cold liquid and it would probably frostbite you if you put your hand in it. The thing she carried it around in was called a Dewar, named after the person who invented it. All she said it was was a glorified thermos. They cost about \$600. One of the demonstrations she did involved a pickle. She dipped the pickle in the liquid nitrogen for about 10 seconds and she had a wood board and nail and started hammering the nail into the board with the pickle! The way below freezing temperatures made the pickle hard in a matter of seconds. Below is a picture.



She also dipped a balloon in the liquid nitrogen and it slowed down the air so much that the balloon deflated. When she took the balloon out of the liquid nitrogen it re-inflated. This is because the freezing temperature of the liquid nitrogen causes the air molecules to slow down in the balloon causing it to deflate. When the balloon is back in a room temperature atmosphere it re-inflates because of the warmth of the air. The last demonstration I would like to share is when she poured liquid nitrogen onto the table. The heat the table is giving off and the coldness of the nitrogen clash and the liquid nitrogen evaporates. This was my favorite day in science class.

