

Cloud in a Bottle Worksheet

Name: _____

Directions

1. Take the label off of the bottle if it isn't already. Tape the temperature strip to the bottom of the fizz keeper, so that the temperature strip will hang freely down when the fizz keeper is screwed onto the bottle. Once the temperature strip is taped in place, screw the fizz keeper on the top of your bottle.
2. Examine the sealed bottle. Turn the bottle so the temperature strip faces you and it is easy to read. Do not handle the bottle any more than necessary, so that the inside temperature of the bottle will not be affected by the warmth of your hands.
3. Record the initial temperature of the inside of the bottle in the Data Table below (enter temperature for 0 pumps).

| Pressure (# pumps) | Temperature (Celsius) |
|----------------------------------|-----------------------|
| 0 | |
| 20 | |
| 40 | |
| 60 | |
| 80 | |
| temperature after cap was opened | |

4. Now pump the fizz keeper 20 times. Record the temperature in the table above. Pump the fizz keeper 20 more times. Record the temperature in the table above. Keep repeating this until you have the temperature recorded for 60 and 80 pumps. Don't exceed 80 pumps because your bottle might pop!
5. Feel the sides of the bottle. Now, screw the fizz keeper off your bottle and record the temperature in the table above.

Question: Pumping the fizz keeper compressed the air more and more inside the bottle. What happened to the temperature of the inside the bottle when you kept pumping the fizz keeper?

Question: When you unscrewed the fizz keeper so the air inside the bottle was no longer being compressed, what happened to the air temperature in the bottle?

Question: State in your own words, what is the relationship between changes in air pressure and temperature?

6. In the same bottle, place a small amount of water in the bottle (again 1/4 inch on the bottom of the bottle will be more than enough). Light a match and drop the match into the bottle. The match should quickly go out.
7. Cap the bottle quickly with your fizz keeper/temperature strip cap. Record the initial temperature of the inside of the bottle, i.e., in this new table below, enter temperature for 0 pumps. Repeat previous procedure of pumping the fizz keeper 20, 40, 60 and 80 more times. Record appropriate temperatures in the table below. Again, open the cap on the bottle and record the resulting temperature in the table.

| Pressure (# pumps) | Temperature (Celsius) |
|----------------------------------|------------------------------|
| 0 | |
| 20 | |
| 40 | |
| 60 | |
| 80 | |
| temperature after cap was opened | |

Question: What differences in results did you notice between this time and the procedure with the dry bottle? Describe what happened when you released the pressure on the bottle with water and a match in it.

Question: Why was a match needed for the cloud to form?

Question: Did the cloud form when you applied pressure or when you released pressure? Did the cloud form when temperatures rose or fell? Why?

Question: Once you have a cloud in your bottle, make the cloud disappear. Describe how you did this: