



## WATER FILTERS

Make your own filter and clean up some dirty water.


### Overview



Water must be clean so that it is safe to drink. One of the ways our water is cleaned is by filtering. In this activity you will make your own filter and clean up some dirty water, using an empty bottle and a coffee or paper filter.

 Printable version

This page will print, but won't look great. Click the button for a print-friendly PDF version.

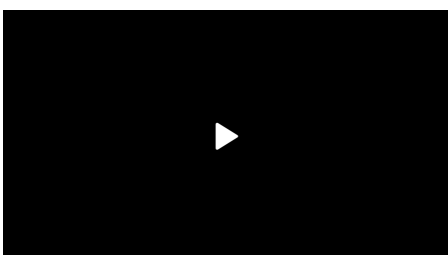
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### What you'll need

- An empty 2 litre pop bottle (any size will do but 2 litre is easiest to put the filter in)
- A coffee filter or circle of paper (sugar paper or an old brown envelope) with a diameter of about 20cm
- Scissors
- Dirty water (mix mud, grass, leaves and small stones from your garden with water)
- An old container to mix this in
- A stirrer (a stick or old wooden spoon)

### What to do

#### Step 1



Children in EYFS Before you start, you may want to listen to the story on the left called Hey, Water! by Antoinette Portis. This non-fiction picture books shows how water is all around us, but can take different shapes and forms.

### Step 2



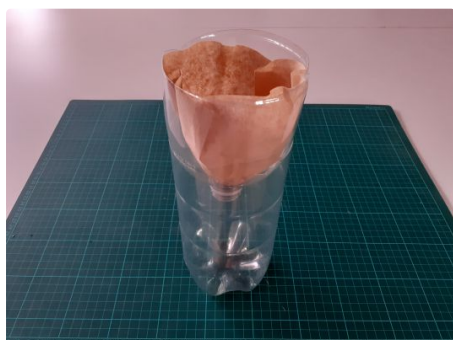
First make some dirty water. Collect some dirt (mud, leaves, grass, stones etc) from outside in a container. Add water and stir.

### Step 3



Take the label and lid off your bottle. Squash your bottle flat about a quarter of the way from the top. Cut the top part of the bottle off.

### Step 4



Put the top part of your bottle into the bottom part with the lid end facing the bottom. This will make your filter. Put your coffee filter inside your filter. If don't have a coffee filter you can make your own, see the "Other things to try - filtering using different materials" section below.

### Step 5



Carefully pour the dirty water into your filter and watch the clean water come out of the bottom of the funnel.

### Duration

20 minutes or so.

### Suitable for...

Age 3 and up.

### Safety notes

You know your children better than anyone, and you should judge whether they're ready for this activity. You might want to think in particular about:

- Supervision: you you might want to supervise children when they are cutting the bottle and watch out for sharp edges.
- Always wash hands after touching dirt and avoid touching your mouth or face.
- Thoroughly wash any containers or stirrers used in this activity before using again for other purposes.

### WARNING!

Do not drink your filtered water- it needs a lot more treatment before it is safe!

Does everybody in the world have clean water to drink?

We are lucky in this country to have clean water pumped straight

### Step 6



Look at the difference between your dirty water and your filtered water. Is the filtered water any cleaner?

### Things to discuss

Take a look at what you can see left in your filter paper. How do you think a filter works?



### How it works

When you poured your mixture of dirt and water through your filter, the water could pass through the tiny gaps in the paper but the dirt (soil, grass, leaves, gravel) particles are too big and are left on the surface of the filter paper. The water that passes through

to our taps. Did you know that 1 in 10 people in the world don't have running water in their houses? They need to collect it each day from rivers, ponds and lakes. This water isn't clean or safe. It is sometimes shared with animals. It can be full of dangerous diseases.

Visit the [wateraid](#) website to find out a lack of clean water stops people from having an equal chance to be healthy, educated and financially secure.

### Careers Link – Water Quality Scientist

Water quality scientists ensure water quality standards for safe drinking water are met. They test and analyse water samples and ensure these meet the water quality standards. They may specialise in working with drinking water, ground water or surface water including rivers, lakes and estuaries. Water quality scientists may need to work closely with businesses, the public or other water industry professionals.

**Attributes:**  
communicator, logical, observant

the filter is called the filtrate and the dirt that is left on the filter paper is called the residue.

Although your water might look clean(er) it is still not safe to drink. You have removed some of the solid dirt, but there is still dirt in the water that you can't see. This includes bacteria, parasites and viruses which can make you very ill.

To find out more about how our drinking water is cleaned, younger children might like to watch this episode of [BBC's Maddie do you know?](#) and older children might like to look at [the water treatment process](#) on the Thames Water website.

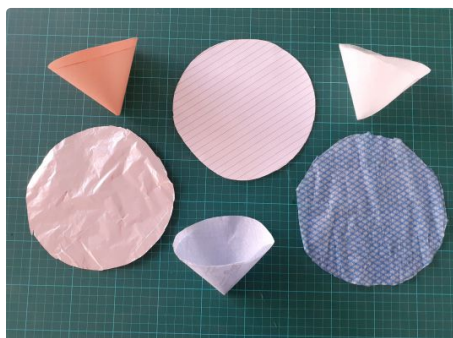


### Meet Laura Wilkinson

Laura is a Technical Advisor for the waste water project team at Northumbrian Water. Watch [this video](#) to find out more about her work.

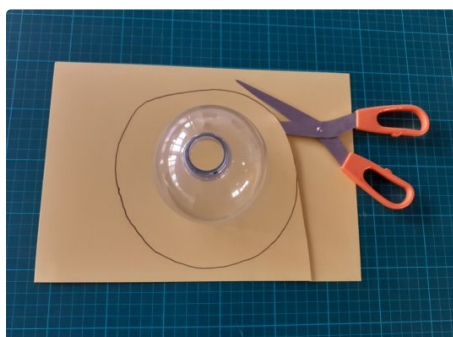
## Other things to try- filtering using different materials

### Step 1



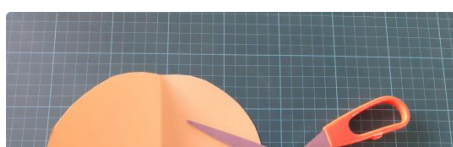
Choose some materials you would like to test as filters. You could try fabric, card, foil, kitchen towel- anything that you can make into a filter shape. You will need about 20cm by 20cm of each material to make your filter.

### Step 2

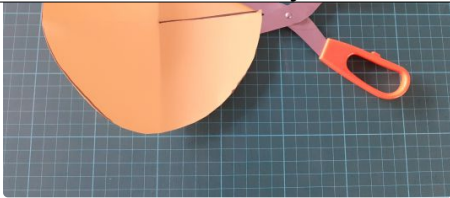


Put the top of your bottle onto the middle of your material. Draw around the bottle leaving an extra 2 - 3cm of your material around the bottle. Cut out the circle.

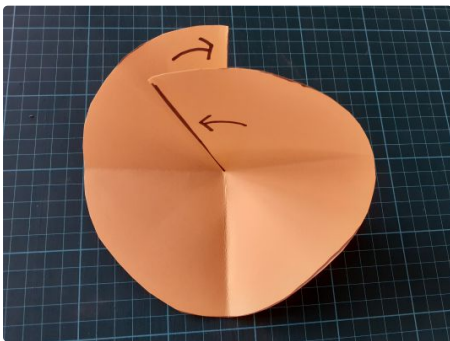
### Step 3



Fold the material into quarters. Open out and cut along one of the fold to the centre point.



#### Step 4



Slide the paper on one side of the cut on top of the paper on the other side of the cut so that a funnel is formed.

#### Step 5



Put the filter paper into your funnel and pour in your dirty water.

#### Step 6



Repeat the investigation using filters made from different materials. Remember to rinse the top and bottom of your plastic bottle filter each time so you don't have any dirt remaining from the previous filtering. You could pour each lot of filtered water into a different container so that you can compare it at the end.

### Other things to try

### Record your investigation in a table



Filter material	Prediction which will filter the best?	Results which water was cleanest?
card	6	6
lined paper	5	1
kitchen towel	3	5
foil	8	7
cloth	2	8
greaseproof paper	7	3
paper envelope	4	4
filter paper	1	2

You might want to predict which material you think will make the best filter before you begin, and record which filter produced the cleanest water.

To make it a fair test, mix up a large amount of the dirty water solution before you start and pour the same amount of water into each filter paper.

## Time how long it takes for each material to filter the water

Do some materials take longer than others to filter the water? Use your watch, a timer on a phone or a kitchen timer to record how long it takes to filter your water. Do the filters that take the longest produce the cleanest water?



## Make a more efficient water filter

Try this [homemade filter](#) on the [Lovetoknow.com](#) website. You will need gravel, sand and activated charcoal in addition to the equipment you have been using.

