

# Pump it up

## Location

Ground floor, Move it exhibition

## In a nutshell

How does height affect hydro power? Change the height of the reservoir and discover how the energy of falling water can be harnessed.

## What to do

Pump water into the upper chamber to store energy. Use this energy by turning the valve and letting the water flow. Look at the rev counter to see how fast the wheel is turning. By changing the height of the reservoir to see how this affects the speed of the turning wheel.

## Time Required

KS3 & KS4 2 -3 minutes per student.

## What's happening?

When water is held in the upper chamber it acts as an (gravitational potential) energy store. The height of the chamber affects how much energy is stored. When the water flows the energy can be used (transferred to kinetic energy). Here the water turns the wheel and generates electricity (electrical energy). This electricity is used to power the rev counter. Hydroelectric dams work by storing and using water like this.



## Curriculum links

Curriculum links	
<b>KS3</b>	<p><b>Energy changes and transfer</b></p> <ul style="list-style-type: none"> <li>- other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels</li> </ul> <p><b>Forces</b></p> <ul style="list-style-type: none"> <li>- forces as pushes or pulls, arising from the interaction between two objects</li> <li>- moment as the turning effect of a force</li> </ul> <p><b>Forces and motion</b></p> <ul style="list-style-type: none"> <li>- forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only)</li> </ul> <p><b>Mathematics - Number</b></p> <ul style="list-style-type: none"> <li>- understand and use place value for decimals, measures and integers of any size</li> </ul>
<b>KS4</b>	<p><b>Energy changes in a system, and in the ways energy is stored before and after such changes</b></p> <ul style="list-style-type: none"> <li>- describe all the changes involved in the way energy is stored when a system changes, for common situations: appropriate examples might be an object projected upwards or up a slope, a moving object hitting an obstacle, an object being accelerated by a constant force, a vehicle slowing down, bringing water to a boil in an electric kettle</li> </ul> <p><b>Conservation, dissipation and national and global energy sources</b></p> <ul style="list-style-type: none"> <li>- describe the main energy sources available for use on Earth (including fossil fuels, nuclear fuel, bio-fuel, wind, hydro-electricity, the tides and the Sun), compare the ways in which they are used and distinguish between renewable and non-renewable sources</li> </ul> <p><b>Forces and their interactions</b></p> <ul style="list-style-type: none"> <li>- recall examples of ways in which objects interact: by gravity, electrostatics, magnetism and by contact (including normal contact force and friction), and describe how such examples involve interactions between pairs of objects which produce a force on each object; represent such forces as vectors</li> <li>- define weight, describe how it is measured and describe the relationship between the weight of that body and the gravitational field strength</li> </ul> <p><b>Design and technology</b></p> <ul style="list-style-type: none"> <li>- how energy is generated and stored in order to choose and use appropriate sources to make products and to power systems</li> <li>- the functions of mechanical devices, to produce different sorts of movement, changing the magnitude and direction of forces</li> </ul>

## Relates to:

Workshops & Theme Days	Shows	Trails	Other exhibits
<ul style="list-style-type: none"> <li>• Engineering solutions (KS3 &amp; KS4)</li> </ul>	<ul style="list-style-type: none"> <li>• Launch it! (KS3)</li> </ul>		<ul style="list-style-type: none"> <li>• Impeller</li> <li>• Treadmill</li> <li>• Waterwheel</li> </ul>

