

Forces Knowledge Progression

		Key Vocabulary
Nursery	<p><u>Moving toys</u> Some toys can help us learn new things. On some toys, we can press things to make them work. They can make sounds, move or spin around when we press a button or lift a flap or pull a lever. Some books have flaps to lift up so we can see a new picture or make the picture move. Some toys have wheels. They look like cars, trucks, trains or buses. Wheeled toys can move if you push them. We can build a track for wheeled toys to move around on. If we push them with our hands they will move.</p>	<p>Move Lift:</p>
Reception	<p>We can use ramps to make wheeled toys move in different ways. Toys can go down ramps if we push them with our hands and let go. They can go down the ramp on their own. Wheeled toys can't go up ramps without us pushing them all the way up, they will roll back down on their own. Some toys that our Mummies and Daddies and Grandmas and Grandads used to play with could move. They were different to our toys now. They moved in different ways.</p>	<p>Push: We can push something to make it move Pull: We can pull something to make it move Up: Down: Wheel: A wheel is round and helps something to move Roll: Force:</p>
Y1		
Y2		
Y3	<p>FORCES AND MAGNETS</p> <p>A force is a push or pull acting on an object as a result of an object's interaction with another object Forces can make objects stop or start moving Some examples of pulling forces:</p> <ul style="list-style-type: none"> - A rower pulling an oar - A tug of war team pulling a rope - A catapult is pulled back - The string of a bow is pulled back - A sledge is pulled - Bell ringers pull ropes <p>Some examples of pushing forces</p> <ul style="list-style-type: none"> - A runner's feet push off the ground - A person pushes down a piano key - A hockey stick pushes the ball - A golf club pushes the golf ball - A bat pushes a ball - A person pushes a pram <p>Pushes and pulls require contact between 2 objects. When we push or pull an object it can move the object, change the shape of the object or make the object change direction.</p> <p>Different surfaces contain different amounts of friction. The amount of friction created by an object moving over a surface depends on the roughness of the surface or object, and the force between them.</p> <p><u>Magnets</u> Something is magnetic when it is attracted to a magnet. Objects which contain iron, nickel or cobalt metals are magnetic. Not all metals are magnetic.</p>	<p>Forces: pushes or pulls. Forces change the motion of an object They will either make it start to move, speed up, slow it down or even make it stop Motion: movement Friction: A force that acts between two surfaces or objects that are moving, or trying to move, across each other Surface: The top layer of something Magnet: An object which produces a magnetic force that pulls certain objects towards it Magnetic: Objects which are attracted to a magnet are magnetic. Objects containing iron, nickel or cobalt metals are magnetic (link to bronze and iron in Stone Age to Iron Age) Magnetic Field: The area around a magnet where there is a magnetic force will pull magnetic objects towards the magnet Poles: North and south poles are found at opposite ends of the magnet Repel: Repulsion is a force that pushes objects away. For example, when a north pole is placed near the north pole of another magnet, the two poles repel (push away from each other)</p>

	<p>A magnetic field is the area around a magnet where there is a magnetic force and it pulls magnetic objects towards the object. A magnetic field is invisible.</p> <p>Magnets have two poles, those that attract and those that repel. One end of a bar magnet is called the North pole and the other end is called the South pole</p> <p>The needle in a compass is a magnet. A compass always points north-south on Earth The Earth is a giant magnet</p> <p><u>Everyday uses of magnets</u> Magnets can be affected by electricity which makes them very useful in machines and computers Magnets are used to make a tight seal on the doors to fridges and freezers. Magnets power speakers in stereos, headphones and televisions Magnets are used in hospital scanning machines such as MRIs which doctors use to look inside people's bodies</p>	
<p>Y5</p>	<p>Know that forces can make an object:</p> <ul style="list-style-type: none"> • start to move • stop moving • move faster • move more slowly • change direction • change its shape <p>Forces involve pushes or pulls</p> <p>It is the Earth's gravitational pull that keeps us on the ground</p> <p>Isaac Newton is thought to have developed the theory of gravity.</p> <p>Mass (kg) is how much is inside an object Weight (N) is how strongly gravity is pulling an object down.</p> <p>The Moon has a smaller mass than the earth so the gravitational pull is smaller than it is on earth. Jupiter has a larger mass than the earth so the gravitational pull is greater than it is on earth.</p> <p>Friction: a force that acts between two surfaces or objects that are moving, or trying to move across each other.</p> <p>Water resistance and air resistance are forms of friction. Friction can be both helpful and unhelpful.</p> <p>Buoyancy – an upward force Streamlining - reduce both air and water resistance.</p> <p>Mechanisms can be used to help with the force needed to move or lift and object:</p> <ul style="list-style-type: none"> • pulley (the more wheels in a pulley, the less force is needed to lift) • levers (a lever always rests on a pivot) • gears / cogs (when 2 gears are connected, they always turn in the opposite direction to each other) <p>EARTH AND SPACE Order of planets from the sun: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Know the phases of the moon (new moon, waxing crescent, first quarter, waxing gibbous, full moon, waning gibbous, last quarter, waning crescent) The moon is a natural satellite, orbits the Earth every 27 days. The moon reflects the light of the Sun</p>	<p>Mass: how much is inside an object Weight: how strongly gravity is pulling an object down Friction: a force that acts between two surfaces or objects that are moving, or trying to move across each other Water resistance: a form of friction Air resistance: a form of friction Buoyancy: an upward force Streamlining: reduce both air and water resistance Mechanisms: can be used to help with the force needed to move or lift an object Pulley: Lever: Gears:</p> <p>Dwarf planet– A celestial body that looks like a small planet. Rotate– Moving around an axis or centre point Orbit– Curved path of a celestial object. Star– A huge ball of gas held together by gravity. Axis– An imaginary line about which something rotates Celestial body– Other natural planets/asteroids outside Earth's atmosphere Sphere– 3D Shape (in a ball shape) Eclipse– The obscuring of light from a light source e.g. the Sun Satellite– An artificial object that orbits around a planet. Solar– Of the sun Atmosphere- The atmosphere of Earth is the layer of gases, commonly known as air, that surrounds the planet Earth and is retained by Earth's gravity. Gravity– the force that attracts a body towards the centre of the earth, or towards any other physical body having mass. Waxing / Waning moon - As the New moon begins its orbit and we see more and more of the moon, this is called Waxing.</p>

(is not a light source) The sun illuminates the side of the moon facing it. Depending on where it is in its orbit around the earth, it will *appear* to have a different shape. At points in the orbit it will have a different name too; new, full, waxing or waning.

To know that Earth's rotation causes **night and day**, and that the earth rotates anti-clockwise, east to west. It takes 24 hours to complete a full rotation and 365 $\frac{1}{4}$ days to rotate the sun.

The Sun is a star at the centre of our solar system, the Milky Way.

The diameter of the Sun is 1.4 million km.

The sun provides light, heat and energy.

Space Terms

Things we need to survive – Oxygen, Atmosphere, Gravity, Nutrients

Key calendar information - 12 months in a year 365 $\frac{1}{4}$ days a year 24 hours a day

Famous Astronauts- Tim Peake Helen Sharman Buzz Aldrin Neil Armstrong Valentina

Tereashkova

Yuri Alekseyevich Garagin

Key vocabulary

After the moon gets to its Full phase, we start to see less and less of the moon. This is called Waning.

Gravity is the force by which a planet or other body draws objects toward its centre. The force of gravity keeps all of the planets in orbit around the sun. Why do you land on the ground when you jump up instead of floating off into space? Why do things fall down when you throw them or drop them? The answer is gravity: an invisible force that pulls objects toward each other. Earth's gravity is what keeps you on the ground and what makes things fall.

Famous Scientists

Isaac Newton– Discovered universal gravitation

Galileo Galilei– Using telescopes, he discovered many new moons and planets.

Stephen Hawking– British physicist and expert on black holes. He worked on cosmology and the structure of the Universe.

Satellites – history of, first satellites - October 4, 1957, when the Soviet Union successfully launched **Sputnik I**. The world's first artificial satellite was about the size of a beach ball, weighed only 83.6 kg and took about 98 minutes to orbit the Earth on its elliptical path.

How we see earth from space - Cameras in space tell stories of life on Earth from a brand new perspective, revealing new discoveries, incredible colours and patterns, and just how fast it is changing.