

**In Which We Discuss the Social Implications of Consuming Dry Ice; A Contemplative Reflection on Modern Dietary Practices**

**Lesson Type**: Module

**Target Grade**: Elementary School

**Author**: Jerry Lung

**Semester**: Spring 2014

**Brief Overview**

This lesson is a module based lesson intertwining states of matter and food. Central to the discussion is dry ice, whose properties we will attempt to elucidate. After which, we may indulge in some treats created using the one and only aforementioned phenomena.

**Teaching Goals**

* The three states of matter and how they transform to each other
* Dry Ice and its properties
* How dry ice affects the phase changes in the food

**Agenda**

* Warm up on states of matter and phase transitions, draw from every day examples
* Introduce the dry ice, put it in water, blow up a balloon with it.
* Make the foods with dry ice.

**Lesson Introduction**

* Phases of matter, phase transitions – use everyday examples
* Solid, liquid, gas, melting, evaporating, condensation, freezing

------

**Module 1: Dry Ice**

**Introduction**

* Teach the kids about dry ice. What is it? SUBLIMATION.

**Materials**

* Dry ice – not sure what amount.
* 1 big group
* Bowl
* Balloon

**Material to Teach**

* Explain what dry ice is. Solid CO2 that is very cold, sublimates straight to CO2 at room temp. Important to just note how cold it is – this is what we need in our activities.
* Explain what sublimation is.

**Procedure for each Module**

* + Put some dry ice in a bowl of water to make fog
  + Put some dry ice in a balloon to blow it up. Compare vs a balloon blown up regularly – it will be heavier and sink faster due to CO2 being heavier.

**Notes for Mentors**

* SAFETY FIRST. Do not let the kids handle it. Mentors must use gloves when handling it.

------

**Module 2: Make SODA Slushies**

**Introduction**

* Activity 1

**Materials**

* Bottles of soda.
* Dry ice

**Material to Teach**

* Dry ice so cold that it freezes the soda below its freezing point, thus turning the soda water into slushies.

**Procedure for each Module**

* Put the soda in the dry ice.

**Notes for Mentors**

* SAFETY FIRST. Do not let the kids handle it. Mentors must use gloves when handling it.

------

**Module 3: Dry Ice Cream**

**Introduction**

<http://chemistry.about.com/od/dryiceprojects/a/dryicecream.htm>

**Materials**

* Dry ice – not sure what amount.
* 3~4 groups
* 3~4 Big Bowls

The following for each group

* 2 cups heavy cream
* 2 cups half-and-half
* 3/4 cup sugar
* 2 teaspoons vanilla extract
* 1/8 teaspoon salt

**Material to Teach**

* Just note how the coldness of the dry ice allows us to make ice cream.

**Procedure for each Module**

* For now, see the above link.

**Notes for Mentors**

* SAFETY FIRST. Do not let the kids handle dry ice. Mentors must use gloves when handling it. Only mentors should be adding the dry ice in, the kids can stir AFTER, NOT DURING, each addition.

**If during testing one of the activities doesn’t pan out, here is an alternative: carbonated fruit.**

**http://chemistry.about.com/od/ediblescienceprojects/a/carbonatedfruit.htm**

**the sublimation of the ice adds fizz to the fruit (wait til it warms back up a bit)**

**References**

* The above about.chemistry.com links, will clarify this in the final section.

-----

**Summary Materials Table**

* Todo later

|  |  |  |  |
| --- | --- | --- | --- |
| **Material** | **Amount per Group** | **Expected $$** | **Vendor (or online link)** |
| Ex: Popsicle sticks | 20 | $10/box |  |
| Ex: Scissors | - |  |  |