

Forces

Explorify planning support



Curriculum statements	Explorify activities	Suggested use / taking it further
MAGNETS		
Compare how things move on different surfaces	Relaxed roll PS	Inspire a whole lesson of investigation. Children could use ramps and toy cars to explore how far they travel over different surfaces. Links to Earth and Space.
Notice that some forces need contact between two objects, but magnetic forces can act at a distance	Magnets WGO	Discussion prompt at the start of topic. Sparks interest and curiosity. Children could explore how this works by making a magnet game that works at a distance using thick cardboard (cut from a cardboard box), a magnet and a paperclip.
Observe how magnets attract or repel each other and attract some materials and not others	Give it a pull OOO	Two images showing a push and a pull contact force are contrasted with magnetic force acting at a distance. Go on to investigate the farthest distance that different magnets will attract a paperclip, here .
Describe magnets as having two poles	Mighty Magnets WGO	Discussion prompt at any time.
Predict whether two magnets will attract or repel each other, depending on which poles are facing	Pull together OOO	Useful for assessing depth of understanding, midway or later through the topic.
Compare and group together a variety of everyday materials on the	Attracting objects MB	Takes a little preparation (putting objects into a mystery bag) but can be tailored to meet the needs of your class. Sparks interest and hones observation skills. Children could then classify materials by whether they are magnetic or not. Or try this .

basis of whether they are attracted to a magnet, and identify some magnetic materials Everyday uses for magnets	Have you ever used a magnet?	HYE	Start the topic by finding out and valuing what your children already know about magnets and the experiences they've had with them.
	What if you had magnets for fingers?	WI	Get your children thinking of a Positive, Minus or Interesting outcome. Useful to assess learning midway or later through topic.
	Scan this over	LWCYH	Capture interest and encourage focus by listening to this sound, then discuss. Good lesson starter midway through topic or later.
	Marvellous magnets	OOO	Explore three unusual applications for magnets, then, after discussing other more common applications for magnets, children could search for magnets in their own homes in objects like fridges or purse clips.

GRAVITY

Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object	Have you ever tried to keep a balloon in the air?	HYE	Discover and value what your children already know about gravity and the experiences they've had that confirm their ideas.
	What goes up must come down	OOO	Sparks interest and curiosity. Links to Earth and Space. Could be used as a lesson starter prior to investigating parachutes or rockets, for instance. Check out Straw Planes on the PSTT Starters for Science page.
	Rocket launchers	PS	An exciting starter for an afternoon of investigation and making.
	Apple of your eye	LWCYH	Capture interest and encourage focus by listening to this sound, then discuss. A different way to start a lesson.
	Weight a minute!	ZIZO	Links to Earth and Space and will provide a useful discussion/assessment point perhaps at the end of a lesson
	Water trick	WGO	Short demo of a classic experiment, upturning a glass of water. Fun (and dry!) way to spark curiosity and interest.
	Standing on eggshells	WGO	Who would have thought two trays of eggs could support the weight of a human? Possible links to Maths and D.T.

	What if there was no gravity?	WI	A simple, focused conversation starter that might be followed up watching one of these amazing films made by astronauts on the Space Station, available here .
	Blocks	WGO	Two blocks dropped on three surfaces, shown in captivating slow motion. Sure to spark curiosity and conversation. Follow up by linking to the feather and hammer drop on the Moon , or to the same experiment in the world's biggest vacuum

BALANCED FORCES

	Have you ever hit a ball with a bat?	HYE	This HYE explore what happens to objects when a force is applied.
	There's a hole in my bottle	WGO	Warning: can't imagine anyone watching this and not wanting to try it! Sure to fire children's interest.
	Fantastic gymnastics	WGO	Here's a different way to kick off a conversation and perhaps even your entire topic on forces. Beautiful to watch.
	Bounce and turn	WGO	Engaging video showing high trampoline bounces. Sure to spark conversation at any time.

AIR RESISTANCE

Identify the effects of air resistance, water resistance and friction, that act between moving surfaces	Have you ever been given medicine in a syringe?	HYE	Explore the children's experiences and existing knowledge before beginning this topic.
	Fancy Footwork	WGO	This film invites a comparison as children watch three types of ball kicked in slow motion. An engaging lesson starter.
	Build an egg parachute	PS	This will certainly lead to an afternoon or morning's investigative science, designing parachutes for eggs.
	Soft landing	WGO	Interesting prompt for discussion during a lesson on air resistance. We meet a scientist testing a parachute to use on Mars.
	Shoot the breeze	OOO	A parachute used to slow a dragster is contrasted with a hot air balloon and a parachute in this lesson starter.
	Moving propellers	OOO	Three craft propelled by rotary propellers in different ways. Another excellent, discussion-based lesson opener.

	Tabletop hovercraft	WGO	Distraction-free demo of a classic experiment. CDs are harder to come by these days but make great hovercrafts. There are fabulous pneumatic (and hydraulic) activities here on SSERC.
	On target	LWCYH	Capture interest and encourage focus by listening to an archer fire arrows, then discuss. A different way to start a lesson. You could go on to make catapults here.
	Defying gravity	OOO	Three objects that fly through the air are contrasted: bubbles, dandelion seeds and an aircraft. A definite discussion starter, which you might follow up by making and flying Tumblewings .
	Blowing in the wind	OOO	A kite, wind chimes and an air sock all depend on air resistance to work, but what differences will the children find? See also Straw Planes , mentioned above.
	Scarf shooter	WGO	Wow children with film of an amazing machine that uses air to push objects through a tangle of tubes.
	What if we used machines like this?	WI	Consider how machines such as the Scarf shooter were commonly used in the past, and how they might still be used, now or in the future.

WATER RESISTANCE

Identify the effects of air resistance, water resistance and friction, that act between moving surfaces	Butterfly swimming	WGO	A single stroke is slowed down in this film of swimmers in action. What makes the butterfly stroke so effective?
	Backstroke swimming	WGO	Children are invited to consider how swimmers reduce drag in this film observing a single stroke: the back stroke.
	Sleek Designs	OOO	An ideal opener for water resistance, inviting children to compare a diving swimmer and penguin with a fast boat.

FRICTION

Have you ever warmed your hands by rubbing them?	HYE	Encourage children to share their own experiences of friction at the start of your topic.
All ground up	ZIZO	Close-up on a rubber running track surface will surely lead to an interesting class discussion on the topic of friction. Children could explore friction by comparing the grip of different shoes, making measurements with a force meter or practise their W/S skills with this .
Get a grip	ZIZO	A close-up of a fat bike tyre on snow which will lead to a discussion about grip on the slippery surface of snow.
Floating bottle	WGO	A curious demo that might come at the end of a lesson, allowing you to assess children's progress formatively, or they could have a go themselves!
Best foot forward	OOO	Three images of footwear – one a pair of skates – will get the conversation started and indicate pre-existing knowledge.
What if brakes were automatic?	WI	This question might be tackled in pairs with children looking for Positive, Minus and Interesting outcomes for this scenario
Moving large stones	PS	This problem will lead to a practical session and might also link well to work on levers and other simple mechanisms.
Marbles	MS	A starter for an afternoon or even a day of practical work creating a marble run, making it as frictionless as possible.
Pottery	WGO	A charming short film of a boy potter (no, not that one!) learning to throw clay on a wheel and about the effects of friction.
Roll up, roll up	ZIZO	A close-up on the wheels of inline skates (rollerblades) will invite talk and perhaps also reveal pre-existing knowledge.
Big hitters	OOO	Children are invited to consider how an ice hockey puck, golf ball and shuttlecock are required to move in different ways.
Black bobbles	ZIZO	Great starter for a lesson about friction as children identify a worn cycle tyre from a close-up photo.
Manoeuvring on the Moon	WGO	Rovers on Mars or the Moon are required to cope with varied terrain as this excellent, short video clearly shows.

LEVERS

	Have you ever moved position to get a seesaw to work better?	HYE	Perhaps the most relatable example of levers in action to show children. This will draw in their existing knowledge and experiences of levers in action.
	Moving bridges	OOO	The seesaw action of London Bridge is compared with Gateshead's tilting hydraulic bridge and the drawbridge of a castle, which is lifted by a pulley.
	Pole position	WGO	This slowed-down film of pole vaulters in action will encourage higher level thinking around how such high jumps are achieved.
	Levers in action	OOO	The simplest of everyday levers are shown and contrasted here as a lesson starter: a seesaw, scissors and a screwdriver opening a can of paint. Children could investigate this last lever themselves and compare how much harder it is to do with a coin instead.
	Force for good	OOO	Three more contrasting, everyday uses of levers: nail clippers, a wheelbarrow and (children's favourite!) another seesaw.

PULLEYS

Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect	Excellent equipment	LWCYH	Here we listen to the sound of two contrasting pulleys and to a can opener. You could follow up with this activity from Practical Action .
	Making work easier	OOO	These three images show three different types of pulley system. Why not task your class with making a zipline for a teddy bear as a follow-up?
	Chock-a-block	ZIZO	Zoom in on a pulley (or 'block' to use the nautical term) used on board the historic ship HMS Warrior.
	Shiny teeth	ZIZO	We zoom in on the teeth of a traditional can opener, inviting discussion as to exactly how such a tool works.
	Standing Tall No 1 and Blue Escape	SWA	Reveal this artwork, with its simple lines and sparing use of colour, to see if the children notice that it depicts pulleys.

GEARS			
Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect	Whirring wonders	WGO	Get close-up to bicycle gears changing in this short film, which will draw out children's own experience in a discussion.
	Tour de force	LWCYH	Capture interest and encourage focus by listening to a bicycle's sound. Will children identify what they hear or surprise you?
	Take a whisk	WGO	This film contrasts four ways to whisk an egg and shows the time each takes – providing a link to learning about time.
	Turning teeth	WGO	Watch the mechanism of an early 19 th century watermill, and notice how – between pouring in of the grain and the production of flour – the system of interlocked cogged wheels must turn.
	A use for a tooth	ZIZO	Zoom in on a single wooden tooth in a cog - part of the mechanism of the early 19 th century watermill (the WGO above)
	Shiny teeth	ZIZO	Both activities reveal an easily-overlooked household device that relies on cogs: the can opener.
	Cogs in the kitchen	OOO	
OTHER SIMPLE MACHINES			
	Take your turn	OOO	A water wheel and two types of windmill are shown in this lesson starter, which should get a discussion started at any time. A selection of activities for exploring simple machines can be found here , and don't miss trying Chain Reactions here .
TENSION AND COMPRESSION			
	The big squeeze	WGO	A favourite Explorify demo, far too messy to perform inside a classroom, we watch a melon compressed too far!
	Rainbow explosion	WGO	Another super demo of something your kids will not be able to resist trying, so watch out!
	Have you ever been given medicine in a syringe?	HYE	This Have You Ever explores pneumatics and hydraulics.
	Build a bridge	PS	An invitation to try a classic activity that could take an afternoon or even a whole day with links to Maths, History and more.

PRESSURE – BUOYANCY / FLIGHT

	Have you ever tried to push a float toy under water?	HYE	This Have You Ever explores density and floating.
	Sturdy pads	WGO	This film invites close observation of a giant lily pad and, with links to Maths (mass) could lead to practical investigation.
	Funky junky boats	PS	The image shows a cardboard boat and the task suggests children use junk materials to create their own boats.
	Strange stripes	ZIZO	This close-up image of a feather is a simple, engaging lesson starter. Could link to learning about Evolution in Year Six.
	Egg in bottle	WGO	A sure-fire way to capture children's attention and spark curiosity as a boiled egg is sucked inside a bottle.
	Heating a can	WGO	Captivating demo involving a heated aluminium can crushed by air pressure alone. Safer to watch than to set up!
	3..2..1 lift off!	WGO	If you haven't any film cannisters to hand, this film shows the explosive reaction of bicarbonate of soda and vinegar.
	Dancing raisins	WGO	This film might be shown after children have observed this phenomenon for themselves with smaller containers. It's slowed down and close-up and uses a large clear-plastic drink bottle.
	Sync or swim	WGO	Synchronised swimmers are shown in this film, which children might not have seen before, capturing interest and curiosity.
	Liquid densities	WGO	Why does water itself sink to the bottom of a jar when mixed with oil?

ABBREVIATIONS AND DESCRIPTIONS OF THE DIFFERENT EXPLORIFY ACTIVITY TYPES		
ZIZO	Zoom In, Zoom Out	Visually engaging close-up photos
OOO	Odd One Out	Find similarities and differences
WGO	What's Going On?	Short, distraction-free videos
HYE	Have You Ever?	Activities linked to everyday experiences
WI	What If?	Explore ideas in new contexts
TBQ	The Big Question	Plan an investigation
PS	Problem Solvers	Think critically and creatively
MS	Mission Survive	Fun, imaginative hands-on challenges
MB	Mystery Bag	Use senses to work out contents in a bag
LWCYH	Listen What Can You Hear?	Recordings of familiar sounds
SWA	Start With Art	Using artworks to prompt science discussion
WJH	What Just Happened?	Observing changes over time
WHO	Who Is?	Learn about a diverse range of scientists

Other recommended resources to support planning:

[PLAN primary science assessment resources \(planassessment.com\)](https://planassessment.com/)

[Assessment \(TAPS\) - Curriculum Materials | Primary Science Teaching Trust \(psts.org.uk\)](https://psts.org.uk/)

[The Great Science Share](#) - see videos on Scientific Enquiry under the tab "Great Science Skills".

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