Y5/6 Cycle A Spring 2 MTP: Forces

SUBJECT	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6
Science	**How can forces affect objects? Session 1A** ✓ To know that a force is a push, pull or twist and to give everyday examples of these in action. ✓ To know that a levers, pulleys and gears are simple machines. ✓ To know that a lever has a fulcrum, load, and effort. ✓ To identify, with support, the different variables in a fair or comparative test e.g., control, dependent, independent. (WS) ✓ To explain, with support, which variables need to be controlled and why, when conducting a fair or comparative test. (WS) ✓ To identify different causal relationships and trends in data, with support. (WS)	**How can forces affect objects? Session 1B** ✓ To know that a levers, pulleys and gears are simple machines. ✓ To explain that some simple machines allow a smaller force to have a greater effect. ✓ To describe how movement increases when turning a small force into a bigger force. ✓ To identify evidence that refutes or support a scientific idea, with support. (WS) ✓ To use a range of equipment, appropriately and accurately, with support, to take readings and observations in scientific enquiries. (WS) ✓ To know when and how to take repeat readings, using this knowledge to explain why, with support. (WS) ✓ To know and explain whether results are reliable, justifying why, with support. (WS) ✓ To analyse results and form conclusions which answer scientific enquiry questions, with support. (WS) ✓ To identify different causal relationships and trends in data, with support. (WS)	**What would happen without gravity? Session 2A** ✓ To know that gravity is a pulling force. ✓ To use knowledge of gravity to explain why unsupported objects fall towards the Earth. ✓ To identify evidence that refutes or support a scientific idea, with support. (WS)	**How can friction be reduced and increased? Session 3A** ✓ To use knowledge of friction as a contact force, to explain what causes it e.g., the resistance that one surface/object has when moving over another. ✓ To use knowledge of friction to explain how different surfaces affect friction. ✓ To explain how to increase or reduce friction. ✓ To identify, with support, the different variables in a fair or comparative test e.g., control, dependent, independent. (WS) ✓ To explain, with support, which variables need to be controlled and why, when conducting a fair or comparative test. (WS) ✓ To know when and how to take repeat readings, using this knowledge to explain why, with support. (WS) ✓ To use a range of equipment, appropriately and accurately, with support, to take readings and observations in scientific enquiries. (WS)	**How does air resistance affect movement? Session 4A** ✓ To know that air resistance is a pushing force. ✓ To describe air resistance as a force that is caused by air particles colliding with any object that moves through it. ✓ To use knowledge of forces to use force arrows to show the size and direction of a force.	**How does water resistance affect movement?** ✓ To know that water resistance is a force that uses friction to slow things down as they move through water. ✓ To use knowledge of water resistance to explain how the surface area affects the resistance e.g., the greater the surface area to greater the resistance. ✓ To record data and results of increasing complexity and accuracy using scientific diagrams and labels, tables, scatter graphs, bar and line graphs, with support. (WS) ✓ To identify different causal relationships and trends in data, with support. (WS)
			What would happen without gravity? Session 2B ✓ To know that gravity is a pulling force. ✓ To use knowledge of gravity to explain why unsupported objects fall towards the Earth. ✓ To know the difference between mass and weight e.g., mass is constant, weight is affected by gravitational force. ✓ To know that the mass of an object does not affect the time taken for it to fall to the ground. ✓ To know when and how to take repeat readings, using this knowledge to explain why, with support. (WS) ✓ To record data and results of increasing complexity and accuracy using scientific diagrams	**How can friction be reduced and increased? Session 3B** ✓ To use knowledge of friction to explain how different surfaces affect friction. ✓ To explain how to increase or reduce friction. ✓ To identify, with support, the different variables in a fair or comparative test e.g., control, dependent, independent. (WS) ✓ To explain, with support, which variables need to be controlled and why, when conducting a fair or comparative test. (WS) ✓ To know when and how to take repeat readings, using this knowledge to explain why, with support. (WS) ✓ To use a range of equipment, appropriately and accurately, with	**How does air resistance affect movement? Session 4B** ✓ To know that air resistance is a pushing force. ✓ To describe air resistance as a force that is caused by air particles colliding with any object that moves through it. ✓ To predict wider results and trends based on the analysis of data gathered, with support. (WS)	**Feel the force: What would life be like without them?** ✓ To know that gravity is a pulling force. ✓ To use knowledge of gravity to explain why unsupported objects fall towards the Earth. ✓ To use knowledge of friction as a contact force, to explain what causes it e.g., the resistance that one surface/object has when moving over another. ✓ To know that air resistance is a pushing force. ✓ To describe air resistance as a force that is caused by air particles colliding with any object that moves through it. ✓ To know that water resistance is a force that uses friction to slow

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			and labels, tables, scatter graphs, bar and line graphs, with support. (WS) ✓ To use relevant and accurate scientific language to discuss, communicate and justify scientific ideas, with support. (WS)	support, to take readings and observations in scientific enquiries. (WS) ✓ To record data and results of increasing complexity and accuracy using scientific diagrams and labels, tables, scatter graphs, bar and line graphs, with support. (WS) ✓ To analyse results and form conclusions which answer scientific enquiry questions, with support. (WS)		things down as they move through water. ✓ To use knowledge of water resistance to explain how the surface area affects the resistance e.g., the greater the surface area to greater the resistance.
D&T	**How do pulleys lift a load?** **SESSION 1A**	**What are gears and how do they work?** **SESSION 2A**	**Why is the design process in product innovation important?** **SESSION 3A**	**Why is the design process in product innovation important?** **SESSION 3B** [possibly 2 sessions]	**Why is the design process in product innovation important?** **SESSION 3C**	**Why is the design process in product innovation important?** **SESSION 3D**
	✓ To know that changing the length of rope on a fixed pulley affects the number of turns of the wheel needed to lift a load. ✓ To know that fixed pulleys lift a load using a wheel, axle and rope.	✓ To know that a gear is a rotating part of a machine that creates movement. ✓ To know how meshing gears at right angles can alter movement.	✓ To know that James Dyson is a designer and engineer who designs household products. ✓ To use knowledge of gears to analyse and evaluate mechanical components in everyday objects. ✓ To know how to use a survey to research intended users' wants and needs to inform the design process.	✓ To know how exploded diagrams can demonstrate the separate parts of a design and how they fit together. ✓ To know how prototypes can be used to test mechanical components in an initial design.	✓ To use knowledge of gears to create a functional product with mechanical components for an intended user.	✓ To use their knowledge of gears to evaluate their own and their peers' designs.
	How do pulleys lift a load? **SESSION 1B**	**What are gears and how do they work?** **SESSION 2B**				
	✓ To know the mechanical differences between fixed, moveable and compound pulleys.	✓ To know how to calculate simple gear ratios. ✓ To know that gear ratio affects the rotational speed and direction of gears in a gear train. ✓ To know that coaxial gears are gears on the same axle.				

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