

**Pioneer Federation**  
**Medium term plan**  
**Cycle 1, Term 2**  
**Science**



<b>Subject:</b> Science forces	
<b>Key Concept/ Theme:</b>	
<b>Prior Learning links:</b> Previous learning in year 3: comparisons of how things move on different surfaces. Noticing that some forces need contact between two objects but magnetic forces can act at a distance. Understanding magnets repelling and attracting and understanding magnetic materials. Understanding magnets as having two poles.	
<b>Vocabulary:</b> gravity, friction, air resistance, upthrust, weight, Measuring forces: Newton meter, Newtons (N), Particles, Surface area, Push, pull, Balance, Mass – grams and kilograms,	
<b>School specific areas to cover (where applicable):</b>	
1.	<p>Deeper learning question: Why do we need to know about forces and name them? How does this help us in the real world?</p> <p>Prior learning reconnection (year group, cycle &amp; term): Year 3/4, forces- magnets. Year 1/2 knowledge of materials and their properties.</p> <p>LO: Let's learn about gravity.</p> <p>Enquiry focus: fair testing</p> <p>Activity: Children to show what they know about gravity at the start of the session. Inform the children that in future lessons they will be learning about how different forms of transport travel through air. Today they will be investigating paper falling from the same height. They could scrunch up the paper, fold it in half or have it flat then compare.</p> <p>Future learning links: To link understanding of forces to any DT projects they will be designing and making, Links to future forces lessons about gears and pulleys.</p>
2.	<p>Deeper learning question: Will all objects fall to the ground at the same speed? Do you agree/disagree- give reasons</p> <p>Reconnection: Think about what they found out about gravity. How does gravity affect our everyday lives?</p> <p>LO: Let's learn how to identify the effects of air resistance that act between moving surfaces.</p> <p>Enquiry focus: repeating results.</p> <p>Activity: They are going to be finding out how the length of the blades on an autogyro affects how quickly it falls- links to surface area.</p>
3	<p>Deeper learning question: Why is it important to measure a force? How could this help us in the world when designing or engineering?</p> <p>Reconnection: Why is it important to understand the size of the surface area when understanding air resistance and gravity? How does this relate to the real world?</p> <p>LO: Let's learn how to identify the effects of friction between moving surfaces.</p> <p>Enquiry focus: predictions, using equipment</p> <p>Activity: Investigating newton meters and pulling a shoe on ramp to measure the force (see part one of lesson on Kent planning)</p>

**Pioneer Federation**  
**Medium term plan**  
**Cycle 1, Term 2**  
**Science**

4	<p>Deeper learning question: Why do we need to understand the effects of friction?  Reconnection: What is a newton meter? How do we measure force? Talk about how measuring force could help us in the real world.  LO: Let's investigate the effects of friction between moving surfaces.  Enquiry focus: Fair testing, recording results  Activity: Investigating using an elastic band and tub to release and measure distance on carpet</p>
5	<p>Deeper learning question: What affects how well an object fired from a trebuchet will travel?  Reconnection: Think about the different forces they have learnt about so far and how the force and the surface help us to learn about real life objects and situations?  LO: To identify the effects of air resistance that act between moving surfaces.  Activity: To make a trebuchet using elastic bands, a spoon and a metal coat hanger to understand air resistance, Children to draw observations and detailed scientific diagrams with explanations showing understanding.</p>
6	<p>Deeper learning question: How does the shape of an object affect how it moves through water?  Reconnection: Review the forces they have learnt so far, focus on scientific language in explanations. Ask them to add arrows to show the force on different pictures.  LO: Let's identify the effects of water resistance that acts between moving surfaces.  Enquiry focus: results/presenting, so what?  Activity: Children to investigate the different shapes of blue tac being dropped in water. Set up comparative investigations</p>
7	<p>Deeper learning question: How does the mass of a boat affect the depth it travels below the water surface?  Reconnection: Draw on the arrows for pictures of water resistance showing the forces acting on an object. Children to look at a photo of objects floating or sinking and generate discussions about what they know using scientific vocabulary and knowledge of forces.  LO: Let's identify the effects of water resistance that act between moving surfaces.  Enquiry focus: Identifying important information.  Activity: Children to measure objects using a newton meter. Children to then measure as they drop into water and observe how this changes when they start to float. Children to measure the depth of water the reach when they start to rise to the top again.  End of unit quiz: Question assessment as assessing on Scientific enquiry skills throughout using the coloured stickers for individual skills.</p>

End points:

To be able to measure with newton meter. To understand different forces acting between moving surfaces (gravity, friction, air resistance and water resistance) and vocabulary related.  
To be able to draw diagrams and use arrows to show the forces involved. To know the effects of the forces.

When investigating, being able to: predict, identify variable when fair testing, produce and repeat results and present data, ask the 'So what?' type questions and identify important information.