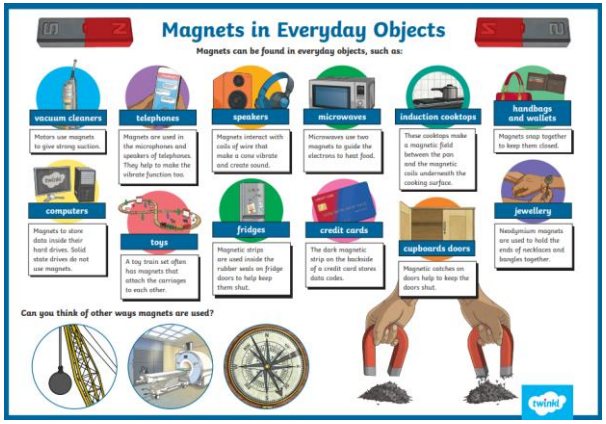
Imagine, Believe, Achieve

Springdale First School

Year 3 / Science / Forces

Children's prior learning in this area	Cultural Capital Opportunities	Key vocabulary and glossary
Reception: Exploring pushes and pulls, floating and sinking **Year 2:** find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	Find out about how magnets are used in real-life situations. 	force push pull Newtons contact material surface distance magnet magnetic magnetic field strength attract repel North pole South pole metal iron nickel cobalt steel

Enquiry Question What are contact forces? Does the mass of an object affect how much force is required to move it?	**Enquiry Question** How does the surface of a ramp affect how far a toy car can travel?
Working scientifically take measurements; interpret results **Enquiry type:** Pattern seeking	**Working scientifically** plan, set up and perform and enquiry; take measurements; interpret results – answer the question **Enquiry type** Comparative and fair test
Children will know: some forces need contact between two objects Pushes and pulls are contact forces. Contact forces need contact between two objects for the force to act. Pushing and pulling can make things move, stop, move faster or slower. Larger masses take bigger pushes and pulls to move or stop them. Bigger pushes and pulls have bigger effects. **Children will know how to:** take simple accurate measurements using whole number standard units relevant to questions or ideas under investigation. **Children will know how to:** interpret results by looking for patterns. ***Practise:*** *Actively demonstrate pushes and pulls in the classroom/playground. In demonstrations, orally describe whether the force is a push or a pull, and which two objects are in contact with each other for the force to act. Demonstrate using push and pull forces to move, stop, move faster or slower. Describe how they changed the amount of force to do this.* ***Apply:*** *Use Newton-meters to measure the force it takes to pull different objects and look at patterns. Record in a pre-given table.* ***Deepen:*** *With guided questioning, identify patterns in results – the bigger the mass (the heavier the object), the bigger the force to move it. Children answer the question in books using a stem sentence.* 	**Children will know:** that different surfaces can affect how things move. They will know that things can move more easily on a smooth, slippery surface and can move faster and travel further compared to when the same object moves on a rough, bumpier surface. They will know that a rough, bumpy surface slows down a moving object and so it will not travel as far compared to a smooth surface. (You can introduce the word friction but pupils do not need to use this term until Year 5). **Children will know how to:** With support and modelling, plan and carry out a simple practical enquiry. Through scaffolded discussion, they will choose appropriate line of enquiry, begin to identify the variable that will change, the variable that will be measured/observed and some variables that need to be kept the same and begin to recognise when a test isn't fair and suggest improvements. **Children will know how to:** take simple accurate measurements using whole number standard units relevant to questions or ideas under investigation. With support, and ONLY if this has already been taught in Maths, begin to measure using standard units (and parts of units (e.g. cm and mm). ***Practise:*** *describe different surfaces and discuss prior experiences for best surfaces for rolling a ball, roller-skating, scooting etc.* ***Practise:*** *Plan and set up enquiry through class discussion.* ***Practise:*** *measure chalk lines on playground/ masking tape lines on floor using tape measures.* ***Apply:*** *carry out enquiry, take measurements and record in pre-given table.* ***Deepen:*** *Interpret results and answer enquiry question.* 

Enquiry Question Which is the strongest magnet?	**Enquiry Question** Which materials can magnets attract?
Working scientifically plan, set up and carry out an enquiry; interpret results **Enquiry type:** Comparative and fair test	**Working scientifically** Gather and record results; Interpret results- answer the question **Enquiry type** identifying, grouping and classifying; research using secondary sources
Assessment opportunity for plan, set up and carry out an enquiry **Children will know:** magnetic forces do not need contact between objects to act. **Children will know how to:** With support and modelling, plan and carry out a simple practical enquiry. Through scaffolded discussion, they will choose appropriate line of enquiry, begin to identify the variable that will change, the variable that will be measured/observed and some variables that need to be kept the same and begin to recognise when a test isn't fair and suggest improvements. ***Practise:*** *Practise using magnets with some objects, experiencing the fact that magnetic forces do not need contact between objects to act. Yes/no table in books – images of two objects with captions, e.g. door and person, magnet and fork, racquet and ball – will contact be needed for the force to act?* ***Practise:*** *Show simple tests and identify the variable that will change, the variable that will be measured and the variables that will be kept the same.* ***Apply:*** *children work in groups to plan, set up and carry out enquiry -which is the strongest magnet when they are shown their resources. Independently, fill in a table to identify the variables.* **Children will know how to:** interpret results by establishing a connection between magnet strength and the variable they measured. **Children will know:** Magnetic forces are affected by magnet strength and distance from object. ***Deepen:*** *Interpret results and answer enquiry question.*	**Children will know:** magnets do not exert attractive forces on all materials **Children will know how to:** make predictions on which materials are magnetic based on prior experiences **Children will know how to:** classify objects by sorting them according to their common characteristics. **Children will know how to:** gather and record their findings in an appropriate way, knowing that a table with headings is a clear way to organise categories of information. They will know how to draw a table with a header row and columns. (for deepen task). **Children will know:** magnets exert attractive forces on materials containing iron, cobalt and nickel. (through research after enquiry). ***Practise:*** *prediction task for a range of given objects – sort objects into two sorting hoops and write which characteristics have caused them to classify the objects in this way.* ***Apply:*** *draw a table following modelling.* ***Apply:*** *carry out enquiry and record results in table.* ***Deepen:*** *interpret results by identifying common characteristic in objects that were magnetic (metal) and research (using simple text) which will enable the children to know that iron, cobalt and nickel are magnetic metals and other metals are not. They will know that metals can be a mix of more than one substance and therefore if it contains iron, cobalt or nickel, it will be magnetic.*

Enquiry Question Which way round do the poles of a magnet need to be to attract or repel?

Working scientifically prediction
Enquiry type Pattern-seeking

WALT: describe magnets as having two poles; predict whether two magnets will attract or repel each other, depending on which poles are facing.

Children will know: that a magnet always has two poles – North and South They will know that opposite poles of magnets attract. They will know that like poles of magnets repel.

Children will know how to: make predictions by referring to scientific knowledge.

Practise: *Label a magnet with names – North Pole/South Pole. Define the words attract and repel in books. Demonstrate magnets repelling and attracting. Draw arrows on an image to show repelling and an image to show attracting.*

Apply: *Make predictions and then test them, ticking or crossing if predictions were right or wrong.*

Deepen: *Jackson says, "this ring magnet doesn't have two poles because it doesn't have a red end and a blue end." Do you agree? Children discuss and suggest ways they could prove he is wrong. Write down their answers, explaining how they know the ring magnet has poles and how they know which is which.*