

## Science- Whole School Overview (Physics Topics)

*In science we build upon the learning in KS1 and by the end of year 6 we aim for all pupils to have studied a broad and progressive science curriculum, which provides the foundations for understanding the world. We focus on a range of key concepts, skills, knowledge & vocabulary, which ensures pupils have the necessary understanding to embrace the KS3 curriculum. We endeavour for pupils to develop rational explanation, a sense of excitement and curiosity about natural phenomena, to understand how science can explain what is occurring, predict how things behave and analyse causes.*



Year 3		
Topic	Forces and Magnets	Light
Link to School Values	Together we are safe	Together we are problem solvers
Recall knowledge and vocabulary	<p><b>Y2 - Uses of everyday materials</b></p> <ul style="list-style-type: none"> <li>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</li> </ul> <p><b>Recall the scientific vocabulary of:</b>                      wood, metal, plastic, glass, brick, rock, paper, cardboard, shiny, non-reflective, flexible, rigid, shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching</p>	<p><b>Y1 – Materials</b></p> <ul style="list-style-type: none"> <li>Describe the simple physical properties of a variety of everyday materials.</li> </ul> <p><b>Y2 - Uses of everyday materials</b></p> <ul style="list-style-type: none"> <li>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.</li> </ul> <p><b>Recall the scientific vocabulary of:</b>                      rigid, opaque, transparent and translucent, shiny, dull</p>
New Knowledge Concepts & Vocabulary	<p><b>New Knowledge Concept:</b></p> <ul style="list-style-type: none"> <li>compare how things (toy cars) move on different surfaces (carpet, desk, playground, grass, lino etc)</li> <li>notice that some forces need contact between two objects, but magnetic forces can act at a distance (contact and non-contact forces)</li> <li>observe how magnets attract or repel each other and attract some materials and not others (use a range of classroom resources including: paper clips, treasury tags, drawing pins,</li> </ul>	<p><b>New Knowledge Concept:</b></p> <ul style="list-style-type: none"> <li>Recognise (through investigation) that they need light in order to see things, and that dark is the absence of light.</li> <li>Notice (through observation) that light is reflected from surfaces.</li> <li>Recognise that light from the sun can be dangerous and (through investigation) recognise that there are ways to protect their eyes.</li> <li>Recognise (through observation) that shadows are formed when the light from a light source is blocked by an opaque object.</li> </ul>

	<p>table/chair legs as magnetic and pencils, pens, whiteboard rubbers etc as non-magnetic)</p> <ul style="list-style-type: none"> <li>compare and group together a variety of everyday materials (use classroom resources as above and kitchen equipment such as knives, forks and plates) on the basis of whether they are attracted to a magnet, and identify some magnetic materials</li> <li>describe magnets as having two poles</li> <li>predict whether two magnets will attract or repel each other, depending on which poles are facing</li> </ul> <p><b>Use the scientific vocabulary of:</b> Force, contact force, non-contact force, magnetic force, magnet, strength, attract, repel, poles, north pole, south pole</p>	<ul style="list-style-type: none"> <li>Use enquiry based learning to find patterns in the way that the size of shadows change.</li> </ul> <p><b>Use the scientific vocabulary of:</b> Light, light source, dark, absence of light, transparent, translucent, opaque, shadow, reflect</p>
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Year 4		
Topic	Sound	Electricity
Link to School Values	Together we are safe	Together we are safe
Recall knowledge and vocabulary	<p><b>Y1 – Animals including humans</b></p> <ul style="list-style-type: none"> <li>Identify, name, draw and label the basic parts of the human body (Head, body, arms, legs, back, feet, hands, bottom, eyes, ears, mouth (tongue), fingers (skin), nose) and say which part of the body is associated with each sense.</li> </ul> <p><b>Use the scientific vocabulary of:</b> Senses, ear, hearing,</p> <p>This is the only time in Primary School that this topic occurs so recap this topic’s objectives each lesson and ensure they are embedded.</p>	<p><b>Y3 Forces/Light</b></p> <ul style="list-style-type: none"> <li>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 <ul style="list-style-type: none"> <li>Recognise that they need light in order to see things, and that dark is the absence of light.</li> </ul> </li> </ul> <p><b>Use the scientific vocabulary of:</b> Light, light source, dark, absence of light Force, contact force, non-contact force, magnetic force</p>

<b>New Knowledge Concepts &amp; Vocabulary</b>	<p><b>New Knowledge Concept:</b></p> <ul style="list-style-type: none"> <li>• Identify how sounds are made, associating some of them with something vibrating (e.g. rice on drums, watching piano strings, tuning forks on water).</li> <li>• Recognise (through observation) that vibrations from sounds travel through a medium (solid, liquid, gas - but not a vacuum) to the ear.</li> <li>• Through investigation, find patterns between the pitch of a sound and features of the object that produced it (usually size).</li> <li>• Through investigation, find patterns between the volume of a sound and the strength of the vibrations that produced it.</li> <li>• Through investigation, recognise that sounds get fainter as the distance from the sound source increases.</li> </ul> <p><b>Use the scientific vocabulary of:</b> Sound, source, vibrate, vibration, pitch (high, low), volume (loud/quiet), sound insulator</p>	<p><b>New Knowledge Concept:</b></p> <ul style="list-style-type: none"> <li>• Identify common appliances that run on electricity (including those associated with the production of light).</li> <li>• Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</li> <li>• Identify (through investigation - leading to prediction) 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.</li> <li>• Recognise (through investigation) that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</li> <li>• Recognise some common conductors (e.g. paper clip, metal fork, copper wire, metal classroom objects) and insulators (cork, paper, plastic and other classroom objects), and associate metals with being good conductors.</li> </ul> <p><b>Use the scientific vocabulary of:</b> Electricity, electrical appliance/device, mains electricity, plug, electrical circuit, complete circuit, component, cell, battery, bulb, switch, buzzer, motor, electrical conductor, electrical insulator</p> <p><b>N.B.</b> Children in Year 4 do not need to use standard symbols for electrical components, as this is taught in Year 6.</p>
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Year 5		
Topic	Forces	Earth and Space
Link to School Values	Together we are safe	Together we embrace difference
Recall knowledge and vocabulary	<p><b>Y3 - Forces and Magnets</b> describe the effects of simple forces that act at a distance (magnetic forces, including those between like and unlike magnetic poles)</p> <p><b>Recall the scientific vocabulary of:</b></p>	<p><b>Y3 Light</b></p> <ul style="list-style-type: none"> <li>• Recognise that they need light in order to see things, and that dark is the absence of light.</li> </ul> <p><b>Y5 Forces</b></p> <ul style="list-style-type: none"> <li>• Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</li> </ul>

	contact force, non-contact force, magnetic force, attract, repel, poles, north pole, south pole	<b>Recall the scientific vocabulary of:</b> gravity, Earth, air resistance, water resistance, friction, Light, light source, dark, absence of light, transparent, translucent, opaque, shadow, reflect
<b>New Knowledge Concepts &amp; Vocabulary</b>	<p><b>New Knowledge Concept:</b></p> <ul style="list-style-type: none"> <li>• Explain that unsupported objects (e.g. balls, paper, feathers) fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</li> <li>• Through investigation, identify the effects of air resistance (spinners), water resistance (plasticine through columns of water) and friction (various surfaces pulled against each other) that act between moving surfaces (contact forces).</li> <li>• Recognise, through practical investigation, that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</li> </ul> <p><b>Use the scientific vocabulary of:</b> gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears</p>	<p><b>New Knowledge Concept:</b></p> <ul style="list-style-type: none"> <li>• Describe the movement of the Earth, and other planets relative to the Sun in the solar system (refer to gravity as the non-contact force that hold the planets in orbit).</li> <li>• Describe the movement of the Moon relative to the Earth (including the phases of the moon).</li> <li>• Describe the Sun, Earth and Moon as approximately spherical bodies.</li> <li>• Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky.</li> </ul> <p><b>NB:</b> pupils should be warned that it is not safe to look directly at the sun, even when wearing dark glasses.</p> <p><b>Use the scientific vocabulary of:</b> Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, solar system, rotates, star, orbit, planets, waxing, waning, gibbous, crescent, full moon, half-moon.</p>

Year 6		
Topic	Electricity	Light
<b>Link to School Values</b>	Together we are safe	Together we are safe
<b>Recall knowledge and vocabulary</b>	<p><b>Y4 - Electricity</b></p> <ul style="list-style-type: none"> <li>• Identify common appliances that run on electricity.</li> <li>• Construct a simple series electrical circuit; naming its basic parts, including cells, wires, bulbs, switches and buzzers.</li> <li>• 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.</li> </ul>	<p><b>Y3 Light</b></p> <ul style="list-style-type: none"> <li>• Recognise that shadows are formed when the light from a light source is blocked by an opaque object.</li> <li>• to find patterns in the way that the size of shadows change.</li> </ul> <p><b>Use the scientific vocabulary of:</b></p>

	<ul style="list-style-type: none"> <li>• Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</li> <li>• Recognise some common and insulators and associate metals with being good conductors.</li> </ul> <p><b>Recall the scientific vocabulary of:</b> Electricity, electrical appliance/device, mains electricity, plug, electrical circuit, complete circuit, component, cell, battery, bulb, switch, buzzer, motor, electrical conductor, electrical insulator</p>	<p>Light, light source, dark, absence of light, transparent, translucent, opaque, shadow, reflect</p>
<p><b>New Knowledge Concepts &amp; Vocabulary</b></p>	<p><b>New Knowledge Concept:</b></p> <ul style="list-style-type: none"> <li>• Through investigation, associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</li> <li>• 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.</li> <li>• Use recognised symbols when representing a simple circuit in a diagram.</li> </ul> <p><b>Use the scientific vocabulary of:</b> Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage</p>	<p><b>New Knowledge Concept:</b></p> <ul style="list-style-type: none"> <li>• Recognise, through investigation, that light appears to travel in straight lines.</li> <li>• 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.</li> <li>• Explain that we see things because light travels from light sources to our eyes or from light sources (the sun, torches, lamps, candles) to objects and then to our eyes.</li> <li>• Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</li> </ul> <p><b>Use the scientific vocabulary of:</b> Light, straight lines, light rays</p>