

Lesson 2 - How do we clean the water?

(The Water Treatment Process)



Before you start this session, please:

- **Print Session Information sheets**
- **Print Activity sheets 2:1, 2:2 and 2:3**
- **Make sure you have access to the internet so that you can watch video clips on YouTube.**
- **Collect together the following items to help you complete the experiment and activities in this lesson.**
 - **For Investigation 1:** collect a jug of water with some compost in it, and you will need a large clear plastic bottle, scissors, sand or filter paper or cotton wool, pebbles or pasta, gravel, or lentils or rice.
 - **For Investigation 2:** ask a grownup to set up the water quality investigation or set it up so you can try it on your family. They will need 4 or 5 cups with water in them, to the cups of water add a small amount of 1 of the following: salt, coffee, tea, white vinegar, sugar, soft drink etc (if you have some) - you need less than a teaspoon of each.

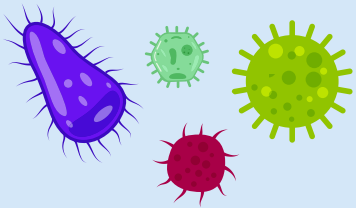
How do we clean the water?

(The water treatment process)

Let's get started

In the last session we learned about the water cycle. Well, Anglian Water has a big role to play in that water cycle. We take water out of the water cycle from sources like reservoirs or deep underground stores and clean it before pumping it to our customers for them to use.

Before water is piped to homes, schools, factories and farms it must be treated and cleaned. It is treated for 3 reasons:



To remove germs and make it safe to drink



To remove small solid particles and make it clean



To remove any unpleasant smells

Making dirty water clean

Water treatment in the Anglian Water region takes place at one of more than 140 water treatment works. These are working every hour of the day and night to make sure the water sent to your homes, schools, factories and shops is clean, safe and healthy.

The type of treatment depends on where the 'raw' water comes from.

If it comes from deep underground (groundwater) it is usually quite clean and requires less treatment than if it comes from a reservoir or river (surface water).



To find out how we treat the water watch the video [The Water Treatment Process](#) on the Education playlist or look at the Supporting Information sheet.

Using the information from the video, label The Water Treatment Process in Activity sheet 2:1.

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Let's do some investigations:

Filtering water and testing the water

Investigation 1:

So now we understand how water is cleaned by Anglian Water let's have a go at filtering some dirty water ourselves.

Have a look at the Filtration Activity sheet 2:2 and have a go at the investigation.

When you have finished think about which part of the Anglian Water clean water treatment process this is like.

Would the water you have filtered be safe to drink?
(Do not drink it!)

No! It still has bacteria in it

How does Anglian Water kill the bacteria?

Investigation 2:

Once Anglian Water has cleaned water from the environment, we test it to make sure it is safe to drink.

Let's look at how.

Samples of water are collected by members of the Anglian Water team called water samplers. Watch the video clip to see [Neal the Sampler](#) at work on the Education Playlist

Once the samples have been collected they are ready to be tested. They are taken to our laboratory in Huntingdon where the tests are carried out by our water quality scientists.

Have a go at being a water quality scientist yourself.

Watch the video to find out how to carry out the investigation. Watch the video [Testing Water](#) on the Education Playlist. You might want a grown up to set this up for you, so you can test the water yourself or you could set up the investigation and get another family member to do the testing.

If you cannot see the video don't worry, the instructions can be found on Activity sheet 2:3.

This is how our water quality scientists test our water and, yes, it really is somebody's job to smell and taste water in our laboratories.

How do we clean the water?

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So, what have you learned?

Anglian Water borrows water from the environment, cleans it at a water treatment works then sends it to your home.

Watch the video [Clean Water](#) to your home on the Education playlist to find out how this clean water travels to your taps and toilets.

Don't worry if you cannot see the video. Go on to the challenges.

Challenges:
Now have a
go at some
of these:

1. Design a poster to tell people all about their tap water.
What do you think they would like to know?
2. Investigate the WaterAid UK website: www.wateraid.org/uk
What do people do when they don't have taps in their home?
3. Find out how water is cleaned in other countries and record your findings - a booklet, a video, a cartoon - you decide how.

We are a very flat region. Pumping water uses lots of energy. That's another good reason to Love Every Drop.

We are very lucky; in some parts of the world water isn't safe to drink. As many as 1 in 6 people in the world don't have access to clean, safe water.

We do 300,000 tests a year to make sure it's clean.

How do we clean the water?

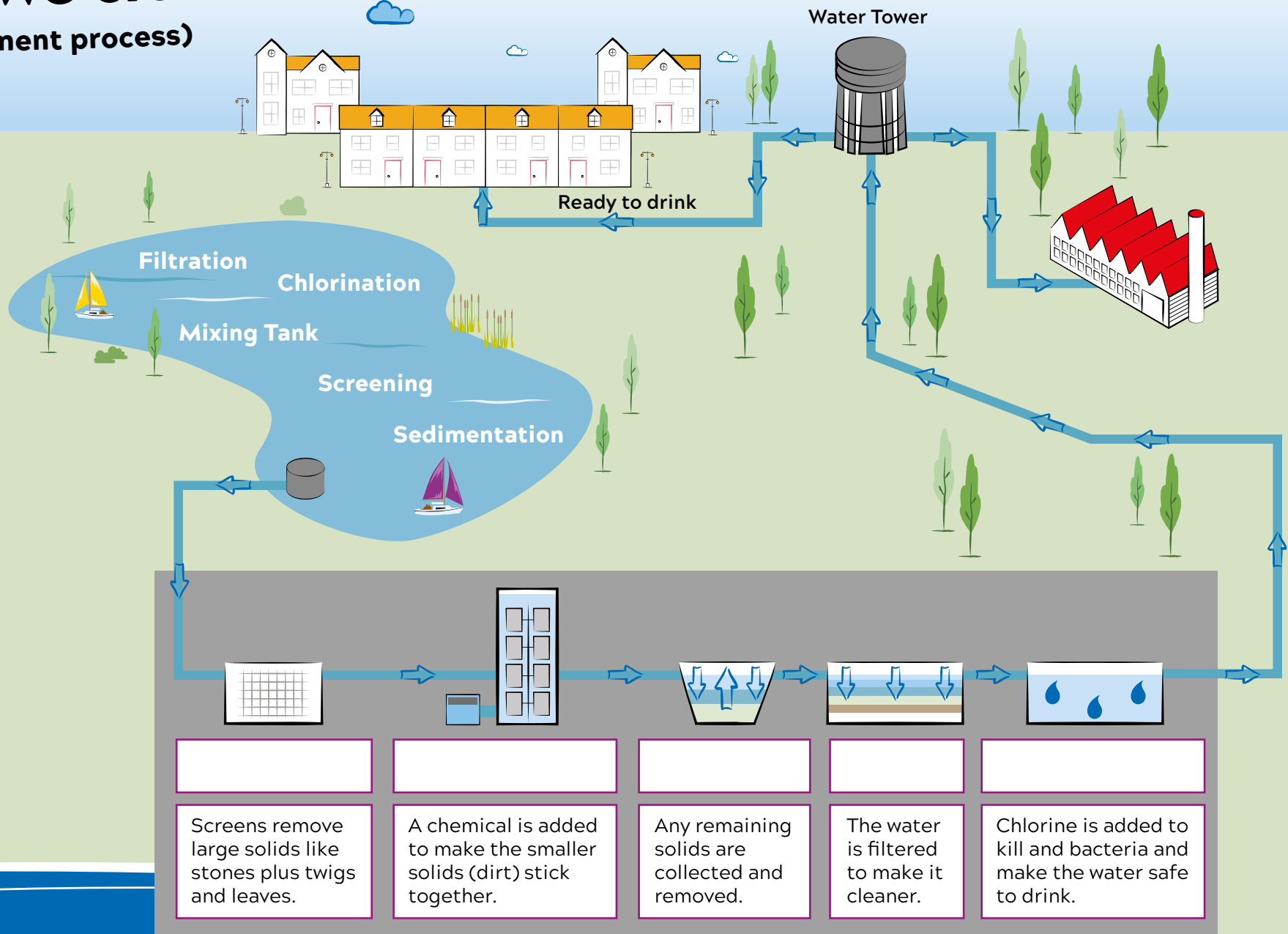
(The water treatment process)

Making water safe to drink

Anglian Water borrows water from the environment and cleans it to make it safe to drink.

None of us would like to drink water straight from the river, so we use a special process to clean it at one of our water treatment works.

Can you write the names of the process on the diagram?
(The words you need are in the lake).



How do we clean the water?

(The water treatment process)

Filtration - your turn!

At the beginning of the water treatment process we use screens to filter out any large items floating in the water.

In this activity you will use different materials to make your own screens to take large items out of the water so it can pass to the next stage of the treatment process.

You will need:

Dirty Water

- compost

Filter materials

- filter paper
- cotton wool
- pebbles
- sand
- gravel
- lentils

Jug

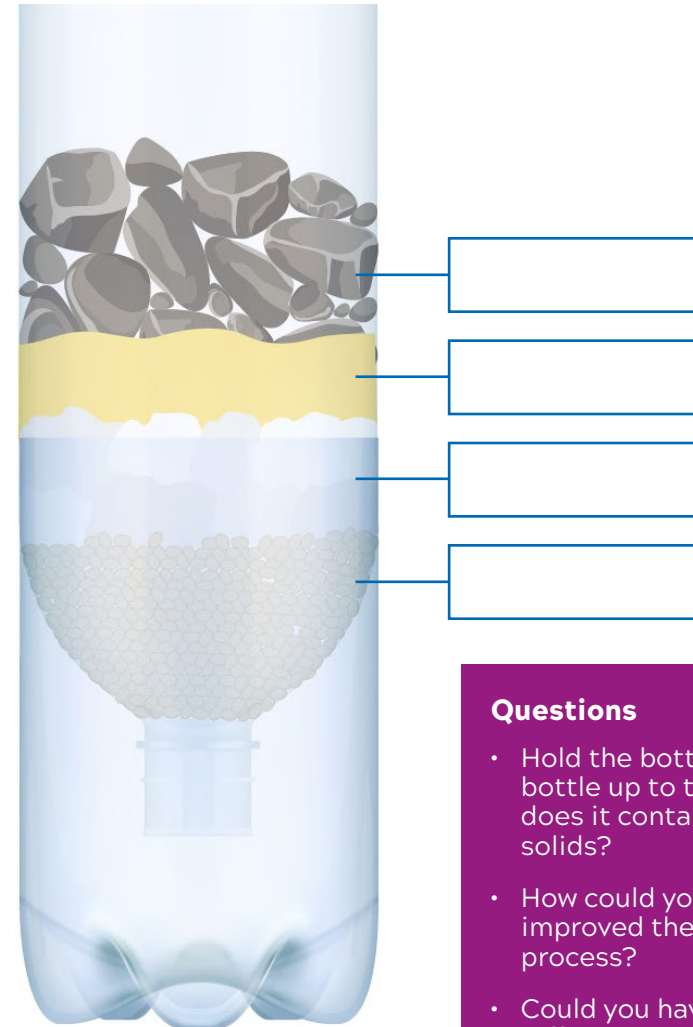
Large clear plastic bottle

To make a funnel

- Clean out the bottle.
- With an adult cut the bottle in two, about two thirds up.
- Turn the top upside down and place it in the bottom third.

Filtration

- Decide the order of your materials that you think will best filter your dirty water and place them into the up turned bottle.
- Mix some compost with some clean water in a jug to make dirty water and carefully pour it into the bottle.



Questions

- Hold the bottom of the bottle up to the light, does it contain any solids?
- How could you have improved the filtering process?
- Could you have used different materials to filter or changed the order of the materials chosen?



Don't worry if you haven't got all the filtration materials.

Try some of your own ideas to get the water as clean as you can.

How do we clean the water?

(The water treatment process)

Testing water

- Place 5 cups or glasses on the side and add some tap water to each.
- Glass number 1 - leave as tap water.
- Glass number 2 - add one of your ingredients to the tap water.
- Repeat until all the other cups or glasses contain tap water and one of your ingredients. (But don't mess with glass number one!)



Glass 1



Glass 2



Glass 3



Glass 4



Glass 5

Good ingredients to use are salt, white vinegar, boiled water, tea/coffee, a soft drink or squash, white sugar (anything that changes the colour or smell).

Be careful to use things that are safe to drink and no-one in your family is allergic to.

You are then ready to start the test.

- **First, hold each cup or glass up to see if there is any colour change.**
- **Next, smell each cup or glass and see if you can guess what is in there.**

If you (or the tester) can't tell what is in the glass, try tasting it by dipping the top of a clean finger into the liquid and tasting it.

You (or the tester) should, by the end of this activity, be able to work out which is the cup/glass with just water in it and what is in each of the other 4 cups/glasses.

How did you/the tester do?

Could you/the tester find the tap water?

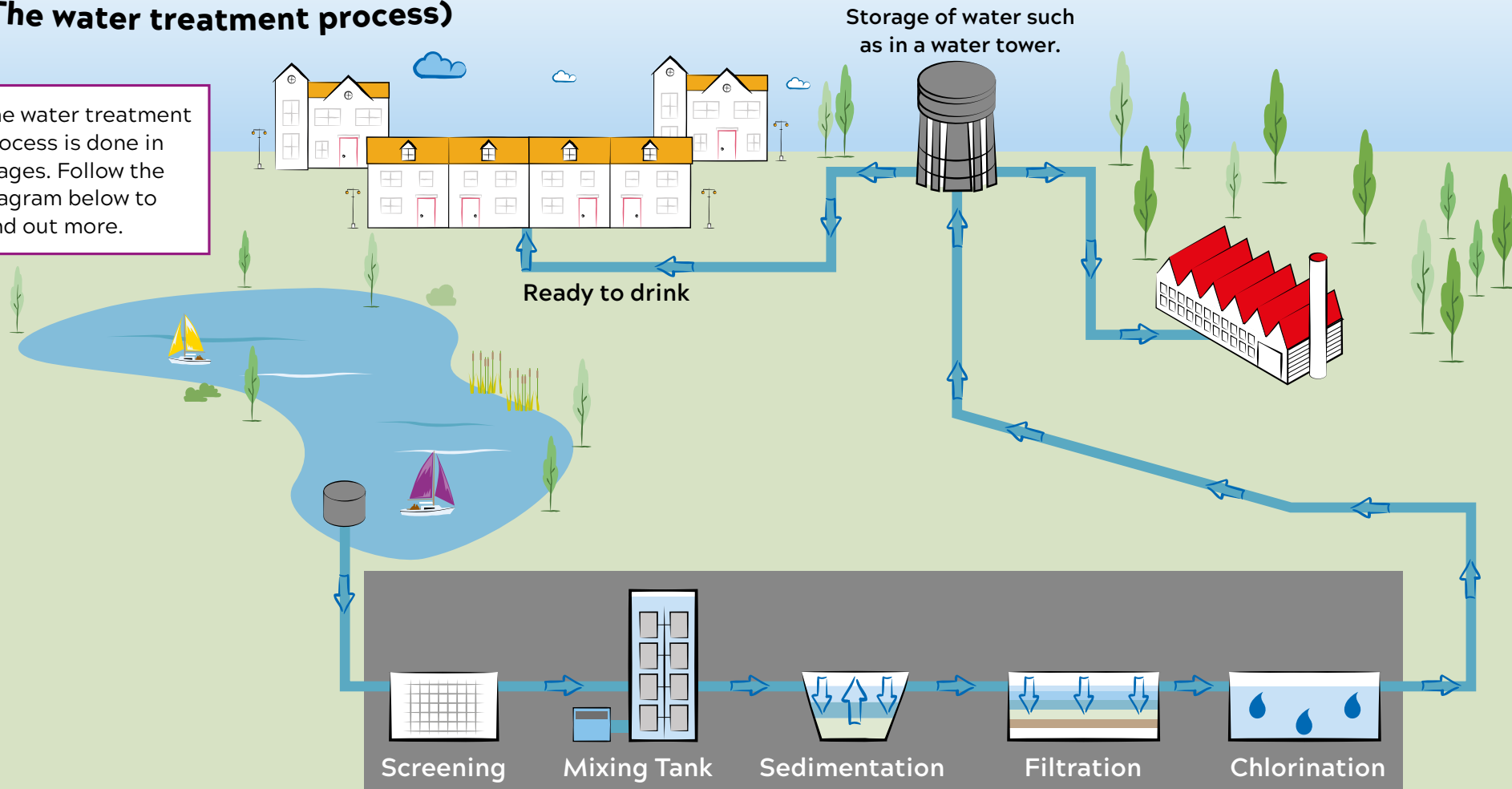
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Making water safe to drink



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The water treatment process is done in stages. Follow the diagram below to find out more.



Screening

Screens remove large solids like stones plus twigs and leaves.

Mixing Tank

A chemical is added to make the smaller solids (dirt) stick together.

Sedimentation

Any remaining solids are collected and removed.

Filtration

The water is filtered to make it cleaner.

Chlorination

Chlorine is added to kill and bacteria and make the water safe to drink.