Coke® & Mentos® - Exploring Explosive Chemistry!

Experimental Procedure

This project follows the Scientific Method. Review the steps before you begin.

1. First, you will need to prepare your crushed Mentos candies. You may want an adult to help you crush the Mentos candies.
    a. Place a piece of wax paper on top of the cutting board.
    b. On the wax paper, carefully use the knife to crush and cut four Mentos candies into many small pieces, as shown in Figure 2 below. Cut each candy in to at least eight pieces. What does the inside of the Mentos candies look like?
    c. When all four candies are cut into pieces, carefully set the piece of wax paper, with the candy pieces still on it, aside somewhere safe.
    d. Repeat steps 1a to 1c two more times so that you have three groups of candy pieces.
        i. You will be testing the crushed candies in three separate trials. It is important to repeat your experiment so that you are sure that your results are repeatable and reproducible.

Image Credit: Teisha Rowland, Science Buddies / Science Buddies

Figure 2. On a piece of wax paper, carefully crush and cut four Mentos candies into many small pieces, as shown here. Prepare three groups of crushed and cut Mentos like this one.

2. Next, you need to make your Mentos cartridge to hold the Mentos for you before you drop them into the soda bottle.
    a. Take one of the index cards and roll it into a tube, slightly larger than the diameter of a Mentos candy. Tape the tube together on the side, and now you have a cartridge for holding your stacks of Mentos.
    b. You will use the other index card to place beneath the tube of Mentos, to keep the Mentos from dropping into the soda bottle until you are ready.

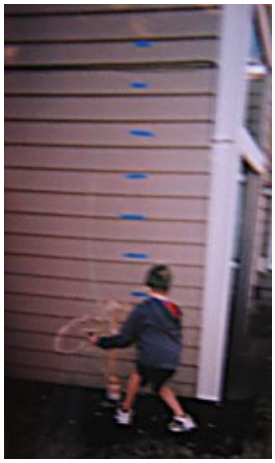

Image Credit

Figure 3. Here is how one science fair student from Marin County, CA set up his Diet Coke and Mentos experiment.

3. Now, prepare your test site so you will be able to measure how high the geysers go.
    a. At the base of an exterior wall with no windows, set one bottle of Diet Coke.
    b. On the exterior wall, use a tape measure and the blue painter's tape to mark off the height from the top of the soda bottle in meters (m), as shown in Figure 3. You will need a ladder and an adult's help to mark off the taller measurements.
4. Set up the video camera with a tripod, if available, and make sure that the soda bottle and marked measurements are in view.
    a. To prevent soda from possibly splashing the camera or volunteer, do not place the video camera too close to the testing spot.
    b. Show your volunteer how to start and stop your video camera.
5. You are now ready to film some Mentos and Diet Coke eruptions! First test the whole Mentos candies and then try the crushed Mentos candy pieces. You should wear clothes that you would not mind having a little Diet Coke splashed on to!
    a. Place an unopened Diet Coke bottle at the outside area that you marked off, at least 2 m from the building and away from anything hanging above the area, such as eaves, overhangs, or wires. Make sure that the bottle is level and stably standing straight up. Why do you think all of this is important?
    b. Carefully remove the cap from the soda bottle and place the flat index card on top, covering up the hole.
    c. Add four whole Mentos to your cartridge and put on your safety goggles.
    d. Have your volunteer start the video camera and speak into the camera and say, "This is trial number 1 using whole Mentos."

i. This will help when you go back to analyze your results. In subsequent trials, have your volunteer say the new trial number (such as 2, 3, 4) and whether it is using whole or crushed Mentos.

e. Place your full cartridge on top of the flat index card. Line up where the opening of the bottle is with the opening of your cartridge. When you are ready, quickly remove the flat index card by pulling it, releasing the Mentos into the bottle. Step back without tipping the bottle over or disturbing the reaction.
   i. *Tip:* The reaction will start very quickly, so be ready to take away the empty cartridge and step away from the bottle as soon as the candies fall into the soda!

f. When the bottle stops spouting, stop recording.

g. Remove the used Diet Coke bottle and set it aside. Do not pour out the remaining soda yet! Use the permanent marker to label the bottle with the trial number, and whether it was used with whole or crushed Mentos candies.

h. Repeat steps 5a to 5g two more times, for a total of three trials using four whole Mentos candies each time.

i. Repeat steps 5a to 5g three more times, but this time use the crushed Mentos candies you prepared in step 1. Use four crushed Mentos candies each time.
   i. In step 5c, use the funnel to help you load the crushed Mentos candy pieces into your cartridge.

6. Now you are ready to watch your videos and analyze your data.
   a. In your lab notebook, make a data table similar to Table 1 below.

Trial	Reaction Time (sec)	Geyser Height (m)	Soda Volume Remaining (mL)
#1: Whole Mentos			
#2: Whole Mentos			
#3: Whole Mentos			
Average Whole Mentos			
#4: Crushed Mentos			
#5: Crushed Mentos			
#6: Crushed Mentos			
Average Crushed Mentos			

Table 1. In your lab notebook, make a data table like this one to record your results in.

   b. To determine the reaction time of each geyser, watch the videos for each trial and note the time for when the geyser starts and when it stops.
      i. In the data table in your lab notebook, write down the total amount of seconds (sec) that the geyser lasted for each trial.

   c. To determine the height of each geyser, watch the videos for each trial using slow motion and pause the recording when the spout is at its maximum height.

i. Use the tape marks in the background to do your best to estimate the height (in meters) of the spout. Write this in your data table.

d. To find out the volume of Diet Coke remaining in the bottle after the eruption, pour the remaining soda into a graduated cylinder (and measure in milliliters [mL]) or into measuring cups (and measure in cups).
    i. For each trial, calculate the total amount of remaining soda in the bottle and write this in your data table.

e. Calculate the average reaction time, geyser height, and soda volume remaining for the trials using whole Mentos and the trials using crushed Mentos. Write these averages in your data table.

7. Make three bar graphs of whole Mentos versus crushed Mentos: One graph of the average reaction time, one of the average geyser height, and one of the soda volume remaining.
    a. You can make the graph by hand or use a website like Create a Graph to make a graph on the computer and print it.
    b. For each graph put whole Mentos and crushed Mentos on the x-axis (the horizontal axis) and average reaction time, average geyser height, or soda volume remaining on the y-axis (the vertical axis).
8. What does your data mean? Do you think that using crushed Mentos, which should have sunk slower in the soda, made a difference in the reaction? Were your results what you expected them to be, or were they different? Why? How do you think the reaction time, geyser height, and soda volume remaining might correlate with each other?

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