

# CO<sub>2</sub> Blast Off!

## materials

- 2 pkgs Mentos
- two 2-liter bottles of clear diet soda (one room temperature and one cold)
- scotch tape
- 2 cardboard 2x2 squares
- timer or stopwatch
- meter stick
- construction paper or geyser tube found online at:  
<http://www.stevespanglerscience.com/product/2072>

## background

Carbon can be stored in three places on our planet: the atmosphere, the oceans and the land biosphere. The oceans are the largest carbon sinks on Earth, storing up to 93% of the planet's carbon. As the surface and ocean temperatures begin to rise, what will happen to the carbon sinks in the ocean? This experiment explores which oceans hold more CO<sub>2</sub> – warm or cold.



## directions

1. Tell students about the ocean as a carbon sink.
  2. Ask students to predict what will happen when 7 Mentos are dropped into a cold pop bottle and also in a room temperature bottle.
  3. Take the students outside for the launch! A wall behind the bottle works well.
  4. Cut a 2 X 2 inch square out of cardboard for each tube, to keep the Mentos from falling in the bottle.
- The goal is to drop all of the 7 Mentos into the bottle at the same time. Roll a piece of construction paper that the Mentos will fit into but still slide out of. Secure the roll of the tube with tape. Position the tube directly over the mouth of the bottle so all the candies will drop into the bottle at the same time. (Or use a strip of scotch tape to stick the Mentos on in a row and drop it in the bottle.)*
5. Place the cardboard on the open cold soda bottle and then put the Mentos roll on top.
  6. Remove the cardboard and let the Mentos fall in the bottle and get out of the way.
  7. Observe the reaction. Record height of the geyser and how long the reaction took place.
  8. Repeat experiment with room temperature soda.

activity time:  
**45 minutes**



## discussion

- Which bottle had a bigger reaction with the CO<sub>2</sub> and Mentos?
- How do you know it was a bigger reaction?
- What observations did you make?
- Is there a difference in the amounts of soda in the two bottles? Which has more and what does that tell you?
- Which releases more CO<sub>2</sub> – warm water or cold water? Why?  
*The molecules in the room temperature bottle are hotter and are moving faster than the molecules in the cold soda. Less gas can be dissolved in room temperature liquid. In colder liquids, the gas molecules move slowly, causing them to diffuse out of solution much more slowly so more gas tends to stay in cold solutions.*
- True or False – As ocean temperatures begin to rise, oceans will become better sinks for carbon dioxide.
- Explain your answer.



## extension

- Try testing different amounts of Mentos to change the results or add a hotter pop bottle that has been left out in the sun.



## vocabulary

**Carbon Sink:** An environmental reservoir that absorbs and stores more carbon than it releases, thereby offsetting greenhouse gas emissions.



## related activity

- Try the Cold Water Motion experiment with students at <https://www.cresis.ku.edu/education/libLessons/lib015.pdf> and then discuss how ocean temperatures and the ocean currents allow the oceans to be the largest carbon sink.

## alignment to national science standards

Unifying Concepts and Processes, Standards A, B, E, F, G

## alignment to kansas science standards

**Science as Inquiry:** K-2: 1.1.1,1.1.3,1.1.4,1.1.5; 3-4: 1.1.1,1.1.3, 1.1.4; 5-7: 1.1.1,1.1.3,1.1.4, 1.3.1

**Physical Science:** K-2: 2.1.2, 2.1.3; 3-4: 2.1.2, 2.1.3, 2.1.4, 2.2.1; 5-7: 2.1.1, 2.3.1, 2.4.1, 2.4.3

**Earth Science:** 3-4: 4.1.1; 5-7: 4.1.1, 4.1.2, 4.2.1

**Science and Tech:** 3-4: 5.2.3

**History and Nature of Science:** K-2: 7.1.1; 3-4: 7.1.1