Science

States of Matter

Solid, Liquid or Gas?

Aim

- I can sort and describe materials.

Success Criteria

- I can sort materials into solids, liquids or gases.
- I can describe the properties of solids, liquids and gases.
- I can show the difference between the particles in solids, liquids and gases.

Sorting Materials

A material may be in one of three states: solid, liquid or gas.

Can you sort the materials into solids, liquids or gases?

Think carefully about each one.

Properties of Materials: Solids

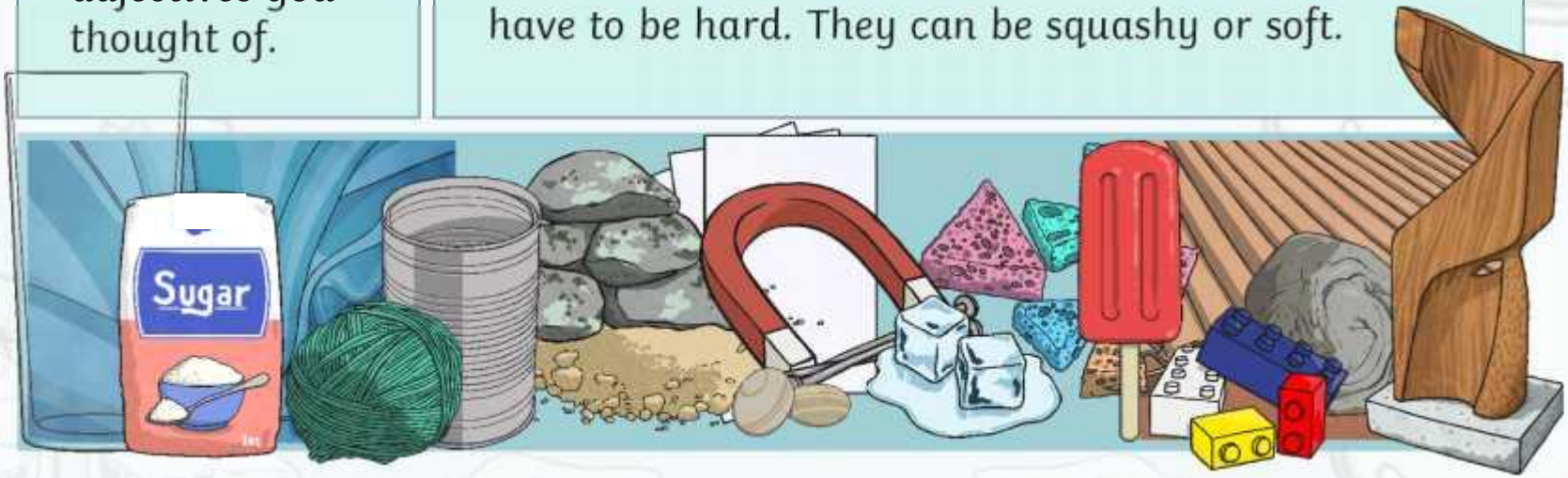
These items are all solids!

What do they have in common? Share the adjectives you thought of.

Materials in a solid state keep their shape unless a force is applied to them.

Solids can be cut, squashed or twisted. They will not change shape on their own.

Solid materials always take up the same amount of space. They do not spread out or flow. Solids do not have to be hard. They can be squashy or soft.



Properties of Materials: Liquids

These items are all liquids!

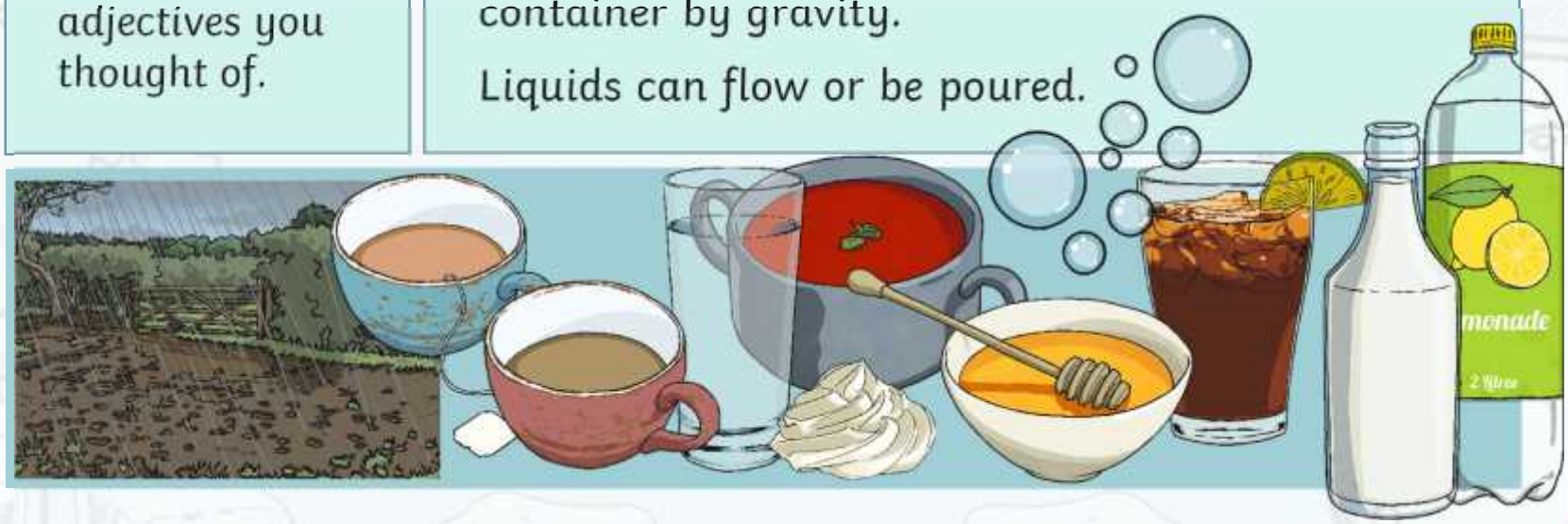
What do they have in common? Share the adjectives you thought of.

Materials in a liquid state take the shape of the container they are in.

Although liquids can change shape, they do not change their volume. This means they still take up the same amount of space.

Liquids are pulled down to the bottom of a container by gravity.

Liquids can flow or be poured.



Properties of Materials: Gases

These items are all gases!

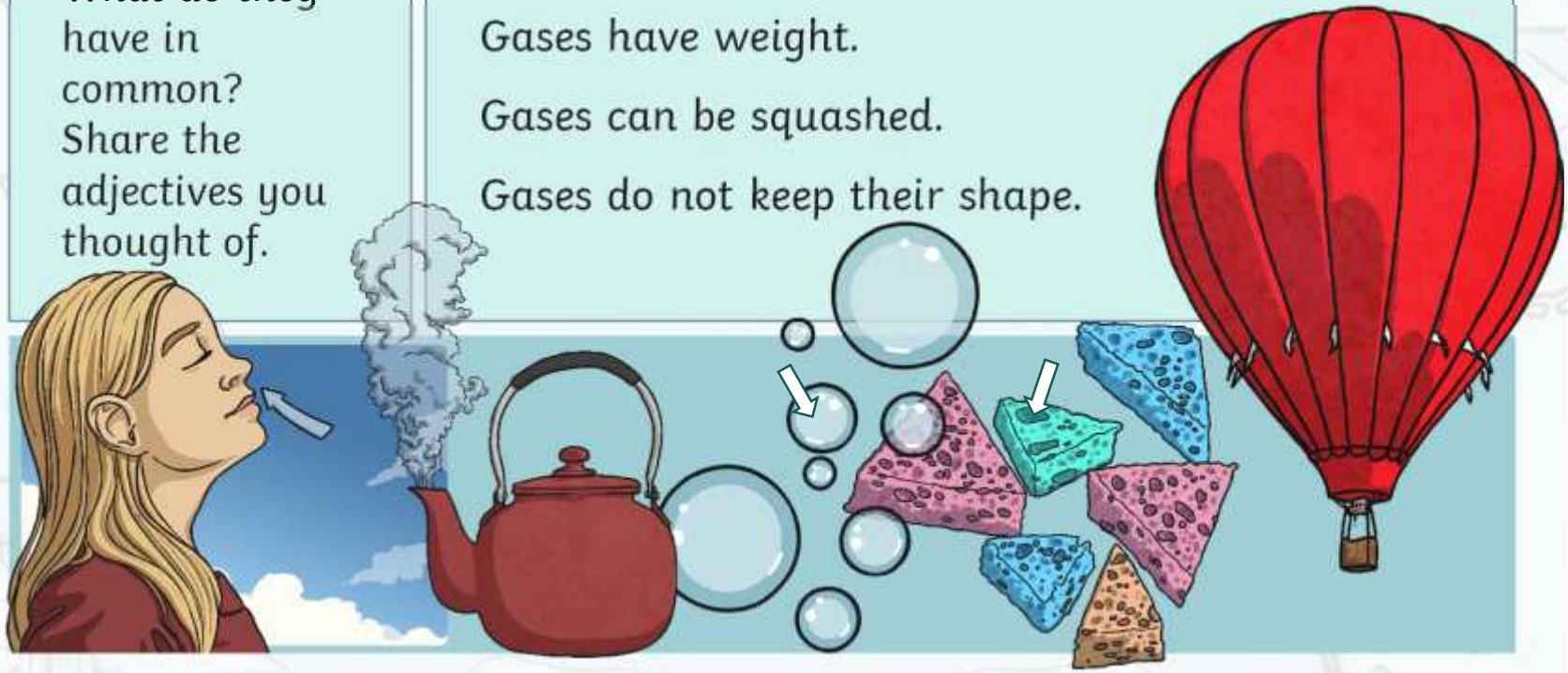
What do they have in common? Share the adjectives you thought of.

Materials in a gaseous state can spread out to completely fill the container or room they are in.

Gases have weight.

Gases can be squashed.

Gases do not keep their shape.



Properties of Materials

Can you match the properties with the correct state?

Talk to your partner to help you.

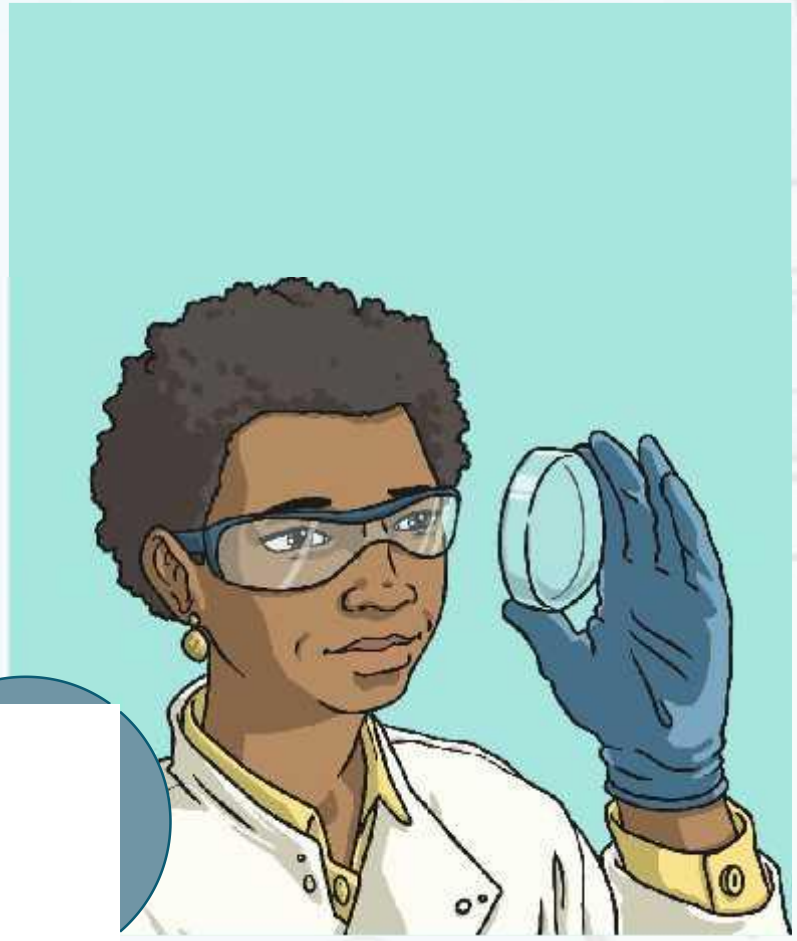
 solid	 liquid	 gas
Spreads out to fill a space.	Keeps its shape.	Can be cut, squashed or torn.
Takes the shape of the container it is in.	Can be poured.	Does not have any fixed shape.

Particles

We can explain the differences between solids, liquids and gases by knowing what they are made of.

Scientists have found out that all materials are made of very tiny particles. These particles are so small that we cannot see them with our eyes, or even with a microscope!

The position and behaviour of the particles is different in solids, liquids and gases.

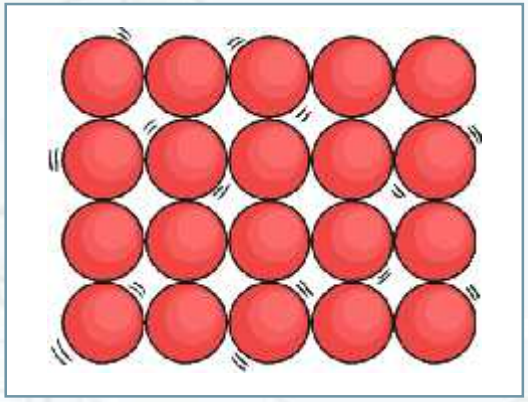


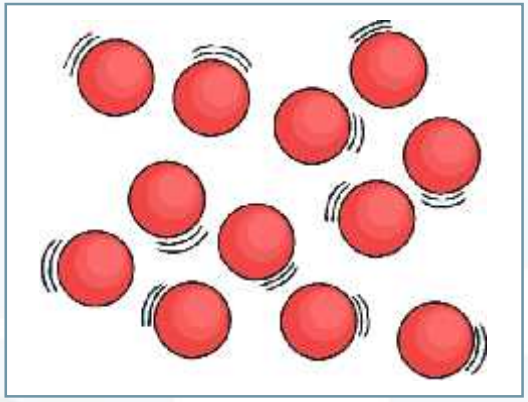
Particles and Properties

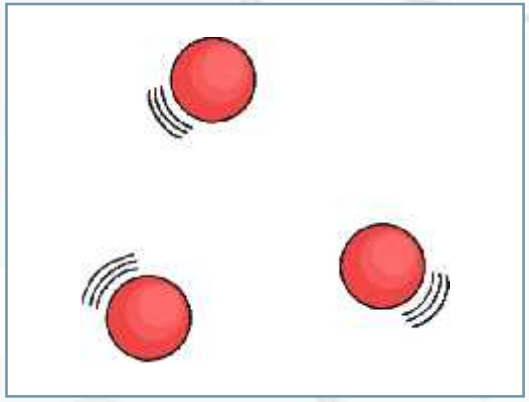
You are going to work as groups to demonstrate the differences in each state!

Follow the instructions on your group's Particle Information Card to find out what you need to do.

Then watch each others' demonstrations to learn about the behaviour of particles in solids, liquids and gases.



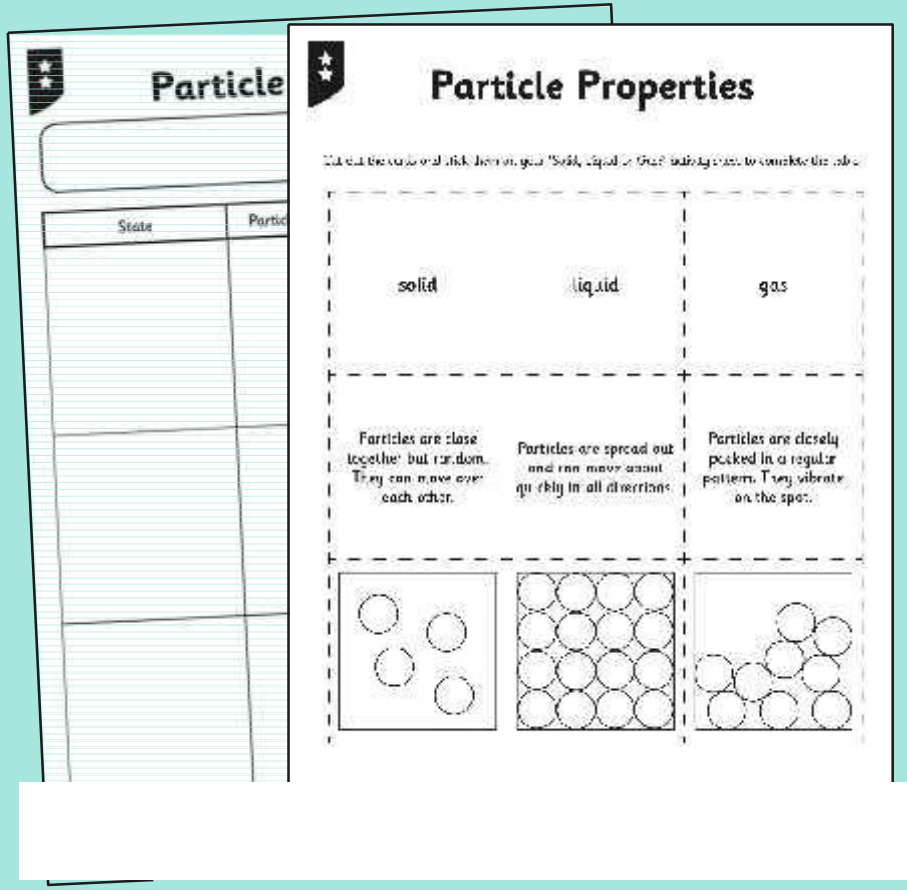




Particles and Properties

Now you have watched the demonstrations, have a look at the information boxes on your Particles and Properties Activity Sheet.

Can you work out which diagram and explanation goes with each state?

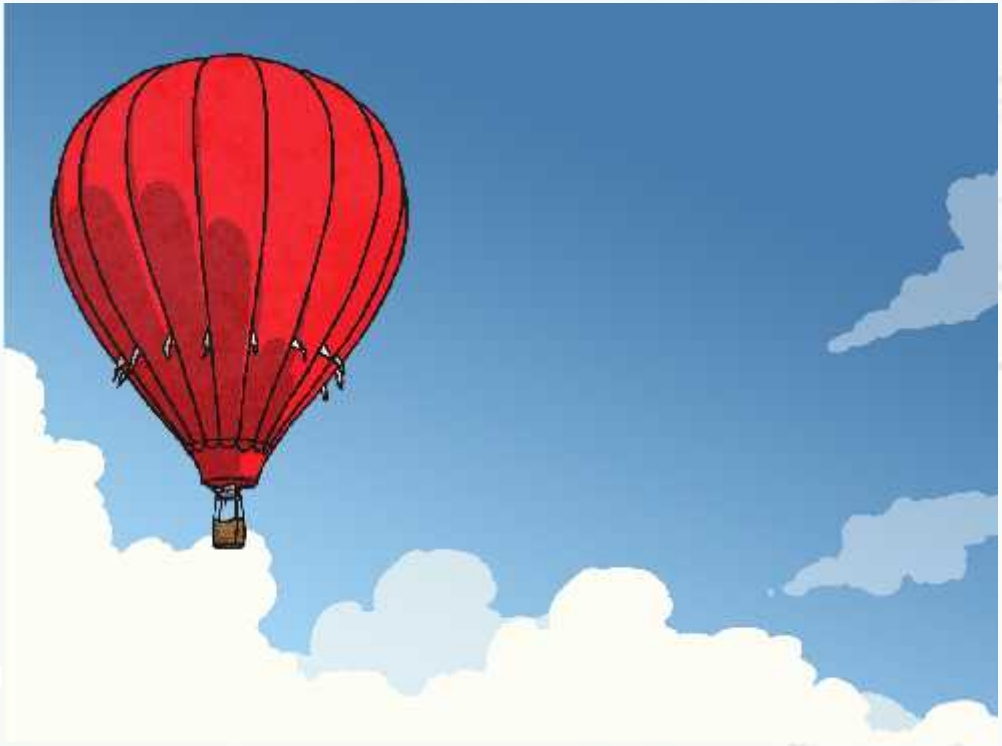


Spotting States of Matter

Watch this short film containing clips of different solids, liquids and gases.

See which materials you can spot, and which states of matter they are.

Share your ideas with the rest of the class.

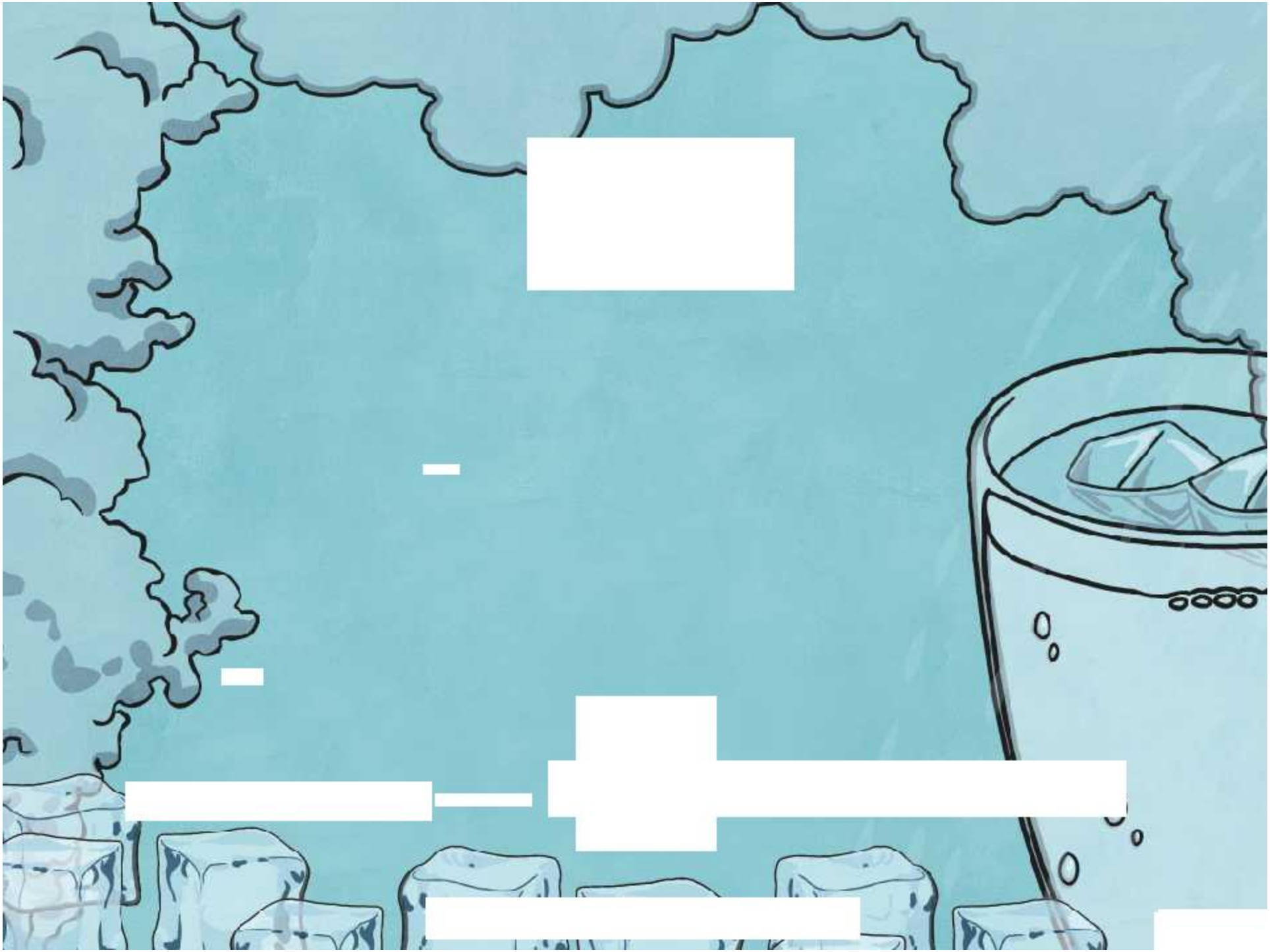


Aim

- I can sort and describe materials.

Success Criteria

- I can sort materials into solids, liquids or gases.
- I can describe the properties of solids, liquids and gases.
- I can show the difference between the particles in solids, liquids and gases.



States of Matter: Solid, Liquid or Gas?

Aim:	**Success Criteria:**	**Resources:**
To compare and group materials together, according to whether they are solids, liquids or gases by sorting and describing materials into solids, liquids and gases. I can sort and describe materials.	I can sort materials into solids, liquids or gases. I can describe the properties of solids, liquids and gases. I can show the difference between the particles in solids, liquids and gases.	**Lesson Pack** Access to the school hall or an outside space
	Key/New Words: Solid, liquid, gas, particles, state, material, properties.	**Preparation:** Differentiated **Solids, Liquids and Gases Sorting Cards** cut out - one per group. **Particle Information Cards** Differentiated **Particles and Properties Activity Sheet** - one per child.

Prior Learning: It will be helpful if children have studied materials and their properties in earlier year groups.

Learning Sequence

	**Sorting Materials:** Explain that there are three states of matter: solid, liquid and gas. Sort the children into mixed ability groups and ask them to sort the items on the differentiated **Solids, Liquids and Gases Sorting Cards**. Guide groups where necessary to sort the easier items first. Listen to conversations within the groups and look for children who have a good prior knowledge of the states of matter and their properties to assist with future planning.	
	**Properties of Materials:** Share the answers from the sorting card activity using the images on the **Lesson Presentation**. Point out and explain the trickier materials: honey is a liquid even though it is viscous; a sponge is a solid, but the spaces inside the sponge are full of air, which is a gas; and the bubbles within the lemonade are carbon dioxide (gas) inside a liquid. Ask children for any words they can think of to describe the materials and states. Explain the properties of solids, liquids and gases using the information on the **Lesson Presentation**. Address any misconceptions or issues arising.	
	**Properties of Materials:** Ask children to talk to a partner to match the states to their properties on the **Lesson Presentation**.	
	**Particles:** Using the **Lesson Presentation**, share key information about particles. Look at how they are arranged and how they behave in solids, liquids and gases.	
	**Particle Behaviour:** Organise children into three equal groups to demonstrate the difference between the particles in solids, liquids and gases using drama and movement. Give each group a card from the **Particle Information Cards** and ask them to follow the instructions to prepare their demonstration. Allow the groups to watch one another's demonstrations in the Hall or outside.	
	**Particles and Properties:** Children match the three states with their particles and properties using the **Particles and Properties Activity Sheet**. Look for children who can accurately identify solids, liquids and gases and understand their properties.  Children match the states to the particle arrangements and materials.  Children match the states to the particle arrangements and properties.  Children match the properties of materials to the states of matter.	
	**Spotting States of Matter:** Show the **States of Matter Photo Pack Lesson 1**. Ask the children to spot the different materials and their states while they look through them. Collect responses.	

Task*it*

Collectit: Make a collection of materials and display them in three groups - a group of solids, a group of liquids and a group of gases.

Labelit: Use **this worksheet** to label the different items as solids, liquids or gases.

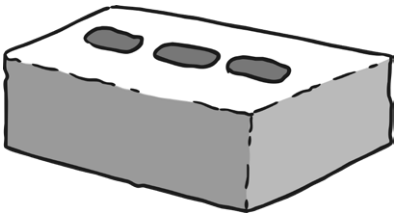
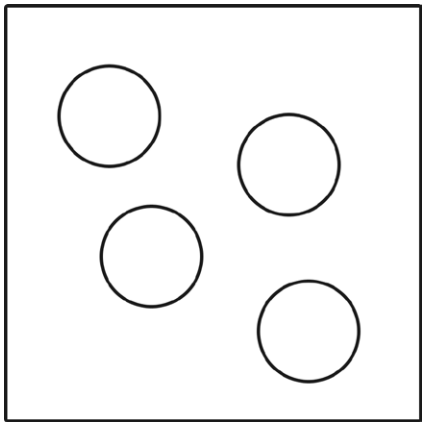
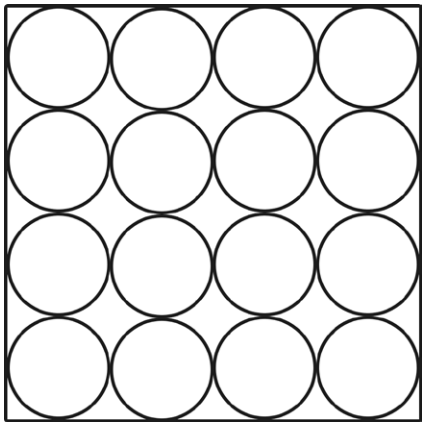
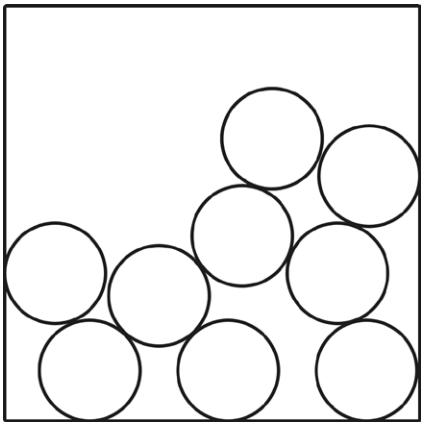
Craftit: Make a collage of different materials by cutting pictures out of magazines or catalogues. Group the materials into solids, liquids and gases.

Particle Properties

State	Particle Arrangement	Material

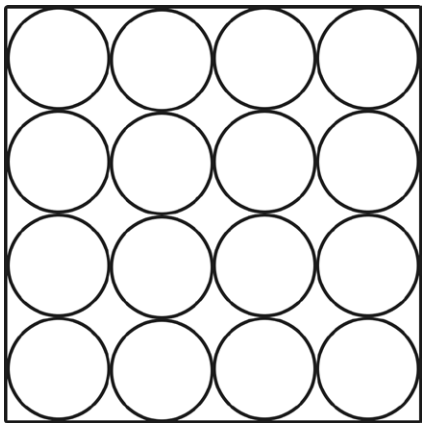
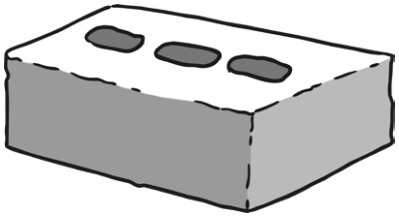
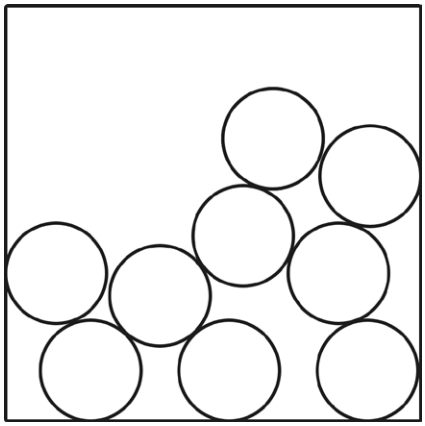
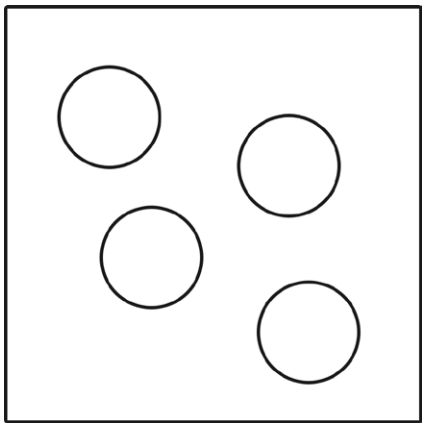
Particle Properties

Cut out the cards and stick them on your 'Solid, Liquid or Gas?' activity sheet to complete the table.

solid	liquid	gas
		
milk	brick	helium
		

Particle Properties **Answers**

Cut out the cards and stick them on your 'Solid, Liquid or Gas?' activity sheet to complete the table.

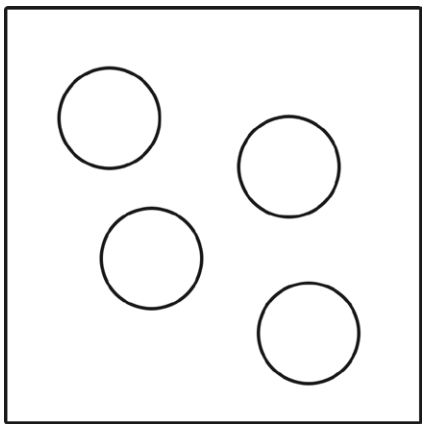
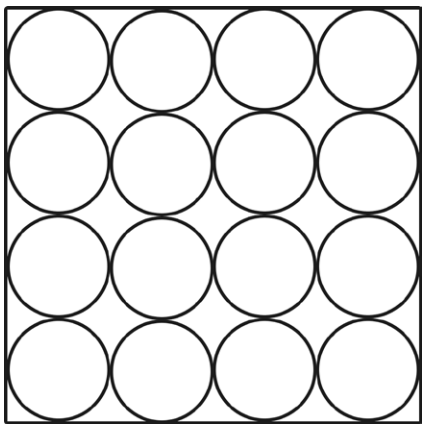
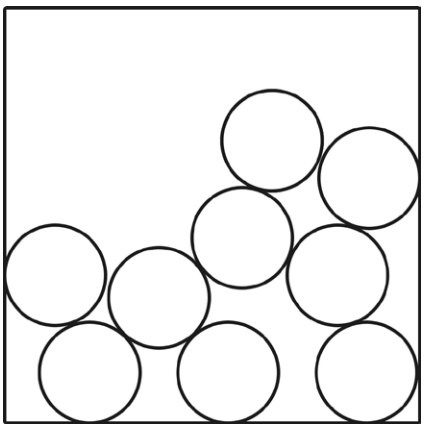
State	Particle Arrangement	Material
solid		 brick
liquid		 milk
gas		 helium

Particle Properties

State	Particle Arrangement	Particle Properties

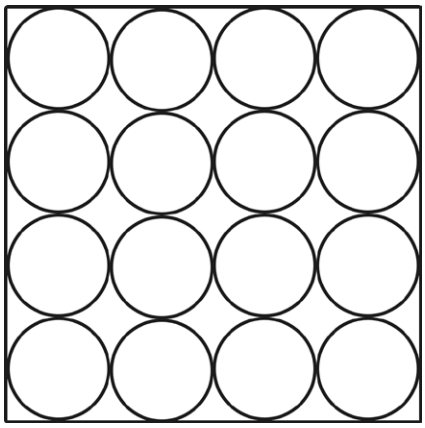
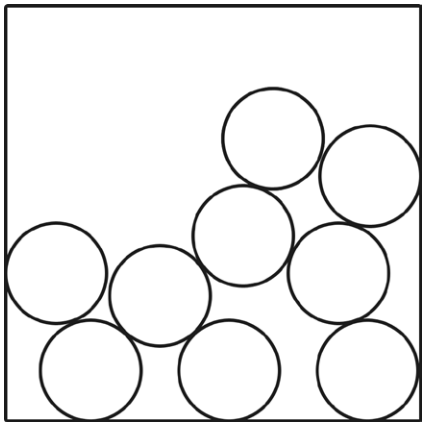
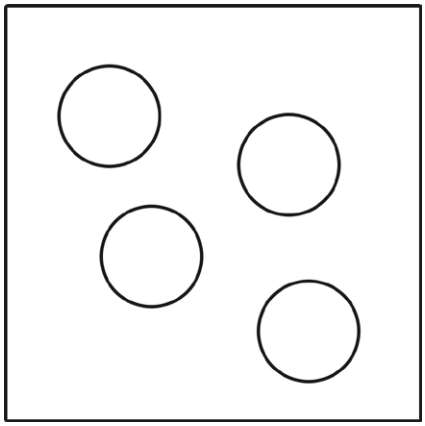
Particle Properties

Cut out the cards and stick them on your 'Solid, Liquid or Gas?' activity sheet to complete the table.

solid	liquid	gas
Particles are close together but random. They can move over each other.	Particles are spread out and can move about quickly in all directions.	Particles are closely packed in a regular pattern. They vibrate on the spot.
		

Particle Properties **Answers**

Cut out the cards and stick them on your 'Solid, Liquid or Gas?' activity sheet to complete the table.

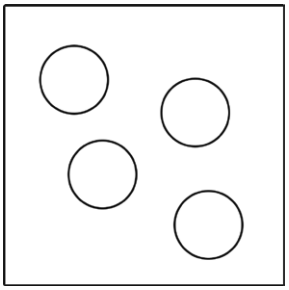
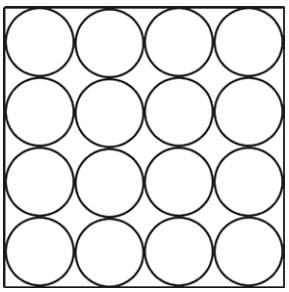
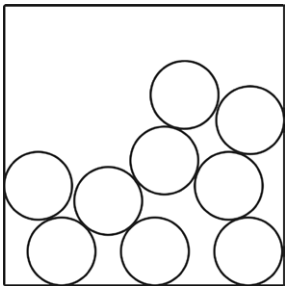
State	Particle Arrangement	Particle Properties
solid		Particles are closely packed in a regular pattern. They vibrate on the spot.
liquid		Particles are close together but random. They can move over each other.
gas		Particles are spread out and can move about quickly in all directions.

Particle Properties

State	Particle Arrangement	Particle Properties	Material Properties

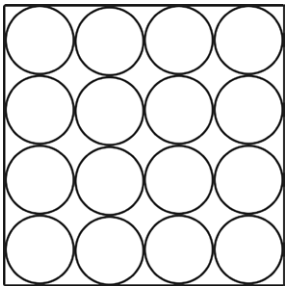
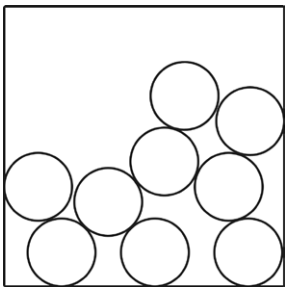
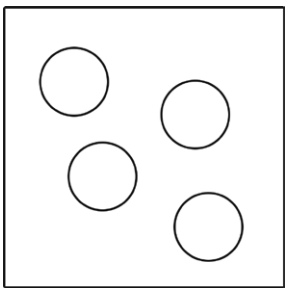
Particle Properties

Cut out the cards and stick them on your 'Solid, Liquid or Gas?' activity sheet to complete the table.

solid	Particles are close together but random. They can move over each other.		Keeps its shape unless a force is applied to it. Remains the same volume.
liquid	Particles are spread out and can move about quickly in all directions.		Does not keep its shape. Can spread out to fill the space it is in.
gas	Particles are closely packed in a regular pattern. They vibrate on the spot.		Takes the shape of the container it is in. Stays the same volume.

Particle Properties **Answers**

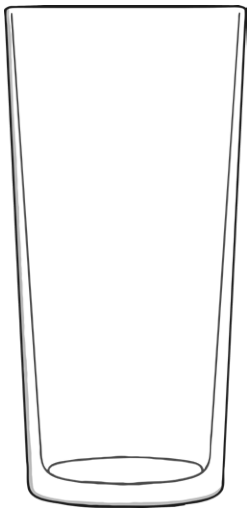
Cut out the cards and stick them on your 'Solid, Liquid or Gas?' activity sheet to complete the table.

State	Particle Arrangement	Particle Properties	Material Proprieties
solid		Particles are closely packed in a regular pattern. They vibrate on the spot.	Keeps its shape unless a force is applied to it. Remains the same volume.
liquid		Particles are close together but random. They can move over each other.	Takes the shape of the container it is in. Stays the same volume.
gas		Particles are spread out and can move about quickly in all directions.	Does not keep its shape. Can spread out to fill the space it is in.

Solid, Liquid or Gas?

Carefully cut out the cards on the other pages and sort them into the correct categories.

Solid	Liquid	Gas



glass

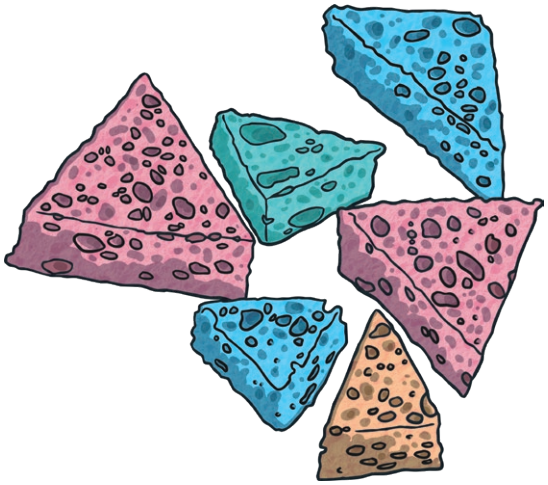
tea

clay

lemonade

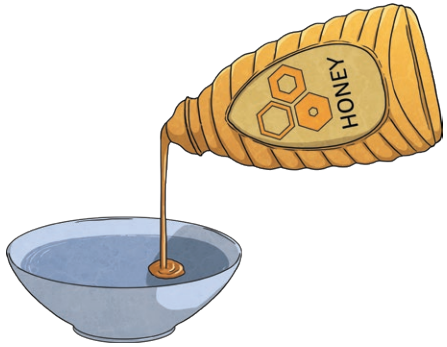
sugar

hot air

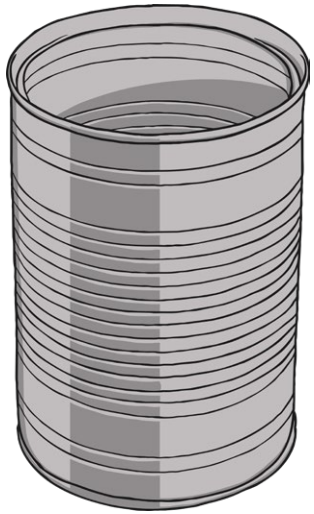


sponge

fabric



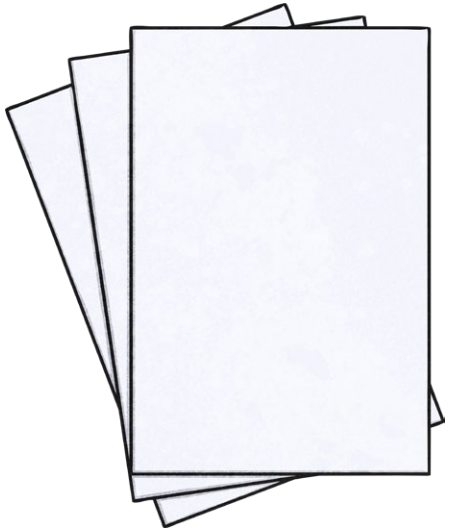
honey



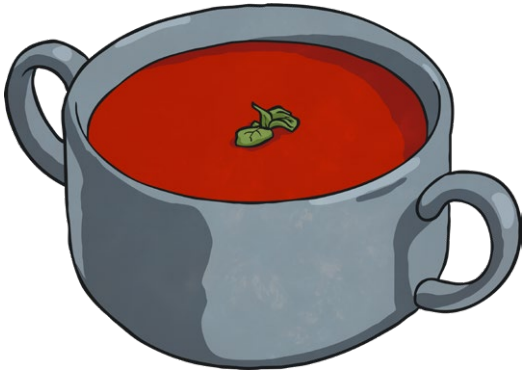
metal

sand

cream



paper

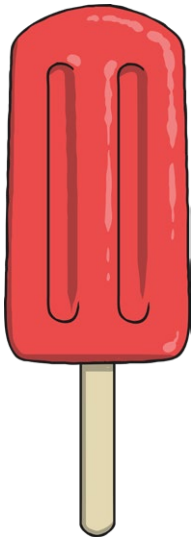


soup

wool

steam

ice



ice lolly

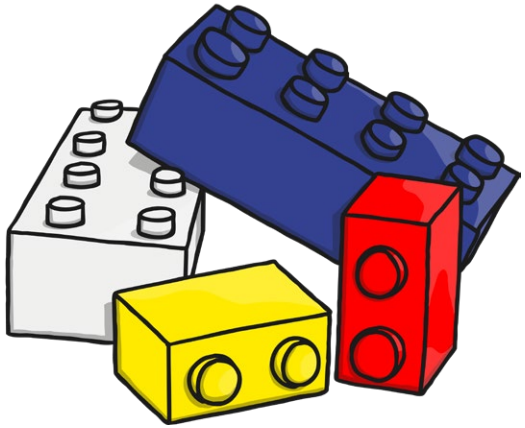
wood

juice

oxygen

rocks

rain



plastic

Solid, Liquid or Gas? **Answers**

Carefully cut out the cards on the other pages and sort them into the correct categories.

Solid	Liquid	Gas
glass	tea	hot air
clay	lemonade	steam
sugar	honey	oxygen
sponge*	cream	
fabric	soup	
metal	juice	
sand	rain	
paper		
wool		
ice**		
ice lolly		
wood		
rocks		
plastic		

*A sponge is a solid, but the spaces inside the sponge are full of air, which is a gas.

** Ice is a solid but it turns into a liquid (water) once melted.

Solids

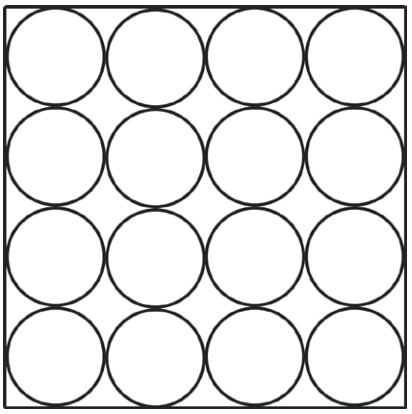
You are the Solids group!

You will work together to act as the particles in a solid material.

In a solid, the particles are close together in ordered rows. They move a little bit on the spot.

Organise your group into rows. Make sure you stand close to each other! Each person should gently move on the spot.

Show your demonstration to the rest of the class.



Liquids

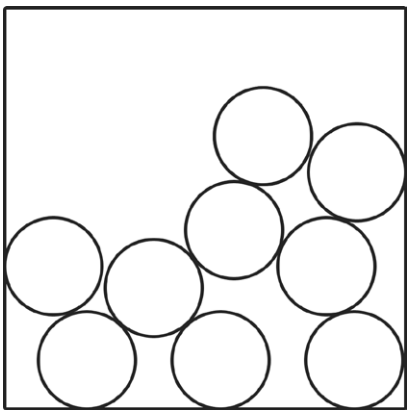
You are the Liquids group!

You will work together to act as the particles in a liquid material.

In a liquid, the particles are quite close together, but can move around each other easily. They move quite a bit, moving gently past each other.

Organise your group so that you are all standing near to each other in a crowd. Each person should gently move around the other people in the group, walking to new positions all the time.

Show your demonstration to the rest of the class.



Gases

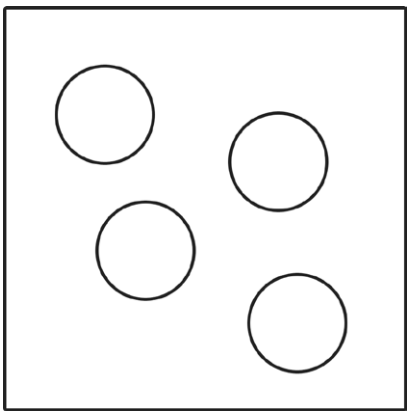
You are the Gases group!

You will work together to act as the particles in a gas.

In a gas, the particles can move around very quickly in all directions. There is a lot of space between each particle.

Organise your group so that you are all standing apart from each other. Make sure you are spread out around the space you are in. Each person should move quickly around the space in different directions. Make sure you take care when you are moving around.

Show your demonstration to the rest of the class.




C 6120
REVIVAL
C61-20
SL C61復活号

Answers

Photo 1 – liquid

Photo 2 – gas

Photo 3 – liquid and gas

Photo 4 – gas

Photo 5 – solid

Photo 6 – gas

Photo 7 – gas

States of Matter | Solid, Liquid or Gas?

I can sort and describe materials.		
I can sort materials into solids, liquids or gases.		
I can describe the properties of solids, liquids and gases.		
I can show the difference between the particles in solids, liquids and gases.		

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