

Exploding Pringles Can Demo

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This is a variation on the traditional demonstration which has been around for many years. I first saw it at an NSTA meeting in 1991. I will provide the basic procedure below along with my new “multiple can demonstration”.

Procedure 1 --- Single Can

1. Empty a standard sized Pringles can. Using a small nail and a hammer, make a hole about 1 mm in size in the center of the metal end of the can.
2. Cut a hole about 6 mm in diameter in the center of the plastic lid. A cork borer works very nicely if you have a set. Otherwise, a drill will work fine.
3. Cover the holes on each end of the can with a piece of scotch tape. Attaching a small piece of paper to the end of the tape makes it easy to remove when you are ready to do the demonstration. This works like an old fashioned pull-tab.
4. You will need a stand to set the Pringles can on which is open in the center. This allows air to enter the bottom of the can while hydrogen leaves through the top. A tripod stand or an iron ring on a ringstand will work well.
5. Remove the lid from the can and hold it upside down so that the metal end is up. Place a rubber tube connected to a hydrogen cylinder in the opening and fill with hydrogen. Use a fairly rapid flow for 10 to 15 seconds to flush the air out completely. The rising pitch of the entering gas will make it clear when the can is full. Quickly replace the plastic lid on the can and place it, lid down, on the stand. At this point, both holes should be covered with tape.
6. Have a match or lighter ready, then remove both pieces of tape and place the can back on the stand. Light the hydrogen escaping from the small hole in the metal end of the can (which is on top). You will hear a small pop and a very faint flame will burn at the top.
7. The flame will burn for about 90 seconds. About 15 seconds before the end, a high pitched whine will be heard from the can. The sound will slowly drop in pitch. When the sound reaches a very low pitch, the can will explode, leaving the lid on the stand and sending the can 10 to 15 feet into the air. Be sure to cover your ears or wear hearing protection!

8. The 75 seconds or so that the can burns before exploding is a great time to discuss why it didn't explode immediately, and perhaps to discuss balanced chemical equations or stoichiometry.

Note: The can may be safely held in the hand of the teacher or a student or child from the audience. When it explodes, the lid will be propelled downward, with no harm to anyone. Be sure to provide the holder with hearing protection.

Procedure 2 --- Multiple Cans

In my ongoing efforts to make demos even more exciting, I started experimenting with multiple cans a few years ago. Much to my surprise, I found that the cans always go off simultaneously, even when placed at the four corners of a lab.

1. Follow the above procedure, but prepare four cans and cover the holes with tape pull tabs. The tape will keep hydrogen from leaking out while all of the cans are filled.
2. While the possibilities are endless, I commonly have two audience members hold cans, while the other two are placed on stands across the room.
3. Fill the cans as in the first procedure, handing two to your volunteers and placing two on the stands.
4. It is best to light all four cans in a period of 15 or 20 seconds, so I have a helper with a long stem butane lighter follow me as I quickly move from can to can, removing the tape. After all four are lit, I have the audience vote for the can they believe will blow up first.
5. After a minute or so, the first can will begin to whine. Pretty soon, the others join in at different pitches, resulting in a cacophony of wailing which sounds like cats on a fence. Be sure to place hearing protection on the two volunteers as soon as the whining begins, as their hands will be occupied.
6. All at once, every can will explode, much to the surprise of everyone.

Note: There should be no limit to the number of cans which could be used, other than the time needed to light them all. I have more experimenting to do, but expect if you wait too long to light the extra cans, they might not explode at the same time as the first.

Safety Note: I have conducted this demo for 11 years without mishap. It seems to be very safe. The only caution I offer is to be sure to purge the air from the can thoroughly. I once used a large coffee can and didn't use sufficient hydrogen. There was enough air remaining that it exploded the instant I lit it. The only safety issue was the fact that my ears hurt for several hours. That's why I now use hearing protection. However, standard Pringles cans have never given me a problem in hundreds of demonstrations. Enjoy!