Demonstration Lesson Plans Click Below ! ! :

1. **Pressure: Balloon on a Bed of Nails**

2. **Marshmallow in Syringe**

3. **Pressure & PVC**

4. **Pressure: Egg in the Bottle**

5. **Atmospheric Pressure & "Collapsing Pop Can"**

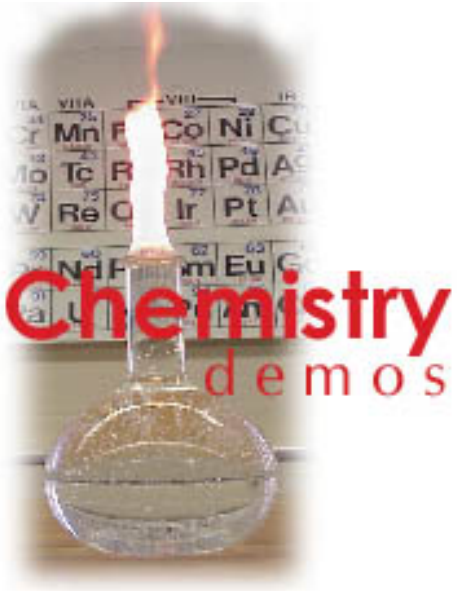
6. **Atmospheric Pressure and smaller Tin Cans**

7. **Atmoshpheric Pressure & the 55-gallon Drum**

8. **Pressure -"The Potato Gun" and Boyle's Law**

9. **Boyle's Law**

Section 1- Chemical & Physical Changes



SECTION 6 : GASES & PRESSURE

Atmospheric Pressure and Smaller Tin Cans

Chemical Topic or Concept: -

- Atmospheric Pressure
- Kinetic Molecular Theory of Gases

Materials: -

- "Empty" Coleman fuel can or the like
- Heating Source - Hot plate or bunsen burner
- 5 gallon bucket of water.

Procedure:

1. Add a half-cup of water to the "empty" Coleman fuel can.
2. Heat the can on a hot-plate.
3. Wait until lots of condensed water vapor (steam) comes out of the can.
4. Remove the can from the heat and quickly close the lid tightly on the can.
5. Place the can aside and let it cool on its own, or for quicker results stick it into a shallow tray with cold water or into a 5 gallon bucket.
6. Observe.

Questions:

Section 2- Chemical & Physical Properties

Section 3 - Water & Its Properties

Section 4 - Corrosion

Section 5 - Acids/ Bases/In dicators

Section 6 - Gases & Pressure

Bibliography

Appendix 1 -Charts & tables, Disposal of Chemicals, Sources of Chemicals, Preparations of Acid and Solutions

Appendix 2 Properties of Common Elements, Descriptions of the Elements, Ban Dihydrogen Monoxide

Appendix 3 *Principles of Education*, Prof. Hanko

***The Reformed Witness*, Rev. Cammenga**

COVENANT HOME

CHEMISTRY HOME

1. List your observations.
2. Why was it necessary to heat the water in the tin can?
3. What could account for the implosion of the tin can? Explain your reasoning. Connect your answer to your observations as much as possible.
4. List the five main points of the Kinetic Molecular Theory of Gases.
5. What does this demonstration teach you about the Kinetic Molecular Theory of Gases?

Explanations:

1. Water is added to the tincan so that the demonstrator can see the condensed water vapor (steam) rise out of the tin can. This gives the demonstrator an idea that the air in the tin can has been warmed sufficiently.
2. The tin can implodes because as the water inside the tin can was heated the water began to vaporize. This vaporization indicates that the air molecules had been increasing in their average kinetic energy. Therefore, the molecules of the air needed more space to move. Since the tin can was open on top, the molecules "escaped" out of the can. The tin can contained less air molecules at this point than it did originally. When the tin can is sealed shut with the lid, no more air molecules can enter or exit the can. Very rapidly the air molecules lose kinetic energy because the can has been lifted off of the hot plate and has been placed in cool water. Since they lost kinetic energy they do not need to occupy as much space as they had previously. Thus, they come closer to each other. By doing so, there is a lack of molecules inside the tin can to provide an equal amount of pressure as is being exerted on the outside of the can by the air molecules that surround the tin can. These air molecules pound on the side of the tin can with approximately a pressure of 15 lbs/in^2. This pressure on the outside of the tin can is greater than the internal pressure and the tin can implodes
3. The five points of the Kinetic Molecular Theory of Gases are these:

    a. Ideal gases consist of infinitely small particles. This means

ideal gases technically take up no space.

b. Ideal gas molecules travel in rapid, random, straight-line motion.
c. Ideal gas molecules experience perfectly elastic collisions (no lose of energy) with each other and the walls of the container.
d. Ideal gases experience no attractive forces between each other or the walls of the container.
e. The average kinetic energy of the molecules is directly related to the temperature. Therefore as the temperature rises so does the kinetic energy of the molecules.

This demonstration best demonstrates the 5^{th} point of the Kinetic Molecular Theory of Gases. This is seen by the fact that the molecules speed up, spread out, and left the container. This was due to the fact that the tin can was heated up.

Reference: Fransen, Ted. **Mennonite Brethern Collegiate Institute.** Winnipeg, MB, **CANADA:** 1990.

The **F**ederation **B**oard of the **P**rotestant **R**eformed **C**hristian **S**chools commissioned Joel Minderhoud to develop this *Repertoire of Chemical Demonstrations*