

Science lesson Sapphire class 12<sup>th</sup> January 2021

Hello Sapphire Class,

I hope you enjoyed your first lesson on our new topic.

What do you remember from the last lesson?

Test yourself here:

1. Gases fill the shape of the container. True or False
2. Liquids have a fixed shape. True or False
3. Solids cannot be compressed. True or False
4. Liquids can be compressed True or False
5. Gases can flow. True or False
6. The particles in a solid are very close together. True or False

How did you do? The answers are at the end of this document.

Today's lesson is all about Gases. Do gases have a weight?



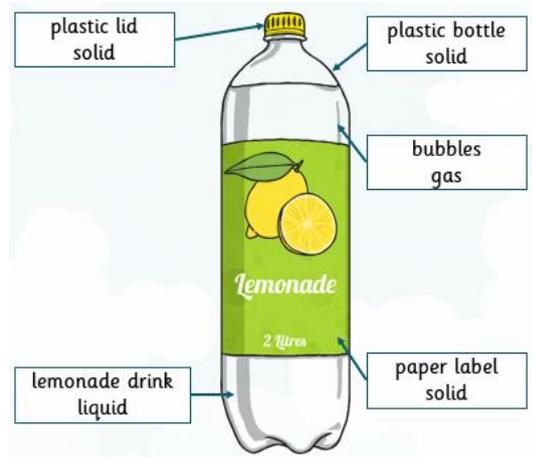
Here is a bottle of fizzy drink.

Which states of matter can you identify in the materials that make up the bottle of fizzy drink?

Use the picture below and try to label 5 different parts of the bottle with the correct states of matter. (lid, bottle, the drink, what is in the drink, bottle label)



Answer:



Can you answer these questions below? Do a little research if you can. Then keep on reading for some more explanations.

1. What are the bubbles in fizzy drinks made of?
2. Why are there bubbles in fizzy drinks?
3. Who made the first fizzy drink?
4. How are fizzy drinks made?

You may have found out:

- Bubbles in fizzy drinks are made from a gas called **carbon dioxide**. Carbon dioxide is a gas that is all around us. It makes up only about 0.04% of the Earth's atmosphere
- In 1767, a clergyman and scientist called Joseph Priestly accidentally invented the first fizzy drink. He found a way to dissolve gas in water, making the first soda water, or carbonated water. When he drank the fizzy water, he described a "peculiar satisfaction".
- Fizzy drinks are made by adding carbon dioxide to liquid under huge pressure. The carbon dioxide dissolves in the liquid and settles in the space above the liquid in the bottle or can. When the container is opened, the pressure decreases and the gas escapes quickly, making a hissing sound. The bubbles appear as the carbon dioxide turns into gas.

- Carbon dioxide can be very useful. Some fire extinguishers use carbon dioxide to cool flames and to stop oxygen getting to the fire.
- Carbon dioxide freezes at  $-78^{\circ}\text{C}$ , and it becomes a solid called dry ice. It is used to transport food that needs to be kept cool and fresh, such as on aeroplanes and trains.

Can you research these questions?

- What other gases do you know?
- Which gas/gases do we breathe?
- Which gas is used for cooking?
- Which gas is in advertising lights?
- Which gases we call pollution gases?

Now to our question. Do Gases Weigh Anything?

Here are three different statements. Which one do you think is correct?

1. Gases are lighter than air, so they do not weigh anything.
2. Gas has no weight because it is invisible.
3. A gas does have weight because it is a material.

Watch this film to see some children thinking about this question by wondering about whether the bubbles of gas in a fizzy drink affect its weight.

[Does gas weigh anything? - KS2 Science - BBC Bitesize](#)

Here is the final activity I would like you to do. The investigation is, to find out which drink contains the most Carbon dioxide.

I want you to do the following:

- Select three different fizzy drink.
- Then weigh each drink
- Then shake/swirl it until it is flat
- Weigh it again.
- The difference between the two weights will tell you how much carbon dioxide is in each drink.
- There is a table to record your results.

Before you do the investigation:

1. First predict which drink contains the most carbon dioxide.
2. How will you know when the fizzy drink is flat?
3. Think about what do you need to keep the same to make it a fair test?
4. Record your findings in a table. What did you find out? Was your prediction correct?

My result table:

Type of fizzy drink	Weight before	Weight after	Weight difference

Here is how I did it:

- I half filled a plastic with a fizzy drink,
- I then weighed the cup with the fizzy lemonade. It weighed 173.1g.
- I gently swirled the cup around (not to spill anything) to make the liquid flat, in other words, to remove the carbon dioxide.
- I then weighed the bottle again and this time it weighed 172.6g.
- The drink was **lighter** after the gas had been removed.
- My drink contained 0.5g of carbon dioxide

Answers:

Test yourself: 1. True, 2. False, 3. True, 4. False, 5. True, 6. True

Can you research these questions?

- gases: air, nitrogen, oxygen, neon, helium, argon
- we breathe: air, air is a mixture of oxygen, nitrogen and a small amount of argon and carbon dioxide
- cooking: natural gas
- advertising lights: neon
- pollution: sulphur dioxide, carbon dioxide

Do Gases Weigh Anything?

This experiment shows that the gas in the fizzy drink, carbon dioxide, does have a weight.

The bottle with the fizzy lemonade was heavier than the flat drink because it contained carbon dioxide. Some gases are lighter than air and some are heavier. Carbon dioxide is heavier than air.