

About this activity



In this activity you will investigate which sealant (sticky material) is best for joining pipes together to stop water from leaking out.

Just like engineers in industry, you should try to change only one thing each time to keep the test fair and the results accurate.

Kit List

- ☑ 1 food can with both ends removed to form a tube
- ☑ 1 food can with one end removed
- ☑ 2 plastic containers with approx. 1 litre capacity (measuring jugs or pop bottles with tops removed will do)
- ☑ 4 sticky materials to use as a sealant. Examples include: Blu-tack, Sellotape, PVA glue, insulating tape, parcel tape, duct tape, masking tape.
- ☑ Safety tin-opener
- ☑ 800ml of water
- ☑ food colouring (any colour)
- ☑ ruler (15cm ruler will do)
- ☑ scissors

Time: 1 hour

With special thanks to the Salters' Institute for funding this publication.



Important words to understand:

- pipe
- pipeline
- sealant
- industry
- fair test
- transport
- plant
- factory
- surface
- leak/leakage
- water-resistant



Not sure what they mean? You could use a dictionary to check (paper or online).



The Problem



Emma and her team of engineers at Crystal Clear Water need to transport water from their water cleaning plant to our homes. To do this, they need to join lots of sections of pipe together to make a pipeline long enough to reach. To join pipes together, they need an effective sealant to make sure no water leaks out from the joints during its journey from the factory to our taps.

A good sealant must:

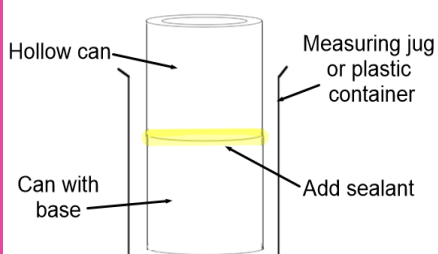
- Stick to the surface of the pipe (including when water is added)
- Be water-resistant
- Leave no air gaps between the surfaces of the two pieces of pipe

Watch out!



- An adult must use a safety tin opener (which leaves a smooth edge) to cut cans into 'pipes'
- Sand, file or tape any remaining rough edges
- Check the safety warnings on the packaging of the sealants you select and only use those that are safe to do so

Setting up your equipment:



OUR METHOD

- Select and apply around 30cm or one length of sealant (sticky material), joining the two cans (one hollow and one with a base) to make your mini pipeline
- Place the mini pipeline upright inside an empty plastic container
- Pour 800ml of coloured water into the mini pipeline and leave it for 5 minutes (the colour will help you to see exactly where your pipeline is leaking)
- Remove the mini pipeline from the plastic container and check for leakage.
- If you have used a measuring jug, read the scale and record your result in a table like the one below in ml. If you've used a pop bottle, mark, label and measure the leaked water using a permanent marker and cm ruler then draw your result using a diagram like the one shown below or take a photo/video.
- Dry your mini pipeline thoroughly and pour any leaked water back out of the container to try again with the other sealants

Fair testing

Which things in the method help to make the test fair?



How you will solve the problem...?

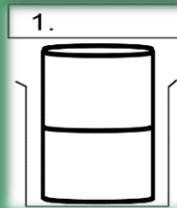
Recording your Results

You could record your measurements in a table like the one below.



Name of Sealant	Leakage (ml)	Other observations

You might want to record your results using diagrams like this one.



You could even record a video or take photographs of your results.



Once you have completed your observations and recorded your results, it is time to advise Emma and her team of engineers at Crystal Clear Water which sealant is best for joining pipes.



THEY WILL WANT TO KNOW...

- How did you carry out your tests and make them fair?
- How did you test each type of sealant?
 - What are your results?
- Which sealant would you recommend?
- Why do you think this sealant was the best?
- Which sealant would you **not** recommend and why?

Write a short report or make a video to share your results with

Crystal Clear Water
Share it with us
[@ciecyork](https://twitter.com/ciecyork)



TAKING IT FURTHER

Follow up activities:



- Make a list of all of the methods you can think of for joining two items together e.g. paper clips, rope etc.
- Continue your research by investigating whether the thickness of the sealant layer makes a difference, i.e. using 1, 2, 3 layers of tape etc.
- Design an advertising poster for the sealant you have chosen to recommend.

Things to think or talk about:



- What must a good sealant be like?
- Which sealants performed well in your investigation?
- Would the sealants you tested be used in real water pipes? Why?
- What else might factories use to seal their pipes together?
- Do you have any industries in your local area which use pipes? What do they use them for?

Good morning children, my name's Andy. I work here at the Billingham **site** and I'm the **plant** manager. Here, we make lots of different things which are sent to a **factory** who use them to make exciting things like cars and toys



The words **site**, **plant** and **factory** are used a lot in industry and can be confusing and easily misunderstood. Companies might have different **sites** (locations where they work) in different parts of the UK or even the world.

Plant describes the 'area' where something is made. There can be more than one plant on a site, one for each product they make! Each area can have indoor and outdoor equipment to make the product. Plants don't usually make finished products, the things they make are often the parts or ingredients used on other sites.

The word **factory** describes one or more buildings where a company makes or puts together lots of products using machines. There is often a finished product at the end of the process, like in a car factory. Modern factories work hard to minimise pollution and look quite different to those with polluting chimney stacks which you might imagine.