

Year 5 - Forces

Session LO • WS skill / enquiry • K & U • Key questions	Teaching and Learning Outline	Recording in Books	Core Vocabulary	Other e.g misconceptions, resources
LO: I am researching K&U: Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Key Question: What is gravity?	Exploratory activity - drop different objects of varying weights and sizes. Consider what's happening to them as they travel and when they stop. Use Question Drop Cards to discuss observations: e.g. What was the most interesting thing that you found out? Consolidate understanding of gravity through: Tig Tag/ BBc Teach or other https://www.bbc.co.uk/teach/class-clips-video/science-ks2-discovering-the-work-of-Sir-Isaac-Newton/zr4mf4j Read simple explanation from text. Create simple set of notes of key findings.	What is gravity? Discuss in pairs. Record simple response, using appropriate technical language.	gravity force earth pull	The heavier object the faster it falls because it has more gravity acting on it Forces always act in pairs which are equal and opposite A moving object has a force which is pushing it forwards and it stops when the pushing force wears out A non-moving object has no forces acting on it
LO: I am planning a fair test	Introduce AR by modeling: x3 pieces of paper - one scrunched, one folded in half, one original (All A4 paper). Drop them from the same height. Develop explanation for what is happening and introduce term air resistance.	Pupils in group plan their own version.	air resistance	Heavy objects fall faster, light objects slower

<p>K&U: Identify the effect of air resistance</p> <p>Key Question: What is air resistance?</p>	<p>Explore making different parachutes and flying them to generate variables for Fair Tests. Model planning a FT using the post-it planner. Conduct simple FT investigation with parachutes (e.g. by changing surface area) Brief summary - what is AR? What more do we know now having conducted the fair test?</p>			
<p>LO: I am reporting and presenting my findings</p> <p>K&U: Identify the effect of water resistance</p> <p>Key questions: What is water resistance and how does it relate to the boat design?</p>	<p>Exploratory activity - objects sinking & floating; moving plates in bowls of water side to side in different ways. Develop simple explanation for the differences that you have found and introduce pupils to the term water resistance. Use Question Drop Cards to explore what's happening: e.g. what new questions do you have after your investigation?</p> <p>Introduce challenge: Groups to make a boat out of a single piece of A4 paper to support the most weight (use marbles as people). Use trial and improvement to create boat. Which boat held up the most weight and why? Reporter from each group to feedback findings and any pertinent issues arising. Relate to key question and design / surface area.</p>	<p>Record response to key question.</p> <p>Relate back to AR - in what ways are both these forces similar?</p>	<p>water resistance float</p>	<p>Heavy objects sink and light objects float</p>

<p>LO: I am observing and explaining</p> <p>K&U: Identify the effect of friction that act between surfaces</p> <p>Key Question: What is friction and how does it act between surfaces?</p>	<p>Explore friction in everyday life e.g. warming hands by rubbing together, shoes on different surfaces such as icy roads and grass, sports shoe design and more using video, images and discussion.</p> <p>What is friction? How does it act between surfaces?</p> <p>Use different services to observe the effect of friction e.g. pull a simple wooden toy over different surfaces (surfaces: carpet, lino, tile, grass) How do the different surfaces compare? Now change the object and explore anew. Are there any patterns? Why? Relate this to helter-skelters and other scenarios where friction is useful.</p>	<p>Record an explanation of friction.</p>	<p>friction forces</p>	<p>Objects always travel better on smooth surfaces</p> <p>Smooth surfaces have no friction</p>
<p>LO: I am selecting measuring equipment to give the most precise results</p> <p>K&U: Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force</p>	<p>Use images / video to show pulleys at use in everyday life. How do you think they work?</p> <p>Explore forcemeters and how they work. Introduce name and units and scales. (Relate to maths learning on decimals). Consider why there are different scales and explore measuring the force required to move different objects. How do you get the most accurate measurement?</p>	<p>Record which force-meter you chose and why (and the results)</p>	<p>mechanic simple machines levers pulleys gears</p>	

<p>to have a greater effect.</p> <p>Key Question: How does a pulley work?</p>	<p>Devise a simple pulley system using a cotton reel (or the back of a chair) and a string. Use a force meter to establish if the pulley makes lifting objects easier than simply lifting them from the floor without a pulley. Choose best force-meters for the task and be able to justify choice.</p> <p>As a class derive an explanation for how a pulley system works.</p>			
<p>LO: I am presenting findings in labelled diagrams.</p> <p>K&U: Recognise that levers allow a smaller force to have a greater effect.</p> <p>Key Question: How does a lever work?</p>	<p>Set up a simple lever using a ruler, a cardboard triangle (or chunky pencil) and some weights.</p> <p>In pairs explore how to move the fulcrum to make lifting weights feel easier.</p> <p>Establish how the lever is working. Model how to draw and label a diagram of the lever to explain how it works.</p>	<p>Record their own modelled diagrams with the fulcrum in different positions. Where do we see levers at work in everyday life? Explore using videos / images. How else does this help us to explain how they work?</p>	<p>mechanic simple machines levers pulleys gears</p>	
<p>LO: I am researching</p> <p>K&U: Recognise that gears allow a smaller</p>	<p>Read an explanation for how gears on a bike work - if possible in conjunction with seeing one in the classroom or having a gear board to show the wheels in motion & a labelled diagram of how they work.</p>	<p>Record findings on the workings of levers, pulleys and gears. What do they all have in common?</p>	<p>mechanic simple machines levers pulleys gears</p>	

<p>force to have a greater effect.</p> <p>Key Question: How do gears work? What do the 3 machines have in common?</p>	<p>Watch video: https://www.youtube.com/watch?v=cShBIYP6uu0 / Tig Tag or other</p> <p>Pick out key features and technical language. Create a set of notes which will allow you to answer the key question. (Relate to maths learning on ratios)</p> <p>How do gears work?</p> <p>How do they work? Use real life examples of different types to illustrate.</p>			
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