The Ogden Trust

making physics matter

Age 5-11 years

Phizzi focus

Forces

The topic of forces is a fascinating area of the primary science curriculum with great opportunities to connect learning with history, design technology and mathematics. This Phizzi focus includes ideas, links and resources to help develop the abstract ideas about forces across the curriculum to give young learners time to embed the big ideas.

Credit: Tomas Castelazo

Fabulous forces

When learning about forces it is really valuable to give children plenty of opportunity to participate in practical enquiries which help them to make sense of the abstract ideas and deepen their understanding of the topic. The Ogden Trust's **slippy shoes** resources outline two approaches to friction enquiries for Year 3 and Year 5 in the context of an expedition to climb Everest with fabulous introduction videos by Dr Melanie Windridge to help set the scene. Alternatively, challenging children to apply their ideas about forces to solve real-life problems is a great way to encourage children to talk through their scientific thinking. An activity such as **Explorify's relaxed roll** is perfect for this, as well as developing teamwork and collaborative skills.

The fantastic, free education resources from Practical Action are still available to download. There are some really inspirational challenges related to forces that engage children in real-world issues including climate change, renewable energy, food security and preparing for disaster such as the **floating garden challenge** and the **squashed tomato challenge.**

For more practical ideas to investigate forces in the classroom don't forget out Phizzi practical resources are free to download from our website. Our **heat shield testing** guide provides a valuable opportunity for children to think about the heating effects of air resistance. To learn more about the forces involved in flying children could investigate paper aeroplanes – our **forces and flight** guide offers helpful advice on how to go about this. For advice on making gears and carrying out pattern seeking enquiries, take a look at our **investigating gears** guide.

STEM Learning has a wonderful practical activity where children make and test their own **hot air balloons**, yet another engaging and exciting way to talk about forces and gravity.

Magnetic maths

The forces section of the national curriculum offers many opportunities for pupils to develop their measuring skills, learning to be accurate and reflecting on the quality of their measurements. From measuring pushes and pulls with a newton meter, to timing how long it takes for a variety of objects to fall due to gravity – the opportunities for comparative and fair tests are endless.

Science can be used as a context for problem solving in maths and to support this, the Trust has created a collection of **Phizzi problem solving** resources. This collection of four activity packs features practical enquiries with a magnetic theme. The KS1 problems are linked to the materials used in fridge magnets and a magnetic fishing game and KS2 is linked to a magnetic racing game and an investigation looking at variation in the Earth's magnetic field with a magnetometer. Theses activities help to model how progression in scientific thinking is in line with the skills that children develop in mathematics.

To supplement these resources, The Ogden Trust has also created a collection of forces timeline card sort games to help children explore how scientific ideas change over time. When children are learning how pushes and pulls affect materials in KS1 they can link this to the real-world context of structure by playing the **longest bridge** or **tallest buildings** card game and applying their mathematical understanding of place value to sort cards. When children move on to learn about gravity and how forces affect the movement of objects in KS2 they can apply their learning to the real-world contexts of **the fastest way to travel** and the **largest planes** to ever fly, investigating patterns in mass and speed data.

Galileo and gravity

The stories behind how our ideas about forces have changed over time are fascinating. Why not explore these further in KS2 using the Ogden Trust research cards to support research enquiries in the classroom? Year 3 children can learn how our **ideas about friction** have changed over time and Year 5 children can learn how **ideas about gravity** have developed from Aristotle in Ancient Greece, to Galileo and the tower of Pisa – the international LIGO experiment shows children that there are always more scientific questions to be answered and the curiosity just goes on and on.

Building on the historical connections with our ideas about forces, children can learn about the forces of air resistance and gravity using **Selina and the Victorian Adventure**, a colourful comic aimed at KS2 and written to promote scientific enquiry.

Forces booklist

Rosie Revere, Engineer by Andrea Beaty

Iggy Peck, Architect by Andrea Beaty

Flight School by Lita Judge

Mrs Armitage on Wheels & Mrs Armitage and the Big Wave by Quentin Blake

Science in a Flash – Forces by Georgia Amson-Bradshaw

Science in infographics – Forces by Jon Richards

Thud! Wile E. Coyote Experiments with Forces and Motion by Christian Cornia

Fantastic Forces and Incredible Machines by Nick Arnold and Georgette Yakman

This booklist was recommended by
Matt Crook, Teacher
Lunt's Heath Primary School, Widnes
(co-ordinator for the Ogden Halton Partnership)