# 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. Here are some likely scenarios:

As you probably know, soda 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. (*Mr. C agrees with this, but maybe I’m wrong.*)

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 CO2 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. ;)

**Final Note:** Tonya Coffey, a physicist at Appalachian State University in Boone, North Carolina, confirmed that the rough surface of the Mentos candy helps speed the reaction. Coffey also found that the aspartame in diet drinks lowers the surface tension and causes a bigger reaction, but that caffeine does not accelerate the reaction.