Solids, liquids and gases

Materials can be solids, liquids or gases. These are states of matter. When a solid is heated it can change state, first to a liquid and then to a gas. When a gas is cooled it can change state, first to a liquid and then to a solid. When water is a solid, we call it ice.

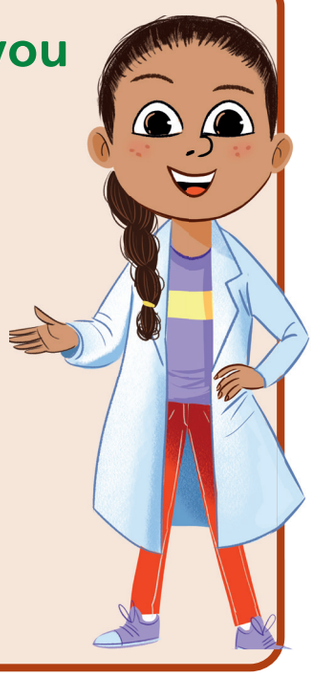
In this topic we will learn:

- how to identify materials as solids, liquids or gases
- how to describe some common properties of solids, liquids and gases
- that solids made of very small particles are a bit like liquids in some ways
- that temperature is a measure of how hot or cold something is
- that temperature is measured in degrees Celsius (°C) using a thermometer
- that water can be in three different states
- that different substances change state at different temperatures.

Does it sometimes get very hot or very cold where you live? When it is hot, puddles of water evaporate quickly. When it is very cold, puddles of water can freeze over.

Here are some key words to help you

solid
liquid
gas
pour
compress
viscous
temperature
change state
thermometer
melting
boiling
evaporating
freezing
condensation



Choose two key words from the box above.
Write or draw what they mean.

Solids

1 Draw **four** different things that are **solids**.
Write the name of each object you draw.

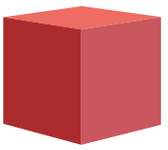
2 a) Circle **one** word that means *compress*.

stretch squash swing snap

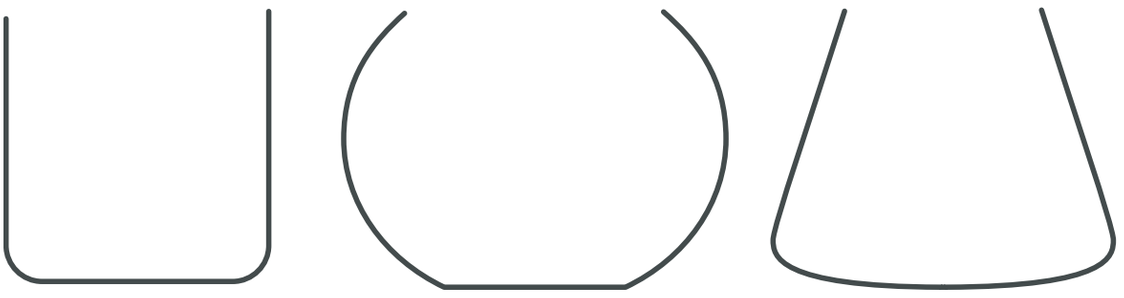
b) Tick (✔) **all** the statements that correctly describe solids.

Solids can flow.	
Solids keep their shape.	
Solids can be poured.	
Solids are easy to compress.	
Solids have a fixed shape.	

3 This cube is a solid.
Predict what the cube looks like inside each of these containers.

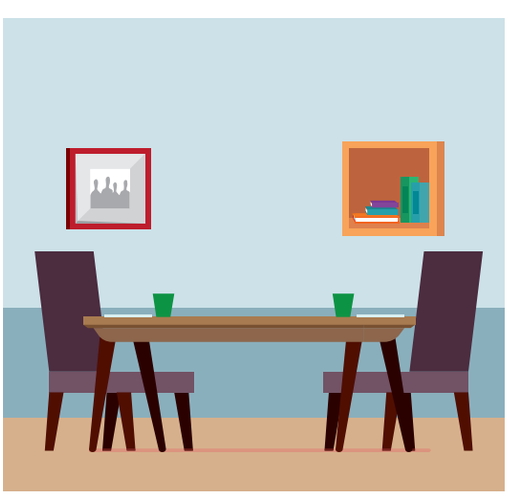


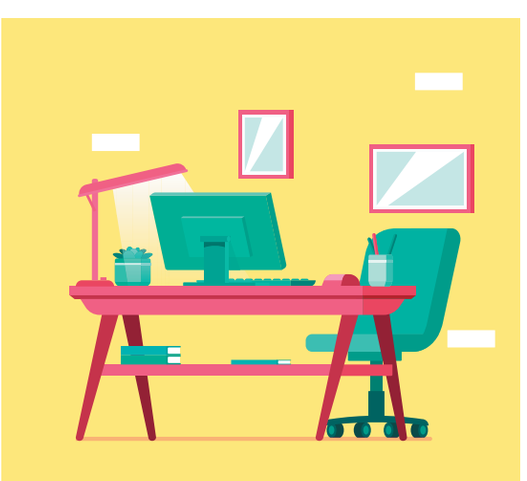
Draw **one** cube in **each** container for your answer.



4 Look for **four** solids in **each** picture. Write their names.

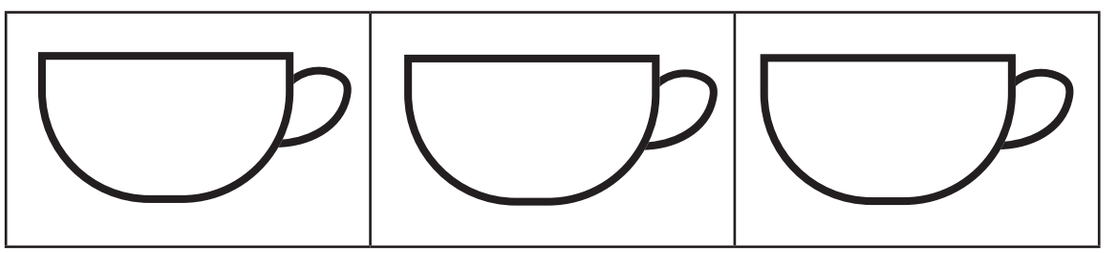
Do not choose the same things in each picture.



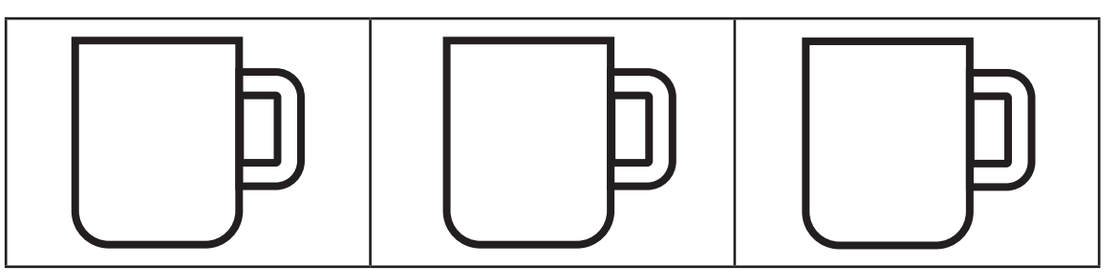


Liquids

1 a) Draw **three** different liquids in these cups.



b) Now draw the **same** three liquids in these mugs.



c) Explain why the liquids look different shapes in the cups and the mugs.

_____

2 These liquids are in different containers.
Circle all the **beakers**.

3 a) Write **one** word to complete the sentence.

This liquid is being _____.

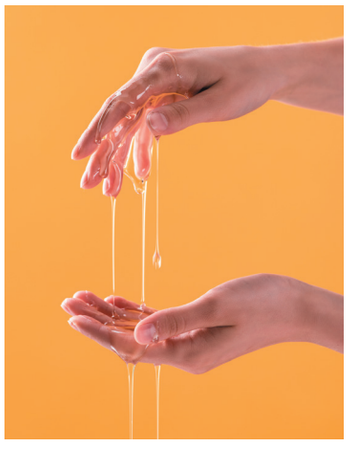
b) Some of the liquid misses the glass. Explain why that part of the liquid looks like this.

_____

_____

c) Write **one** word to complete the sentence.

This liquid is _____ from one hand to the other.



4 Tick (✔) **all** the statements that correctly describe liquids.

Liquids can flow.	
Liquids change their shape.	
Liquids can be poured.	
Liquids are very easy to compress.	
Liquids take the shape of their container.	

Gases

1 Draw **one** line from each of these to show whether it is is a **solid**, a **liquid** or a **gas**.

milk	
air	solid
wood	liquid
helium	gas
plastic	

2 Tick (✔) **all** the columns next to statements that describe gases.

Gases can be poured.	
Gases change their shape.	
Gases move around.	
Gases are very easy to compress.	
Gases have a fixed shape.	
Gases fill the space they are in.	
Many gases are invisible.	

3 Some balloons stand up very straight like this.

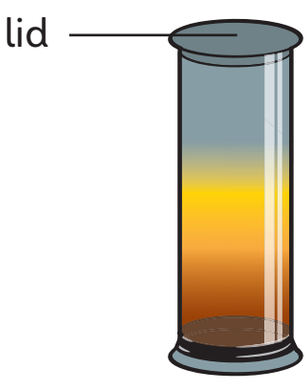
a) Which gas is inside this balloon? _____

b) Which gas is all around us? _____

4 A scientist has brown gas in a jar.

What happens if she takes the lid off?

Draw your prediction in the box below.



5 a) Maria blows some bubbles.
Circle the bubble that has the **most** gas inside it.

b) Name the gas that is inside the bubbles.

_____

Solid, liquid or gas?

1 a) Label this drink to show a **solid**, a **liquid** and a **gas**.
Use a word and a label line each time.

b) Rio blows lots of air down the straw.
Draw on the picture what the drink looks now.

2 Name **two** different gases.

1. _____ 2. _____

3 a) Look at these two pictures.

juice **sand**

Complete the sentences using words from the box.
Words can be used only **once**.

liquid	gas	solid	pile
pool	grain	tiny	big

Juice is a _____ and sand is a _____.

When it is not in a container, juice makes a _____, but sand makes a _____.

Sand is made of lots of grains. Each _____ is a _____ solid.

b) Which **two** of these have properties most like **sand**?
Circle **two** words.

oranges sugar wood metal salt milk

Comparing liquids

1 The picture shows some honey.

a) Draw lines and write the words to label a **drip** and a **pool**.

b) The honey is viscous.
Circle the correct meaning of *viscous*.

we can eat it it flows slowly it has a fixed shape

c) Predict what honey will look like in this container.
Draw your prediction.

2 Plan an investigation to compare how viscous some liquids are.

a) Write a scientific question that can be tested.

_____

_____

b) What will you change in your investigation?

_____

c) What will you observe or measure?

_____

d) Predict which liquid is most viscous. _____

e) Draw and label your equipment.

3 a) Complete the table for your results.

- Put the names of the liquids in the **first** column.
- Put units for time in the column heading **only**.

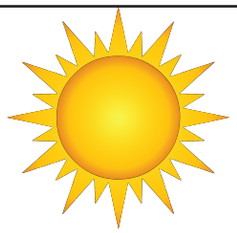
b) Write a conclusion to answer your scientific question.

_____

_____

Temperature

1 Write **hot** or **cold** under each picture.

2 This learner is measuring.

a) Circle **one** word to show what she is measuring.

colour length temperature time

b) Name the measuring equipment she is using.

_____

3 This child is eating food.

a) Do you think the food is **hot** or **cold**?

_____

b) What evidence is there to support your choice?

_____

c) Draw a picture of a place that is **hot** and a place that is **cold**.

hot

cold

Using a thermometer

1 a) What is a thermometer used to measure?
Write **one** word.

_____

b) In what unit is temperature measured?

Write it in **words** on the line. Write the **symbol** in the box.

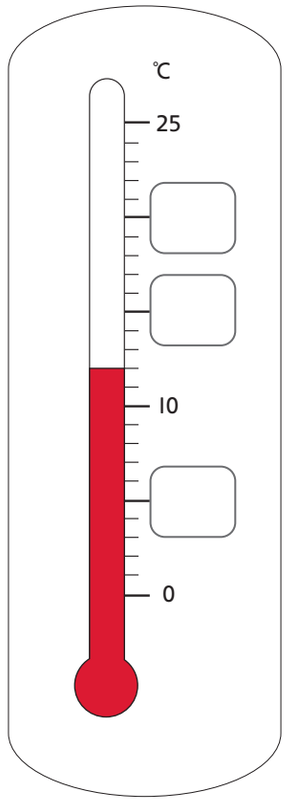
unit _____

2 a) Complete the scale on this thermometer by writing the missing numbers.

b) What temperature does the thermometer show? Write the unit too.

_____

c) Colour in more of the red part to show 21 °C.



3 What is this sort of thermometer used for?

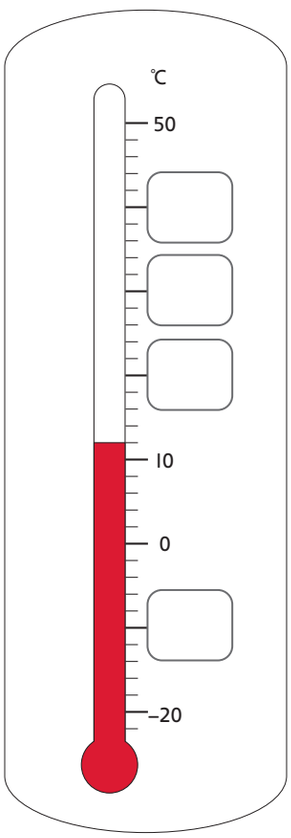
_____

4 a) Complete the **scale** on this thermometer by writing the missing numbers.

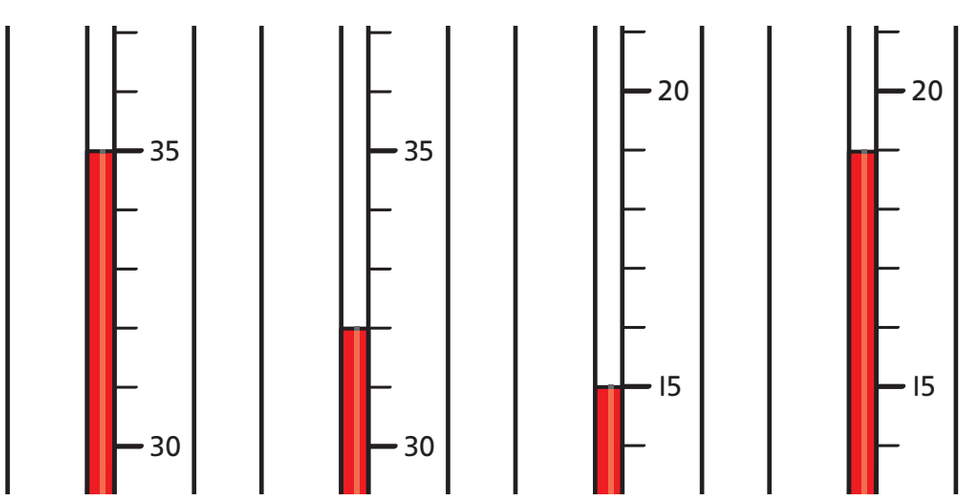
b) What temperature does the thermometer show?

_____

c) Colour in more of the red part to show 32 °C.



5 Write the temperature each thermometer scale shows.
Hint: write the missing numbers on the scales first.



_____ °C _____ °C _____ °C _____ °C

Changing state

1 a) What is happening to this ice cream? Write **one** word.

_____

b) Use a word and a line to label a part that is **solid** and a part that is **liquid**.

c) Solid and liquid are two states of matter.

Name **one** other state of matter. _____

2 Gold is a metal.
The picture shows hot, liquid gold.

a) Describe **one** thing you can see happening that shows this gold is a liquid.

_____

b) What state will the gold change into when it is cooled?

_____

3 Kasim says that this cheese, tomato and olive pizza is hot.

What evidence can you see to support his suggestion?

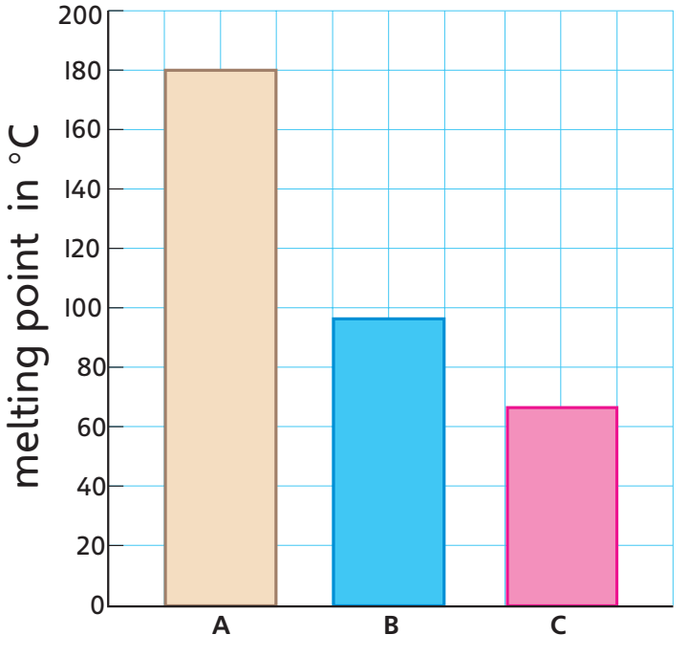
_____

4 The pictures show similar size blocks of gold, chocolate and butter.

gold **chocolate** **butter**

Predict which one needs the highest temperature to make it melt. _____

5 The graph shows the temperature at which three different materials (**A**, **B** and **C**) melt.



a) At what temperature does **A** melt? _____

b) Which material melts at the lowest temperature? _____

c) Are any of them liquids at 100 °C? If so, which?

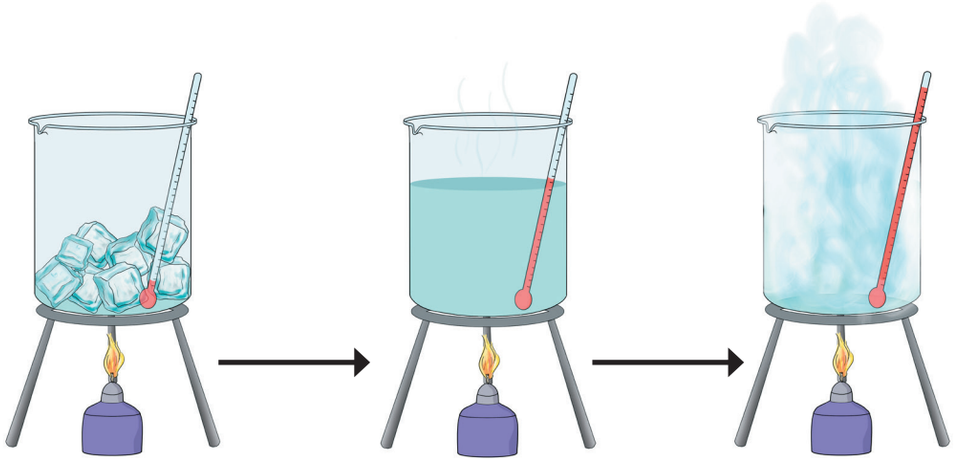
_____

States of water

1 Water can be in three different states.
Write the name of **one** state under **each** picture.

2 The diagram shows some ice cubes being heated.



a) Name the glass equipment the ice cubes are in.

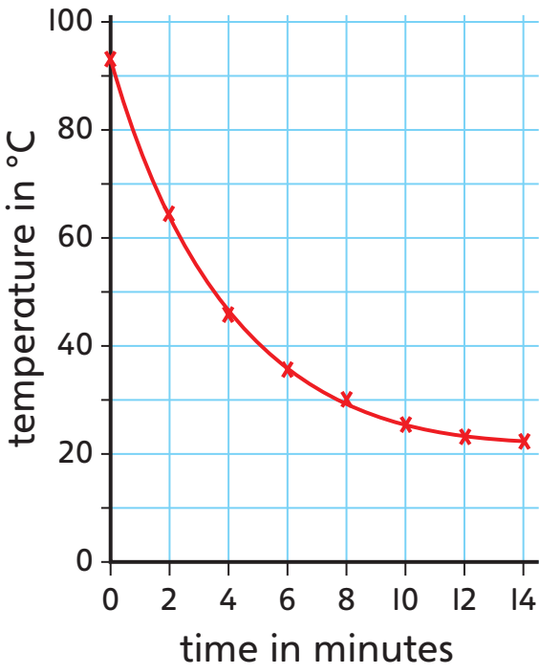
_____

b) (i) Write **liquid**, **solid** or **gas** *under* each part of the diagram.

(ii) Write **water**, **water vapour** or **ice** *above* each part of the diagram.

(iii) Write **evaporating** or **melting** on the two *arrows*.

3 Sudhir has a beaker of hot water. He measures the temperature of the water regularly and plots this graph.



a) Name **two** pieces of measuring equipment he needs.

1. _____ 2. _____

b) How many times does Sudhir measure the temperature of the water? ☐

c) How long does he wait before taking the next measurement? _____

d) Circle the result on the graph that shows when the water is at 30 °C.

e) Sudhir says the water is cooling. What evidence can you see on the graph that supports his statement?

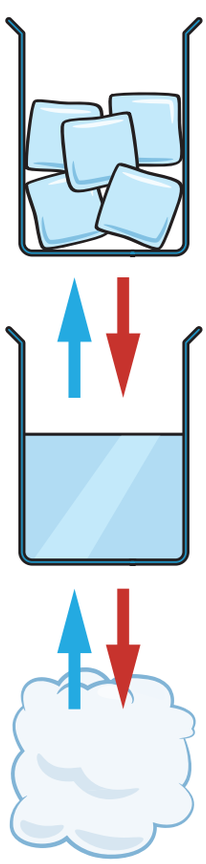
_____

More about water

1 The diagram shows water changing state.

a) Write **gas**, **liquid** or **solid** beside each picture. Write them all on the same side.

b) On the other side of each picture, write **water**, **ice** or **water vapour**.



c) Write **one** word from the box beside each of the red and blue arrows.

melting	condensation	freezing	evaporation

2 Complete the sentences to describe the pictures.

On a cold window, water vapour in the _____ changes to liquid water.

This is called _____.

Liquid water on this tap has changed to a _____ called ice.

This is called _____.

3 Look at the thermometer on page 91 of your Textbook.

a) At what temperature does water **boil**? _____

b) At what temperature does water **freeze**? _____

c) In which state is water at **60 °C**? _____

d) In which state is water at **120 °C**? _____

4 A learner says this can must be very cold.

What evidence can you see that supports their statement?

_____

_____

What have I learned?

1 I can identify materials as solids, liquids or gases and I can see which they are.

I know this because I can write **solid**, **liquid** or **gas** under these pictures.

2 I can describe some common properties of solids, liquids and gases.

I know this because I can write **one** property of each.

solid: _____

liquid: _____

gas: _____

3 I understand that solids made of very small particles are a bit like liquids in some ways.

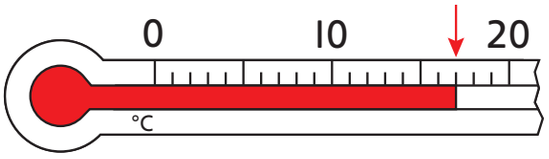
I know this because I can describe a property of solid sand that makes it look a bit like a liquid.

_____

4 I understand that temperature is a measure of how hot or cold something is.

I understand that temperature is measured in degrees Celsius (°C) using a thermometer.

I know this because I can write the temperature shown on this thermometer.



_____

5 I understand that water can be in three different states and changes from one state to another at different temperatures.

I know this because I know that water boils at _____ °C and freezes at _____ °C.

6 I understand that different substances change state at different temperatures.

I know this because I know that ice melts at a _____ temperature than metal.