

## Mentos Fountain

### Materials

- A roll or box of Mentos® mints
- 2-liter bottle of diet soda (diet *or* regular soda will work, but diet soda is not as sticky)
- Piece of paper (or for a perfect drop every time, check out Steve Spangler's [Geyser Tube](#))

You can also get everything you need for the experiment in the [Fizz Factor Book Kit](#). When you're done experimenting with the Mentos and soda, use your empty bottles for even more experiments described in the [Soda Bottle Science Kit!](#)

1. This activity is probably best done outside in the middle of an abandoned field, or better yet, on a huge lawn.
2. Carefully open the bottle of soda. Position the bottle on the ground so that it will not tip over.
3. Unwrap the whole roll of Mentos. The goal is to drop all of the Mentos into the bottle of soda at the same time (which is trickier than it looks). One method for doing this is to roll a piece of paper into a tube just big enough to hold the loose Mentos. You'll want to be able to position the tube directly over the mouth of the bottle so that all of the candies drop into the bottle at the same time.
4. Don't drop them into the bottle just yet! Warn the spectators to stand back. Okay, you're going to drop all of the Mentos into the bottle at the same time and then get truckin' (move out of the way... so long... bye- bye... hasta la vista!)
5. It's just like fireworks on the 4th of July. The spectators erupt, of course, in a chorus of ooohs and ahhs. Someone yells out, "Do it again" and you do.

### Now Try This!

1. You'll need a 2-liter bottle of diet soda (diet doesn't make a sticky mess) and an outdoor location for your geyser. Select a flat surface on the lawn or driveway to place the bottle.?
2. Start by tying one end of the string to the trigger pin (the string might already be attached to the pin).
3. Open the bottle of soda and attach the Geyser Tube. Put the trigger pin into the hole at the base of the Geyser Tube.
4. Twist off the top cap on the Geyser Tube and drop 7 MENTOS® candies into the tube. The trigger pin will keep the candy from falling into the soda... before you're ready. Replace the twist-on cap.
5. Warn everyone to stand back. Countdown... 3-2-1... and pull the trigger. The MENTOS will drop and the soda will go flying into the air!?
6. Pour out the remaining soda and take a look at the MENTOS®. You can see where the soda has eaten away at the surface of the candy. No need to waste the candy... they still taste great.



### How does it work?

Here's the question of the day... Why do Mentos mixed with soda produce this incredible eruption? You should know that there is considerable debate over how and why this works.

While we offer the most probable explanations below, we also understand and admit that other explanation could be possible... and we welcome your thoughts.

As you probably know, soda pop is basically sugar (or diet sweetener), flavoring, water and preservatives. The thing that makes soda bubbly is invisible carbon dioxide gas, which is pumped into bottles at the bottling factory using tons of pressure. Until you open the bottle and pour a glass of soda, the gas mostly stays suspended in the liquid and cannot expand to form more bubbles, which gases naturally do.

But there's more... If you shake the bottle and then open it, the gas is released from the protective hold of the water molecules and escapes with a whoosh, taking some of the soda along with it. What other ways can you cause the gas to escape? Just drop something into a glass of soda and notice how bubbles immediately form on the surface of the object.

For example, adding salt to soda causes it to foam up because thousands of little bubbles form on the surface of each grain of salt. Many scientists, including Lee Marek, claim that the Mentos phenomenon is a physical reaction, not a chemical one.

Water molecules strongly attract each other, linking together to form a tight mesh around each bubble of carbon dioxide gas in the soda. In order to form a new bubble, or even to expand a bubble that has already formed, water molecules must push away from each other. It takes extra energy to break this "surface tension." • In other words, water "resists" the expansion of bubbles in the soda.

When you drop the Mentos into the soda, the gelatin and gum arabic from the dissolving candy break the surface tension. This disrupts the water mesh, so that it takes less work to expand and form new bubbles. Each Mentos candy has thousands of tiny pits all over the surface. These tiny pits are called nucleation sites - perfect places for carbon dioxide bubbles to form. As soon as the Mentos hit the soda, bubbles form all over the surface of the candy.

Couple this with the fact that the Mentos candies are heavy and sink to the bottom of the bottle and you've got a double-whammy. When all this gas is released, it literally pushes all of the liquid up and out of the bottle in an incredible soda blast. You can see a similar effect when cooking potatoes or pasta are lowered into a pot of boiling water. The water will sometimes boil over because organic materials that leach out of the cooking potatoes or pasta disrupt the tight mesh of water molecules at the surface of the water, making it easier for bubbles and foam to form.

When a scoop of ice cream is added to root beer, the float • foams over for essentially the same reason. The surface tension of the root beer is lowered by gums and proteins from the melting ice cream, and the CO<sub>2</sub> bubbles expand and release easily, creating a beautiful foam on top Next question... Why should you use diet Coke or diet Pepsi? The simple answer is that diet soda just works better than regular soda. Some people speculate that it has something to do with the artificial sweetener, but the verdict is still out.

More importantly, diet soda does not leave a sticky mess to have to clean up. Hey, that's important.

What's the record for the biggest Mentos fountain? My official record is a 18 foot blast that shot up and almost took out a half million dollar, high-definition television camera. You'll find video on-line at [www.SteveSpanglerScience.com](http://www.SteveSpanglerScience.com) of some of our favorite eruptions.

On a personal note... I've performed this demonstration well over a thousand times - on television, talk shows, science conventions, teacher associations, for CEO's at huge motivational speaking rallies, for Nobel Prize winners and anyone else who might watch. And the reaction is always the same... that's amazing! My thanks to Lee Marek who originally shared the Mentos idea with me and to the hundreds of teachers and science enthusiasts who continue to share their funny pictures, videos and experiences.