



Pentagon
For Learning and Play



Water Wall

Activities

Time to bring water play and investigative learning to your EYFS playground. Pump the water from the bottom reservoir to the top, and when the water reaches a certain height watch it pour out (by auto syphoning) into the water channels, via gravity along whatever route your children have assembled! Get the water to spin the water wheel and fill the water tipper until it tips (based on a Japanese shishi odoshi). The wall is a great aid to the teaching of science and the water cycle, source to mouth, water recycling, kinetic energy, flow and gravity, balance and equilibrium, mass and weight of materials (water and plastic). It's fantastic fun too - each upper reservoir can pour enough water for the whole wall to be spinning and tipping for five minutes or more!

What is water, where does it come from and what is it used for?

Water is a transparent, colourless, odourless liquid which forms rain, rivers, lakes and the seas. It is the basis of fluids in all living organisms. Whilst children are playing at the Water Wall, ask them to consider this and take the time to notice, touch and listen to the water as it runs across the Water Wall, splashing, dripping and flowing. **What does it feel like in their hands?**

Discuss the meanings of the vocabulary used to describe water with them. **What factors can change water and what happens to water if it becomes very cold or very hot?**

We all use water for drinking, washing clothes, cleaning the house or car, having our bath or shower, cooking food, looking after our pets or watering the plants in the garden. It's one of our biggest and most essential resources for survival.



On top of that, even greater amounts of water are used every day in all sorts of different industries across the world, for manufacturing, generating energy and transporting products or people to name but a few. **Can your children think of any more uses for water?**

Discuss with them how water is used in local communities. Villages and towns use water for all sorts of things; watering public areas such as parks and flowerbeds, fighting fire, cleaning the roads.

Schools, hospitals and businesses use water all the time and in different ways.

Restaurants need water to cook delicious meals and swimming pools are full of water for recreation. **Can you think of examples of where you have seen water being used in your community?**

Imagine our playground is your example. Let's get to work with role play on the Water Wall, transporting and using the water with all different vessels to look after our community!

Water Cycle

Here's how to demonstrate the Water Cycle using the Water Wall:

- Water comes from rivers and streams, lakes and the seas, inside plants and trees and under the ground. Ask children to fill the reservoir at the bottom of the Water Wall with water to create their source.
- The heat from the sun warms the air and causes the vapour to rise. Ask the children to use the water pumps to pump water from the lower reservoir up to the top reservoirs on the Water Wall, and imagine that this is vapour rising into the sky.

- Heat from the sun turns water into a vapour. We can't really see this happening when we are looking at the sea for example, as the water source is so vast, but if you boil a kettle, add hot water to their reservoir source and ask children to spot the steam coming off it, this will give them an idea of what vapour is. This process is called evaporation. The evaporation of water into the atmosphere from the leaves and stems of plants is called transpiration. There is plenty of new vocabulary here to talk about!



- As the vapour rises into the sky, it gets cold. When it gets cold, it gathers in clouds. This is called condensation. Ask the children to watch the top reservoirs filling up with water and imagine that they are clouds getting bigger and heavier with the water, until they can't take it anymore and they are ready to burst!
- When the clouds become too big and heavy to hold the water, they drop it straight back down to Earth as rain! Clouds move across the sky in the wind before they do this, so they drop the water off across different parts of the Earth. Water falls to the ground in the shape of rain, snow, sleet or hail depending on the temperature of the surrounding air. Children will love watching the upper reservoirs on the Water Wall becoming full to bursting like clouds, until they reach tipping point and send all the "rain" rushing back down the Water Wall!

- Some rainwater runs into streams, rivers, lakes or the sea. Streams and rivers carry the water on to lakes or the sea. Some of the rainwater soaks into the ground, and in some cases, it soaks down deep and gathers to form underground wells which people can tap into to find drinking water. Watch the water as it travels down the Water Wall. Where does it go? Does it all go in the same direction? What makes it change direction? Does it all land back in the reservoir? What happens to the water that lands on the ground?
- Some rainwater lands high up in the mountains and is so fresh and clean that it is safe enough to drink straight away! The further it travels the more it becomes dirty or polluted and it must be treated before we can safely use it for drinking. Talk to the children about how water can be affected by pollutants every day. Place items such as sand along the route and watch how this impacts on the water's journey. Look at what happens to water that falls from the Water Wall onto the ground. What does it mix with? Would you want to drink it?
- Water that soaks down into the ground is called groundwater. Some groundwater eventually travels to the sea via underground rivers, picking up salts and minerals on the way. That is what makes the sea so salty. See if you can get hold of a local waterways map and find out if there are any underground rivers near you. Children will be excited to learn that they might walk across a river every day and they don't even know it's there!

- Sometimes, if it is cold enough, water gets trapped on Earth in the form of ice. Use the Water Wall in the winter if it is cold enough to see if any water left in it freezes overnight. Children will be excited to put their coats on the next day and go out to see if it has frozen! Let them explore the feel and texture of the ice. Can they break it? What happens if they warm it up with their hands or their breath? Did they know that water trapped in ice caps and glaciers might have been there for millions of years? Can you see anything trapped in the ice on your Water Wall in the winter?



How Water Gets into Our Taps

Have you ever wondered **why** and **how**, when you turn a tap on, water comes out of it? Well your Water Wall can provide the perfect demonstration.

This is how:

- Water is transported through underground pipes across the county. It begins its journey from natural sources such as rivers and lakes, and is stored in manmade resources called reservoirs.
- Water is transported through pipes to a water treatment plant, where it goes through several processes to clean it and remove any unwanted chemicals, pollutants or other hazardous substances to make it safe for drinking.
- The clean water is then pumped to an underground service reservoir, which is covered with grass or gravel to keep the water clean, or a water tower, through large mains pipes. The water can travel downwards naturally thanks to gravity, but in flat or hilly areas it needs to be pumped.
- When the pipes lead to a water tower, the water is pumped up to it. When it is ready for release, gravity takes it to the buildings where it is needed, such as our homes.

- Water travels on to our homes through smaller mains pipes. Our towns and villages are full of a network of underground pipes carrying water into each building. It travels into smaller pipes within our houses, and all the way to our taps! All the water that flows into our homes is drinkable.

Use the Water Wall to demonstrate to children all the different systems and scientific concepts behind water's journey from reservoirs to our taps!

The upper reservoirs can act as water towers and the hand bilge pumps and hoses can be used to demonstrate how the water travels upwards through pipes. Water will flow naturally down the guttering like water travelling downwards through pipes.

Who wants to catch it in a cup at the bottom? You could take it further by filtering water through funnels and add sand to demonstrate the cleaning process. Use a few drops of different food colourings in the water to add interest and show how quickly the water mixes and moves around.



Farming, irrigation and water conservation

A working farm gets through gallons of water every single day. Talk with the children about the use of water on a farm. Has anyone ever been to a farm? Can they think of ways in which water might be used on the farm?

Use the Water Wall to set up a farm irrigation system and explain to children how water is used and transported around a farm, and how it can be conserved.

They can discuss the science behind this too. Set up little stations around the Water Wall with, for example, toy farmyard animals in a “field” that need to drink, dried pulses and grains, toy foods, hay or straw as crops that needs to be watered to grow, farmyard machinery such as toy tractors and trucks that need to be kept clean.

Challenge the children to transport water to, across and from the Water Wall, using it to service all the areas of the “farm”. They need to try and do this conserving as much water as possible, no waste! How can they find ways of doing this? The main methods that farmers tend to use are:

- Inspecting the systems to check for and stop any leaks
- Harvesting rainwater
- Creating or extending farm reservoirs
- Making sure that their irrigation systems are efficient



Because children can design the Water Wall to channel water in whichever direction they choose, they can use all the different parts to transport the water to different areas of the “farm”. Thinking about the ways in which farmers’ conserve water, what can they do to keep their system efficient?

Children can work in teams and allocate roles between them. They can experiment with different materials to stop any leaks that they find in their system. Does plasticine, play dough or candle wax work?

What does it mean to make something “waterproof” or “watertight”? How can they make use of the reservoirs to supply and store the water ready for when it is needed? What else can they use to channel or transport the water even further?

This exercise provides the perfect opportunity to teach children about water conservation. Why is it important, not just for farms, but for all of us, industries, businesses and households, to conserve water?

Do the children have any good ideas as to how they can help to conserve water every day?

Water Transport

Do you know how people and goods can move round on or under water? Have you ever been on a boat? What is a submarine? How do fishermen get out to sea to find fish? One of the first and oldest types of transportation is by boat.

Provide children with some vessels that they can use as “boats” on the Water Wall. Can they get a boat to travel safely down the Water Wall and into the reservoir? Do they need to change the course on the Water Wall to make this happen? What floats and what sinks?

How do boats stay afloat? Modern boats are well designed to stay afloat, but occasionally boats sink due to fierce storms or because of a leak. Ask children to build their own miniature boats or rafts using a variety of resources.

Will their boat make its way down to the bottom of the Water Wall or will it collapse or sink on the way? Use a mixture of waterproof and non-waterproof vessels and materials so they can experiment and see for themselves what happens. Discuss with them why some materials work and some don't.



Water Transportation

Use the Water Wall to have a look at two interesting methods of water transportation - **Roman aqueducts and canals:**

Roman Aqueducts

The Water Wall works following the same principles of gravity and downward flow as an aqueduct! Set children to work as Roman engineers building their very own aqueduct in the school playground.

They should place the channels to transport water as they see fit, along as far and as complex a route as they can. Can they create a gentle flow like that of an aqueduct?

Some aqueducts are still used today, but thanks to modern day technology, engineers can use electricity to power strong pumps to force water upwards when they need to.

Children can use the hoses and hand pumps on the water wall to create modern day aqueducts of their own.

Challenge them to transport water from the Water Wall to other water play stations around the school playground and see if they can build a feature as effective as the Romans did! This requires teamwork.

It took hundreds of people working together to build Roman aqueducts because they didn't have

machines! Can the children think of all the things that we use machines for these days and how difficult it must have been to build anything back then?

Children will really have to problem solve, use their imaginations and communicate effectively with each other as they work on this task. They will be developing essential life skills, compounding their understanding of the subject, and having a lot of fun splashing water everywhere at the same time!

Canals

Does anyone know what a canal is? Has anyone seen a canal boat before, or been lucky enough to have a ride on one? The UK is covered in a network of canals.

Use the Water Wall to allow children to simulate canal boats travelling up and down a lock. Immerse one of the hoses under water in the bottom reservoir and feed a water supply through it.

- Attach another piece of gutter immediately below the first gutter, slightly to the left or right, and completely straight. Block off each end in the same way. Pierce a small hole in the material that is blocking one end of the first gutter with a plastic straw, and let the second gutter slowly fill with water travelling down through the straw.

When most of the water has travelled into the second gutter, remove or “open” the pierced “gate” and allow the boat to travel down into the second gutter on the remaining water. See how many times you can repeat this and whether you can take the boat all the way down to the bottom reservoir.

Practice makes perfect and children can problem solve and find the best way to do this as they go. You will need a little artistic licence and imagination for this of course, but it will give children a great idea of how boats can travel up and down by using water!

- Sit a toy boat on the water. Watch the boat rise as the water level gets higher and higher. When it reaches the top, off it goes on its journey.

Use the bamboo gutters to build a canal system on the Water Wall. Start by attaching one piece of gutter to the wall at eye level. Can they attach it to the wall so that it is completely straight and the water does not flow out?

They will need to find a way to block off the ends of the wall with plasticine, cling film or other waterproof item they can think of, to act as lock gates, then fill the gutter with water from one of the reservoirs.

Place a boat on the water. If they have succeeded the boat will not travel.



KS1 & KS2 Energy Sources

Generating Electricity

The Water Wall is a great resource for teaching KS1 and KS2 lessons about energy. An idea for this is to describe how water is used as a way of generating electricity.

Use the water wheels on the Water Wall to represent turbines. Ask children to imagine that the turbines must spin as fast as possible, and continuously, to generate enough electricity to power their school!

Challenge them to see how fast they can get the water wheel to spin, and to see how long they can get it to spin for at any one time.

How can they go about this? How do they build a course on the water wall to make this happen? How can they get the water to travel faster? What do they need to do to maintain a constant supply of water to the water wheel?

Make sure they are wearing their rain coats because they will be having a lot of fun sending the wheel spinning!



12 Other Brilliant Water Wall Activities

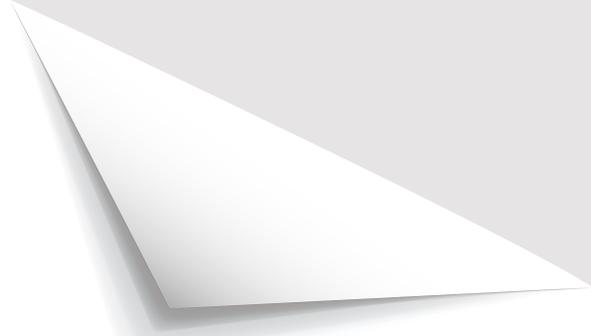


- 1. Coloured Water Mixing - Using natural non-staining food dyes, mix colours such as blue, yellow and red to see what colour the water turns out towards the end of the Water Wall.
- 2. Glitter in The Water - When glitter is added to water, it acts as a sediment, making the children curious as to where it goes...
- 3. Ping Pong Ball Race - Ping pong balls can be used down much of the Water Wall. Set races to help teach children the importance of gravity and water flow.

- 4. Timing Games - Children can also calculate how long it takes different small items and shapes to go from the top of the Water Wall to the bottom.
- 5. Measuring Experiments - There are so many measuring experiments that children can do with our Water Wall. For example, how much water have we put in at the top of the water wall? How much water is left at the bottom? Where has the rest of the water gone?
- 6. Diverting the Water - What item can you use to take the water from the Water Wall and pass it around the rest of the water play zone? Also, what items effectively stop the flow of water on the wall?
- 7. Can You Make Things Waterproof - Let children figure out what materials to use to make something waterproof on the wall. For example, candle wax is an interesting element to use. Can the children make watertight/waterproof joins for the Water Wall?
- 8. Reading and Writing instructions - Let the older children write instructions for the Water Wall and some of the games and then allow the younger children to read them and see if they can be followed correctly.
- 9. Picture Instructions - Let the children explain what they have done with the Water Wall with their very own picture instructions.

- 10. Building Teamwork - Working as a team, remove different the loose parts of the Water Wall to create different outcomes to the flow of water... what happens when you change the angle and why does this happen?
- 11. Mini Beasts Invading the Water Wall - Investigate the 'mini beasts' that have been attracted to the Water Wall. Add elements to the wall that will attract different types of insects to help keep investigations fresh and different.
- 12. Twig and Leaf Art - Let the children create artistic creations with the elements that have been blown to the bottom of the Water Wall or in the reservoir. These are normally twigs and leaves, so see what creations they come up with.





Find out more...

If you would like to set up a [Water Wall](#) in your school playground or are interested in discussing the development of your outdoor environment, simply fill out our [Contact Form](#) and we will be in touch with you to book a free consultation.

To find out more about our unique process as well as view our full range of outdoor resources, [case studies](#) and educational [blogs](#), make sure to visit our website at www.pentagonplay.co.uk