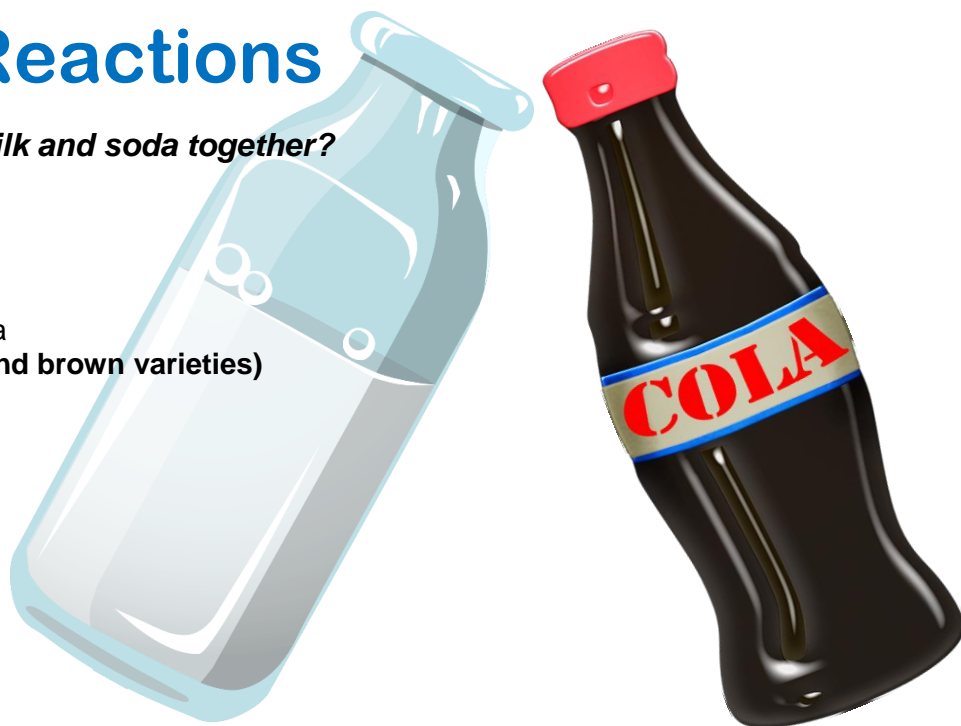


Milk & Soda Reactions

What happens when you mix milk and soda together?

What You'll Need:

Assorted 16 oz bottles of soda
(include both clear and brown varieties)
Nonfat Dry Milk
Teaspoon measure
Time keeping device



What to Do:

To make it easier to observe any chemical or physical reactions, start by carefully removing the label from the unopened bottles of soda.

Open each bottle. Carefully add 2 teaspoons of milk powder to each bottle.

Replace the bottle caps.

Gently rock the bottles back and forth to mix things inside.

Let the bottles sit undisturbed in a quiet place for 5 minutes. Check the bottles and record your findings.

Continue checking and recording every 15 minutes to see what's going on inside the bottles.

Compare the results for different types of soda. Which ones react similarly and which ones did not?

Look at the ingredient lists for each type of soda (see attached table). What do the sodas that react the same have in common?

What do you think happened?

Taking It Further

Do you think that you would get the same results using different types of milk (whole milk, 2% milk heavy cream, almond milk, coconut milk)? Try it and see.

SODA BRAND	INGREDIENT LIST
Coke	CARBONATED WATER, HIGH FRUCTOSE CORN SYRUP, CARAMEL COLOR, PHOSPHORIC ACID, NATURAL FLAVORS, CAFFEINE
Coke Zero Sugar	CARBONATED WATER, CARAMEL COLOR, PHOSPHORIC ACID, ASPARTAME, POTASSIUM BENZOATE (TO PROTECT TASTE), NATURAL FLAVORS, POTASSIUM CITRATE, ACESULFAME POTASSIUM, CAFFEINE
Pepsi	CARBONATED WATER SUGAR CARAMEL COLOR PHOSPHORIC ACID CAFFEINE NATURAL FLAVOR
Dr. Pepper	CARBONATED WATER, HIGH FRUCTOSE CORN SYRUP, CARAMEL COLOR, PHOSPHORIC ACID, NATURAL AND ARTIFICIAL FLAVORS, SODIUM BENZOATE (PRESERVATIVE), CAFFEINE
Barg's Rootbeer	CARBONATED WATER, HIGH FRUCTOSE CORN SYRUP, CARAMEL COLOR, SODIUM BENZOATE (TO PROTECT TASTE), CITRIC ACID, CAFFEINE, ARTIFICIAL AND NATURAL FLAVORS, ACACIA
Sprite	CARBONATED WATER, HIGH FRUCTOSE CORN SYRUP, CITRIC ACID, NATURAL FLAVORS, SODIUM CITRATE, SODIUM BENZOATE (TO PROTECT TASTE)
Fanta Orange	CARBONATED WATER, HIGH FRUCTOSE CORN SYRUP, CITRIC ACID, SODIUM BENZOATE (TO PROTECT TASTE), NATURAL FLAVORS, MODIFIED FOOD STARCH, SODIUM POLYPHOSPHATES, GLYCEROL ESTER OF ROSIN, YELLOW 6, RED 40.

What's Going On

When you add the milk powder to a cola product, the phosphoric acid in the soda reacted by attaching itself to the proteins in the milk, making them heavier and causing them along with most of the caramel color to sink to the bottom of the bottle. The rest of the liquid, stripped of its heavier elements, rose to the surface

Fruit-based sodas and root beer contain citric acid instead of phosphoric acid which does not react to the milk protein the same way.

