



## Example Scheme of Work – MKSHK Year 4 Science

<b>Teacher</b>		<b>Prep</b>	<b>Year</b>	<b>4</b>	<b>No of pupils</b>		<b>Subject</b>	Science
<b>Topic</b>	<b>Forces</b>						<b>No. of lessons</b>	6

<b>About this Unit</b>	<p>Pupils should explore falling objects and raise questions about the effects of air resistance. They should explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. They should experience forces that make things begin to move, get faster or slow down. Pupils should explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel. Pupils should explore the effects of levers, pulleys and simple machines on movement. Pupils might find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. Pupils might work scientifically by: exploring falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. They might explore resistance in water by making and testing boats of different shapes. They might design and make products that use levers, pulleys, gears and/or springs and explore their effects.</p>
------------------------	--

<b>Lesson</b>	<b>Learning</b> <i>(what is to be learnt and the evidence of the learning)</i>	<b>Learning Activities</b> <i>(the planned activities/tasks to develop knowledge, skills and understanding in the subject)</i>	<b>Differentiation</b> <i>(learning activities/resources/tasks to support and extend learners)</i>	<b>Assessment Opportunities/AfL</b> <i>(method of identifying achievement/assessment strategies to move learning forward)</i>
<b>1</b>	To be able to identify weight as a force and to know that it is measured in newtons.	<p>What is weight? Children to think, pair, share their ideas.</p> <ul style="list-style-type: none"> <li>Explain that weight describes how heavy an object is and that it is Earth's gravitational force that causes objects to have weight. Explain that gravity is a force that pulls objects towards the earth's centre. Look at the diagram of clouds places around the globe. Which way will the rain fall? Invite children to come to the board to draw in the rain and then check if they were right by looking at the diagram and explanations on the next slides.</li> <li>Show children a video of astronauts walking on the moon (e.g: <a href="http://www.youtube.com/watch?v=nGMEn0FFQvw">http://www.youtube.com/watch?v=nGMEn0FFQvw</a>). Why are these astronauts bouncing instead of walking? Explain that the gravitational</li> </ul>		<p>Do children know that weight is a force?</p> <p>Do children know that forces are measured in newtons?</p> <p>Do children know that gravity causes objects to have weight and that the gravitational force on the</p>

		<p>force on the moon is weaker than on Earth. Earth's gravitational force is 6 times stronger. What do you think it would feel like to walk on the moon? Invite children to share their ideas.</p> <ul style="list-style-type: none"> <li>• Show children the force meter on the slides. Do you know what this is and what it does? What do the numbers stand for? Invite children to share their ideas.</li> <li>• Explain that a force meter measures the force upon an object and measures it in newtons (N). What is the weight in newtons of these objects? Children to read the scales on the force meter to answer each question.</li> </ul>		moon is different to that on Earth?
2	To identify that several forces may act on one object and to be able to identify the direction of different forces.	<ul style="list-style-type: none"> <li>• Do you know what these words mean: propulsion, friction, up-thrust, gravity, air resistance, water resistance, attraction, repulsion? Invite children to share their ideas and create a definition for what they think they might mean on the slides as a class.</li> <li>• Go through the explanations for each of the words. Were our definitions correct? Do we need to change anything? Go back to the definitions and alter as necessary.</li> <li>• Show children the picture of the motor boat on the slides. Which forces are acting on this motor boat?</li> <li>• Children to think, pair, share their ideas. Go through the explanation on the slides.</li> <li>• Show children the picture of a paperclip suspended by a magnet. Which forces are acting here? Invite children to come to the board to draw arrows to show the direction the forces are acting in.</li> <li>• Repeat with the picture of someone sliding down a hill on a sledge.</li> </ul>		<p>Do children know that several forces can act on an object at once?</p> <p>Can children name and define some different forces?</p> <p>Can children annotate drawings of forces in action and use arrows to label the direction of the forces?</p>
3	To find out how the weight of an object changes when it is in and out of water.	<p>Show children the pictures of objects on the slides. What would happen to these objects if we put them in water? Why?</p> <ul style="list-style-type: none"> <li>• Explain that water has an upwards force called upthrust which pushes against the gravitational force.</li> <li>• This means that some objects are able to float on water instead of sinking. Ensure children understand that this does not mean that gravity does not act through water.</li> <li>• What would happen to the weight of these objects if we submerged them in water and why? Children to think, pair, share their ideas.</li> <li>• Explain that today children will be carrying out an experiment to see what happens to the weight of objects when they are put into water. How could we carry out this experiment? How would we make it a fair test? How can we make sure our measurements are accurate? Invite children to share their ideas.</li> </ul>		<p>Can children explain why some objects will float on water?</p> <p>Can children make measurements of force using a force meter for objects both in and out of water?</p> <p>Can children draw conclusions from the data they have gathered?</p>

		<ul style="list-style-type: none"> <li>Go through the ideas for how to conduct the experiment on the slides.</li> </ul>		
4	To find out what happens to the length of an elastic band when weights are suspended from it.	<p>What do you think would happen to this elastic band if we suspended a weight from it? Children to think, pair, share their ideas.</p> <ul style="list-style-type: none"> <li>Tell children that today they will be investigating what happens to the length of an elastic band when weights are suspended from them. How could we do this? What materials and tools would we need?</li> <li>How can we make sure that everyone stays safe? What will we need to do to make sure this is a fair test?</li> <li>Go through the information on slides suggesting how to carry out the experiment safely.</li> </ul>		<p>Do children know that the amount an elastic band stretched depends on the force acting on it?</p> <p>Can children gather data by making careful measurements of length?</p> <p>Can children represent data in a line graph and use this to identify patterns in the data?</p>
5	To investigate air resistance and how this affects objects falling to the ground.	<p>Show children the picture of a man about to jump out of a plane. Why is he doing this?! How will he land safely on the ground again? Invite children to share their ideas.</p> <ul style="list-style-type: none"> <li>Explain that a parachute saves sky divers' lives because the air resistance acts against the gravitational force and slows the sky diver down so he can land safely. Show children some of the different explanations for how this works on the slides. Which of these statements do you think describes this most scientifically? Which statements do not? What could you add to the statements that are not very clear to improve them? Children to discuss their ideas.</li> </ul>		<p>Do children know that air resistance slows moving objects?</p> <p>Can children plan, carry out and assess experiments to investigate air resistance?</p> <p>Can children draw conclusions from their investigations?</p>
6	To be able to consolidate and assess knowledge of forces.	<ul style="list-style-type: none"> <li>What have we found out about forces throughout the course of this unit? Children to think, pair, share their ideas and then create a mind map on the slides.</li> <li>Go through the true or false questions on the slides and ask children to choose the correct answer.</li> <li>Encourage children to discuss the reasons for their choices.</li> <li>What is the most surprising thing you have found out about forces? What would you like to investigate further and why? Invite children to share their ideas.</li> </ul>		<p>Can children evaluate and assess what they have learnt about forces?</p> <p>Can children demonstrate their knowledge of forces in a variety of ways?</p> <p>Can children solve problems relating to forces using their prior knowledge?</p>