

Forces

What you've learnt already

How things move on different surfaces

That magnets attract magnetic materials, and that they have two poles which attract or repel each other

That some forces need contact between two objects, but magnetic forces can act at a distance

How to 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.

Choices

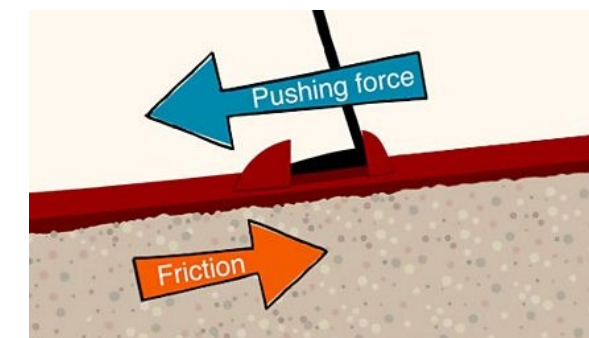
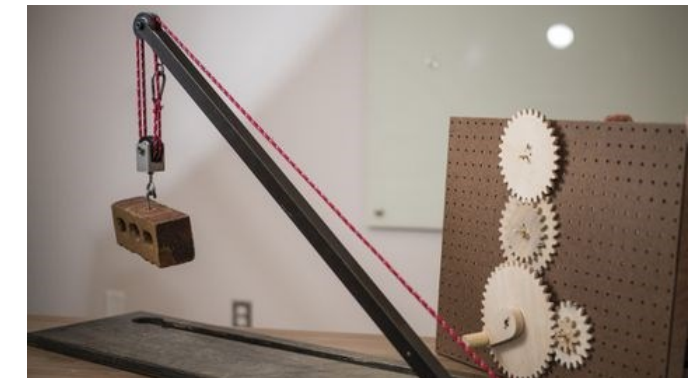
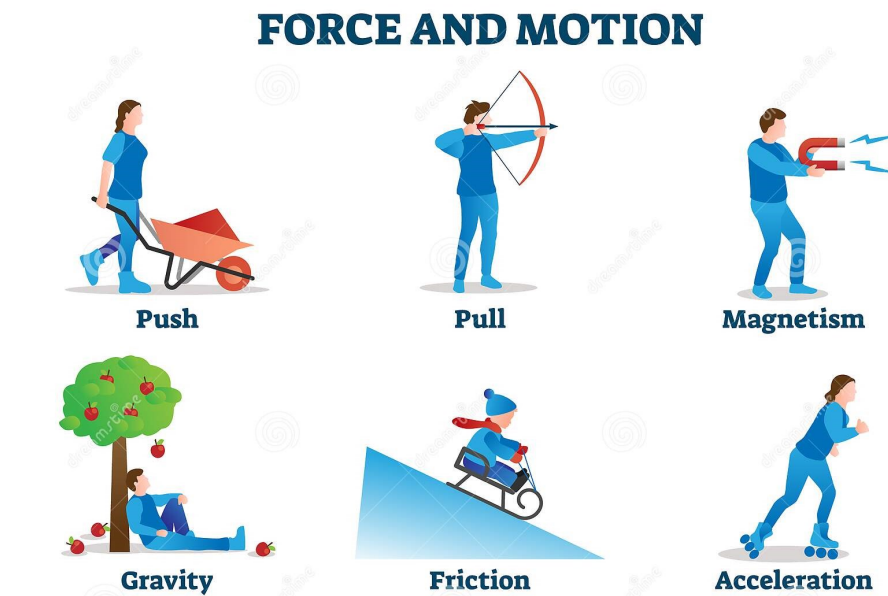
Choose different variables within investigation for desired effects. Would you want to experience less gravity? Why?

Which do you think is more beneficial: water resistance, air resistance, or friction? Why?

Key Vocabulary

Air Resistance	A force caused by air. The force acts in the opposite direction to an object moving through the air.
Force	A force is a power that causes an object to move or that changes movement
Friction	The resistance that one surface or object encounters when moving over another
Gears	Gears are mechanical parts with cut teeth designed to fit with teeth on another part so as to transmit or receive force and motion
Gravity	The force by which all objects in the universe are attracted to each other.
Lever	a rigid bar resting on a pivot, used to move a heavy or firmly fixed load with one end when pressure is applied to the other.
Newton	The unit used to measure force - named after Isaac Newton.
Opposing	Used to describe something that is acting against another force (opposing force).
Pulley	a wheel with a grooved rim around which a cord passes, which acts to change the direction of a force applied to the cord and is used to raise heavy weights
variables	an element, feature, or factor that is liable to vary or change
Water resistance	A force caused by water. The force acts in the opposite direction to an object moving through the water.

Diagrams



Lesson Sequence

L1	WALT explore the friction between different surfaces
L2	WALT understand why some objects fall faster than others
L3	WALT understand how the size of the canopy affects the time it takes a parachute to fall
L4	WALT identify how the shape of an object affects its movement in water
L5	WALT investigate how the number of pulleys affect the force needed to lift a load
L6	WALT investigate how the length of a lever affect the force needed to lift a load
L7	WALT observe how gears work

Key Knowledge

- There are different types of forces (push, pull, friction, air resistance, water resistance, magnetic forces, gravity) which have different effects on objects
- Unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.
- Gravity can act without direct contact between the Earth and an object.
- Air resistance, water resistance and friction act between moving surfaces.
- 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 (i.e. to make something faster/slower)
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
- More than one force can act on an object simultaneously (either reinforcing or opposing each other).

Key working scientifically skills

Plan an enquiry into air resistance using parachutes, recognising and controlling variables.
Report findings from enquiries and conclusions.
Take measurements using Newton meters.

Forces

What is friction?	What is gravity?	What is air resistance?	What is water resistance?
What experiment would be conducted to measure air resistance?	Name as many forces as you can.	What do you use to <i>measure</i> a force?	Who discovered gravity?
What does 'streamlined' mean? How can it be useful?	How do levers and pulleys affect the force needed? Give examples	How do different materials affect the friction of something moving along it?	What's the difference between mass and weight?
What's the difference between a dependent and a controlled variable?	Do you think a paper helicopter with longer propellers would fall to the ground quicker than one with shorter propellers? Why?	Give two real-life examples of why friction is useful.	If you dropped a hammer and a feather on the moon, which would land first? Why?

One Point

Two Points

Three Points

Four Points

Forces

<p>What is friction?</p> <p>The resistance that one surface or object encounters when moving over another</p>	<p>What is gravity?</p> <p>The force by which all objects in the universe are attracted to each other.</p>	<p>What is air resistance?</p> <p>A force that is caused by air. The force acts in the opposite direction to an object moving through the air.</p>	<p>What is water resistance?</p> <p>A force that is caused by water. The force acts in the opposite direction to an object moving through the water.</p>
<p>What experiment would be conducted to measure air resistance?</p> <p>Answers may vary</p>	<p>Name as many forces as you can.</p> <p>Gravity, Magnetic force, air resistance, water resistance, surface resistance</p>	<p>What do you use to <i>measure</i> a force?</p> <p>Forcemeter</p>	<p>Who discovered gravity?</p> <p>Isaac Newton</p>
<p>What does ‘streamlined’ mean?</p> <p>How can it be useful?</p> <p>Designed to move through air/water with as little resistance as possible.</p>	<p>How do levers and pulleys affect the force needed? Give examples.</p> <p>It can reduce the force needed to be applied to make an object move.</p>	<p>How do different materials affect the friction of something moving along it?</p> <p>The rougher the surface, the more friction will be applied. The more friction, the more force needed to make it move.</p>	<p>What’s the difference between mass and weight?</p> <p>Mass is how heavy an object is. Weight is the force of gravity acting on the object.</p>
<p>What’s the difference between a dependent and a controlled variable?</p> <p>Dependent is the variable being measured. Controlled is the thing that stays the same.</p>	<p>Do you think a paper helicopter with longer propellers would fall to the ground quicker than one with shorter propellers? Why?</p> <p>Answers may vary. Longer = slower.</p>	<p>Give two real-life examples of why friction is useful.</p> <p>Answers may vary - include tires on road when braking, Brushing teeth to remove plaque.</p>	<p>If you dropped a hammer and a feather on the moon, which would land first? Why?</p> <p>Both at the same time. No air resistance.</p>

One Point

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Three Points

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