

States of matter

Exploring the properties of gases

Year 4
Age 8 - 9

For parents

Thank you for supporting your child's learning in science.

Before the session:

- Please read slide 2 so you know what your child is learning and what you need to get ready.
- As an alternative to paper, slide 6 may be printed for your child to record on.

During the session:

- Share the learning intentions on slide 2.
- Support your child with the main activities on slides 3-6, as needed.
- Slide 7 has further, optional activities.
- Slide 8 has a glossary of key terms.

Reviewing with your child:

- Slide 9 gives an idea of what your child may produce.



States of matter

Exploring the properties of gases

Key Learning

- A **gas** fills all available space; it has no fixed shape or volume.
- Many gases are **invisible**.
- A gas has a mass, so its weight can be measured.
- A gas can be squashed or **compressed** into a smaller space.

I can...

- understand the properties of gases.
- describe some everyday uses of gases.

Activities (pages 3 - 6): 30 - 40 mins

- Use lined paper, a ruler and a pencil.
- Alternatively, you may like to print page 6 as a worksheet.



Find out more... (page 7): 20 - 30 mins

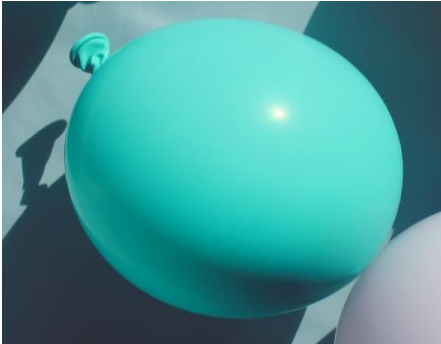
- You may like to investigate carbon dioxide gas by making it from bicarbonate of soda.



Explore, review, think, talk...

Does air weigh anything?
(5 - 10 minutes)

- Does the air in a balloon weigh anything?
- How do you think you could find out?

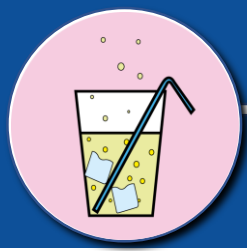


Think or talk about the questions, then watch this clip:

<https://www.bbc.co.uk/bitesize/clips/zhbygk7>

- What did the children in the clip find out about the gas in fizzy drinks?
- How did they investigate?
- Can this help you answer the question about air in a balloon?





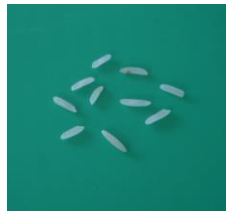
Properties of gases

Do gases weigh anything?
(5-10 minutes)

Many gases are invisible, including the air around us.

However, all gases are made up of tiny particles of matter so they have a mass and can be weighed.

- **Air** in a full party balloon has a mass of about 0.2 grams.
- This is about the same mass as ten small grains of rice!



- **Helium** is a very light gas. It is sometimes used to fill party balloons so they rise up in air.



- **Carbon dioxide** is a gas which is heavier than air. It is sometimes used as a fire extinguisher because it can flow down over the flames.



Properties of gases

Can gases be squashed or compressed into a smaller space?
(5 - 10 minutes)

- Watch the first minute of this clip about deep sea diving to observe fish:

<https://www.bbc.co.uk/programmes/articles/41CtKNScD66yfvn37tPzmNP/studying-tool-using-tusk-fish>



- How does a scuba diver carry air to breathe under water?
- Why can divers stay under water for over three hours?

- Air can be squashed or **compressed** into a smaller space.
- Scuba divers' air tanks hold compressed air, so they can stay under water for a long time.
- *How else do we use compressed gas?*



car tyre



bicycle tyre



aerosol spray



cooking gas

Make a poster or mind map to describe some everyday uses of gases.

Use what you have learnt and the word bank to help you.

You may like to draw pictures or use photographs.

Word bank:

gas, compressed, air, helium, carbon dioxide, cooking gas, aerosol gas.

bicycle tyre, car tyre, balloon, fizzy drink, scuba diving tank, aerosol can, fire extinguisher, gas bottle, cooker.

I can describe some everyday uses of gases.



Find out more...

*Find out more about carbon dioxide gas
(20 - 30 minutes)*

Ask an adult if you can investigate more about carbon dioxide gas with them:

- Use the link to the PSTT Science Fun at Home 'What a gas!' activity to investigate making carbon dioxide gas at home:
- https://pstt.org.uk/application/files/8615/8814/8781/Science_Fun_at_Home_6_Gases.pdf

SCIENCE FUN AT HOME



Have some fun at home with
these science activities from
Science Sparks and the
Primary Science Teaching Trust



- Use the link to the RSC's Chemistry in your Cupboard 'Building a rocket' activity to find out how to make a gas propelled rocket by compressing carbon dioxide. (This is an outside activity only!)
- <https://bit.ly/3avocm1>



Glossary of terms

States of matter: There are three **states of matter**: **solid**, **liquid** and **gas**.

Gas: A **gas** is a material which fills all available space; it has **no fixed shape** or **volume**.

Invisible: Many gases are **invisible** so you cannot see them.

Compressed: A gas can be **compressed** or squashed into a smaller space or volume. For example, divers use compressed air tanks under water.

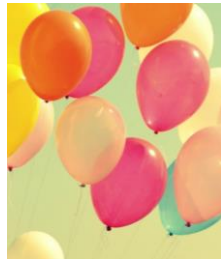
Matter: A gas is made up of tiny particles of **matter**. This means gas has a mass and its weight can be measured.

Volume: The **volume** is the amount of space taken up by a solid, liquid or gas.

Possible learning outcome for reviewing your work: I can describe some everyday uses of gases.



Compressed air is pumped into bicycle tyres and car tyres so the wheels can roll smoothly on a road.



Helium gas is sometimes used in party balloons. Helium is lighter than air so the balloons rise up.



Carbon dioxide is added to some drinks to make fizzy drinks like lemonade and coke.



Compressed air in a scuba diving tank is used by divers so they can breathe under water.

Uses of gases



Carbon dioxide is used as a fire extinguisher. It is heavier than air so it will flow down over the flames.



Aerosol cans often have compressed gas inside to help the spray to spread out.



Cooking gas is burnt to heat water and cook food. It is compressed into gas bottles for camping.