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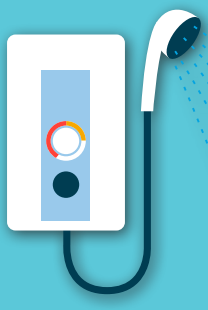
All about water

Join us on our watery adventure



United Utilities

Water for the North West

United Utilities

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Who are we?

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We have 3 million customers

We supply water in all homes and schools across the North West

We supply your home with clean water every day

Let's do some Science!

Solids, liquids and gases are called the **three states of matter.**

All substances are made from **atoms** or **molecules** (atoms joined together), also known as **particles**. The way that these particles move around determines whether the substance is a solid, liquid or gas.

Solids

In a solid, the particles are touching and packed closely together. They are fixed and cannot move.

The properties of solids include:

- A solid stays in one place and can be held.
- Solids can be cut or shaped.
- Solids keep their shape and volume and do not flow like liquids.
- Solids take up the same amount of space and do not spread out like gases.
- Even though they can be poured, salt, sugar and flour are all solids. Each particle keeps the same shape and volume.

Liquids

In a liquid, the particles are mainly touching, but some gaps have appeared in the structure. These gaps allow the particles to move, and so the particles are arranged randomly.

The properties of liquids include:

- Liquids can change their shape depending on the container they are in.
- Liquids can flow or be poured easily. They are not easy to hold.
- Even when liquids change their shape, they always take up the same amount of space and their volume stays the same.

Gases

In a gas, the particles are widely spaced and entirely free to move. They can whizz around at high speed.

The properties of gases include:

- Gases do not have a fixed shape.
- Gases can spread out and change their shape and volume to fill up whatever container they are in.
- Gases are often invisible.
- Gases can be squashed.

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Activity time

Water is a naturally occurring material which can be found in three states of matter: solid, liquid and gas. In the different states, the particles are:

- Really close together (when it's a solid)
- Mainly touching, but some gaps have appeared in the structure (when it's a liquid)
- Widely spaced and entirely free to move (when it's a gas).

Look at the following materials and write them in the correct box.

Wood	Oxygen	Milk	Feather	Ice	Helium
Steam	Pencil	Water	Air	Sea	Syrup

Solid	Liquid	Gas

Answers at the back of the booklet

The water cycle

More than 70% of the Earth's surface is covered with water, but 97% of that is in the oceans, and 2% is frozen in the polar ice caps.

The remaining 1% is freshwater found in rivers, lakes and underground. It is this 1% that we depend on for the water we need.

Pure water boils at 100°C and freezes at 0°C.

Water can be a solid, liquid or a gas.

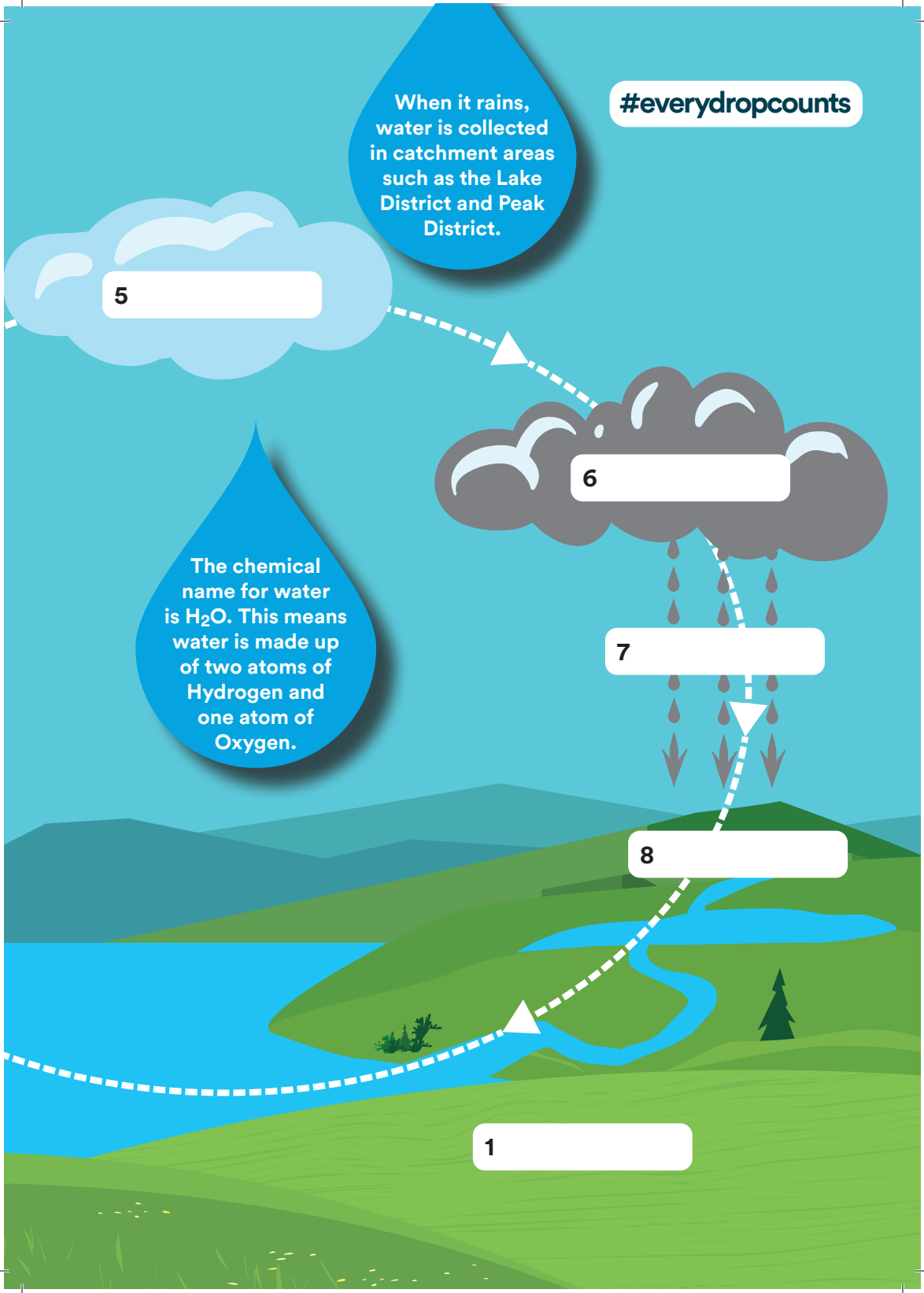
4 _____

3 _____

2 _____

The words below each play a part in the water cycle. Can you put them in the right place in the picture?

Condensation
Sun
Precipitation
Land
Sea
Collection
Evaporation
Cloud


When it rains, water is collected in catchment areas such as the Lake District and Peak District.
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5
6
The chemical name for water is H_2O. This means water is made up of two atoms of Hydrogen and one atom of Oxygen.
7
8
1

My water diary

Use this water diary to record your water usage for one week and work out whether you are a water waster or a water saver.

Activity		Monday	Tuesday	Wednesday	Thursday
	Have a bath				
	Have a shower				
	Flush the toilet				
	Have a drink				
	Wash your hands				
	Brush your teeth (turning the tap off)				
	Brush your teeth (leaving the tap running)				

The average person in the North West uses roughly 142 litres of water each day, which is...

Mark down how many times a week you do the activities...

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Friday	Saturday	Sunday	Total number for week		Litres per activity		Total number of litres
				x	80	=	
				x	30	=	
				x	9	=	
				x	$\frac{1}{4}$	=	
				x	1	=	
				x	1	=	
				x	12	=	
			Grand total				

994 litres per week!

Top Tips
for saving water at home

- Turn off the tap when you brush your teeth
- Have a shower instead of a bath
- Take a shorter shower, if possible stay in for no more than 4 minutes
- Use a bowl for washing the dishes
- Let your parent or guardian know to repair a dripping tap!
- Check there is a full load in the washing machine and dishwasher before they are used
- Use a watering can instead of a hosepipe to water the garden
- Get a water butt and collect the rain from your roof to water the garden
- Use a bucket instead of a hosepipe when washing the car

If you were to turn off the tap whilst brushing your teeth for two minutes, how many litres of water would you save?

- ☐ **5 litres**
- ☐ **7 litres**
- ☐ **11 litres**

Answers at the back of the booklet

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Match up the activity

Have a look at the pictures and draw a line to the amount of water you think each one uses.

80 litres

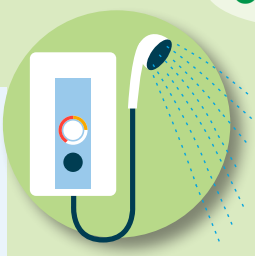
$\frac{1}{4}$ litre

12 litres

1 litre

9 litres

30 litres



Answers at the back of the booklet

Water safety

Reservoirs are large open areas of water which are used to store water before it gets treated.

Reservoirs may look inviting on a hot day but don't be fooled, they can be very dangerous places and a swim can soon become fatal.

You may swim well in a warm swimming pool but that does not mean you will be able to swim in cold water such as reservoirs, rivers, ponds or canals.

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Activity time *(Try this at home or at school)*

Design your own filter

When water from a reservoir arrives at the water treatment works it can be dirty or cloudy. The first thing that happens is that it has to be filtered to remove particles of mud and dirt.

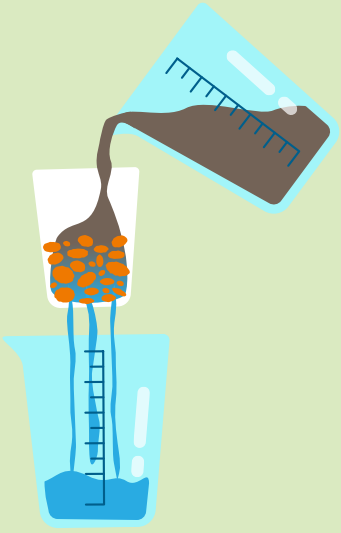
You will need:

- Sand, gravel, stones
- Muddy water (soil and water)
- 1 disposable plastic cup with small holes in the base
- 2 clear beakers

Place the sand gravel and stones in layers into the plastic cup. In small groups decide which order to place the sand, gravel and stones. Think about which material will be best at trapping the particles of soil.

Remember to leave some room at the top to pour the water on to. Hold you filter over the clear beaker to catch the water coming through the filter.

When the water has passed through the filter into the beaker, wait for the other groups to finish and compare them to see who has the cleanest water.



Where does the water go?

You use water in many different ways in your home such as washing your hands, having a shower or flushing the toilet. But have you ever thought about where that water goes?

Once you pull the plug or flush the loo, the dirty water goes into the drain and then into our sewers which flow to the nearest treatment works. Here we clean the water before safely returning it to rivers and the sea.

In the North West, we collect and treat the equivalent of 184,000,000 toilet flushes a day!

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We find some strange things down in the underground sewers such as children's toys and mobile phones. We think these get into the drains accidentally. But some people flush things such as wet wipes, cotton wool and ear buds thinking they're ok to go down the loo.

But all these products don't just disappear down the u-bend, they can stick together to form a blockage in the pipes which stops the dirty water from flowing down the sewer to be treated.

Sometimes the dirty water has nowhere to go and spills over the toilet seat flooding the bathroom and that's not very nice.

Help us to keep the sewers flowing by putting wet wipes and bathroom rubbish in the bin.

What kind of water saver are you?

Answer the questions and add up the total A, B and C's you get. Don't worry if you don't know some of the answers - you can leave them blank. Why not ask a grown up to complete the quiz, too?

1. Do you mostly have:

- Ⓐ Short showers
- Ⓑ Some baths, some short showers
- Ⓒ Baths filled to the brim

2. When you have a shower, do you stay in for:

- Ⓐ Up to 5 minutes
- Ⓑ 5-10 minutes
- Ⓒ Over 10 minutes

3. When you have a bath, do you:

- Ⓐ Only fill it a little bit
- Ⓑ Fill it about half-way
- Ⓒ Fill it to the brim

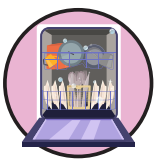
4. When you brush your teeth, do you:

- Ⓐ Turn off the tap whilst you brush
- Ⓑ Sometimes turn off the tap whilst you brush
- Ⓒ Leave the tap running all the time

5. Do you wait until you have a full load before using the washing machine?

- Ⓐ Always
- Ⓑ Sometimes
- Ⓒ Never

6. Do you wait until the dishwasher is full before using it?



- Ⓐ Always
- Ⓑ Sometimes
- Ⓒ I do not use a dishwasher

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7. To wash dishes in the sink, do you:

Ⓐ Use a washing up bowl
Ⓑ Put the plug in the sink and fill it up
Ⓒ Leave the tap running all the time

8. If you have a dripping tap, or shower that leaks, do you:

Ⓐ Fix it immediately
Ⓑ Get around to it eventually and collect the water for watering the plants
Ⓒ Ignore it

9. If you have a dual flush toilet (two buttons on it) do you...

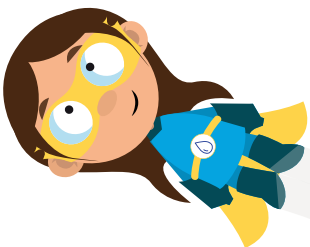
Ⓐ Always press the correct button
Ⓑ Sometimes press the correct button
Ⓒ Don't know which button to press so press both

10. To wash the car, do you:

Ⓐ Fill a bucket
Ⓑ Go to a car wash that recycles most of the dirty water
Ⓒ Use a hose-pipe

11. To water the garden, do you:

Ⓐ Use water from a water butt
Ⓑ Fill a watering can from the tap
Ⓒ Use a hose-pipe connected to the tap



Mostly Ⓐ Congratulations. You're a serious saver
Mostly Ⓑ Well done. You think water conservation is important
Mostly Ⓒ Thank you for your efforts, but try and change to some more A's!

Think before you flu

experiment

Toilet paper vs wet wipes

It's important to only flush the 3 Ps down the toilet - Pee, Poo and (toilet) Paper. they all flow through the sewers and reach the wastewater treatment works safely.

Sometimes, people flush other things such as wet wipes, cotton wool, ear buds and other bathroom rubbish.

Have a go at this experiment, and discover what happens to a wet wipe when it's flushed, compared to toilet paper.

Overview Put some toilet paper and a wet wipe into two separate containers and shake them as if they were flushed.

Apparatus

What equipment will I need?

- 2 plastic sealable containers or bottles with caps
- 2 pieces of toilet paper per experiment
- 1 wet wipe per experiment
- Tap water
- Clock or stopwatch for counting in seconds

Prediction

What do you think will happen?

Fair testing

How I will make it a fair test and keep all things the same?
The only difference should be the two types of material.
Write down four ways to make it a fair test.

Words to help you: ***container***, ***water***, ***time***, ***container***, ***size***

I will need to ensure the materials (wipe and toilet paper) are the same .....

I will need to use the same size and shape .....

I will need to use the same amount of .....

I will need to shake the ..... **for the same length of** .....

ush

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Both containers must have the same amount of water inside.

Use a clock or stopwatch to help time the experiment.

Method

What am I going to do?

- Put 500ml of water in to each container or enough for the container to be half full.
- Add one wet wipe to one container.
- Add two pieces of toilet paper to the second container.
- Shake each container for nine seconds to represent a toilet flush (a standard toilet flushes for nine seconds).
- Look at both containers and compare the materials inside.

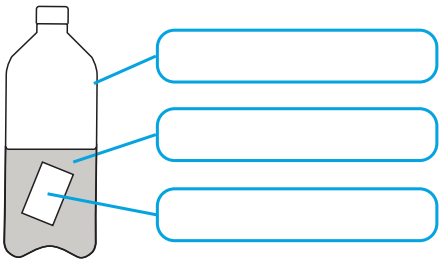
A diagram of my experiment

Label the apparatus

Container

Water

Wipe or toilet paper

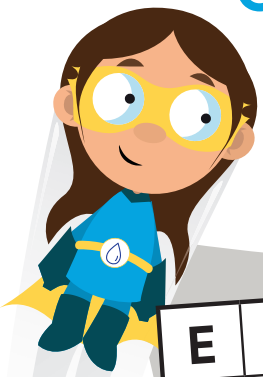


Results **What happened in the experiment?**

Conclusion **What did I find out and why did it happen?**

Water Cycle WORD SEARCH

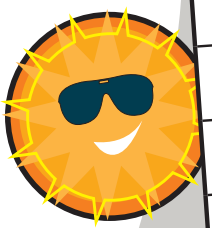
Can you find these words?



WORDS TO FIND:

1. Sea
2. Sun
3. Evaporate
4. Wind
5. Cloud
6. Rain
7. Collected
8. Stored
9. Treatment
10. Piped
11. Water cycle
12. Litres

E	L	C	Y	C	R	E	T	A	W
D	A	P	R	O	U	E	R	I	I
R	S	M	L	L	T	N	E	U	N
R	A	P	F	L	E	G	A	L	D
C	P	I	P	E	D	I	T	G	S
H	O	N	N	C	A	O	M	J	E
U	A	E	S	T	O	R	E	D	R
A	T	S	M	E	S	U	N	H	T
C	L	O	U	D	U	J	T	O	I
E	T	A	R	O	P	A	V	E	L



Water Safety
WORD SEARCH

WORDS TO FIND:

1. Cold
2. Drown
3. Pool
4. Reservoir
5. Signs
6. Warning
7. Deep
8. Lifeguard
9. Rescue
10. Safe
11. Swimming

D	R	G	G	E	S	D	E	H	E
R	R	I	N	N	W	L	F	T	U
O	M	A	O	I	I	O	A	G	C
W	S	P	U	V	M	C	S	G	S
N	P	I	O	G	R	M	N	G	E
L	O	O	P	A	E	I	I	A	R
S	I	G	N	S	N	F	S	W	W
R	E	S	E	R	V	O	I	R	S
L	M	W	A	P	E	E	D	L	R
R	S	W	O	C	O	E	Y	E	H

Answers

Science activity

Solid – Wood, ice, pencil, feather
Liquid – Milk, syrup, water, sea
Gas - Steam, air, helium, oxygen

The watercycle

1. Land	**5. Cloud**
2. Sea	**6. Condensation**
3. Evaporation	**7. Precipitation**
4. Sun	**8. Collection**

Top tips

You would save 11 litres

Match the activity

Have a bath	***80 litres***	***Wash you hands***	***1 litre***
Have a drink	$\frac{1}{4}$ ***litre***	***Flush the loo***	***9 litres***
Have a shower	***30 litres***	***Brush your teeth***	***12 litres***

Wordsearch

Water Cycle

E	L	C	Y	C	R	E	T	A	W
D	A	P	R	O	U	E	R	I	I
R	S	M	L	L	T	N	E	U	N
R	A	P	F	L	E	G	A	L	D
C	P	I	P	E	D	I	T	G	S
H	O	N	N	C	A	O	M	J	E
U	A	E	S	T	O	R	E	D	R
A	T	S	M	E	S	U	N	H	T
C	L	O	U	D	U	J	T	O	I
E	T	A	R	O	P	A	V	E	L

Water Safety

D	R	G	G	E	S	D	E	H	E
R	R	I	N	N	W	L	F	T	U
O	M	A	O	I	I	O	A	G	C
W	S	P	U	V	M	C	S	G	S
N	P	I	O	G	R	M	N	G	E
L	O	O	P	A	E	I	I	A	R
S	I	G	N	S	N	F	S	W	W
R	E	S	E	R	V	O	I	R	S
L	M	W	A	P	E	E	D	L	R
R	S	W	O	C	O	E	Y	E	H

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Well done!

You have completed your water adventure and you are now an

H_2O HERO

For more information, visit **www.unitedutilities.com** and search education to find our learning hub page, where fun activities like this booklet and more, can be found!

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Water for the North West