

**Science - Year 4**

State of Matter – Block 4SM

# **States of Matter Scientists**

Session 2

**Resource Pack**

## Some common gases

Gas	Facts and Uses
<b>Air</b>	Air is the gas all around us. It is a mixture of several different gases, mainly nitrogen and oxygen. Without air we cannot breathe and plants can't photosynthesise. Air supports balloons and aeroplanes, inflates bicycle tyres and turns windmills.
<b>Natural Gas</b>	Natural gas comes from the ground. It contains mostly methane. It burns easily (flammable) and is used as a fuel for heating.
<b>Oxygen</b>	About 1/5 of the air is oxygen (O <sub>2</sub> ). Without oxygen we cannot breathe and fires won't burn. Oxygen is produced by plants (during photosynthesis). It is also used in welding and as rocket fuel. Pure oxygen is often given to people to breathe in hospital.
<b>Ozone</b>	The ozone layer that protects Earth from the Sun's potentially damaging UV light is made up of ozone (O <sub>3</sub> ).
<b>Carbon dioxide</b>	Carbon dioxide is needed by plants to make their food during photosynthesis. Living organisms breathe out carbon dioxide as a waste product from aerobic respiration (which is using oxygen to react with carbohydrates to produce energy). Carbon dioxide is the gas in fizzy drinks. It is also used in fire extinguishers.
<b>Nitrogen</b>	Nitrogen is the main gas in air (about 80%). It is used to make plant food (fertilizer) and also in explosives.
<b>Nitrous oxide</b>	It is used as an anaesthetic in hospitals (laughing gas) and to increase the power of engines in motor racing.
<b>Water vapour</b>	Water vapour is formed when water evaporates. There is lots of water vapour in the air we breathe out. Water vapour can form clouds.
<b>Helium</b>	There is a small amount of helium in the air. It is a very light gas and is used in balloons and airships to help them float in the air.
<b>Argon</b>	There is a small amount of argon in the air. Argon is the gas inside electric light bulbs.
<b>Neon</b>	Used in advertising signs as it glows when electricity is passed through it.

## Is this plastic bottle empty?

Resources: A plastic bottle with a lid on.

Take a plastic bottle with the lid tightly on and try and squash it flat. Why can't you flatten it? The plastic bottle is empty of liquid but full of gases! The air inside is stopping you from squashing it.

Take the lid off the bottle. Try squashing the bottle now. Why can you flatten it? Explain it to a friend.



Do gases weigh anything?

Resources: balloon (1 for each child), weighing scales

Weigh an empty balloon and then inflate it and weigh it again. *What do you notice?* Why is the inflated balloon heavier? The air forced into balloon (under pressure) is matter and therefore makes the inflated balloon heavier. Can you explain this to a friend?



## How does the smell travel?

Resources: a range of aromatherapy oil, tissues

Work with a partner. One person places one drop of a scented oil onto a tissue. While the partner closes their eyes, the other must hide the tissue somewhere within the classroom. Using their sense of smell, the partner must hunt for the tissue. Can they notice when the smell gets stronger?

Think about the movement of gas particles and use scientific language to explain how the smell travels.



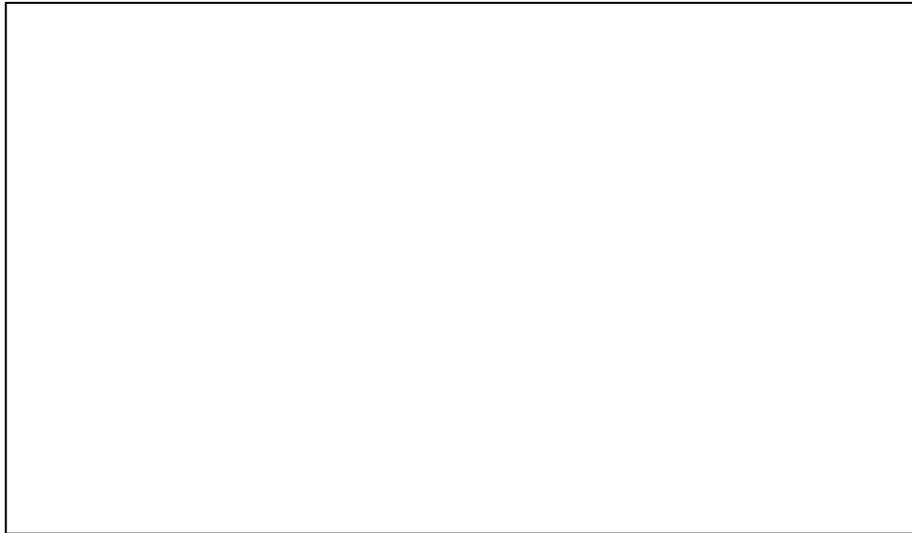
# Finding evidence of air around us

Air is everywhere and fills even the smallest spaces between or within solids.

Pour water over some common objects, what do you notice? Use your magnifying glass to get a really good look...

When I pour water over \_\_\_\_\_

I notice that...

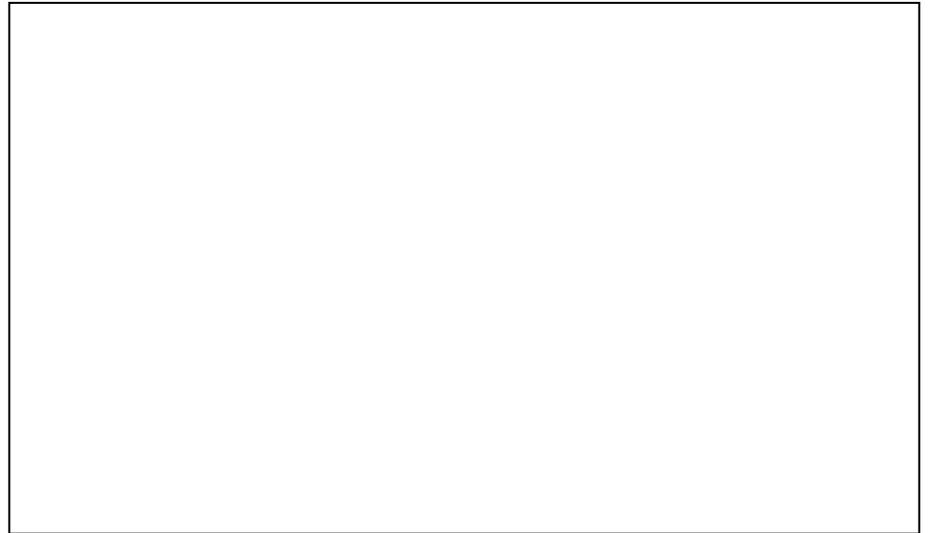


This shows that \_\_\_\_\_

\_\_\_\_\_

When I pour water over \_\_\_\_\_

I notice that...



This shows that \_\_\_\_\_

\_\_\_\_\_