

# Mentos Fountain

## Kitchen Table Demonstration

### The Rundown

**Time:** 10 minutes

**Content:** solubility of gases, properties of water, solute, solvent

**Safety Concerns:** None

**Materials Availability:** All everyday materials that are available at an grocery store.

Has anyone ever told you to try eating mentos and drinking coke at the same time? If so, don't do it! It is often times difficult to imagine that common everyday substances can result in explosions when combined with one another. Think about water. Although it is a chemical that is required by all life forms, and it is extremely common and prevalent, it reacts explosively when combined with any of the alkali metals. While the alkali metal and water reaction represents a chemical change, we can also observe explosions due to physical changes. The mixing of a mentos candy and soda is one great example.



### Content Application

- Solubility
- Solute
- Solvent



### Enduring Understandings

- Solubility depends on the intermolecular forces between a solute and a solvent.
- Solubility of a gas or solid is dependent upon pressure and temperature conditions.



### Chemistry

**Solubility** is a physical property that refers to the ability of a solute to dissolve in a solvent. Most of the time, for polar substances, we use water as the solvent because of its unique properties. After all, water is considered to be the universal solvent.

Solubility is dependent upon a couple of things. **Temperature** is one variable which can change the solubility of a solid or gas solute in a liquid solvent. Higher temperatures increase the solubility of a solid in a liquid, but decrease the solubility of a gas in a liquid.

**Pressure** is another variable which primarily affects the solubility of a gas. The higher the pressure, the more likely the gas is to dissolve in a liquid solvent.

When it really comes down to what is happening on a molecular or atomic level, it is the **intermolecular forces** between a solute and a solvent that determine the degree of solubility for the solution pair.

In this demonstration, the process of a dissolved gas becoming suspended in solution (coming out of solution) is observed. Although there is some debate as to the exact

chemicals that are responsible for creating the fountain of Diet Coke once mentos are added, an episode of *Mythbusters* narrowed the key ingredients down to caffeine, potassium benzoate, aspartame and dissolved CO<sub>2</sub> gas in the Diet Coke in combination with the gelatin and gum arabic ingredients of Mentos. The CO<sub>2</sub> gas bottled under high pressure allows it to become and remain dissolved in the soda. Upon opening the two liter bottle, some of the carbon dioxide comes out of solution, but the majority of it still remains dissolved due

to the intermolecular attractions of the solvent. When the mentos are added, these intermolecular attractions are disrupted. The most significant cause of the eruption is due to the presence of small holes called nucleation sites on the surface of the mint mentos, which allow for CO<sub>2</sub> gas to form very rapidly and in great quantity, in turn causing the jet of soda.



### Materials

- 2 L bottle of Diet Coke (less sticky to clean)
- roll of mint mentos (causes the best fountain)
- cylinder or roll of paper



## Safety

- It is best to do this demonstration outside, otherwise you will have a very sticky mess to clean up. Be sure to stand clear of the soda bottle once the mentos are added.



## Procedure

1. Place the 2L bottle of Diet Coke on a flat piece of ground outside.
2. Remove the roll of mint mentos from the packaging. Loosely roll all mentos in the paper so that they can all be dropped into the bottle at the same time. Immediately after the mentos are added, move out of the way!



## Disposal

- No disposal needed if done outside.

## Follow-Up

Suggestions:

1. While the demonstration is taking place, have the students write down observations about what happens during the demo.
2. Use this as a POE demonstration. Have the students Predict, Observe, and Explain what is happening.



## Student Participation and