*DT curriculum progression of knowledge and skills*

**Our beliefs:**

Design and Technology (D&T) is a vital part of our curriculum as it helps to prepare children to deal with tomorrow's rapidly changing world. At Studley Green, children receive a D&T curriculum which allows them to exercise their creativity through exploring, designing, making and evaluating. Our aim is to develop children's knowledge, practical skills and creativity to be able to apply these ideas in everyday life and become problem solvers. Therefore, we are dedicated to delivering exciting and inspiring lessons that children will enjoy and remember.

**Our DT curriculum:**

Design and Technology at Studley Green follows a clear structure similar to other foundation subjects which include opportunities for prior learning links, vocabulary teaching and everybody reading. We subscribe to Kapow primary, using their resources and lesson plans to develop our scheme of work. Our DT curriculum is split into the technical knowledge of: Cooking and Nutrition, textiles, mechanisms and structures. In KS1 children cover all these 4 areas of DT in both years. In KS2 these 4 areas of technical knowledge plus electrical systems and digital world are taught at least once across the key stages. Each Design and technology project clearly follows the design process where children get to research, design, make and evaluate. A range of skills are taught ensuring that children are aware of health and safety issues related to the tasks undertaken. When planning, clear and appropriate cross curricular links are made and projects sometimes relate to class topics to ensure a memorable learning experience. Children are asked to work independently and collaboratively in Design and Technology lessons to develop leadership, team working and problem solving skills.

**EYFS:**

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| Reception | Physical Development | | ● Progress towards a more fluent style of moving, with developing control and grace.<br>● Develop their small motor skills so that they can use a range of tools, competently, safely and confidently.<br>● Use their core muscle strength to achieve a good posture when sitting at a table or sitting on the floor. |
| | Expressive Arts and Design | | ● Explore, use and refine a variety of artistic effects to express their ideas and feelings.<br>● Return to and build on previous learning, refining ideas and developing their ability to represent them.<br>● Create collaboratively, sharing ideas, resources and skills. |
| ELG | Physical development | Fine motor skills | ● Use a range of small tools, including scissors, paintbrushes and cutlery. |
| | Expressive Arts and Design | Creating with materials | ● Safely use and explore a variety of materials, tools, techniques, experimenting with colour, design, texture, form and function.<br>● Share their creations, explaining the process they have used. |

**National Curriculum Objectives**

**KS1**

- design purposeful, functional, appealing products for themselves and others users based on design criteria
- generate, develop, model and communicate their ideas through talking, drawing, templates, mock ups and, where appropriate, information and communication technology
- select from and use a range of tools and equipment to perform practical tasks
- select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics
- explore and evaluate a range of existing products
- evaluate their ideas and products against design criteria
- build structures, exploring how they can be made stronger, stiffer and more stronger
- explore and use mechanisms, (for example leavers, sliders, wheels and axles ) in their products

**KS2**

- When designing and making, pupils should be taught :
- use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups , generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design
- select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately
- select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities
- investigate and analyse a range of existing products
- evaluate their ideas and products against their own design criteria and consider the views of others to improve their work
- understand how key events and individuals in design and technology have helped shape the world
- apply their understanding of how to strengthen, stiffen and reinforce more complex structures
- understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]
- 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

**DT Progression - overview**

| | Cooking and Nutrition | Mechanisms | Structures | Textiles | Electrical Systems | Digital Worlds |
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| **Y1** | Fruits and Vegetables - smoothie<br><br>Term 4 - Plants | Wheels and Axles - toy vehicles<br><br>Term 1 - Toys | Windmills<br><br>Term 6- Africa | Puppets<br><br>Term 2 | | |
| **Y2** | A balanced Diet - Wraps<br><br>Term 1 - My Body | Ferris Wheels (London eye)<br><br>Term 6 - Paddington | Baby bears chairs<br><br>Term 6 - Paddington (one day) | Pouches<br><br>Term 4 - Footprints | | |
| **Y3** | Eating seasonally - Puff Pastry Tarts.<br><br>Term 5 - Egypt | Pneumatics toys<br><br>Term 1 - Leon and the place in Between. | Castles - The ice castle<br><br>Term 3 - Frozen Lands | | Electrical posters -Romans<br><br>Term 6b - Romans | |
| **Y4** | Adapting a recipe, French Biscuits<br><br>Term 2 - Welcome to France | Slingshot Cars<br><br>T6 -Water, water, everywhere | | Fastenings - book sleeve<br><br>Term 1 - Trowbridge | | Mindful moments timer - microbit<br><br>Term 4 - Invention and Innovation |
| **Y5** | What could be healthier?<br><br>Term 5 - Greek Moussaka | Automata Toys - Space toys<br><br>Term 3 - Space | Bridges<br><br>Term 6- Rivers | Stuffed toys - make do and mend<br><br>Term 2 - WW2 | | |
| **Y6** | Come dine with me<br><br>Term 3 - S.American- 3 course meal | | | | Steady hand games<br><br>Term 5 - Tomorrow's world | Dyson and 3D printing Engineering<br>Term 6 - That's entertainment |

| **Explore, plan, make, evaluate** | | | | |
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| | **Explore** | **Planning** | **Make** | **Evaluate** |
| **1** | • Think of some ideas of their own | • Explain and plan what they want to do<br>• Use choose the best tools and materials - scissors, glue stick, masking tape, sellotape, split pins<br>• Describe their design by using words, pictures,<br>• Understand why it's important to have clear design criteria<br>• Include individual preferences and requirements in design<br>• Create clearly labelled drawings<br>• Use a template to create a product | • Explain what they are making<br>• Making stable structures from card, tape and glue.<br>• Learning how to turn 2D nets into 3D structures.<br>• Follow instructions to cut and assemble.<br>• Join materials together in different ways<br>• Sequence steps for construction | • Describe how something works or looks<br>• Explain what went well with their work<br>• Tasting different food combinations<br>• Reflecting on a finished product saying what they like and dislike |
| **2** | • Think of some ideas of their own<br>• Learning about different types of structures found in the natural world and everyday objects | • Explain and plan what they want to do<br>• Use choose the best tools and materials explain why these are best<br>• Describe their design by using words, pictures, diagrams, models and words<br>• Make simple plans and develop their own ideas. | • Explain what they are making<br>• Select appropriate tools and explain why they are using<br>• Join materials together in different ways (paper card and tape)<br>• Follow a design brief/criteria<br>• Build strong and stiff structures by folding paper<br>• Selecting and cutting fabrics for sewing | • Explain what went well with their work<br>• If they did it again, can they explain what they would improve<br>• Troubleshooting scenarios posed by teacher<br>• Evaluate quality of stitching on others work<br>• Identify aspects of their peers work that they particularly like and why |

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| **3** | • Begin to research others' needs<br>• Begin to evaluate existing products, considering: how well they have been made, materials, whether they work, how they have been made, fit for purpose begin to understand by whom, when and where products were designed<br>• Carry out research on a given topic to develop a range of initial ideas | • Describe purpose of product<br>• Design a product that fits the requirements of a given brief<br>• Have at least one idea about how to create product<br>• Create a plan which shows order, equipment and tools<br>• describe design using an accurately labelled sketch and words<br>• Generating ideas using thumbnail sketches and exploded diagrams learning that different types of drawings are used in design to explain ideas clearly<br>• Make design decisions<br>• Design appealing products with a specific user in mind | • Explain how product will work<br>• Select suitable tools/equipment due to the<br>• Select appropriate materials fit for purpose due to their functional and aesthetic characteristics<br>• Constructing a range of 3D shapes using nets<br>• Manipulating materials to create different effects by cutting, creasing, folding and weaving<br>• Measure and mark out materials using a template or ruler<br>• Learn ways to give a product a higher quality finish | • Use design criteria to evaluate finished product including testing product<br>• Revisiting the requirements of the client to review developing design ideas and check that they fulfil their needs<br>• Evaluate own work and those of others in relation to the aesthetic of the finished product and in comparison to the original design<br>• Suggesting points of modification of individual designs<br>• Use the views of others to improve designs<br>• Learning to give and accept constructive criticism on own work and the work of others |
| **4** | • Use research for design ideas<br>• Taste test existing products considering: how well they've been made, materials, whether they work, how they have been made, fit for purpose<br>• Articulating advantages and disadvantages of different fastening types | • Show design meets a range of requirements and is fit for purpose<br>• Design a product (biscuit) within a given budget<br>• Drawing a net to create a structure<br>• Writing design criteria for a product articulating designs made | • Make and explain design decisions considering availability of resources<br>• Make and test a paper template with accuracy<br>• Select suitable tools and equipment, explain choices in relation to required techniques and use accurately<br>• Select appropriate materials, fit for purpose; explain choices<br>• Measure, mark, cut and assemble with increasing accuracy | • Use criteria to evaluate product<br>• Begin to explain how I could improve original design<br>• Evaluate the speed of a final product based on the effect of shape on speed and the accuracy of workmanship on performance<br>• Deciding how many of the criteria should be met for the product to be considered successful |

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| 5 | • Use internet and questionnaires for research and design ideas<br>• Take a user's view into account when designing<br>• Begin to consider needs/wants of individuals/groups when designing and ensure product is fit for purpose<br>• Evaluate and discuss existing products, considering: how well they've been made, materials, whether they work, how they have been made, fit for purpose<br>• Experimenting with a range of CAMS<br>• Understand how linkages change the direction of the force | • Produce a logical, realistic plan and explain it to others<br>• Make design decisions considering time and resources.<br>• Clearly explain how parts of the product will work.<br>• Model and refine design ideas by making prototypes and using pattern pieces.<br>• Use exploded diagrams<br>• Design a stable structure that is able to support weight<br>• Understand and draw cross-sectional diagrams | • Explain why selecting appropriate materials and tools is an important part of the design process<br>• Mainly accurately assemble, join and combine materials/components<br>• Apply a range of finishing techniques<br>• Begin to be resourceful with practical problems<br>• Create a frame structure with focus on triangulating<br>• Independently measuring and marking wood accurately<br>• Using correct techniques to saw safely<br>• Identify where a structure needs support and use card corners for support | • Evaluate ideas and finished product against specification, considering purpose and appearance.<br>• Test and evaluate final product<br>• Begin to evaluate how much products cost to make and how innovative they are<br>• Suggest points for improvement for own and others designs<br>• Apply points of improvement |

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| 6 | • Draw on market research to inform design<br>• Use research of user's individual needs, wants, requirements for design<br>• Do thorough evaluations of existing products considering: how well they've been made, materials, whether they work, how they've been made, fit for purpose<br>• Research and discuss how sustainable materials are<br>• Discuss some key inventors/designers/ engineers/ chefs/manufacturers of ground-breaking products<br>• Do thorough evaluations of existing products considering: how well they've been made, materials, whether they work, how they've been made, fit for purpose | • Drawing a design from 3 different perspectives<br>• Generating ideas through sketches and discussion<br>• Modelling ideas through prototypes<br>• Understand what is meant by 'form over function' and 'fit for purpose'<br>• Identify features of design that will appeal to the intended user<br>• Create own design criteria and specification<br>• Use annotated sketches, cross-sectional planning<br>• Make design decisions, considering, resources and cost<br>• Clearly explain how parts of design will work, and how they are fit for purpose* independently model and refine design ideas by making prototypes and using pattern pieces<br>• Placing and manoeuvring 3D objects using computer-aided design<br>• Changing the properties of or combine one or more 3D objects using computer-aided design | • Use selected tools and equipment precisely<br>• Produce suitable lists of tools, equipment, materials needed, considering constraints<br>• Select appropriate materials, fit for purpose; explain choices, considering functionality and aesthetics<br>• Explain how product will appeal to audience; make changes to improve quality<br>• Accurately measure, mark out, cut and shape materials/components<br>• Accurately assemble, join and combine materials/components<br>• Accurately apply a range of finishing techniques | • Evaluate quality of design while designing and making; is it fit for purpose?<br>• Keep checking design is the best it can be.<br>• Evaluate ideas and finished product against specification, stating if it's fit for purpose<br>• Test and evaluate final product; explain what would improve it and the effect different resources may have had<br>• Taste test and score final product |

| Technical Knowledge | | | | | | |
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| Year group | Cooking & nutrition | Mechanisms | Structures | Textiles | Electrical systems | Digital world |
| 1 | •Chopping fruits and vegetables safely using a plastic knife.<br>• Understanding the difference between fruits and vegetables<br>• To understand that some foods typically known as vegetables are actually fruits (e.g. cucumber)<br>• To know that a blender is a machine which mixes ingredients together into a smooth liquid<br>• To know that a fruit has seeds and a vegetable does not<br>• To know that fruits grow on trees or vines<br>• To know that vegetables can grow either above or below ground<br>• To know that vegetables can come from different parts of the plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber) | • To know that wheels need to be round to rotate and move<br>• To understand that for a wheel to move it must be attached to a rotating axle<br>• To know that an axle moves within an axle holder which is fixed to the vehicle or toy<br>• To know that the frame of a vehicle (chassis) needs to be balanced | • To understand that the shape of materials can be changed to improve the strength and stiffness of structures<br>• To understand that cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses)<br>• To understand that axles are used in structures and mechanisms to make parts turn in a circle<br>• To begin to understand that different structures are used for different purposes<br>• To know that a structure is something that has been made and put together | •Cutting fabric neatly with scissors<br>• To know that 'joining technique' means connecting two pieces of material together<br>• To know that there are various temporary methods of joining fabric by using staples. glue or pins<br>• To understand that different techniques for joining materials can be used for different purposes<br>• To understand that a template (or fabric pattern) is used to cut out the same shape multiple times<br>• To know that drawing a design idea is useful to see how an idea will look | | |

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| 2 | •Slicing food using the bridge and claw grip using a plastic knife<br>• To understand what makes a balanced diet<br>• To know where to find the nutritional information on packaging<br>• To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar<br>• To understand that I should eat a range of different foods from each food group, and roughly how much of each food group<br>• To know that nutrients are substances in food that all living things need to make energy, grow and develop<br>• To know that 'ingredients' means the items in a mixture or recipe<br>• To know that I should only have a maximum of five teaspoons of sugar a day to stay healthy<br>• To know that many food and drinks we do not expect to contain sugar do; we call these 'hidden sugars' | • To know that different materials have different properties and are therefore suitable for different uses<br>• To know that it is important to test my design as I go along so that I can solve any problems that may occur | • To know that shapes and structures with wide, flat bases or legs are the most stable<br>• To understand that the shape of a structure affects its strength<br>• To know that materials can be manipulated to improve strength and stiffness<br>• To know that a structure is something which has been formed or made from parts<br>• To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move<br>• To know that a 'strong' structure is one which does not break easily<br>• To know that a 'stiff' structure or material is one which does not bend easily | •Thread a needle<br>•Sew a running stitch with neat evenly spaced stitches to join fabric<br>• Neatly pinning and cutting a fabric using a template<br>• To know that sewing is a method of joining fabric<br>• To know that different stitches can be used when sewing<br>• To understand the importance of tying a knot after sewing the final stitch | | |

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| 3 | •Create a healthy and nutritious savoury tart using seasonal ingredients<br>•Describe the benefits of seasonal fruits and vegetables and the impact on the environment<br>•Know how to prepare themselves and their work space to cook safely learning the basic rules to avoid food contamination<br>•Following the instructions within a recipe<br>•To know that not all fruits and vegetables can be grown in the UK<br>•To know that climate affects food growth<br>•To know that vegetables and fruit grow in certain seasons<br>•To know that cooking instructions are known as a 'recipe'<br>• To know that imported food is food which has been brought into the country<br>•To know that exported food is food which has been sent to | • To understand how pneumatic systems work<br>• To understand that pneumatic systems can be used as part of a mechanism<br>• To know that pneumatic systems operate by drawing in, releasing and compressing air | • To understand that wide and flat based objects are more stable<br>• To understand the importance of strength and stiffness in structures<br>• To know that a paper net is a flat 2D shape that can become a 3D shape once assembled | | • To understand that an electrical system is a group of parts (components) that work together to transport electricity around a circuit<br>• To understand common features of an electric product (switch, battery or plug, dials, buttons etc.)<br>• To list examples of common electric products (kettle, remote control etc.)<br>• To understand that an electric product uses an electrical system to work (function)<br>• To know the name and appearance of a bulb, battery, battery holder and crocodile wire to build simple circuits<br>• To understand that electrical conductors are materials which electricity can pass through<br>• To understand that electrical insulators are materials which electricity cannot pass through<br>• To know that a | |

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| | another country.<br>• To understand that imported foods travel from far away and this can negatively impact the environment<br>• To know that each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre<br>•To understand that vitamins, minerals and fibre are important for energy, growth and maintaining health<br>•To know safety rules for using, storing and cleaning a knife safely | | | | battery contains stored electricity that can be used to power products<br>• To know that an electrical circuit must be complete for electricity to flow<br>• To know that a switch can be used to complete and break an electrical circuit<br>• To understand the importance and purpose of information design | |

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| 4 | • Follow a biscuit recipe<br>• Cook safely following basic hygiene rules<br>•Adapt a recipe<br>• To know that the amount of an ingredient in a recipe is known as the 'quantity'<br>• To know that it is important to use oven gloves when removing hot food from an oven<br>• To know the following cooking techniques: sieving, creaming, rubbing method, cooling<br>•To understand the importance of budgeting while planning ingredients for biscuits | • To understand that all moving things have kinetic energy<br>• To understand that kinetic energy is the energy that something (object/person) has by being in motion<br>• To know that air resistance is the level of drag on an object as it is forced through the air<br>• To understand that the shape of a moving object will affect how it moves due to air resistance. | | •Selecting stitches to join fabric (Running stitch, cross-stitch )<br>• Working neatly to join fabric<br>• Incorporate a fastening to a design<br>• To know that a fastening is something which holds two pieces of material together for example a zipper, toggle, button, press stud and velcro<br>• To know that different fastening types are useful for different purposes<br>• To know that creating a mock up (prototype) of their design is useful for checking ideas and proportions | | • To understand what variables are in programming<br>• To know some of the features of a Micro:bit<br>• To know that an algorithm is a set of instructions to be followed by the computer<br>• To know that it is important to check my code for errors (bugs)<br>• To know that a simulator can be used as a way of checking your code works before installing it onto an electronic device |

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| 5 | •Write an amended method for a recipe to incorporate the relevant changes to ingredients<br>•Design an appealing package to reflect a recipe<br>• Cutting and preparing vegetables safely - using sharp chef knives, hot pans and hobs<br>• To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues<br>• To know that I can adapt a recipe to make it healthier by substituting ingredients<br>• To know that I can use a nutritional calculator to see how healthy a food option is<br>• To understand that 'cross-contamination' means that bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects | • To understand that the mechanism in an automata uses a system of cams, axles and followers<br>• To understand that different shaped cams produce different outputs<br>• To understand how to use a bench hook and saw safely | • To understand some different ways to reinforce structures<br>• To understand how triangles can be used to reinforce bridges<br>• To know that properties are words that describe the form and function of materials<br>• To understand why material selection is important based on their properties<br>• To understand the material (functional and aesthetic) properties of wood<br>• To understand how to carry and use a saw safely | •Creating strong and secure blanket stitch when joining fabrics.<br>•Threading needles independently<br>• Using applique to attach pieces of fabric decoration<br>•To know that blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric<br>• To understand that it is easier to finish simpler designs to a high standard<br>• To know that soft toys are often made by creating appendages separately and then attaching them to the main body<br>• To know that small, neat stitches which are pulled taut are important to ensure that the soft toy is strong and holds the stuffing securely | | |

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| 6 | •Write a recipe explaining the key steps, method and ingredients<br>•Working to a given timescale<br>•Working safely and hygienically with safety and independence<br>• To know that 'flavour' is how a food or drink tastes<br>• To know that many countries have 'national dishes' which are recipes associated with that country<br>• To know that 'processed food' means food that has been put through multiple changes in a factory<br>• To understand that it is important to wash fruit and vegetables before eating to remove any dirt and insecticides<br>• To understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork) | | | | • To know that batteries contain acid, which can be dangerous if they leak<br>• To know the names of the components in a basic series circuit including a buzzer<br>•To know that 'form' means the shape and appearance of an object<br>•To know the difference between 'form' and 'function' | 3D printing:<br>To understand<br><br>Dyson Disassembly: |