Science Project Overview Year 3 Magnets and forces

Subject Knowledge (PoS) **Substantive knowledge**	**Working Scientifically** (PoS+Overview) **Disciplinary knowledge**	**Working Scientifically Methods**
• Objects move differently dependent on the surface they are travelling on. • Objects appear to move further and faster on smooth surfaces as these create less friction. • Objects appear to move slower and not so far on rougher surfaces as these create more friction. • Friction is the force that slows things down. • Friction acts against the objects that is moving. • Some forces need contact between two objects e.g. a push or a pull. • Magnetic forces can act at a distance. • Magnets attract when the opposing poles are facing one another. • Magnets repel when the same poles are facing one another. • For a material to attract to a magnet it must be magnetic. • Magnetic materials include iron, steel, nickel and cobalt. • Non-magnetic metals include gold, silver, copper and aluminium. • Any material that is not made from metal is non-magnetic. • Magnets have two poles- a north pole and a south pole.	During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • ask their own questions about what they observe • Make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including: observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources. • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings. • draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.	Using different types of scientific enquiry to answer their own questions, including: • observing changes over time, • noticing patterns, • grouping and classifying things, • carrying out simple comparative and fair tests • and finding things out using secondary sources
Previous learning: • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 -	**Preparing for:** • Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. (Y5 - Forces) • Identify the effects of air resistance, water resistance and friction, that act between	**Bespoke to our school** Lots of time is dedicated to learning tier 2 and 3 vocabulary as many of our children have limited vocabulary when they

Uses of everyday materials)	moving surfaces. (Y5 - Forces) • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. (Y5 - Forces) • Magnetic fields by plotting with compass, representation by field lines. (KS3) • Earth's magnetism, compass and navigation. (KS3) •	begin our school. Children learn best through hands on practical lessons and this evidence can be found in our class evidence books.

Vocabulary:
Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole ,move, movement, surfaces, contact, distance, magnetic materials

Misconceptions:
• the bigger the magnet the stronger it is
• all metals are magnetic.

Maths links:
Measurement: Use the appropriate units of length (m/cm/mm), mass (kg/g) and volume/capacity (l/ml) to measure, compare, add and subtract – when calculating distances between objects and magnets
Statistics : Use bar charts, pictograms and tables to present and interpret data- to plot results from investigations
Use information in scaled bar charts, pictograms and tables to solve one-step and two-step questions- to look at results from investigations and discuss/write conclusions.

Explorify links:
Dancing raisins
Egg in bottle
Magnets
There's a hole in my bottle
River crossing
Moving propellers
Rocket launchers,
Marbles
Newspaper towers

Possible careers/jobs:
Robotics Engineer(creates robots to perform duties), Magnet Engineer(design magnets or machines and devices that use magnets)