PARK LANE PRIMARY SCHOOL	YEAR 5 FORCES	SCIENCE

PRIOR KNOWLEDGE	COMMON MISCONCEPTIONS
Builds on previous knowledge from Y3 Forces. • Compare how things move on different surfaces • Notice that some forces need contact between two objects, but magnetic forces can act at a distance • Observe how magnets attract or repel each other and attract some materials and not others • Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials	• **If an object is at rest, no forces are acting on it:** Forces can also act on objects that are not moving. For example, the force of gravity is acting on all objects on Earth, even if they are not moving. • **Forces must come into contact with an object to act upon it:** A non-contact force is a force that acts between two objects without any physical contact between them, such as gravity, magnetism and electrostatic force. • **The force of gravity is always the same:** The force of gravity depends on the mass of the objects involved. For example, the force of gravity between the Earth and the Moon is much weaker than the force of gravity between the Earth and an apple. • **There is no gravity in space:** There is a small amount of gravity everywhere in space. However, this microgravity is sometimes called zero-gravity, which is misleading! • **Mass and weight are the same:** Mass is the amount of matter in an object and is measured in kilograms (kg). Weight is the force of gravity acting on an object. It is a measure of how much the Earth pulls on an object. Weight is measured in Newtons (N). • **Friction always hinders motion, so you always want to eliminate friction:** Friction is a force that opposes the relative motion of two surfaces in contact. It is a necessary force that allows us to do many things in our everyday lives, such as breaking, gripping and sealing. • **Force and power are the same:** Force is what causes an object to move, while power is the rate at which work is done.

Lesson Intention	National Curriculum Reference	Scientific Enquiry	Rocket Words	Resources
Explore gravity and the life and work of Isaac Newton	Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object	**Researching using secondary sources:** Identifying scientific evidence that has been used to support or refute ideas or arguments	➢ Sir Isaac Newton Gravity Astronomy Weight Mass	1m ruler/tape measure, weighing scales, variety of balls (tennis ball, soft ball, marble, hockey ball etc), pencil, 2 sheets of paper, stopwatch
Examine the connection between air resistance and parachutes	Identify the effects of air resistance, water resistance and friction, that act between moving surfaces	**Observing over time:** Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate	➢ Galileo Galilei air resistance opposing streamlined parachute	feather, tennis ball, small plastic toys/weights, stopwatches, variety of materials to test (different types of papers, plastic bags, bin bags, variety of materials), rulers, hole punch, string, calculators
Explore factors which affect an object's ability to resist water	Identify the effects of air resistance, water resistance and friction, that act between moving surfaces	**Answering questions through collecting, analysing & presenting data (problem-solving):** Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a	water resistance streamlined upthrust buoyant sink	small object (such as a marble, or penny), large clear container filled with water, mini whiteboard, modelling clay, water, variety of containers (such as large bottles with the tops cut off, or large

		degree of trust in results, in oral and written forms such as displays and other presentations		measuring cylinders), weighing scales
Investigate the effects of friction on different surfaces	Identify the effects of air resistance, water resistance and friction, that act between moving surfaces	**Comparative & fair testing (controlled investigation):** Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	Friction Resistance Lubricant Newton meter Newton	a variety of surfaces (different carpets or carpet tiles, variety of wooden floors, tarmac/playground surface), trainer, Newton meter, ruler, weight Alternatively, children could cover a plank of wood with different surfaces (such as sandpaper, a towel, tinfoil, lino, carpet, corrugated cardboard, bubble wrap etc.), squared paper
Investigate mechanisms - levers and pulleys	Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect	**Answering questions through collecting, analysing & presenting data (problem-solving):** Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations	Lever Load Pivot Fulcrum pulley	mini whiteboards, ball, a load to lift per child (weights/1 pint milk bottle/bag of sand etc.), materials to create a pulley - string, cotton reels, dowel, wheels, cardboard
Investigate mechanisms - gears	Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect	**Comparative & fair testing (controlled investigation):** Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	Mechanism Gear Mesh rack and pinion bevel gear	strong cardboard, lolly sticks, paper straws, sticky tape, thin dowel/cocktail sticks, plasticine, sticky tape, glue, compass, scissors