ALBERT VILLAGE
PRIMARY SCHOOL

Albert Village Primary School Science Curriculum Light

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Year 3 Light

National Curriculum Learning Objectives	• Recognise that they need light in order to see things, and that dark is the absence of light • Notice that light is reflected from surfaces • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes • Recognise that shadows are formed when the light from a light source is blocked by an opaque object • Find patterns in the way that the size of shadows change

Prior learning	**Future learning**
• Describe what they see, hear and feel whilst outside. (Reception – Light) • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans) • Describe the simple physical properties of a variety of everyday materials. (Y1 - Materials)	• Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. (Y5 - Properties and changes of materials) • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky (Y5 – Earth and Space) • Recognise that light appears to travel in straight lines. (Y6 - Light) • Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. (Y6 - Light) • Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. (Y6 - Light) • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. (Y6 - Light)

Key learning	**Possible experiences**	**Vocabulary**
• We see object because our eyes can sense light • Dark is the absence of light • We cannot see anything in complete darkness • Some objects are sources of light, e.g. the Sun, light bulbs, candles • Objects are easier to see if there is more light • Some surfaces reflect light • Reflective objects are easier to see when there is less light	• Explore how different objects are more or less visible in different levels of lighting. • Find different objects around the room/school that are opaque. Translucent or transparent • Explore using different materials, how opaque, translucent and transparent objects allow different levels of light through from the light source, e.g. make a handheld telescope and cover the end with different materials	light, light source, dark, absence of light, surface, shadow, reflect, mirror, Sun, sunlight, dangerous, opaque, translucent, transparent

• Light from the Sun can damage our eyes • Never look directly at the Sun • We can protect our eyes by wearing sunglasses or a hat that shades our eyes • Shadows are formed on a surface when an opaque or translucent object is between a light source and blocks some of the light • The size of the shadow depends on the position of the source, object and surface	• Experience true darkness by setting up an area with as little light as possible, e.g. blackout tent • Explore how objects with different surfaces, e.g. shiny vs matt, are more or less visible. E.g. shine a torch on different materials • Explore how shadows vary as the distance between a light source and an object or surface is changed. • Choose suitable materials to make shadow puppets. • Create artwork using shadows. • Make a pair of sunglasses and find out which material would be most suitable • Go outside and explore how a shadow can change when you change the shape of your body - in Year 5, children will track their shadows on the playground throughout the day during their Earth and Space topic.	

Possible Enquiry Coverage	
Classifying	• Based on the children's own criteria: classify light sources (leading to man-made/natural), or classify materials (leading to reflective/non-reflective, transparent/translucent/opaque).
Observing over time	• Not relevant (Do not look at how shadows in the playground change throughout the day.)
Pattern seeking	
Comparative/fair testing	• Test materials for reflectiveness. • Test materials for transparency. • Investigate shadows (size of shadows, shape of shadows).
Researching	

Scientists across the curriculum	Percy Shaw: Inventor of the cat's eye

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Year 6 Light

National Curriculum Learning Objectives	• Recognise that light appears to travel in straight lines • Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them

Prior learning	**Future learning**
• Recognise that they need light in order to see things and that dark is the absence of light. (Y3 - Light) • Notice that light is reflected from surfaces. (Y3 - Light) • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3 - Light) • Recognise that shadows are formed when the light from a light source is blocked by an opaque object. (Y3 - Light) • Find patterns in the way that the size of shadows change. (Y3 - Light) • Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. (Y5 - Properties and changes of materials)	• The similarities and differences between light waves and waves in matter. (KS3) • Light waves travelling through a vacuum; speed of light. (KS3) • The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface. (KS3) • Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye. (KS3) • Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras. (KS3) • Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection. (KS3)

Key learning	**Possible experiences**	**Vocabulary**

• Light appears to travel in straight lines • We see objects when light from them goes into our eyes • Sometimes, light may come directly from light sources • Other times, light must be reflected from the object into our eyes for the object to be seen • Objects that block light (opaque) will cause shadows • Because light travels in straight lines, the shape of a shadow will be the same as the outline shape of the object	• Sort objects based on how much light they allow through • Explore different ways to demonstrate that light travels in straight lines e.g. using lasers, shining a torch down a bent and straight hose pipe, shining a torch through different shaped holes in card. • Explore the uses of the behaviour of light, reflection and shadows, such as in periscope design, rear view mirrors and shadow puppets.	light, light source, dark, absence of light, surface, shadow, reflect, mirror, Sun, sunlight, dangerous, opaque, translucent, transparent, straight lines, light rays

Possible Enquiry Coverage	
Classifying	•
Observing over time	•
Pattern seeking	•
Comparative/fair testing	Investigate the shape of shadows and link this to light travelling in straight lines.
Researching	

Scientists across the curriculum	Euclid: Mathematician who predicted that light travels in straight lines and we only see things that light falls on Ibn al-Haytham (Alhazen): Physicist and Mathematician who delevoped a theory that light travels in a straight line, and proved it by carrying out the first scientific experiment Ibn Sahl: Mathematician who observed the paths of rays of light as they reflected of different mirrors Colin Webb: Professor or Laser Physics

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Albert Village Primary School Science Curriculum
Forces & Magnets

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Year 3 Forces and magnets

National Curriculum Learning Objectives	• Compare how things move on different surfaces • Notice that some forces need contact between two objects, but magnetic forces can act at a distance • Observe how magnets attract or repel each other and attract some materials and not others • 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 • Describe magnets as having two poles • Predict whether two magnets will attract or repel each other, depending on which poles are facing

Prior learning	**Future learning**
• Explore the natural world around them. (Reception – Forces) • Describe what they see, hear and feel whilst outside. (Reception – Forces) • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials)	• Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. (Y5 - Forces) • Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. (Y5 - Forces) • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. (Y5 - Forces) • Magnetic fields by plotting with compass, representation by field lines. (KS3) • Earth's magnetism, compass and navigation. (KS3)

Key learning	**Possible experiences**	**Vocabulary**
• A force is a push or a pull • When an object moves on a surface, the texture of the surface and object affect how it moves • A rougher surface/object makes objects faster/easier • A smoother surface/object makes objects move slower • Magnets attract magnetic material • Examples of magnetic materials are: iron and nickel. Metals containing these are also magnetic, e.g. stainless steel • Not all metals are magnetic	• Make observations and comparisons of children's toys and sort into pushes and pulls • Explore different pushes and pulls in the classroom and around school • Carry out investigations to explore how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes etc. • Explore what materials are attracted to a magnet. • Classify materials according to whether they are magnetic.	Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole

• The strongest parts of a magnet are called poles • Magnets have two poles: north and north • If two of the same poles are brought together, they will repel/push away from each other • If opposite poles are brought together, they will attract/pull together • For some forces to act, there must be contact (pushes and pulls), e.g. opening a door • Some forces can act at a distance (magnetism). The magnet does not need to touch the object it attracts	• Explore the way that magnets behave in relation to each other. • Use a marked magnet to find the unmarked poles on other types of magnets. • Explore how magnets work at a distance e.g. through the table, in water, jumping paper clips up off the table. • Devise an investigation to test the strength of magnets.	

Possible Enquiry Coverage	
Classifying	• Based on the children's own criteria: sort materials (leading towards metal/non-metal and magnetic/not magnetic), or sort toys (leading to what makes them move e.g. push/pull).
Observing over time	
Pattern seeking	
Comparative/fair testing	• Test how objects move on different surfaces e.g. cars, spinning tops, wind-up/clockwork toys. • Test the strength of different magnets.
Researching	• Find out how magnets are used in everyday life.

Scientists across the curriculum	William Gilbert: Doctor who developed the theory of magnetism Leonardo Da Vinci: First person to plan and carry out tests on friction Eric Laithwaite: Electrical Engineer who developed the technology behind the Maglev train

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Year 5 Forces

National Curriculum Learning Objectives	• Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • Identify the effects of air resistance, water resistance and friction that act between moving surfaces • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect

Prior learning	**Future learning**
• Compare how things move on different surfaces. (Y3 - Forces and magnets) • Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3 - Forces and magnets) • Observe how magnets attract or repel each other and attract some materials and not others. (Y3 - Forces and magnets) • 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. (Y3 - Forces and magnets) • Describe magnets as having two poles. (Y3 - Forces and magnets) • Predict whether two magnets will attract or repel each other, depending on which poles are facing. (Y3 - Forces and magnets)	• Forces as pushes or pulls, arising from the interaction between two objects. (KS3) • Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. (KS3) • Moment as the turning effect of a force. (KS3) • Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water. (KS3) • Forces measured in Newtons, measurements of stretch or compression as force is changed. (KS3)

Key learning	**Possible experiences**	**Vocabulary**
• A forces causes an object to start/stop moving, speed up/slow down or change direction • Gravity is a force that acts at a distance • Everything is pulled towards the Earth's core by gravity • Gravity causes unsupported objects to fall • Friction is a contact force • Air resistance is a type of friction that acts in the opposite direction to objects moving in the air	• Investigate the effect of friction in a range of contexts e.g. trainers, bathmats, mats for a helter-skelter. • Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through water and pulling shapes, such as boats, along the surface of water.	Forcemeter, force, gravity, Earth, air resistance, water resistance, friction, mechanism, simple machines, levers, pulleys, gears

• Water resistance is a type of friction that acts in the opposite direction to objects moving in water • A mechanism is a device that allows a small force to be increased to a bigger force, or have a greater effect • Pulleys, lever and gears are all mechanisms, also known as simple machines	• Investigate falling objects and the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats. • Explore how levers, pulleys and gears work. • Make a product that involves a lever, pulley or gear. • Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.	

Possible Enquiry Coverage	
Classifying	•
Observing over time	•
Pattern seeking	•
Comparative/fair testing	• Compare friction e.g. trainers or weighted match box pulled with forcemeter, balloon rockets, CD hovercraft, balloon cars. • Compare water resistance e.g. boats in a gutter of water, plasticine in a cylinder of liquid (easier with a more viscous liquid e.g. bubble bath). • Compare air resistance e.g. spinners, parachutes, sailing boats, straw rockets. • Compare levers, pulleys and gears – see illustrations below.
Researching	• Research Heath Robinson and Rube Goldberg machines. (Children present what they've learned in different ways: create a model, write a song, write a story, create a PPT, etc. This could be cross-curricular with D&T and English biography writing.)

Scientists across the curriculum	Galileo Galilei and Isaac Newton: Scientists who helped develop the theory of gravitation George Cayley: Aeronautical Engineer who designed the first successful glider to carry a human being Brahmagupta: Mathematician and Astronomer who was the first scientist to talk about gravity

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Albert Village Primary School Science Curriculum
Sound

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Year 4 Sound

National Curriculum Learning Objectives	• Identify how sounds are made, associating some of them with something vibrating • Recognise that vibrations from sounds travel through a medium to the ear • Find patterns between the pitch of a sound and features of the object that produced it • Find patterns between the volume of a sound and the strength of the vibrations that produced it • Recognise that sounds get fainter as the distance from the sound source increases

Prior learning	**Future learning**
• Describe what they see, hear and feel whilst outside. (Reception – Sound) • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans)	• Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition. (KS3) • Frequencies of sound waves, measured in Hertz (Hz); echoes, reflection and absorption of sound. (KS3) • Sound needs a medium to travel, the speed of sound in air, in water, in solids. (KS3) • Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal. (KS3) • Auditory range of humans and animals. (KS3) • Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound. (KS3) • Waves transferring information for conversion to electrical signals by microphone. (KS3)

Key learning	**Possible experiences**	**Vocabulary**
• Sound is caused by vibrations • Vibrations (sounds) travel through mediums from the source to our ears • The vibrations that travel to our ears cause a vibration inside our ears, allowing us to hear/sense the sound • The mediums are solids, liquids and gases	• Classify sound sources • Explore making sounds with a range of objects, such as musical instruments and other household objects • Explore how string telephones or ear gongs work • Explore altering the pitch or volume of objects, such as the length of a guitar string, amount of water in bottles, size of tuning forks	Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation

• Sometimes, the medium a vibration travels through changes the sound, e.g. underwater, sounds are quieter and muffled • Volume is how loud or quiet a sound is • Volume changes depending on the strength of the vibration (the more energy we give a vibration, the louder the sound) • Larger vibrations create louder sounds, smaller vibrations create quieter sounds • Sounds decrease in volume as you move away from the source • A sound insulator is a material which blocks sound effectively • Pitch us how high or low a sound is • Pitch is affected by the feature of the object • Short objects create a lower pitch • Longer object make a lower pitch	• Measure sounds over different distances • Measure sounds through different insulation materials	

Possible Enquiry Coverage	
Classifying	• Based on the children's own criteria, sort musical instruments.
Observing over time	
Pattern seeking	
Comparative/fair testing	• Measure volume from different instruments. • Measure how volume changes away from a source. • Investigate string telephones. • Explore pitch e.g. through a carousel of activities using milk bottles, straw pipes, rulers, elastic band guitars.
Researching	• Research, make and play their own instruments based on what they learned about pitch and volume.

Scientists across the curriculum	Aristotle: Philosopher who developed the concept that sound travels through air due to the movement of air particles Isaac Newton: Mathematician and Physicist who measured the speed of sound

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Albert Village Primary School Science Curriculum
Electricity

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Year 4 Electricity

National Curriculum Learning Objectives	• Identify common appliances that run on electricity • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • Recognise some common conductors and insulators, and associate metals with being good conductors

Prior learning	**Future learning**
None – due to the abstract nature of electricity, it is not appropriate to introduce it earlier than year 4	• Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. (Y6 - Electricity) • Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. (Y6 - Electricity) • Use recognised symbols when representing a simple circuit in a diagram. (Y6 - Electricity)

Key learning	**Possible experiences**	**Vocabulary**
• Electricity is the flow of electric charge in one direction • There are two types of electric charge: mains and battery • Many household devices and appliances run on electricity • A circuit always needs a power source (cell or battery) • A cell is a single device that provides power • A battery is two or more cells that provides power • Circuits contain components, such as: bulbs, buzzers, motors • If there is a break in the circuit or a loose connection, the component will not work • Switches can be added to circuits to turn the component on and off	• Identify and classify appliances that run on mains or battery • Construct a range of circuits • Draw simple diagrams of circuits (but do not use the standard circuit symbols) • Explore which materials can be used instead of wires to make a circuit • Classify the materials that were suitable/not suitable for wires • Explore how to connect a range of different switches and investigate how they function in different ways	Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor,

• Conductors allow electricity to pass through them • Metals are good conductors so they can be used as wires in a circuit • Insulators do now allow electricity to pass through them • None metals are good insulators, e.g. plastic and rubber	• Apply their knowledge of conductors and insulators to design and make different types of switch. • Make circuits that can be controlled as part of a DT project. Children should be given one component at a time to add to circuits.	insulator, metal, non-metal, symbol Children in Year 4 do not need to use standard symbols for electrical components, as this is taught in Year 6.

Possible Enquiry Coverage	
Classifying	• Based on the children's own criteria, classify household appliances and/or toys (leading to electrical/not electrical, batteries/mains). • Test materials to classify into insulators and conductors.
Observing over time	
Pattern seeking	
Comparative/fair testing	• Conduct a test to find out whether objects are conductors or insulators
Researching	

Scientists across the curriculum	Thomas Edison: Inventor of the lightbulb and power grid Joseph Swan: Physicist and Chemist who developed a primitive electric light 20 years before Thomas Edison Lewis Howard Latimer: Electronic Engineer who improved the design of Edison's light bulb and brought street lighting into the world Ronit Kanwar: Businessman who set up a company to provide affordable, sustainable solar-powered lights for poor areas in rural India William Kamkwamba: Inventor who used wind turbines to bring electricity to his village in Malawi Zubera Iqbal: Chemist who explores sustainable ways to recycle electric vehicle batteries

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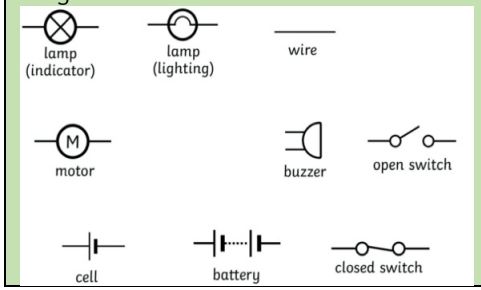
Year 6 Electricity

National Curriculum Learning Objectives	• Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • Use recognised symbols when representing a simple circuit in a diagram

Prior learning	**Future learning**
• Identify common appliances that run on electricity. (Y4 - Electricity) • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. (Y4 - Electricity) • Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. (Y4 - Electricity) • Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. (Y4 - Electricity) • Recognise some common conductors and insulators, and associate metals with being good conductors. (Y4 - Electricity)	• Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge. (KS3) • Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current. (KS3) • Differences in resistance between conducting and insulating components (quantitative). (KS3) • Static electricity. (KS3)

Key learning	**Possible experiences**	**Vocabulary**
• Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound • If you use a battery with a higher voltage, it will make a bulb brighter, a motor spin faster or a buzzer make a louder sound • Adding components to a circuit will make blubs less bright, motors spin slower and buzzers quieter	• Look at circuit diagrams and decide whether or not they will work • Draw circuits using symbols • Explain how a circuit operates to achieve particular operations, such as to control the light from a torch with different brightnesses or make a motor go faster or slower • Make circuits to solve particular problems, such as a quiet and a loud burglar alarm • Carry out fair tests exploring changes in circuits	Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage Children do not need to understand what voltage is, but will use volts and voltage to describe

• Turning a switch off breaks/opens a circuit so the circuit is not complete, and the electricity cannot flow through all the components • A circuit has to be closed (switch on) for the electricity to flow through, and the components to work Children must know and use circuit symbols in drawings of circuit diagrams:  	• Make circuits that can be controlled as part of a DT project	different batteries. The words "cells" and "batteries" are now used interchangeably.

Possible Enquiry Coverage	
Classifying	
Observing over time	
Pattern seeking	
Comparative/fair testing	• Investigate the effect of adding more bulbs to a circuit • Investigate the effect of adding more cells to a circuit • Investigate the effect of adding more buzzers to a circuit • Investigate the effect of adding more motors to a circuit
Researching	

Scientists across the curriculum	Nikola Tesla: Electrical and Mechanical Engineer who developed the AC electrical system and made important advances in technologies such as x-rays, neon lights and robotics Alessandro Volta: Physicist who developed the electric battery Mildred S Dresselhaus: Materials Scientist whose research led to the development of the rechargeable batteries in all modern electronic equipment

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Albert Village Primary School Science Curriculum
Earth & Space

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Year 1 Seasonal Changes

National Curriculum Learning Objectives	• Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies

Prior learning	**Future learning**
	• Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3 - Light) • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. (Y5 - Earth and space) • The seasons and the Earth's tilt, day length at different times of year, in different hemispheres. (KS3)

Key learning	**Possible experiences**	**Vocabulary**
• There are 4 seasons: autumn, winter, spring and summer • In the UK, usually, the weather and temperature changes with the seasons: autumn gets colder, winter is the coldest, spring gets warmer, summer is the hottest • Autumn and winter are often rainier, and spring and summer are often drier • The length of daylight in mid-summer is longer than in mid-winter The change in weather causes many other changes: • Numbers and types of animals found in local habitats • Seed and plant growth • Leaves on trees (autumn leaves turn brown and fall off, no leaves in winter, new leaves grow in spring and full leaves in summer) • Types of clothes worn by people (more layers in winter, fewer in summer)	• Go for regular walks around the local area to observe changes • Create a photo diary and annotate observations and comparisons • Collect information about the weather regularly throughout the year. • Present this information in tables and charts to compare the weather across the seasons. • Collect information, regularly throughout the year, of features that change with the seasons e.g. plants, animals, humans. • Present this information in different ways to compare the seasons. • Gather data about day length regularly throughout the year and present this to compare the seasons.	weather, sunny, rainy, raining, shower, windy, snowy, cloudy, hot, warm, cold, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, rainbow, seasons, winter, summer, spring, autumn, Sun, sunrise, sunset, day length

• Spring is often associated with offspring being born (lambs, chicks, etc.) • One of the best indicators of the time of year is the trees • It is not safe to look directly at the sun, even with sunglasses		

Possible Enquiry Coverage	
Classifying	
Observing over time	• Take weather measurements and make observations over time. • Record/Photograph what children are wearing (jumper, coat, hats, scarves, etc.) • Make observations of daylight hours e.g. send a diary and toy bear home with one child each day and ask the child to record their activities, but the bear needs to go to bed when it gets dark and the children must record the time this happens. (This gathers evidence, over time, that day length changes and so do activities.)
Pattern seeking	• At the end of the year, look for patterns in evidence e.g. Does it rain more in spring? Do we have more sunny days in the summer? Which was the coldest month?
Comparative/fair testing	
Researching	

Scientists across the curriculum	Jim Cantore (Meteorologist and storm tracker)

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Year 5 Earth and space

National Curriculum Learning Objectives	• Describe the movement of the Earth, and other planets, relative to the Sun in the solar system • Describe the movement of the Moon relative to the Earth • Describe the Sun, Earth and Moon as approximately spherical bodies • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky

Prior learning	**Future learning**
• Explore the natural world around them. (Reception – Earth and space) • Describe what they see, hear and feel whilst outside. (Reception – Earth and space) • Observe changes across the four seasons. (Y1 - Seasonal changes) • Observe and describe weather associated with the seasons and how day length varies. (Y1 - Seasonal changes)	• Gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only). (KS3) • Our Sun as a star, other stars in our galaxy, other galaxies. (KS3) • The seasons and the Earth's tilt, day length at different times of year, in different hemispheres. (KS3) • The light year as a unit of astronomical distance. (KS3)

Key learning	**Possible experiences**	**Vocabulary**
• The Sun is a star and light source • The Sun is at the centre of our solar system • Earth is where we live and it is a planet in our solar system • There are 8 planets in our solar system (not essential for children to remember the names) • The planets (including Earth) orbit the Sun in a fixed orbit • Earth takes 365 $\frac{1}{4}$ days to complete its orbit around the Sun • Earth rotates (spins) on its axis every 24 hours • As Earth rotates, half faces the Sun (day) and the other half faces away from the Sun (night) • As the Earth rotates, the Sun appears to move across the sky • The Moon is made of natural rock and orbits the Earth • The Moon takes around 28 days to complete its orbit of Earth • The Sun, Earth and Moon are approximately spherical • You should never look directly at the Sun	• Use secondary sources to help create a model e.g. role play or using balls to show the movement of the Earth around the Sun and the Moon around the Earth • Use secondary sources to help make a model to show why day and night occur, e.g. using a torch and ball • Make first-hand observations of how shadows caused by the Sun change through the day, e.g. children draw chalk around their shadows first thing in the morning and revisit at regular points throughout the day • Make a sundial • Research time zones	Sun, Moon, Earth, planets (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, Solar System, rotate, star, orbit

	• Consider the views of scientists in the past and evidence used to deduce shapes and movements of the Earth, Moon and planets before space travel	

Possible Enquiry Coverage	
Classifying	
Observing over time	• Measure shadows throughout the day.
Pattern seeking	
Comparative/fair testing	
Researching	• Generate questions to research about the Earth and space. (Children present what they've learned in different ways: create a model, write a song, write a story, create a PPT, etc.)

Scientists across the curriculum	Claudius Ptolemaeus Ptolemy: Astronomer who developed the theory that the Earth was at the centre of the solar system around which the Sun and other planets orbited Nicolaus Copernicus: Astronomer who developed the theory that the Sun was at the centre of the solar system around which the planets orbited Galileo Galilei: Astronomer, Mathematician and Physicist who made the first telescope and discovered Neptune and the rings of Saturn Johannes Kepler: Mathematician, Astronomer and Astrologer who developed the theory that the planets moved on oval paths around the Sun Stephen hawking: Physicist and Cosmologist who developed the theory that the Big Bang may have been caused by a black hole in reverse Neil Armstrong: Astronaut who was the first human to talk on the Moon Margaret Hamilton: Computer Scientist who was responsible for the software that allowed astronauts Neil Armstrong and Buzz Aldrin to land on the Moon Caroline Herschel: Astronomer who was the first woman to discover a comet Valentina Tereshkova: Astronaut and first woman in space Mae Jemison: Astronaut and first black woman in space Dr Claudia Alexander: Physicist who was the project manager on NASA's Galileo mission to Jupiter Maggie Aderin-Pocock: Space scientist and TV presenter Helen Sharman: Astronaut who was the first British citizen to go into space Tim Peake: Astronaut who was the first British person to walk in space