

Learning bundle: STEM mechanical advantage



KS2 children aged 7-11

Learning objectives <ul style="list-style-type: none"> • Understand the term mechanical advantage • See how mechanical advantage was used in the past and is still used today • Conduct a mechanical advantage experiment and make observations 	Resources <ul style="list-style-type: none"> • Build a lock game • North Pier news article • Mechanical advantage film • Gear ratio experiment • LEGO canal crane
Success criteria <ul style="list-style-type: none"> • All children will know that mechanical advantage is using a machine to make a small force bigger. • Most children will also be able to give examples of mechanical advantage, applying it to things they know about or use. They will know the meaning of gear ratios. • Some children will also understand and be able to explain gear ratios. 	
Teaching/parent input <p>STEM is all around us in our daily lives, simple forces that we all understand such as push and pull can be utilised for our own means. Using often simple machines or ideas we can manipulate forces to make tasks easier. Mechanical advantage had been used for thousands of years to enable us to move large objects with small forces. One of the most basic examples of this is using a lever to lift a heavy object, to open a heavy gate or to enable us to move heavy loads in a wheelbarrow. Today we have much more complex machines that use mechanical advantage through gears, such as bikes, cranes, winches and even cars.</p>	
Activities <p>Play: the lock game on the Explorers website to gain an understanding of how locks work and to see the long balance beams used as levers to open and close the heavy gates.</p> <p>Read: all about how we use mechanical advantage in our work to maintain and look after our canals and rivers.</p> <p>Watch: a short film at the National Waterways Museum. Our Mechanical Advantage film gives you a really good introduction to the subject and shows you some real-life examples.</p> <p>Do: have a go at our gear ratio experiment to understand more detail about how cranes use mechanical advantage in different ways to suit different loads and situations.</p> <p>Create: Build your own canal crane with our Lego step-by-step instructions.</p>	
Suggestions <p>Use this activity bundle as a starting point for further investigation and understanding into forces and motion, the history of the canals and your local waterways. What will you discover near where you live?</p>	
Plenary <p>Forces can make things easier and harder. Gravity makes it difficult to lift heavy things. We use machines to increase forces and makes jobs easier.</p>	Key words <p>Gear, mechanical, advantage, crane, ratio, canal, lock, hydraulics</p>
Useful websites/external resources <p>Learn more about mechanical advantage on the BBC Bitesize website.</p>	Get outside ideas <p>Go and explore your local canal network, what things can you see and how do they work? Use the Canal & River Trust map to find your nearest canal.</p>