



# Medium Term Unit Planning

<b>Topic Name:</b> Science - Forces	
<b>Learning outcome:</b> The children will be able to understand that unsupported objects fall towards the earth because of gravity. They will be able to identify the effect of drag forces such as air resistance, water resistance and friction acting between moving surfaces and to describe why moving objects that are not driven tend to slow down. They will also be able to understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs which allow a smaller force to have a greater effect.	
<b>Hook:</b> Sticking a pen to a book using an invisible force.	<b>Topic Showcase (e.g. display, museum, performance, presentation):</b> Titanic Exhibition stall about forces (levers and pulleys) for parents and children in the school.
<b>Oracy:</b> During the Titanic exhibition the children will be explaining and demonstrating what they have learnt about forces (levers and pulleys).	<b>Key Vocabulary:</b> Gravity, drag forces, air resistance, water resistance, friction, force, motion, mechanical devices, gears, pulleys, lever, springs, effect.
<b>Key Texts (whole class reading/end of the day book/Talk for Writing Texts etc.):</b> <ul style="list-style-type: none"> <li>• William Kamkwamba 'Tilting at windmills: the boy who harnessed the wind' – WCR text</li> <li>• How Does a Parachute Work? – WCR text</li> <li>• How Do Solar Panels Work For Kids – WCR text</li> </ul>	
<b>Citizenship/Community Opportunities (Focus – change in attitude/increase knowledge and awareness/make a difference):</b> The children will be setting up a stall in the Titanic exhibition dedicated to their forces topic (levers and pulleys) for the parents to come and visit in school.	



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## Experiences/Visits/Visitors:

Creating a forces stall in their own Titanic exhibition

## Main subjects covered:

Science

## Science threshold concepts:

### Work scientifically

This concept involves learning the methodologies of the discipline of science.

### Understand movement, forces and magnets

This concept involves understanding what causes motion.

## Notes:

This scheme of work will be linked to the children's topic 'Titanic.'

Lesson title and learning Intention	Threshold concepts (success criteria)	Milestones (success criteria)	Lesson structure/differentiation
1. To identify the effects of friction.	<b>Work scientifically</b> This concept involves learning the methodologies of the discipline of science.	Report findings from enquiries, including oral and written explanations of results, explanations involving causal	Ask the children to stick their pen to their book using an invisible force. Introduce the children to the idea of gravity. Explain the concept of gravity and



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	<p><b>Understand movement, forces and magnets</b> This concept involves understanding what causes motion.</p>	<p>relationships, and conclusions.</p> <p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</p> <p>Identify the effect of drag forces, such as air resistance, water resistance and friction that act between moving surfaces.</p> <p>Describe, in terms of drag forces, why moving objects that are not driven tend to slow down.</p>	<p>how it works. Move onto what forces are in general and give some examples. Introduce friction and demonstrate by pushing a book across a smooth (table) surface and a rough (carpet) surface. Children to carry out investigation into friction – picking up jelly cubes (one coated in oil and one not). Children to predict which jelly cube they think will be easier to pick up and why, using specific terminology. Once complete, children to feedback their results to the rest of the class. Introduce air resistance and demonstrate using a normal piece of A4 paper and piece of A4 paper crunched up into a ball.</p>
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			Children to explain the effect of air resistance on this specific example.
2. To identify the effects of water resistance.	<p><b>Work scientifically</b> This concept involves learning the methodologies of the discipline of science.</p> <p><b>Understand movement, forces and magnets</b> This concept involves understanding what causes motion.</p>	<p>Present findings in written form, displays and other presentations.</p> <p>Identify the effect of drag forces, such as air resistance, water resistance and friction that act between moving surfaces.</p> <p>Describe, in terms of drag forces, why moving objects that are not driven tend to slow down.</p>	<p>Recap forces definitions, gravity, friction and air resistance. Introduce water resistance and how it is similar to air resistance studied previously.</p> <p>Children to carry out investigation into water resistance – making various, streamlined and not streamlined shapes out of plasticine and dropping them into a tall container of water, filming them in slow motion. Children to record which shape reached the bottom of the container first and last.</p>



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<p>3. To understand how levers and pulleys allow a smaller force to have a greater effect.</p>	<p><b>Work scientifically</b> This concept involves learning the methodologies of the discipline of science.</p> <p><b>Understand movement, forces and magnets</b> This concept involves understanding what causes motion.</p>	<p>Take measurements, using a range of scientific equipment, with increasing accuracy and precision.</p> <p>Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs.</p> <p>Understand that some mechanisms including levers, pulleys and gears,</p>	<p>Children to watch a re-enactment video of the construction of the Titanic, encouraging the children to think about how they lifted such heavy items. Introduce pulleys, what they are and how they work. Show video of the world's strongest man pulling an articulated lorry and a group of children doing the same thing using pulleys. Children to set up a 1,2, 3, 4 and 5 pulley system on the school playground to lift a heavy bag of books. Children to write down their own explanation of how the pulley system worked to create a mechanical advantage, including a labelled diagram.</p>
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		<p>allow a smaller force to have a greater effect.</p>	<p>Introduce levers, what they are and how they work. Children to set up a lever system to lift a can of food. Children to use Newton meters to measure how much force is needed to lift the weight and how this alters depending on where the fulcrum is positioned. Children to write down their own explanation of how the lever system worked to create a mechanical advantage, including a labelled diagram.</p>
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