Earth and Space/ Electricity/ Light/ Sound/	
EYFS	• Begin to explore through Welly Walks each season
Year 1 - Seasons	Knowledge Block 1- Surviving the changing seasons • There are four seasons, **Spring, summer, autumn** and **winter** • Each season is about three months long • In Spring, young animals like lambs and chicks are born, the flowers bloom and the weather starts to become warmer. • In autumn, the leaves fall off the trees and the amount of time we have in the day becomes less. • Winter has the shortest amount of time during the day and the weather is at its coldest. • In summer the trees are full of green leaves and the weather is at its warmest.
Year 1 STICKY KNOWLEDGE	• Know the four seasons

Year 2 – Pushes and pulls	Knowledge Block 1 • Objects can move (be in **Motion**) in various ways-roll, slide and bounce Knowledge Block 2 • The **pushing** or **pulling** of an object can affect its motion. • Pushing or pulling can do three things, **slow down, speed up or change the direction** of an object. Knowledge Block 3 The larger the push/pull the bigger the effect on motion
Year 2 STICKY KNOWLEDGE	• Know that the larger push/pull, the bigger the effect on motion.

Year 3 - Magnets	Knowledge Block 1- What magnets do • Magnets exert **attractive forces** on some **metals** Knowledge Block 2- Magnets don't need to touch • Magnetic forces work through other materials including air, so magnets don't need to be touching to **exert** their force. It is called a **non-contact force** Knowledge Block 3- Magnets attract and repel • Each end of a magnet is called a **pole**, opposite poles are called north and south. • Magnets exert **attractive** forces on each other when the poles facing each other are north and south (opposites). • Magnets exert **repulsive** forces on each other when the poles facing each other are the same. Knowledge Block 4- what affects magnetic strength The strength of magnetic forces is affected by: • The strength of the magnet. • The distance between the magnet and the object. • The material the object is made from.
Year 3 – Light	Knowledge Block 1- Light and sight • There must be light for us to see. • Light comes from a **source**. • We need light to see things, even **shiny** things. • Light from the sun can be dangerous and that there are ways to protect their eyes Knowledge Block 2- What light does when it hits materials • If an object is **transparent** light will go through it and we will be able to see through it. • If an object is **opaque,** it will block the light and no light will get through. This is what forms shadows. • The closer to the light source an object is, the bigger the shadow will be. This is because the object blocks more of the light. • The further away from the light source an object is, the smaller the shadow will be. This is because the object blocks less of the light. • If an object is perfectly **reflective,** light will bounce back off it and we will see reflections of objects. • If the material is **translucent,** it will allow light through, but we won't be able to see through it.
Year 3 STICKY KNOWLEDGE	• Know each end of a magnet is called a pole which means they attract or repel each other • Know shadows are formed when the light from a light source is blocked • Know that light comes from a source • Know that we need light in order to see things and that dark is the absence of light

Year 4 - Electricity	Knowledge Block 1- Electricity as a power source • Lots of devices are powered by electricity • Electricity comes from a source There are two main sources- batteries and mains Knowledge Block 2- What batteries do • A battery pushes electricity to the device. • To be able to push electricity the battery must be connected to the device using wires • This is called a circuit Knowledge Block 3- Making devices work harder • If there are more batteries added to a circuit this provides a bigger push on the electricity • This will make the device work harder e.g., brighter bulbs, faster spinning motor, louder buzzer Knowledge Block 3- Insulators and conductors • Some materials will allow electricity to flow through them- Conductors • Metals such as silver, gold and copper are good conductors. Water is also a conductor of electricity. • Other materials will not allow electricity to flow through them- Insulators • Plastic, wood, glass and rubber are good electrical insulators. That is why they are used to cover materials that carry electricity. • A switch opens and closes a circuit
Year 4 STICKY KNOWLEDGE	• Know electricity is a power source • Know batteries and mains are the two main sources of electricity • Know what a cell, wire, bulb, switch and buzzer is • Know some common appliances that run on electricity • Know what is meant by a loop or complete circuit • Know what batteries do • Know the effect of adding more batteries to a circuit • Know what is meant by a conductor • Know what is meant by an insulator

Year 5 – Space and Gravity	Knowledge Block 1: Our Solar system • A **Solar system** is a collection of **planets**, which **orbit** (a curved path) a **star**. • There are huge number of stars in space and therefore a huge number of solar systems • Our solar system consists of 8 planets, many of those planets have **moons** which orbit around them. • Earth's moon is not a planet but is a satellite which orbits Earth. It is around a quarter of the size of Earth. • As the Moon orbits the Earth, the Sun lights up different parts of it, making it seem as if the Moon is changing shape. We call these the phases of the moon. • The Moon doesn't emit (give off) light itself, the 'moonlight' we see is actually the Sun's light reflected off the lunar surface. • Our solar system can be represented with a model (see diagram), but it isn't possible to draw it to scale. • The planets and moons are **rotating** (spinning) • The time it takes one planet to rotate is called a **day**. On Earth this is 24 hours • The time it takes a planet to complete one orbit around its star is called a **year**. On Earth this is 356.25 days • The solar system is with a massive collection of stars called the **galaxy** (called the Milky way) • The Milky way is one of billions of galaxies in the **Universe**. Knowledge Block 2: What else is in the solar system? • Stars are huge balls of gas that produce vast amounts of light and heat. • **Asteroids** are lumps of rock that orbit a star (there are millions in between Mars and Jupiter) • **Comets** are objects that are made of Ice, which melts when they get closer to the sun leaving a tail. Knowledge Block 3: Gravity and its effects • **Gravity** is force of attraction between two objects with **mass** (a quantity of matter) • The bigger the mass the bigger force it exerts • Gravity works over distance but gets weaker as distance increases • Stars, planets, moons have a very large amount of mass. They exert a gravitational attraction on each other • Differences in gravity result in smaller mass objects orbiting around lager mass objects, e.g., planets around stars and moons around planets
Year 5 – Forces that oppose motion	Knowledge Block 1: Water and air resistance. • When objects move through air and water, they have to push it out of the way. The water and air push back with forces called **water resistance** and **air resistance**. The harder it is to push the material out of the way the greater the resistance. • Gases weigh less than liquids and so water resistance is greater than air resistance.

	Knowledge Block 2: Friction • Friction is a force against motion caused by two surfaces rubbing against each other. It occurs because no surfaces are perfectly smooth; they have bumps and undulations that can interlock when placed on top of each other. • To move one interlocking surface over another, one of three things must happen: • The surfaces must rise slightly • The bumps on the surface must bend • The bumps on the surface must break • All of these actions require a force, this is what causes friction Knowledge Block 3: Managing Forces • Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move. • The use of levers can reduce the force needed to move things. The object you are lifting is called the load, and the force you apply to the arm to make the object move is called the effort. • The use of pulleys can reduce the force needed to move things
Year 5 – STICKY KNOWLEDGE	• Know that a solar system is a collection of planets which orbit a star • Know the planets and moon rotate • Know a day is the time it takes one planet to rotate; a year is the time it takes for the planet to orbit around the sun. • Know what is meant by gravity • Know what is meant by water and air resistance • Know what is meant by the term friction

Year 6 – How light behaves	Knowledge Block 1: How light travels • When light is emitted from a light source, it travels in straight lines until it hits an object. This can be represented by an arrow. • Shadows form when light hits an opaque object. The area behind the object is in darkness because light can only travel in straight lines. • Shadows have the same shape as the objects that cast them. Knowledge Block 2: How light behaves when it hits objects • When light hits a transparent object, it goes through it in a straight line so we can see a clear image through it. • When light hits a translucent material, it goes through it but is scattered, this means light can pass through, but we can't see an image through it. • When light hits a mirrored surface, it reflects off it in straight lines, so we can see an image in the reflective material. • Sometimes when light hits a material it reflects off it in many different directions (it is scattered). In this case light will be reflected but no image will be seen in the material. • Shiny surfaces are better reflectors and rough surfaces scatter light more. Opaque objects don't allow any light to pass through them Knowledge Block 3: How we see • Animals see objects when light is reflected off the object and enters the eye through the pupil. • The pupil changes its size to allow enough, but not too much light into the eye. • Too much light damages the eye and too little results in poor quality images.
Year 6 – Controlling electrical circuits	Knowledge Block 1: Pushing electrical current • Current is the flow of electricity around a circuit. • The power supply in a circuit pushes the current round the circuit • The voltage of the power supply is a measure of this push • Voltage is measure in volts • Batteries have a limited store of energy and when this is gone, they can no longer push the current Knowledge Block 2: Electrical current • Current is the flow of electricity through a conductor • When current passes through a device it makes it work • Increasing the voltage (the number of cells in the battery) increases the current. The larger the flow of current, the harder the device works Knowledge Block 3: Electrical resistance • All parts of a circuit offer resistance to electrical current including the wires. • Resistance is the slowing down of electrical current

	• The more devices added into a circuit the greater the resistance. This means less current flows around the circuit
Year 6 - Sound	Knowledge Block 1: Describing Sound • Sounds can be produced in a variety of ways. • Sounds have the properties of **pitch** and **volume**. • When a sound is produced it spreads out from its source in all directions Knowledge Block 2: How sound is made and travels • Sound is caused by **vibration** (objects move rapidly back and forth or up and down) • When objects vibrate it makes the objects in contact with it also vibrate. This includes the air. • The vibration travels through the air and makes other objects it is in contact with vibrate including your **ear drum**. Knowledge Block 3: Pitch and Volume changes • Pitch and volume are caused by how the material vibrates • The pitch of a sound is caused by how fast an object vibrates. This is called the **frequency** of vibration. Higher the frequency, higher the pitch • Smaller objects or tighter strings tend to vibrate with a higher frequency • The volume of sound is caused by how big each vibration is. This is called the **amplitude** of vibration. The bigger the amplitude the higher the volume. • Sounds get fainter as the distance from the sound source increases.
Year 6 – STICKY KNOWLEDGE	• Know that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • Know why shadows form • Know the meaning of transparent, translucent, reflective and opaque • Know that light appears to travel in straight lines • Know about how the eye responds to light • Know what is meant by voltage • Know why a bulb may become brighter or dimmer • Know and be able to draw the symbol for a cell, buzzer, lamp, switch and motor • Know what is meant by pitch and volume