Name: _____

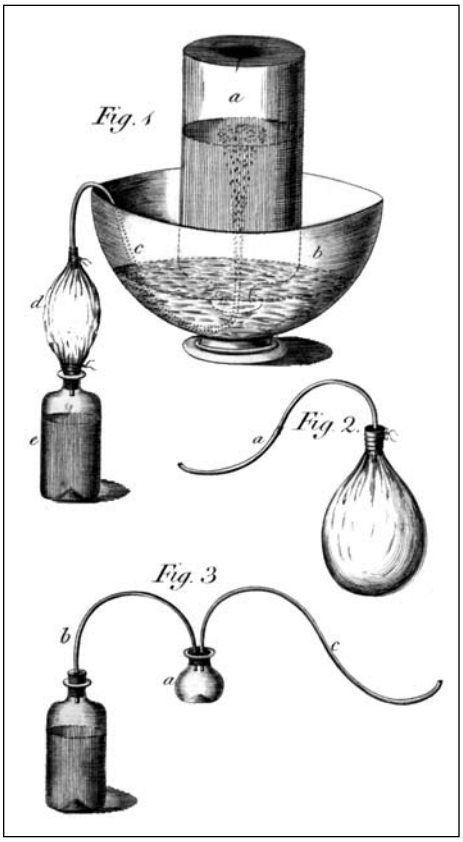
Think about it

You made a lemon soda by dissolving a solid (sugar) in a liquid (lemon juice) to make a syrup. You then dissolved the syrup in another liquid (club soda). The club soda already had a gas dissolved in it. So the soda you made was a combination of dissolved solid, liquid, and gas. The type of soda you made is not that different from the sodas of the past.

Vocabulary
pharmacist
carbonated
concentrated
fermenting
apparatus

History of soda pop

People have been making different types of soda pop for many years. The idea for making soda pop probably came from people drinking carbonated water from natural springs. The carbonation in the water was thought to improve health so lots of people wanted this special water. Scientists and pharmacists wanted to find a way to artificially add carbon dioxide to regular water so people wouldn't have to depend on natural springs as the only supply for carbonated water. Finding a way to add carbon dioxide to water was a challenging problem.



Courtesy of Douglas A. Lockard, Roy G. Neville Historical Chemical Library

Equipment Priestley used to add carbon dioxide to water.

A scientist from England named Joseph Priestley is believed to be among the first people to figure out a way to artificially add carbonation to water. He knew that fermenting grain to make beer produced a lot of carbon dioxide gas. So Priestley figured out a way to hang a container of water over a beer-making tub so that the carbon dioxide could mix and dissolve into the water.

A few years later, in 1772, Priestley used another method in which he dripped sulfuric acid onto marble to produce carbon dioxide gas and then mixed the gas into water. This method worked well but was not convenient for making carbonated water in small stores and pharmacies where it was needed. So inventors began working on different types of systems based on the acid-and-marble method to add carbonation to water. In the early 1830s an apparatus was finally invented that could produce carbonated water conveniently and in large quantities. These machines were installed and used in drug stores where carbonated water was produced, flavored, and sold by the glass.

Name: _____

Think about it (*continued*)

Soda pop today

The way that soda pop is made on a large scale in factories today is different but does have some similarities to the old methods. The four main ingredients in the soda pop you buy in the store are still water, sweetener, flavoring, and carbon dioxide gas.

The water used to make soda pop is regular local water. The soda pop company may filter or treat the water in some way to be sure it is clean and ready for use.

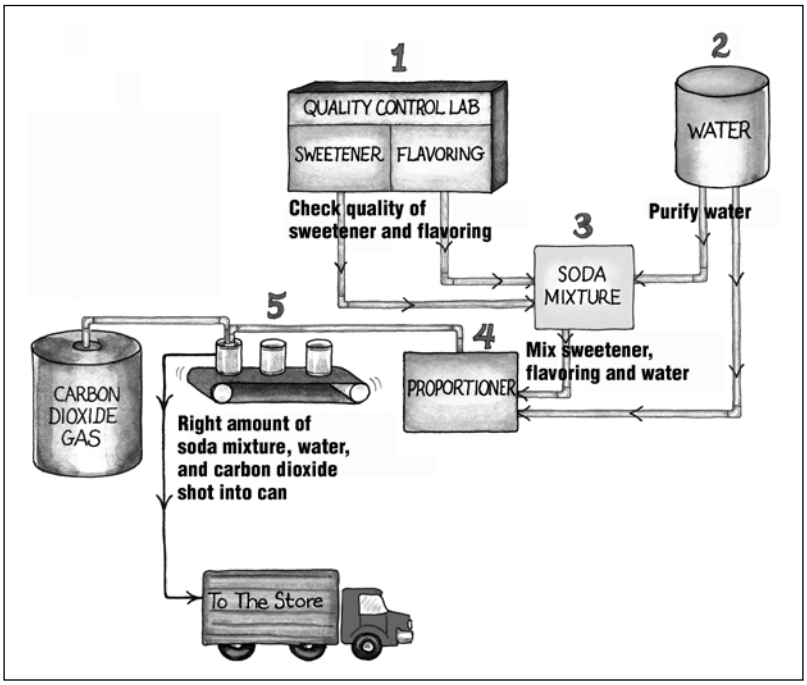
The sweetener used is usually corn syrup. This is a very sweet liquid made mostly from the starches in corn. This syrup arrives at the soda pop factory in big tanker trucks. The syrup is checked for quality and then pumped into tanks for later use.

The flavoring is delivered as a concentrate. Since this is the part that gives the soda pop most of its flavor, the ingredients of the flavor concentrate are kept as secret as possible so other companies can't use them.

The carbon dioxide gas is stored in tanks and is injected into the soda as it is canned or bottled.

Putting it all together

Corn syrup and flavoring (1) and water (2) are added to giant stainless steel mixing tanks (3). These tanks have big rotating blades that thoroughly mix the sweetener, flavoring, and water together to make a concentrated syrup.



This water-sweetener-flavoring mixture is then transferred to another special tank called the proportioner (4). Here, more water is added so that all the ingredients have the correct concentrations.

At this point, the soda solution is ready except for the fizz. The soda solution is then added to bottles or cans (5), and carbon dioxide gas is injected under pressure at the same time. The bottles or cans are immediately sealed.

Think about it (*continued*)

1. According to the reading, inventors most likely designed another way to make carbonated water because:
   a. It was dangerous to drip sulfuric acid over marble.
   b. It tasted better when marble was no longer used.
   c. A faster and more convenient way to make carbonated water was needed.
   d. Fermenting grain produces a bad smell.

2. The idea of modern soda pop came from people in history drinking carbonated water. In the reading, what is the best description of the word *carbonated*?
   a. water that has flavoring added
   b. the syrup used to make soda pop
   c. any liquid that is sold by the glass
   d. water that contains dissolved carbon dioxide gas

3. Which is the best summary of the section entitled "Soda pop today"?
   a. The disagreement over which type of soda is best continues today.
   b. Soda pop is made from four ingredients: water, sweetener, flavoring, and carbon dioxide gas.
   c. Joseph Priestley discovered the method in which soda pop is made today.
   d. Soda pop is actually made from a solid, liquid, and gas.

4. The purpose for the entire reading is to:
   a. tell how Joseph Priestley was an amazing inventor.
   b. explain that soda pop contains carbon dioxide and water.
   c. give some examples of how soda pop used to be made with machines in drug stores.
   d. inform the reader about the history of soda pop and how it compares to soda pop today.

5. The sweetener used in modern soda pop is made from:
   a. Sugar cane
   b. Starches from corn
   c. Glucose
   d. Fruit juice concentrate

6. Look back at the picture showing the steps for making modern soda pop. The last step in the process is to:
   a. add sugar and stir.
   b. add the carbon dioxide and soda solution and seal the container.
   c. heat the soda solution to release carbon dioxide gas.
   d. add the sweetener and flavoring and shake.

Name: _____

Think about it (*continued*)

7. What was one of the most challenging problems in making the first artificially carbonated water?

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8. Why did scientists and pharmacists want to find a way to artificially add carbon dioxide gas to water?

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9. Joseph Priestley tried two methods for dissolving carbon dioxide into water. What were they?

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10. Describe one way old-style and modern soda pop are similar and one way they are different?

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