St James' Church of England Primary School
Key Learning in Science – Forces

Key Learning: Forces		
Key Learning	**Notes and guidance (Non-statutory)**	**Working Scientifically (Featured skills)**
KS1 - Not statutory within NC2014 Pupils should be taught to: **LKS2: Year 3 – Forces and magnets** ▪ **Compare how some 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.** ▪ **Describe magnets as having two poles.** ▪ **Predict whether two magnets will attract or repel each other, depending on which poles are facing.**	**KS1 -** N/A **LKS2: Year 3 – Forces and magnets** *Pupils should observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing). They should explore the behaviour and everyday uses of different magnets (for example, bar, ring, button, horseshoe).*	**KS1 Forces -** N/A Pupils might work scientifically by: **LKS2 : Year 3 – Forces and magnets** • *Comparing how different things move and grouping them.* • *Raising questions and carrying out tests to find out how far things move on different surfaces and gathering and recording data to find answers to their questions.* • *Exploring the strengths of different magnets and finding a fair way to compare them.* • *Sorting materials into those that are magnetic and those that are not.* • *Looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another.* • *Identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.*
UKS2: Year 5 – Forces ▪ **Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.** ▪ **Identify the effects of air resistance, water resistance and friction, that act between moving surfaces**	**UKS2: Year 5 – Forces** *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*	**UKS2: Year 5 – Forces** • *Exploring falling paper cones or cup-cake cases and designing and making [exploring] a variety of parachutes and carrying out fair tests to determine which designs are the most effective.* • *Exploring resistance in water by making and testing boats of different shapes.*

▪ **Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.** ▫ There are different types of forces (push, pull, friction, air resistance, water resistance, magnetic forces, gravity). ▫ Gravity can act without direct contact between the Earth and an object. ▫ Friction, air resistance and water resistance are forces which slow down moving objects. ▫ Friction, air resistance and water resistance can be useful or unwanted. ▫ The effects of friction, air resistance and water resistance can be reduced or increased for a preferred effect . ▫ More than one force can act on an object simultaneously (either reinforcing or opposing each other).	*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 such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.*	• *Design and make artefacts that use simple levers, pulleys, gears and/or springs and explore their effects.*

Key Learning (continued)	Notes and guidance (continued) (Non-statutory)	Working Scientifically (continued) (Featured skills)
NB: At KS2, pupils will only need to *experience* objects falling and *describe the effect of* air resistance on these falling objects. They do not need to understand differences in gravity associated with different planets/moons within the solar system or be able to *explain* gravitational forces. The concept of gravity will be revisited in the KS3. However, the following information might be useful as background information for some teachers to avoid introducing misconceptions. The larger the mass of a planet, star or moon the more gravitational pull it exerts. This gravitational		

force is responsible for keeping the planets orbiting the sun and the orbiting of moons around the planets. Gravity is a non-contact force and so works over a distance. Weight is the force due to gravity acting on different masses - weight will change when on the Moon compared with on the Earth as the Moon has a smaller gravitational pull than the Earth		