



Knowledge and Skills Progression – Science (Processes)



	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Processes								
Pattern seeking	The weather is colder in winter and warmer in summer. Talk about the weather as being warm or cold.	The weather can change throughout the day, week and month. The weather is different at different times in the year. Notice and begin to describe patterns of weather in summer and winter.	There are four seasons: spring, summer, autumn and winter. Certain events and weather patterns happen in different seasons. Observe changes across the four seasons.	The UK has typical weather in each of the seasons. For example, winter is cold and sometimes frosty, whereas summer is warm and sometimes sunny. Describe typical UK seasonal weather patterns.	Shadows change shape and size when the light source moves. For example, when the light source is high above the object, the shadow is short and when the light source is low down, the object's shadow is long. Find patterns in the way shadows change during the day.	Volume is how loud or quiet a sound is. The harder an instrument is hit, plucked or blown, the stronger the vibrations and the louder the sound. Compare and find patterns in the volume of a sound, using a range of equipment, such as musical instruments. Pitch is how high or low a sound is. Parts of an instrument that are shorter, tighter or thinner produce high-pitched sounds. Parts of an instrument that are longer, looser or fatter produce low-pitched sounds. Compare and find patterns in the pitch of a sound, using a range of equipment, such as musical instruments.	As Earth orbits the Sun, it also spins on its axis. It takes Earth a day (24 hours) to complete a full spin. During the day, the Sun appears to move through the sky. However, this is due to the Earth rotating and not the Sun moving. Earth rotates to the east or, if viewed from above the North Pole, it rotates anti-clockwise, which means the Sun rises in the east and sets in the west. As Earth rotates, different parts of it face the Sun, which brings what we call daytime. The part facing away is in shadow, which is night time. Use the idea of Earth's rotation to explain day and night, and the Sun's apparent movement across the sky.	A shadow appears when an object blocks the passage of light. Apart from some distortion or fuzziness at the edges, shadows are the same shape as the object. The distortion or fuzziness depends on the position or type of light source. Explain, using words, diagrams or a model, why shadows have the same shape as the objects that cast them and how shadows can be changed.

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Processes Changes	In the winter, the evenings gets darker earlier. In the summer, the evening stay lighter for longer. Talk about things they can do on winter evenings and things they can do on summer evenings and begin to notice the difference in day length.	The number of daylight hours varies throughout the year, according to the season. The days are longer in summer and shorter in winter. Notice and talk about the differences in day length between the seasons.	Day length (the number of daylight hours) is longer in the summer months and shorter in the winter months. Observe and describe how day length changes across the year.	Some objects and materials can be changed by squashing, bending, twisting, stretching, heating, cooling, mixing and being left to decay. Describe how some objects and materials can be changed and how these changes can be desirable or undesirable.	Fossils form over millions of years and are the remains of a once-living organism, preserved as rock. Scientists can use fossils to find out what life on Earth was like in prehistoric times. Fossils form when a living thing dies in a watery environment. The body gets covered by mud and sand and the soft tissues rot away. Over time, the ground hardens to form sedimentary rock and the skeletal or shell remains turn to rock. Describe simply how fossils are formed, using words, pictures or a model.	Heating or cooling materials can bring about a change of state. This change of state can be reversible or irreversible. The temperature at which materials change state varies depending on the material. Water changes state from solid (ice) \rightleftharpoons liquid (water) at 0°C and from liquid (water) \rightleftharpoons gas (water vapour) at 100°C. The process of changing from a solid to liquid is called melting. The reverse process of changing from a liquid to a solid is called freezing. The process of changing from a liquid to a gas is called evaporation. The reverse process of changing from a gas to a liquid is called condensation. Observe and explain that some materials change state	Reversible changes include heating, cooling, melting, dissolving and evaporating. Irreversible changes include burning, rusting, decaying and chemical reactions. Identify, demonstrate and compare reversible and irreversible changes.	Describe some significant changes that have happened on Earth and the evidence, such as fossils, that support this.

						when they are heated or cooled and measure or research the temperature in degrees Celsius (°C) at which materials change state.		
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Processes Earth	Ways to describe daily weather include sunny, rainy, warm or cold. Weather is warmer in the summer and colder in the winter. Say what the daily weather is like.	Ways to describe daily weather include sunny, rainy, windy, cloudy, warm or cold. Weather is warmer in the summer with more sunshine and colder in the winter with more snow, hail and rain. Describe simply how weather changes as the seasons change.	Different types of weather include sunshine, rain, hail, wind, snow, fog, lightning, storm and cloud. The weather can change daily and some weather types are more common in certain seasons, such as snow in winter. Observe and describe different types of weather.	The Earth is spherical and is covered in water and land. When it is daytime in one location, it is night time on the other side of the world. Describe features of Earth using words and pictures.	Soils are made from tiny pieces of eroded rock, air and organic matter. There are a variety of naturally occurring soils, including clay, sand and silt. Different areas have different soil types. Investigate soils from the local environment, making comparisons and identifying features.	The water cycle has four stages: evaporation, condensation, precipitation and collection. Water in lakes, rivers and streams is warmed by the Sun, causing the water to evaporate and rise into the air as water vapour. As the water vapour rises, it cools and condenses to form water droplets in clouds. The clouds become full of water until the water falls back to the ground as precipitation (rain, hail, snow and ice). The fallen water collects back in lakes, rivers and streams. Evaporation and condensation are caused by temperature	The Solar System is made up of the Sun and everything that orbits around it. There are eight planets in our Solar System: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. Earth orbits around the Sun and a year (365 days) is the length of time it takes for Earth to complete a full orbit. Describe or model the movement of the planets in our Solar System, including Earth, relative to the Sun. The Moon orbits Earth, completing a full orbit every month (28 days). Describe or model the movement of the	Light sources give out light. They can be natural or artificial. When light hits an object, it is absorbed, scattered, reflected or a combination of all three. Light from a source or reflected light enter the eye. Vertebrates, such as mammals, birds and reptiles, have a cornea and lens that refracts light that enters the eye and focuses it on the nerve tissue at the back of the eye, which is called the retina. Once light reaches the retina, it is transmitted to the brain via the optic nerve. Explain that, due to how light travels, we can see things because they give out or reflect light into the eye. Light travels in straight lines. Identify that light

						changes. Describe the water cycle using words or diagrams and explain the part played by evaporation and condensation.	Moon relative to Earth.	travels in straight lines.
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Processes	Notice and begin to describe natural phenomena, such as weather, rainbows and clouds.	Natural phenomena include weather, shadows, rainbows, clouds, flooding and waves. Name and describe natural phenomena, such as the size of shadows, the colours of a rainbow, the speed of clouds moving across the sky and the strength of a wave.	A shadow is formed when light from a light source, such as the Sun, is blocked by an opaque object, but not by transparent objects. Explain in simple terms how shadows are formed.	When an instrument is played by plucking, striking or blowing, the air around or inside it vibrates. These vibrations travel as a sound wave to the ear. Explain in simple terms how sounds are made.	A shadow is formed when light from a light source, such as the Sun, is blocked by an object. Opaque objects cast dark shadows. Translucent objects cast pale shadows. Transparent objects cast very pale shadows. Explain, using words or diagrams, how shadows are formed when a light source is blocked by an opaque object. Dark is the absence of light and we need light to be able to see. Describe the differences between dark and light and how we need light to be able to see.	When an instrument is played, the air around or inside it vibrates. These vibrations travel as a sound wave. Sound waves travel through a medium, such as air or water, to the ear. Explain how sounds are made and heard using diagrams, models, written methods or verbally.	The Sun, Earth, Moon and the planets in our solar system are roughly spherical. All planets are spherical because their mass is so large that they have their own force of gravity. This force of gravity pulls all of a planet's material towards its centre, which compresses it into the most compact shape – a sphere. Describe the Sun, Earth and Moon as approximately spherical bodies and use this knowledge to understand the phases of the Moon and eclipses.	'White' light is a term used to describe visible, ordinary daylight. White light can be split into a spectrum of colours (rainbow) by droplets of water or prisms. Describe, using scientific language, phenomena associated with refraction of light.

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Processes Forces	Some objects float and others sink. Talk about and play with objects that float and sink and describe different forces that they can feel.	Some objects float and others sink. When an object sinks it falls through water to the bottom of the vessel. An object that floats stays at the water's surface. Describe, predict and sort things that float and sink and talk about the forces that they can feel.	Simple equipment can be used for measuring weather, such as measuring temperature with a thermometer; identifying wind direction and force with a windsock or measuring rainfall with a rain gauge. Investigate weather using toys, models or simple equipment.	Some objects float and others sink. Objects that float are typically light or hollow. Objects that sink are typically heavy or dense. Sort and group objects that float and sink.	An object will not move unless a pushing or pulling force is applied. Some forces require direct contact, whereas other forces can act at a distance, such as magnetic force. Explain that an object will not move unless a push or pull force is applied, describing forces in action and whether the force requires direct contact or whether the force can act at a distance (magnetic force).	A series circuit is a simple loop with only one path for the electricity to flow. A series circuit must be a complete loop to work and have a source of power from a battery or cell. Predict and describe whether a circuit will work based on whether or not the circuit is a complete loop and has a battery or cell.	Gravity is a force of attraction. Anything with a mass can exert a gravitational pull on another object. The Earth's large mass exerts a gravitational pull on all objects on Earth, making dropped objects fall to the ground. Explain that objects fall to Earth due to the force of gravity.	Voltage is measured in volts (V) and is a measure of the difference in electrical energy between two parts of a circuit. The bigger the voltage, the more electrons are pushed through the circuit. The more voltage flowing through a lamp, buzzer or motor, the brighter the lamp, the louder the buzzer and the faster the motor. Explain how the brightness of a lamp or volume of a buzzer is affected by the number and voltage of cells used in a circuit.
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Modelling	Toys and models that are powered by a battery can be switched on and off. Play with and explore battery-powered toys and models.	Some light sources need electricity or batteries to work, such as a torch, and some do not, such as candles. Explore and describe electrical and non-electrical light sources.	Electrical circuits can light lamps or sound a buzzer. A switch turns an electrical circuit off and on. Describe, following exploration, what simple electrical circuits can do.	Models can have moving parts that use levers, sliders, wheels and axles. Make models with moving parts.	Make working models with simple mechanisms or electrical circuits.	Electrical components include cells, wires, lamps, motors, switches and buzzers. Switches open and close a circuit and provide control. Construct operational simple series circuits using a range of components and switches for	Mechanisms, such as levers, pulleys and gears, give us a mechanical advantage. A mechanical advantage is a measurement of how much a simple machine multiplies the force that we put in. The bigger the mechanical advantage, the less force we need to apply.	There are recognised symbols for different components of circuits. Create circuits using a range of components and record diagrammatically using the recognised symbols for electrical components.

						control.	Describe and demonstrate how simple levers, gears and pulleys assist the movement of objects.	
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