

St. Benedict's Primary School
Design and Technology
KNOWLEDGE AND SKILLS BUILDER

Design and Technology element from the National Curriculum – TECHNICAL KNOWLEDGE

Phase	Context for learning	Knowledge and Skills
EYFS	Reception Topic Heroes and Villains Summer 1 Big Question Context – Building houses for The Three Little Pigs Exploring and using media and materials	Skills Choosing from a range of materials for their suitability Knowledge Materials have different uses and purposes, choose the most suitable for the job
KEY STAGE 1	Year 1 Autumn 1 ILP Enchanted Woodlands Big Question – Who lives in a woodland? Context - Nests and Dens Programmes of Study Build structures, exploring how they can be made stronger, stiffer and more stable.	Skills Construct simple structures, models or other products using a range of materials. Knowledge Different materials can be used for different purposes, depending on their properties.
	Year 1 ILP Enchanted Woodlands Big Question – Who lives in a woodland? Context – Innovate task- Make a camp Programmes of Study Build structures, exploring how they can be made stronger, stiffer and more stable.	Skills Construct simple structures, models or other products using a range of materials. Knowledge Different materials can be used for different purposes, depending on their properties.
	Year 1 Autumn 2 ILP Bright Lights Big City Big Question – How is a city different to the countryside? Context - Moving Models Programmes of Study Build structures, exploring how they can be made stronger, stiffer and more stable.	Skills Construct a moving structure or model using a range of materials. Knowledge Different materials can be used for different purposes, depending on their properties.
	Year 1 Autumn 2 ILP Bright Lights Big City Big Question – How is a city different to the countryside? Context – Making Pudding Lane Programmes of Study Build structures, exploring how they can be made stronger, stiffer and more stable.	Skills Construct simple structures, models or other products using a range of materials. Knowledge Different materials can be used for different purposes, depending on their properties. For example, cardboard is a stronger building material than paper.
	Year 1 Autumn 2 ILP Bright Lights Big City Big Question – How is a city different to the countryside?	Skills Construct simple structures, models or other products using a range of materials.

<p>Context – Innovate task: Making souvenirs Programmes of Study Build structures, exploring how they can be made stronger, stiffer and more stable.</p>	<p>Knowledge Different materials can be used for different purposes, depending on their properties. For example, cardboard is a stronger building material than paper. Plastic is light and can float. Clay is heavy and will sink.</p>
<p>Year 1 Autumn 2 ILP Bright Lights Big City Big Question – How is a city different to the countryside? Context – Express task: London landmark models Programmes of Study Build structures, exploring how they can be made stronger, stiffer and more stable.</p>	<p>Skills Construct simple structures, models or other products using a range of materials. Knowledge Different materials can be used for different purposes, depending on their properties. For example, cardboard is a stronger building material than paper. Plastic is light and can float. Clay is heavy and will sink.</p>
<p>Year 1 Summer 2 ILP Dinosaur Planet Big Question– Context – Create a prehistoric landscape Programmes of Study Build structures, exploring how they can be made stronger, stiffer and more stable</p>	<p>Skills Construct simple structures, models or other products using a range of materials. Knowledge Different materials can be used for different purposes, depending on their properties. For example, cardboard is a stronger building material than paper. Plastic is light and can float. Clay is heavy and will sink.</p>
<p>Year 1 Summer 2 ILP Dinosaur Planet Big Question– Context – Junk dinosaurs Programmes of Study Build structures, exploring how they can be made stronger, stiffer and more stable</p>	<p>Skills Construct simple structures, models or other products using a range of materials. Knowledge Different materials can be used for different purposes, depending on their properties. For example, cardboard is a stronger building material than paper. Plastic is light and can float. Clay is heavy and will sink.</p>
<p>Year 1 Summer 2 ILP Dinosaur Planet Big Question– Context – Create a gift for the dinosaur museum Programmes of Study Build structures, exploring how they can be made stronger, stiffer and more stable</p>	<p>Skills Construct simple structures, models or other products using a range of materials. Knowledge Different materials can be used for different purposes, depending on their properties. For example, cardboard is a stronger building material than paper. Plastic is light and can float. Clay is heavy and will sink.</p>
<p>Year 2 Autumn 2 Land Ahoy ILP Big Question– How is an explorer different to a pirate? Context – Making boats using moving parts or a mechanism Programmes of Study Explore and use mechanisms [for example, levers, sliders, wheels and axles] in their products.</p>	<p>Skills Use a range of mechanisms (levers, sliders, wheels and axles) in models or products. Knowledge A mechanism is a device that takes one type of motion or force and produces a different one. A mechanism makes a job easier to do. Mechanisms include sliders, levers, linkages, gears, pulleys and cams.</p>
<p>Year 2 Spring 2 ILP Towers, Tunnels and Turrets Big Question– What was life like inside a castle?</p>	<p>Skills Explore how a structure can be made stronger, stiffer and more stable.</p>

	<p>Context – Create tunnels Programmes of Study Build structures, exploring how they can be made stronger, stiffer and more stable</p>	<p>Knowledge Structures can be made stronger, stiffer and more stable by using cardboard rather than paper and triangular shapes rather than squares. A broader base will also make a structure more stable.</p>
	<p>Year 2 Spring 2 ILP Towers, Tunnels and Turrets Big Question– What was life like inside a castle? Context – Construct marshmallow and spaghetti bridges Programmes of Study Build structures, exploring how they can be made stronger, stiffer and more stable</p>	<p>Skills Explore how a structure can be made stronger, stiffer and more stable. Knowledge Structures can be made stronger, stiffer and more stable by using cardboard rather than paper and triangular shapes rather than squares. A broader base will also make a structure more stable.</p>
	<p>Year 2 Spring 2 ILP Towers, Tunnels and Turrets Big Question– What was life like inside a castle? Context – Build a new tower for Rapunzel Programmes of Study Build structures, exploring how they can be made stronger, stiffer and more stable</p>	<p>Skills Explore how a structure can be made stronger, stiffer and more stable. Knowledge Structures can be made stronger, stiffer and more stable by using cardboard rather than paper and triangular shapes rather than squares. A broader base will also make a structure more stable.</p>
LOWER KEY STAGE 2	<p>Year 3 Spring 1 ILP Tremors Big Question – What causes tremors on earth? Context – Build the best earthquake-proof tower or shelter Programmes of Study Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.</p>	<p>Skills Create shell or frame structures using diagonal struts to strengthen them. Knowledge Shell structures are hollow, 3-D structures with a thin outer covering, such as a box. Frame structures are made from thin, rigid components, such as a tent frame. The rigid frame gives the structure shape and support. Diagonal struts can strengthen the structure. Knowledge</p>
	<p>Year 3 Spring 1 ILP Tremors Big Question – What causes tremors on earth? Context – Emergency plan for a volcano eruption- Build a study shelter Programmes of Study Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.</p>	<p>Skills Create shell or frame structures using diagonal struts to strengthen them. Knowledge Shell structures are hollow, 3-D structures with a thin outer covering, such as a box. Frame structures are made from thin, rigid components, such as a tent frame. The rigid frame gives the structure shape and support. Diagonal struts can strengthen the structure. Knowledge</p>
	<p>Year 3 Spring 2 ILP Mighty Metals Big Question – How do different forces effect metals? Context – Investigate how using a lever can help to lift heavy objects. Programmes of Study Understand and use mechanical systems in their products (for example, gears, pulleys, cams, levers and linkages).</p>	<p>Skills Explore and use a range of mechanisms (levers, sliders, axles, wheels and cams) in models or products. Knowledge Levers consist of a rigid bar that rotates around a fixed point, called a fulcrum. They reduce the amount of work needed to lift a heavy object. Sliders move from side to side or up and down, and are often used to make moving parts in books. Axles are shafts on which wheels can rotate to make a moving vehicle. Cams are devices that can convert circular motion into up-and-down motion.</p>

<p>Year 3 Spring 2 ILP Mighty Metals Big Question – How do different forces effect metals? Context – Innovate task: Constructing a friend for the Iron Man. Use circuits to create a feature such as eyes that glow in the dark. Programmes of Study Understand and use electrical systems in their products (for example, series circuits incorporating switches, bulbs, buzzers and motors)</p>	<p>Skills Incorporate a simple series circuit into a model. Knowledge An electric circuit can be used in a model, such as a lighthouse. It can be controlled using a switch.</p>
<p>Year 3 Spring 2 ILP Mighty Metals Big Question – How do different forces effect metals? Context – Innovate task: Constructing a friend for the Iron Man. Add a switch to turn the eyes on and off. Programmes of Study Understand and use electrical systems in their products (for example, series circuits incorporating switches, bulbs, buzzers and motors)</p>	<p>Skills Incorporate a simple series circuit into a model. Knowledge An electric circuit can be used in a model, such as a lighthouse. It can be controlled using a switch.</p>
<p>Year 3 standalone lesson Big Question - Context – Electrical systems. Create a nightlight using a simple circuit. Programmes of Study Apply their understanding of computing to program, monitor and control their products.</p>	<p>Skill Write a program to make something move on a tablet or computer screen. Knowledge A program is a set of instructions written to perform a specified task on a computer.</p>
<p>Year 4 Spring 1 ILP Traders and Raiders Big Question – Where did the Anglo Saxons settle and why? Context – Make models of Anglo-Saxon homes Programmes of Study Apply their understanding of how to strengthen, stiffen and reinforce more complex structures</p>	<p>Skills Prototype shell and frame structures, showing awareness of how to strengthen, stiffen and reinforce them. Knowledge A prototype is a mock-up of a design that will look like the finished product but may not be full size or made of the same materials. Shell and frame structures can be strengthened by gluing several layers of card together, using triangular shapes rather than squares, adding diagonal support struts and using 'Jinks' corners (small, thin pieces of card cut into a right-angled triangle and glued over each joint to straighten and strengthen them).</p>
<p>Year 4 Summer 2 ILP Blue Abyss Big Question - Context – Make a model submarine Programmes of Study Understand and use electrical systems in their products (for example, series circuits incorporating switches, bulbs, buzzers and motors).</p>	<p>Skills Incorporate circuits that use a variety of components into models or products. Knowledge Components can be added to circuits to achieve a particular goal. These include bulbs for lighthouses and torches, buzzers for burglar alarms and electronic games, motors for fairground rides and motorised vehicles and switches for lights and televisions.</p>
<p>Year 4 standalone lesson Big Question - Context – Making an electrical circuit using lights, buzzers and switches.</p>	<p>Skill Write a program to control a physical device, such as a light, speaker or buzzer.</p>

	<p>Programmes of Study</p> <p>Apply their understanding of computing to program, monitor and control their products.</p>	<p>Knowledge Remote control is controlling a machine or activity from a distance. Computers can be used to remotely control a device, such as a light, speaker or buzzer.</p>
UPPER KEY STAGE 2	<p>Year 5 Spring 1 ILP Alchemy Island</p> <p>Big Question –</p> <p>Context – Circuit building: create a simple copper ribbon circuit</p> <p>Programmes of Study</p> <p>Understand and use electrical systems in their products (for example, series circuits incorporating switches, bulbs, buzzers and motors).</p>	<p>Skills Use electrical circuits of increasing complexity in their models or products, showing an understanding of control.</p> <p>Knowledge Electrical circuits can be controlled by a simple on/off switch, or by a variable resistor that can adjust the size of the current in the circuit. Real-life examples are a dimmer switch for lights or volume control on a stereo.</p>
	<p>Year 5 standalone lesson</p> <p>Big Question -</p> <p>Context – Design and make a moving toy using cams</p> <p>Programmes of Study</p> <p>Understand and use mechanical systems in their products (for example, gears, pulleys, cams, levers and linkages).</p>	<p>Skill Use mechanical systems in their products, such as pneumatics and hydraulics.</p> <p>Knowledge Pneumatic systems use energy that is stored in compressed air to do work, such as inflating a balloon to open a model monster's mouth. These effects can be achieved using syringes and plastic tubing. Hydraulic mechanisms work in a similar way, but instead of air, the system is filled with a liquid, usually water. It is important that the system is air or watertight.</p>
	<p>Year 5 standalone lesson</p> <p>Big Question -</p> <p>Context – Add circuit and switches to their board game.</p> <p>Programmes of Study</p> <p>Apply their understanding of computing to program, monitor and control their products.</p>	<p>Skill Link a physical device to a computer or tablet so that it can be controlled (such as changing motor speed or turning an LED on and off) by a program.</p> <p>Knowledge Equipment and devices can be controlled by pressing buttons on a control panel, such as on a washing machine or microwave.</p>
	<p>Year 5 standalone lesson</p> <p>Big Question -</p> <p>Context – To build pyramid using various methods to support framework</p> <p>Programmes of Study</p> <p>Apply their understanding of how to strengthen, stiffen and reinforce more complex structures</p>	<p>Skill Build a framework using a range of materials to support mechanisms.</p> <p>Knowledge Various methods can be used to support a framework. These include cross braces, guy ropes and diagonal struts. Frameworks can be built using lolly sticks, skewers and bamboo canes.</p>
	<p>Year 6 Autumn 1 ILP A Child's War</p> <p>Big Question –</p> <p>Context – Construct a structurally sound miniature Anderson shelter.</p> <p>Programmes of Study</p> <p>Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.</p>	<p>Skills Select the most appropriate materials and frameworks for different structures, explaining what makes them strong.</p> <p>Knowledge Strength can be added to a framework by using multiple layers. For example, corrugated cardboard can be placed with corrugations running alternately vertically and horizontally. Triangular shapes can be used instead of square shapes because they are more rigid. Frameworks can be further strengthened by adding an outer cover.</p>

	<p>Year 6 Spring 1 ILP Frozen Kingdom Big Question – Context – Express task: Make a large scale igloo Programmes of Study Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.</p>	<p>Skills Select the most appropriate materials and frameworks for different structures, explaining what makes them strong. Knowledge Strength can be added to a framework by using multiple layers. For example, corrugated cardboard can be placed with corrugations running alternately vertically and horizontally. Triangular shapes can be used instead of square shapes because they are more rigid. Frameworks can be further strengthened by adding an outer cover.</p>
	<p>Year 6 Summer 1 ILP Hola Mexico Big Question - Context – Innovate task: Build a small-scale model of a temple or stela. Programmes of Study Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.</p>	<p>Skills Select the most appropriate materials and frameworks for different structures, explaining what makes them strong. Knowledge Strength can be added to a framework by using multiple layers. For example, corrugated cardboard can be placed with corrugations running alternately vertically and horizontally. Triangular shapes can be used instead of square shapes because they are more rigid. Frameworks can be further strengthened by adding an outer cover.</p>
	<p>Year 6 Summer 2 ILP Gallery Rebels Big Question - Context – Express task: Create a Damien Hirst style spin painting Programmes of Study Understand and use mechanical systems in their products (for example, gears, pulleys, cams, levers and linkages).</p>	<p>Skills Explain and use mechanical systems in their products to meet a design brief. Knowledge Mechanical systems can include sliders, levers, linkages, gears, pulleys and cams. Other mechanisms include pneumatics and hydraulics.</p>
	<p>Year 6 Standalone lesson Big Question - Context – Electricity Programmes of Study Understand and use electrical systems in their products (for example, series circuits incorporating switches, bulbs, buzzers and motors). Apply their understanding of computing to program, monitor and control their products</p>	<p>Skill Understand and use electrical circuits that incorporate a variety of components (switches, lamps, buzzers and motors) and use programming to control their products. Knowledge Computer programs can control electrical circuits that include a variety of components, such as switches, lamps, buzzers and motors.</p>