



Water flow fun

A do-at-home civil engineering activity for ages 4-18.

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Water flow fun

How many people helped you brush your teeth this morning?

None – really? But who built the network of pipes that allows water to come out of your tap – possibly from a source many miles away - when you turn it on?

This was done by civil engineers who design and build the world around us.

The knowledge civil engineers need to successfully send water through a pipe network is called **fluid dynamics**. Today we are going to do an experiment with balloons to learn more about this.

What you'll need

- Two water balloons
- A stopwatch
- Measuring tape
- Two bowls
- Sellotape
- A safety pin
- A measuring jug
- Optional – a camera phone or camera

Activity instructions

Fill up two balloons with water and place them in bowls outside.

Use a safety pin (you may need to get an adult to do this) to pierce a hole one of the balloons. Water should start to shoot out quite quickly. This is what civil engineers call a **turbulent water flow** take a photo of what it looks like as it shoots out of the balloon.

This happens because the elasticity of the balloon is squeezing the water and causes pressure on the water to shoot it out in an arc. Civil engineers need the right water pressure to make the water come out of the tap when you turn it to brush your teeth in the morning. Too slow and it won't reach you!

What we are going to do now is to see if we can increase the water pressure to make the water flow even faster.

Take some sellotape and put four strips of it across the second balloon in a hashtag shape. Now use the pin to put another hole in the balloon and watch what happens – you should see that the water looks like it is frozen as it shoots out of the balloon!



It is not really frozen – it's just that the tape adds more pressure and causes the water to shoot out so fast it's hard for the human eye to see it moving. Amazing!

This higher pressure water flow is what civil engineers call a **laminar flow** and it is used when they need to move fluid (like clean drinking water) very fast through pipes.

For 11-16 year olds

Use a measuring tape to figure out how much further (how much more powerful) the laminar flow is than the turbulent flow as a percentage.

For 16-18 year olds

Use a stopwatch and a measuring jug to compare the difference in speed between the turbulent and the laminar flow of water and find out how much faster the laminar flow is as a percentage.

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Civil engineering project case studies: ice.org.uk/what-is-civil-engineering/what-do-civil-engineers-do

Civil engineer (people) case studies: ice.org.uk/what-is-civil-engineering/who-are-civil-engineers

Info about all types of engineering careers (not just civil): Tomorrow's Engineers
tomorrowsengineers.org.uk

