



Medium Term Plan Forces



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P levels

Performance attainment targets (P scales) and performance descriptors are used for pupils aged 5 to 16 with special educational needs (SEN) who are working below the standard of the national curriculum tests and assessments. PSTT recognises that the national curriculum levels used in this document are no longer current. We have had so many requests to return these materials to the website that they remain in the documents as a guide for those who have used them in the past. The written statements may be useful to others as an indication of children's development. For further information about P levels see:

<https://www.gov.uk/government/publications/p-scales-attainment-targets-for-pupils-with-sen>

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Primary Science Teaching Trust recommends that a full risk assessment is carried out before undertaking in the classroom any of the practical investigations contained in the plans.

Safety Note

PSTT advises teachers to refer to either CLEAPSS website or SSERC website for up to date health and safety information when planning practical activities for children.

Big Questions

- Why do things move?
- Is perpetual motion possible?
- Is gravity everywhere?
- Could we live without friction?
- Is gravity real or does the Earth just suck?

Answers

- Objects move when a force is applied to them.
- Perpetual motion is motion of bodies that continues indefinitely. This is not possible because motion slowly uses up the energy stored in the source and will be exhausted.
- Gravity is everywhere there is matter because mass will exert a force on other mass.
- It would be difficult to live without friction because we would not have grip.
- Gravity is a real force which exists because the Earth is so massive.

Learning Objectives

Pupils will have opportunities:

- To experience a range of pushes and pulls
- To experience different types of forces

Quick review activities

- Visit a play area or gym to experience big pushes and pulls.
- Label a circus of activities with 'push' or 'pull' labels
- Watch video clips or look through comics to identify images of pushes and pulls.
- Swing a bucket containing a coin or water round at different speeds for pupils to observe what happens. Vary the speed.
- Play tug of war to feel pushes and pulls
- Find things in the classroom that need a push or pull to make them work
- Find out how many ways they can make a ping pong ball move
- Sort toys or other objects into those with or without moving parts
- Make a nail into a magnet
- Sort objects into ones that have grip and ones that don't
- Play skittles! Try different sorts of balls
- Play games in PE using words like Stop: Start: Slow down: Speed up:

Vocabulary relevant to this topic

- Force - a push or a pull in a particular direction - we can only see the effects of forces
 - Push – a force that moves something away
 - Pull – force that moves something nearer
 - Twist – a force that uses a pull
 - Squeeze – a force that uses push
 - Stretch – a force that uses a pull
 - Bend – a force that uses a pull
 - Balanced forces - forces that are the same size but are acting in opposite directions
 - Friction - a force between two surfaces that are touching: gives us grip, slows or stops movement, always works in the direction opposite the direction in which the object is moving, or trying to move
 - Gravity – a force that pulls us to centre of earth
 - Mass – the amount of stuff in something
 - Weight – the force pulling down on something because of gravity
 - Newton – a unit to measure force
 - Magnet – attracts some metals. Both repels and attracts other magnets
 - Attract- pulled towards magnet: draw together with an invisible force
 - Repel – push away from magnet
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- fast, slow, turn, backwards, forwards, roll, stop, go

Background information about this topic

Motion is one of the key topics in physics. Everything in the universe moves. It might only be a small amount of movement and very, very slow, but movement does happen. Don't forget that even if you appear to be standing still, the Earth is moving around the Sun, and the Sun is moving around our galaxy. The movement never stops. Motion is one part of what physicists call mechanics. Over the years, scientists have discovered several rules or laws that explain motion and the causes of changes in motion. The physics of motion is all about forces. Isaac Newton published a book in 1687 that tried to explain about forces using 3 laws. One of his main ideas was that in order to make something move quickly or slowly a force has to be applied. The scientific meaning of force is different to the everyday meaning which can cause confusion for pupils. There are different words to describe the different ways force can be applied e.g. push, pull, squeeze, twist – although they are all forms of push or pull.

Forces cannot be seen, and sometimes not felt, but we are aware of the effects. Forces can be divided into contact and non-contact: for example gravity and magnetism are forces that act at a distance. Both of these forces weaken with distance and can act through things. A force has 2 characteristics -size and direction. Arrows are a model used to represent forces where the direction of the arrow shows the direction of the force and the length of the arrow corresponds to the size of the force.

Forces can be big, such as the pull of a star on a planet or very small, such as the pull of a nucleus on an electron. Forces are acting everywhere in the universe at all times. Energy, power and pressure are not the same as force although they are often used as such in everyday language. Very simply:

- Energy is generally needed to produce/apply a force
- Pressure is the force per unit of area and explains why snow shoes preventing you sinking in snow
- Power is the rate of working and how quickly energy is transferred

Forces can make things speed up, slow down, stop, move, change direction or change shape. The movement, direction or shape of an object will not change unless there is a force on it. This can seem counter-intuitive because a rolling ball will eventually stop –this is due to force of friction. Friction is a force that holds back the movement of a sliding object and is everywhere that objects come into contact with each other. Friction acts in the opposite direction to the way an object wants to slide. Friction only happens with solid objects, but you do get resistance to motion in both liquids and gases. This doesn't involve sliding surfaces like friction does, but is instead like the kind of resistance you get if you try to push your way through a crowd. It's a colliding situation, not a sliding one. If the gas is air, this is referred to as air resistance. Although liquids offer resistance to objects moving through them, they also smooth surfaces and reduce friction. Streamlining is a way of reducing resistance when moving through air and water.

A ball thrown into the air falls to the ground because of another force - gravity.

Forces act in pairs. When an object is stationary on the ground, there are two forces acting on it: the downward force of gravity and the force upward from the ground. The force of gravity causes the object to push down on the ground. As a result, the ground pushes back. This upward force is called the reaction force and it results from the push of the object on the ground. Whenever one object pushes another, the second object pushes against the first. The concept of a reaction force is important in science and is summarised: **EVERY ACTION HAS AN EQUAL AND OPPOSITE REACTION**. This is sometimes hard to understand but if we push down on a table we can feel it pushing back even though we can't see anything. Balanced forces are a model for everyday situations when nothing much is moving or changing, e.g. a car going at a steady speed has balanced forces – some pupils think that there are no forces in this situation. If opposing forces are not in a line then the object will twist or turn, e.g. a see-saw.

Floating and sinking depends on the forces of gravity and upthrust of the water. If something floats the pull of gravity and the upthrust are equal: if it sinks the pull of gravity is greater. It also depends on the material the object is made from, its shape and the type of liquid it is in. Objects less dense than the liquid will float, e.g. cream on top of milk. Something like iron which is denser than water can be made to float by forming it into a hollow shape which is then filled with air and this in effect makes it less dense. This also applies to gases, e.g. air resistance and gravity in a falling parachute.

Every object in the universe that has mass exerts a force, on every other mass. The size of the pull depends on the masses of the objects. You exert a gravitational force on the people around you, but that force isn't very strong, since people aren't very massive. When you look at really large masses, like the Earth and Moon, the gravitational pull becomes very impressive. The gravitational force between the Earth and the molecules of gas in the atmosphere is strong enough to hold the atmosphere close to our surface. Smaller planets, that have less mass, may not be able to hold an atmosphere. The force of gravity is always present on Earth.

The force of gravity is not the same for all objects. It is bigger for objects which have more mass. Objects with a bigger mass need a bigger force to make them begin to fall. All objects begin to fall (accelerate) at the same rate. On Earth, some objects speed up faster than others as they fall. This is because there is a pushing force, upwards, on all falling objects, caused by the air. Once an object is moving, if the air resistance (resistance to movement) is the same size as the force of gravity the object falls at a constant rate.

Mass is 'the amount of stuff in an object'. The mass of an object stays the same, e.g. a large mass of 1000kg would weigh a great deal on Earth and be heavy. Transported to the Moon it would still be a 1000kg mass because none of the matter in it would have been taken away. However, the weight would be about one sixth of its weight on Earth. Mass is not really to do with how heavy an object feels, but how difficult it is to start it moving, speed it up, slow it down, stop it or change its direction (to accelerate it).

Weight is defined as the force of gravity on an object. The Earth pulls you down and gives you your weight. The Moon is smaller than the Earth and has less mass, so when an object is on the Moon, it is pulled downwards with a smaller force than it would be on the Earth. This is why things weigh less on the Moon. They weigh less though their mass is the same. 1kg weighs 10 Newtons on Earth and 1.6N on the Moon.

Only iron, cobalt and nickel are attracted to a magnet. These metals are made up of countless tiny bits or domains, all of them magnets. Usually, these domains are facing randomly, like people crowded into a room, pushing in different directions. When the iron is made magnetic, all the magnetic domains face the same way. It's as if everyone turned to face the same way and pushed forward together. When the magnetic domains line up like this the combined magnetic force in the same direction is strong.

Physicists use some basic terms when they look at motion. How fast an object moves, its speed or velocity, can be influenced by forces. Speed is the distance travelled in a set time. Velocity is speed in a given direction e.g. a car travelling in a straight line at a constant speed has a constant velocity. If it turned a corner at the same constant speed, its velocity would change.

Forces P1-3

Objective 1 : To experience a range of pushes and pulls

Descriptions of intended outcomes at different levels of attainment

- Experiences being pushed and pulled (P1i);
- Gives intermittent reactions to pushes and pulls (P1ii);
- Shows in interest in aspects of pushes and pulls (P2i);
- Responds or show a differentiated response to being pushed or pulled (P2ii);
- Responds intentionally to being pushed and observes results of own actions with interest-watches rolling down a slope (P3i);
- Actively explores pushes and pulls for longer periods (P3ii)

Forces P1-3

Objective 1 : To experience a range of pushes and pulls

<p>Possible Activities:</p>	<p>Resources:</p>
<p>Experience whole body pushing e.g. pulled in a blanket, swing, Sherborne, Jabadao, Hydro Therapy , Physiotherapy</p> <p>Experience a hammock.</p>	<p>Access to hydrotherapy pool and play area: blanket: swing: hammock</p>
<p>Optional activities you might like to try include:</p>	<p>Resources:</p>
<p>Moving over different surfaces or any of whole body pushing not experienced before</p>	<p>Access to range of surfaces: Sherbourne or similar programme</p>
<p>Visit a different movement programme. Different setting e.g a dance studio rather than the school hall.</p>	

Points to Note:

Check with physiotherapist that experiences are appropriate.

Students may initially be more engaged with the new environment than the actual pushes and pulls they are experiencing.

Forces P1-3

Objective 1 : To experience a range of pushes and pulls

Possible Activities:	Resources:
Experience body rolling and moving limbs into different positions with pushes and pulls	Space for rolling: suitable flooring
Optional activities you might like to try include:	Resources:
Experience body rolling and moving limbs into different positions with pushes and pulls but vary the speed e.g. faster, slower	Space for rolling: suitable flooring
Explore body rolling, moving limbs into different positions in different places e.g a play park or on different surfaces	

Points to Note:

Check with physiotherapist that experiences are appropriate

Students may initially be more engaged with the new environment than the actual pushes and pulls they are experiencing

Forces P1-3

Objective 1 : To experience a range of pushes and pulls

Possible Activities:	Resources:
Experience a variety of pushes and pulls with everyday objects and toys e.g. opening and closing doors or drawers; playing skittles; pushing a box; kicking a ball;	Everyday objects: toys: P.E equipment
Optional activities you might like to try include:	Resources:
Experience ten pin bowling or boccia	Access to bowling alley: Boccia equipment
Experience journeys in vehicles – experience speeding up , slowing down , going uphill, speed bumps, cobbled surfaces etc.	

Points to Note:

Check with physiotherapist that experiences are appropriate

Forces P1-3

Objective 1 : To experience a range of pushes and pulls

<p>Possible Activities:</p>	<p>Resources:</p>
<p>Investigate the forces required when you make e.g scones or bread. Rubbing in – pushing Push flour through sieve Whisking – pushing and pulling Rolling out – push and pull Cutting out - pushing</p>	<p>Ingredients to make e.g. scones</p>
<p>Optional activities you might like to try include:</p>	<p>Resources:</p>
<p>Look at forces involved in a range of cooking techniques which require forces e.g mashing potatoes, garlic press, rotary whisk, lemon squeezer, egg cutter</p>	<p>Different cooking techniques forces e.g mashing potatoes, garlic press, rotary whisk, lemon squeezer, egg cutter</p>
<p>Look at forces in involved in a range of DIY activities, e.g. screwdrivers, saw, hammer, painting, filling etc.</p>	

Points to Note:

Bear in mind certain activities may be hazardous and risk assessments should be completed, particularly for the DIY activities.

Forces P1-3

Objective 1 : To experience a range of pushes and pulls

<p>Possible Activities:</p>	<p>Resources:</p>
<p>Play 'Pass the parcel' game – when the music stops students take a card out of a box. Each card contains an instruction e.g. 'push the ball' or 'pull the elastic'</p> <p>Find out different ways to stop something moving and talk about why it might be dangerous to stop some things</p>	<p>Photo and/or symbol supported instruction cards: Box to hold cards: Appropriate music: objects for completing actions with</p>
<p>Optional activities you might like to try include:</p>	<p>Resources:</p>
<p>Go to a play park and talk about the pushes and pulls they are experiencing. Take photos and on return sort photos into pushes and pulls</p> <p>Talk about things they can see moving which humans haven't caused e.g. trees in wind: washing blowing: windmills: water wheels</p>	<p>Access to play park Camera</p>
<p>Explore upthrust, pushes and pulls in the swimming pool or paddling pool– using balls, boats and floats etc.</p> <p>Blow bubbles, blow up balloons and let them go, drop a sheet of paper and talk about what makes them move</p>	

Points to Note:

Check with physiotherapist that experiences are appropriate

Talking about the dangers of some moving objects can be linked to road safety/ PSHE if appropriate

Forces P1-3

Objective 1 : To experience a range of pushes and pulls

<p>Possible Activities:</p>	<p>Resources:</p>
<p>Use Kinex or Lego to build simple shapes, count the number of pushes to build the shape, and the number of pulls to take it apart.</p>	<p>Lego or Knex: recording 'system'</p>
<p>Optional activities you might like to try include:</p>	<p>Resources:</p>
<p>Make an object out of playdough – count the pushes and pulls</p>	<p>Playdough or similar</p>
<p>Show http://www.tes.co.uk/teaching-resource/Pushing-and-Pulling-6085142 Role play some of the ideas from the film or if you have access – try canoeing to experience pushes and pulls.</p>	

Points to Note:

Pupils could record using different coloured counters or laminated symbols for pushes and pulls

Forces P1-3

Objective 1 : To experience a range of pushes and pulls

<p>Possible Activities:</p>	<p>Resources:</p>
<p>Investigate what affects the size of a crater by dropping items onto different media e.g sand, play dough, flour and observe the shapes that are made.</p>	<p>Sand: play dough: flour: items for dropping – marbles, balls, etc.</p>
<p>Optional activities you might like to try include:</p>	<p>Resources:</p>
<p>Investigate the effect of increasing force e.g. pressing an object onto wet sand (or another medium) and then increase the weight that presses down on it. Compare the results. Pupils could compare difference between wet and dry sand.</p>	<p>Wet sand or other medium: Object large enough to sit a mass on e.g. a wooden block: 10g and 100g masses</p>
<p>Investigate the effect of increasing the weight on the length and shape of different makes of knee high pop socks or similar</p>	

Points to Note:

Take care when dropping items from a height.

Use a crash mat under the knee high pop sock in case the masses drop

Forces P1-3

Objective 2: To experience different types of forces

Descriptions of intended outcomes at different levels of attainment

- Experiences different types of forces but may be passive or resistant (P1i);
- Shows an emerging awareness of experiences related to forces (P1ii);
- Accepts and engages in coactive exploration (P2i);
- Responds consistently or shows a differentiated response to different types of forces (P2ii);
- Explores the different forces in more complex ways and observes results of own actions (P3i);
- Responds to options and choices about different forces with actions and gestures (P3ii)

Possible Activities:	Resources:
<p>Experience going in a lift</p> <p>Experience attraction and repulsion of large magnets (possibly hand over hand)</p> <p>Experience being pushed and rolled over different surfaces</p> <p>Explore the feel of different fabrics and materials</p>	<p>Access to a lift – or lifts – a shopping centre would be ideal: Large magnets:</p> <p>Access to different surfaces e.g carpeted, concrete, grass:</p> <p>Different fabrics e.g velvet, hessian, silk.</p>

Forces P1-3

Objective 2: To experience different types of forces

Optional activities you might like to try include:	Resources:
<p>Experience being bounced on a trampoline or bed</p> <p>Experience sliding on a hosed sheet of plastic (on grass) accompanied by an adult if necessary</p> <p>Explore the feel of different soles of shoes</p>	<p>Access to a trampoline or bed:</p> <p>Access to a play park: large sheet of plastic: hose pipe:</p> <p>Different shoes and boots with clean soles</p>
<p>Hoist a student who would not normally experience this.</p> <p>Experience going down a zip wire – accompanied by an adult if necessary.</p> <p>Explore the feel of different tyres</p>	

Points to Note:

Hoisting needs to be carried out by a trained person

Consider the safety of the students using the water slide and zip wire.

Forces P1-3

Objective 2: To experience different types of forces

<p>Possible Activities:</p>	<p>Resources:</p>
<p>Explore sliding old CDs along different surfaces to explore how far they travel. Experience rubbing hands getting warm and rubbing hands on rough surfaces</p>	<p>CDs: Range of different surfaces e.g. plastic, wood, carpet, lino, sandpapers, gravel</p>
<p>Optional activities you might like to try include:</p>	<p>Resources:</p>
<p>Explore what happens if the surfaces are changed to see how this affects a CD's ability to slide e.g. use different substances to smooth surfaces</p>	<p>CDs: sand paper or wood surface: spray polish, candlewax, soap, butter, oil</p>
<p>Attach balloons to the CD to create hovercrafts https://www.stevespanglerscience.com/lab/experiments/cd-hovercraft-sick-science/ Explore using different sizes of balloons and different surfaces</p>	

Points to Note:

Be careful that pupils don't rub hands too hard on rough surfaces.

Surfaces will need to be fixed down in not already as a piece of sandpaper will slide as smooth on the back.

Forces P1-3

Objective 2: To experience different types of forces

<p>Possible Activities:</p>	<p>Resources:</p>
<p>Create parachutes of different sizes and observe how they fall</p> <p>Experience walking through water – what does it feel like?</p>	<p>String: tissue or thin material to make parachutes</p>
<p>Optional activities you might like to try include:</p>	<p>Resources:</p>
<p>Make spinners of different sizes to observe how they fall. Link to the way seeds fall. http://www.planet-science.com/categories/under-11s/our-world/2011/09/make-a-spinning-seed!.aspx</p>	<p>Spinner templates: Sycamore seeds: Ash seeds</p>
<p>Make rocket mice http://www.sciencemuseum.org.uk/educators/teaching_resources/activities/rocket_mice.aspx</p>	

Points to Note:

By asking the relevant questions in these investigations, students can achieve at different levels.

Forces P1-3

Objective 2: To experience different types of forces

<p>Possible Activities:</p>	<p>Resources:</p>
<p>Investigate which materials let the magnet pull through them. Arrange a magnet in a stand so that it is attracting a paperclip attached to some thread, but there is a gap in between. Pass different materials through the gap to see if the paperclip is still attracted to the magnet or if it falls down.</p>	<p>Clamp stand: Magnet: Paper clip attached to thread. Thin materials to pass through gap e.g. foil, card, plastic etc.</p>
<p>Optional activities you might like to try include:</p>	<p>Resources:</p>
<p>Test a range of magnets with iron filings in a sealed container. Which magnet picks up the most filings?</p>	<p>Iron filings in a sealed container Range of different magnets</p>
<p>Make a magnetic fishing Game. What is the biggest fish you could attract? http://makezine.com/craft/how-to_magnetic_fishing_game/</p>	

Points to Note:

- Avoid small magnets students could swallow.
- Paper clips.
- Iron filings can damage the cornea, students should handle iron filings in sealed containers.

Forces P1-3

Objective 2: To experience different types of forces

Optional activities you might like to try include:	Resources:
<p>Make a balancing or oscillating toy e.g. http://www.sciencetoymaker.org/bird/assembl.html</p> <p>Loop a piece of string (or an elastic band) around a hammer and a ruler as shown in the figure. You may find Blu-Tack useful for stopping them sliding apart.</p>	<p>Ruler: hammer: string: blu tac: Drinking straws: thin rubber bands: white card: scissors: tape</p>
<p>Explore balancing toys or watch balancing experiments on You Tube</p> <p>Balance a fork and spoon on a match on the edge of a glass. Put the round end of a spoon into the prongs of a fork. Use a match inserted in the prongs and resting on the edge of a glass to suspend the fork and spoon in midair. {Insert diagram 3}</p>	

Points to Note:

Balancing toys link to DT.

A range of balancing toys and other balancing objects, e.g. for side of drinking glass are available on the internet .

Forces P1-3

Objective 2: To experience different types of forces

<p>Possible Activities:</p>	<p>Resources:</p>
<p>Investigate pulling shoes along the same surface and measuring how much force is needed by using different sized elastic bands</p> <p>Investigate friction using jelly cubes. Break up cubes and place in bowl. Use the chop sticks to transfer jelly cubes from one bowl to the other. Now add some oil or lard or similar to jelly cubes and again transfer to another bowl. Compare the difference.</p> <p>Investigate how non stick a pan is. Talk with pupils about how to do this e,g, cook the same food in different pans and compare how much sticks.</p>	<p>Different shoes: different sized elastic bands: Jelly cubes: oil: lard: butter: chop sticks: small bowls: non stick pans and ordinary – various: different foods to cook in it</p>
<p>Optional activities you might like to try include:</p>	<p>Resources:</p>
<p>Investigate the size of the force needed to pull different objects using different size springs.</p> <p>Demonstrate a ghost in a bottle as in the clip below. The rope stays in the bottle by friction. http://www.youtube.com/watch?v=Z7zkDWPKG-o</p>	<p>Variety of objects: different sized springs</p>
<p>Use Newton Meters and Push meters to measure forces and rank these in order.</p> <p>Demonstrate friction between two Yellow Pages. Overlap the pages of the two phone books together. Try to pull them apart or hold one up and see if the other falls Try it again but put fewer pages together. What happens?</p>	



Forces P1-3



Objective 2: To experience different types of forces

Points to Note:

Pupils think that things stop moving because they run out of force

More able students could use a Newton meter to carry out these investigations

With Yellow Pages when the force of friction covers a big area, it becomes very strong. The more pages you put together, the bigger the area and the more friction you create.

Forces P1-3

Objective 2: To experience different types of forces

<p>Possible Activities:</p>	<p>Resources:</p>
<p>Fill film canisters with items with different masses and drop them from the same height to show that they all fall at the same rate. It might be possible to video this so that it can be watched again or even in slow motion.</p>	<p>Film canisters: objects to put in them: video:</p>
<p>Optional activities you might like to try include:</p>	<p>Resources:</p>
<p>Test fruits or eggs to see if they float or sink. For example: Find out if there are differences between ripe and unripe bananas or bananas either with and without skins Find out if you can tell the difference between fresh/ bad eggs.</p>	<p>Large bowls: variety of ripe and unripe fruit</p>
<p>Floating and sinking investigations using unusual materials e.g wood. Pumice, sponge, Does the temperature of the water make a difference? Do they float the same in salt water or Coke?</p>	

Forces P4-6

Objective 1: To experience a range of pushes and pulls

Descriptions of intended outcomes at different levels of attainment

- Communicates awareness of a change as a result of pushing and pulling actions (P4i);
- Explores using vocalisation (P4ii);
- Tries out a range of equipment with anticipation (P5i);
- Responds to simple scientific questions (P5ii);
- Begins to make connections between their actions and the effects of pushes and pulls (P6i);
- Follows simple instructions to carry out an activity (P6ii)

Forces P4-6

Objective 1: To experience a range of pushes and pulls

Possible Activities:	Resources:
Explore rolling with a range of equipment e.g. hoops, quoits, fruit and vegetables, tins containing different foods	Hoops, balls, quoits, Boccia balls, bean bags, fruit, veg etc
Optional activities you might like to try include:	Resources:
Set up different large scale marble runs and watch what happens Or create different ramps and experience rolling objects, vegetables and tins down them	Large scale marble run, ramps and objects to roll
Explore blowing different objects in different ways	

Points to Note:

Check with physiotherapist that experiences are appropriate

Rolling tins of food gives some interesting experiences!

Some pupils may be able to sort objects into ones that roll and those which don't.

Objective 2: To experience different types of forces

Descriptions of intended outcomes at different levels of attainment

- Communicates awareness of changes as a result of different forces (P4i);
- Follows a simple procedure with step-by-step support to gather evidence (P4ii);
- Begins to initiate an interaction and cooperate with turn taking (P5i);
- Tries out equipment once they feel that they have built up familiarity (P5ii);
- Begins to make generalisations and connections (P6i);
- Closely observes changes caused by different forces (P6ii)

<p>Possible Activities:</p>	<p>Resources:</p>
<p>Investigate a tray of materials to find out which ones are attracted to the magnet.</p> <p>Explore magnets attracting and repelling and the fact they can attract or repel without touching</p>	<p>Various materials including some made from iron and steel so they will be magnetic</p>
<p>Optional activities you might like to try include:</p>	<p>Resources:</p>
<p>Explore a range of different types of magnets to see if they are all the same strength</p> <p>Talk about using magnets to help in recycling by trying magnets on different cans</p>	<p>Different strengths and types of magnets: different types of drink cans</p>

Objective 2: To experience different types of forces

Explore how to make an object move with a magnet separated by different surfaces e.g. a table, a book, a tray.	
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Look at some magnets that might be in the home or school	
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Points to Note:

Pupils may think all metals are magnetic

Magnetic force can be non-contact because the force can act at a distance

The distinction between a magnet and magnetic material can cause problems. Two magnets can repel but magnet and magnetic material always attract. Two magnetic materials do nothing!

Avoid using small magnets students could swallow, Extra strong neodymium magnets are not suitable for this ability group.

Pupils do not carry out formal investigations but are just exploring

Forces P7-8

Objective 1: To experience a range of pushes and pulls

Descriptions of intended outcomes at different levels of attainment

- Communicates simple observations using the words push and pull to describe movement (P7i);
- Makes a simple record of their findings (P7ii);
- Describes the effects and different types of pushes and pulls (comparing) (P8i);
- Observes changes in the features of objects or situations (P8ii)

Forces P7-8

Objective 1: To experience a range of pushes and pulls

<p>Possible Activities:</p>	<p>Resources:</p>
<p>With adult support, put up a tent or gazebo. Use the words push and pull. Consolidate by sequencing photos.</p> <p>Find out which everyday objects are easiest to push or pull</p>	<p>Tent or gazebo: Access to outside: Everyday objects e.g. wheelbarrow, broom, PE mat, heavy box, trolley</p>
<p>Optional activities you might like to try include:</p>	<p>Resources:</p>
<p>Use different pumps to experience larger and smaller pushes and pulls. Find out which is the easiest or hardest to push or pull</p> <p>Experience making things go faster and slower e.g. fast forward on video, turning taps on slowly and quickly, electric whisk on different speeds, pushing revolving doors</p>	<p>Bike pumps: Water pistols: Foot pump for lilo or pool: Syringes: Balloon pumps: Car tyre pump: Football pump</p>
<p>Use comics to find or sort pictures of pushes and pulls</p> <p>Experience the pushes and pulls in getting dressed – particularly with tight fitting items like socks, swimming costume etc.</p>	

Forces P7-8

Objective 2: To experience different types of forces

Descriptions of intended outcomes at different levels of attainment

- Makes simple suggestions of what to do to find the answer (P7i);
- Makes simple records of their findings (P7ii);
- Contributes to planning an investigation and locates some simple equipment to use (P8i);
- Notices when something has not worked and tries a different approach or suggests a way to improve it (P8ii)

Forces P7-8

Objective 2: To experience different types of forces

<p>Possible Activities:</p>	<p>Resources:</p>
<p>Investigate the effect of a slope on movement e.g. Use a simple slope made from a tray and vary the height using books. Place an item on the tray and investigate the number of books needed to make the item move. Repeat for other items.</p>	<p>Books: plastic trays: items to move down slope</p>
<p>Optional activities you might like to try include:</p>	<p>Resources:</p>
<p>Investigate the effect of different slope surfaces on movement.</p>	<p>Slopes with different surfaces e.g. fix different types of flooring or sandpaper to a slope</p>
<p>Feel rough surfaces. Which is the roughest? Use digital viewer to observe and photograph. Could link this to slopes investigation</p>	

Forces L1-3

Objective 1: To experience a range of pushes and pulls

Descriptions of intended outcomes at different levels of attainment

- Demonstrates how to make object's change shape, speed or direction (L1i);
- Records results in pre-drawn tables (L1ii);
- Describes simply what they found out (L1iii);
- Recognises the bigger the force you use, the greater the effect (L2i);
- Identifies things to measure or observe related to the size of a force (L2ii);
- Says whether what happened was what they expected to happen and identifies any unexpected outcomes (L2iii);
- Classifies actions correctly as pushes or pulls and describes how to make things speed up, slow down or change direction (L3i);
- Makes some accurate observations or whole number measurements related to forces (L3ii);
- Suggests improvements to their working methods (L3iii)

Forces L1-3

Objective 1: To experience a range of pushes and pulls

<p>Possible Activities:</p>	<p>Resources:</p>
<p>Play blow football to experience changing speed and direction. Blowing is a push force.</p>	<p>Blow football</p>
<p>Optional activities you might like to try include:</p>	<p>Resources:</p>
<p>Investigate whether the amount of water in bottles affects how easily they can be knocked over</p>	<p>Plastic bottles: water: different sized balls:</p>
<p>Make sailing boats to blow around an obstacle course and talk about where different forces were needed</p>	

Forces L1-3

Objective 2: To experience different types of forces

Descriptions of intended outcomes at different levels of attainment

- Describes some of the effects of forces including magnetism, friction and gravity (L1i);
- Presents results in simple tables provided (L1ii);
- Communicates any observations or patterns, differences or regular changes in materials (L1iii);
- Recognises magnetism, gravity and friction in everyday contexts and applications (L2i);
- Makes measurements using standard and non-standard units as appropriate (L2ii);
- Ranks results in order (L2iii);
- Describes the direction of forces related to friction, gravity and magnets (L3i);
- Identifies what they are keeping the same or changing to make a fair test (L3ii);
- Constructs tables that have quantitative units and appropriate headings (L3iii)

Possible Activities:	Resources:
<p>Investigate the strength of different magnets by making chains of paperclips. Hold one paperclip next to magnet and then touch another paperclip to the first paperclip, : continue until no more will stick. How long is the chain? What happens if you detach the first paperclip from the magnet?</p> <p>Look at different magnetic fields using iron filings bubbles</p>	<p>Range of magnets: Paper clips: Iron filings bubbles</p>

Forces L1-3

Objective 2: To experience different types of forces

Optional activities you might like to try include:	Resources:
<p>Investigate the strengths of magnets by finding out how many pieces of paper stop a magnet from sticking to the fridge</p> <p>Make a compass with a piece of cork and needle that has been stroked by a magnet</p>	<p>Fridge magnet or ordinary magnets: Pieces of paper: Access to fridge or metal cupboard/ filing cabinet : dishes: water: cork: needles</p>
<p>Investigate if breakfast cereals are magnetic by crushing cereal in a plastic bag with rolling pin and then seeing if cereal sticks to magnet.</p> <p>Play with magnetic putty – watch it eat a magnet! (film clips on YouTube)</p>	

Points to Note:

Avoid using small magnets students could swallow,

Extra strong neodymium magnets are not suitable for this ability group.

Check magnetic putty meets current safety regulations. Some brands sold contain unsafe levels of arsenic.