DT National Curriculum

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| **EYFS** | **Key Stage 1** | **Key Stage 2** |
| ¾ year olds | Reception | Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts, such as the home and school, gardens and playgrounds, the local community, industry and the wider environment. When designing and making, pupils should be taught to:**Design**• design purposeful, functional, appealing products for themselves and other 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. **Make**• select from and use a range of tools and equipment to perform practical tasks such as cutting, shaping, joining and finishing. • select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics. **Evaluate**• explore and evaluate a range of existing products.• evaluate their ideas and products against design criteria. **Technical knowledge**• build structures, exploring how they can be made stronger, stiffer and more stable.• explore and use mechanisms, such as levers, sliders, wheels and axles, in their products. **Cooking and nutrition**• use the basic principles of a healthy and varied diet to prepare dishes.• understand where food comes from.  | Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment. When designing and making, pupils should be taught to: **Design**• 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. **Make**• select from and use a wider range of tools and equipment to perform practical tasks, such as 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. **Evaluate**• 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**Technical knowledge**• apply their understanding of how to strengthen, stiffen and reinforce more complex structures.• understand and use mechanical systems in their products, such as gears, pulleys, cams, levers and linkages. • understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs, buzzers and motors.• apply their understanding of computing to programme, monitor and control their products. **Cooking and nutrition**• understand and apply the principles of a healthy and varied diet.• prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques.• understand seasonality and know where and how a variety of ingredients are grown, reared, caught and processed. |
| Choose the right resources to carry out their own plan.  Use one-handed tools and equipment, for example, making snips in paper with scissors. Explore how things work. | Develop their small motor skills so that they can use a range of tools competently, safely and confidently.Return to and build on their previous learning, refining ideas and developing their ability to represent them. Create collaboratively, sharing ideas, resources and skills |

Skills progression

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|  | **Nursery** | **Reception** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** |  **Year 6** |
| **Design****Developing, Planning and Communicating Ideas**Ideas Safety | Have their own ideas | Have their own ideas.Use pictures and words to plan | \* have own ideas \* explain what I want to do \*explain what my product is for, and how it will work \* use pictures and words to plan, begin to use models \* design a product for myself following design criteria \*research similar existing products | \* have own ideas and plan what to do next \* explain what I want to do and describe how I may do it \* explain purpose of product, how it will work and how it will be suitable for the user \* describe design using pictures, words, models, diagrams, begin to use ICT \* design products for myself and others following design criteria \* choose best tools and materials, and explain choices \* use knowledge of existing products to produce ideas | \*begin to research others’ needs \* show design meets a range of requirements \* describe purpose of product\* follow a given design criteria \* have at least one idea about how to create product \* create a plan which shows order, equipment and tools \*describe design using an accurately labelled sketch and words \* make design decisions \*explain how product will work \* make a prototype \* begin to use computers to show design  | \* use research for design ideas \* show design meets a range of requirements and is fit for purpose\*begin to create own design criteria \*have at least one idea about how to create product and suggest improvements for design. \* produce a plan and explain it to others \*say how realistic plan is. \*include an annotated sketch \*make and explain design decisions considering availability of resources \*explain how product will work\* make a prototype \*begin to use computers to show design. | \*use internet and questionnaires for research and design ideas\*take a user’s view into account when designing \* begin to consider needs/wants of individuals/groups when designing and ensure product is fit for purpose \*create own design criteria \* have a range of ideas \*produce a logical, realistic plan and explain it to others. \*use cross-sectional planning and annotated sketches \* make design decisions considering time and resources. \*clearly explain how parts of product will work. \*model and refine design ideas by making prototypes and using pattern pieces. \*use computer-aided designs  | \* draw on market research to inform design \* use research of user’s individual needs, wants, requirements for design \* identify features of design that will appeal to the intended user \* create own design criteria and specification \* come up with innovative design ideas \*follow and refine a logical plan. \*use annotated sketches, cross-sectional planning and exploded diagrams \* make design decisions, considering, resources and cost \* 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 \* use computer-aided designs  |
| **Make** | Make.Select toolsChoose suitable materials. | Make.Select toolsWork in a safe manner.Choose suitable materials.Consider what I need to do next. | \*explain what I’m making and why\*consider what I need to do next \*select tools/equipment to cut, shape, join, finish and explain choices \*measure, mark out, cut and shape, with support \*choose suitable materials and explain choices \*try to use finishing techniques to make product look good \*work in a safe and hygienic manner  | \*explain what I am making and why it fits the purpose \*make suggestions as to what I need to do next. \*join materials/components together in different ways \*measure, mark out, cut and shape materials and components, with support. \*describe which tools I’m using and why \*choose suitable materials and explain choices depending on characteristics. \*use finishing techniques to make product look good \*work safely and hygienically | \*select suitable tools/equipment, explain choices; begin to use them accurately \* select appropriate materials, fit for purpose. \* work through plan in order \*consider how good product will be \* begin to measure, mark out, cut and shape materials/components with some accuracy \* begin to assemble, join and combine materials and components with some accuracy \* begin to apply a range of finishing techniques with some accuracy   |  \* select suitable tools and equipment, explain choices in relation to required techniques and use accurately \*select appropriate materials, fit for purpose; explain choices \* work through plan in order. \* realise if product is going to be good quality \* measure, mark out, cut and shape materials/components with some accuracy \*assemble, join and combine materials and components with some accuracy \*apply a range of finishing techniques with some accuracy | \* use selected tools/equipment with good level of precision \* produce suitable lists of tools, equipment/materials needed \*select appropriate materials, fit for purpose; explain choices, considering functionality \* create and follow detailed step by-step plan \* explain how product will appeal to an audience \* mainly accurately measure, mark out, cut and shape materials/components \*mainly accurately assemble, join and combine materials/components \* mainly accurately apply a range of finishing techniques \* use techniques that involve a small number of steps \* begin to be resourceful with practical problems   | \* use selected tools/equipment with good level of precision \* produce suitable lists of tools, equipment/materials needed \*select appropriate materials, fit for purpose; explain choices, considering functionality \* create and follow detailed step by-step plan \* explain how product will appeal to an audience \* mainly accurately measure, mark out, cut and shape materials/components \*mainly accurately assemble, join and combine materials/components \* mainly accurately apply a range of finishing techniques \* use techniques that involve a small number of steps \* begin to be resourceful with practical problems \* use selected tools and equipment precisely \*produce suitable lists of tools, equipment, materials needed, considering constraints \* select appropriate materials, fit for purpose; explain choices, considering functionality and aesthetics\* create, follow, and adapt detailed step-by-step plans \*explain how product will appeal to audience; make changes to improve quality \* accurately measure, mark out, cut and shape materials/components \* accurately assemble, join and combine materials/components \* accurately apply a range of finishing techniques \* use techniques that involve a number of steps \* be resourceful with practical problems  |
| **Evaluate** | Talk about my work.Talk about what has been made – is it good and isn’t good. | Talk about my work.Talk about what has been made – is it good and isn’t good.Begin to talk about what could make it better. | \*talk about my work, linking it to what I was asked to do \* talk about existing products considering: use, materials, how they work, audience, where they might be used \*talk about existing products, and say what is and isn’t good \* talk about things that other people have made \*begin to talk about what could make product better  | \* describe what went well, thinking about design criteria \* talk about existing products considering: use, materials, how they work, audience, where they might be used; express personal opinion \*evaluate how good existing products are \*talk about what I would do differently if I were to do it again and why | \*look at design criteria while designing and making \*use design criteria to evaluate finished product \* say what I would change to make design better\*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 \* learn about some inventors/designers/ engineers/chefs/ manufacturers of ground breaking products | \*refer to design criteria while designing and making \*use criteria to evaluate product \* begin to explain how I could improve original design \*evaluate existing products, considering: how well they’ve been made, materials, whether they work, how they have been made, fit for purpose \* discuss by whom, when and where products were designed \* research whether products can be recycled or reused \* know about some inventors/designers/ engineers/chefs/manufacturers of ground-breaking products | \*evaluate quality of design while designing and making \*evaluate ideas and finished product against specification, considering purpose and appearance. \*test and evaluate final product \* evaluate and discuss existing products, considering: how well they’ve been made, materials, whether they work, how they have been made, fit for purpose \* begin to evaluate how much products cost to make and how innovative they are \*research how sustainable materials are \*talk about some key inventors/designers/ engineers/ chefs/manufacturers of ground breaking products | \*evaluate quality of design while designing and making; is it fit for purpose? \* keep checking design is best it can be.\*evaluate ideas and finished product against specification, stating if it’s fit for purpose \*test and evaluate final product; explain what would improve it and the effect different resources may have had \*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 \*evaluate how much products cost to make and how innovative they are \*research and discuss how sustainable materials are \*consider the impact of products beyond their intended purpose \*discuss some key inventors/designers/ engineers/ chefs/manufacturers of ground breaking products |

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|  | **Nursery**  | **Reception** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** |  **Year 6** |
| Technical knowledgeMaterials/ structures | Talk about materials | Talk about materials.Describe differences in materials. Suggest ways to make material/product stronger. | \*describe some different characteristics of materials\*begin to measure and join materials, with some support \*describe differences in materials \*suggest ways to make material/product stronger |  | \*measure materials \*use appropriate materials \*work accurately to make cuts and holes \* join materials in different ways \* use own ideas to begin to make strong structures \*use joining, rolling or folding to make it stronger  |  |  | \*select materials carefully, considering intended use of the product, the aesthetics and functionality.\*explain how product meets design criteria\*continue working on product even if original didn’t work \*measure accurately enough to ensure precision \*ensure product is strong and fit for purpose  \* reinforce and strengthen a 3D frame |
| Technical knowledge - Mechanisms | Talk about simple levers that they use eg scissors | Talk about simple levers that they use eg scissors, whole punches,  | \*begin to use levers or slides | \*begin to understand how to use wheels and axles | \*select appropriate tools / techniques \*alter product after checking, to make it better \*begin to try new/different ideas \*use simple lever and linkages to create movement \*use pneumatics to create movement | \*select most appropriate tools / techniques \*explain alterations to product after checking it\*grow in confidence about trying new / different ideas. \*use levers and linkages to create movement \*incorporate pneumatics  | \*refine product after testing, considering aesthetics, functionality and purpose \*grow in confidence about trying new / different ideas \* use cams, pulleys or gears to create movement |  |
| Technical knowledge - Textiles | Know that there are different materials, in order to develop ideas about how to use them and what to make. | Know how to safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.  |  | \*choose suitable textiles\*measure textiles \*cut and join textiles together to make a product explain how I did it\*carefully cut textiles to produce accurate piecesChoose suitable textilesexplain choices of textile understand that a 3D textile structure can be made from two identical fabric shapes | \*join different textiles in different ways \*explain how to join things in different ways\*choose textiles considering appearance and functionality\*think about how to make product strong \* begin to devise a template \*begin to understand that a simple fabric shape can be used to make a 3D textiles project |  | \*think about user and aesthetics when choosing textiles \*use own template \* think about and make product attractive and strong \*think of a range of ways to join things\* think carefully about what would improve product  \*begin to understand that a single 3D textiles project can be made from a combination of fabric shapes. | \*make a prototype  |
| Technical knowledge - – Food and nutrition Food Preparation and Safety Healthy Diet Origins of Food Measurement | Wash handsDiscuss how fruit and vegetables are healthy. | Wash hands & clean surfaces.Say where some foods come from, (i.e. plant or animal)Say where some foods come from, (i.e. plant or animal) | \*describe textures \*wash hands & clean surfaces \*think of interesting ways to decorate food \*say where some foods come from, (i.e. plant or animal) \*describe differences between some food groups (i.e. sweet, vegetable etc.) \*discuss how fruit and vegetables are healthy \*cut, peel and grate safely, with support | \*explain hygiene and keep a hygienic kitchen\*describe properties of ingredients and importance of varied diet \*say where food comes from (animal, underground etc.) \*describe how food is farmed, home-grown, caught \*draw eat well plate; explain there are groups of food \*describe “five a day” \*cut, peel and grate with increasing confidence | \*carefully select ingredients \*use equipment safely\*make product look attractive \*think about how to grow plants to use in cooking \*begin to understand food comes from UK and wider world \*describe how healthy diet= variety/balance of food/drinks \*explain how food and drink are needed for active/healthy bodies. \*prepare and cook some dishes safely and hygienically \*grow in confidence using some of the following techniques: peeling, chopping, slicing, grating, mixing, spreading, kneading and baking | \*explain how to be safe/hygienic \*think about presenting product in interesting/ attractive ways \*understand ingredients can be fresh, pre-cooked or processed \*begin to understand about food being grown, reared or caught in the UK or wider world\*describe eat well plate and how a healthy diet=variety / balance of food and drinks \*explain importance of food and drink for active, healthy bodies \*prepare and cook some dishes safely and hygienically \*use some of the following techniques: peeling, chopping, slicing, grating, mixing, spreading, kneading and baking | \*explain how to be safe / hygienic and follow own guidelines \*present product well - interesting, attractive, fit for purpose \*begin to understand seasonality of foods\*understand food can be grown, reared or caught in the UK and the wider world \*describe how recipes can be adapted to change appearance, taste, texture, aroma \*explain how there are different substances in food / drink needed for health \*prepare and cook some savoury dishes safely and hygienically including, where appropriate, use of heat source \* use range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking | \*understand a recipe can be adapted by adding / substituting ingredients \*explain seasonality of foods \*learn about food processing methods \*name some types of food that are grown, reared or caught in the UK or wider world \*adapt recipes to change appearance, taste, texture or aroma. \*describe some of the different substances in food and drink, and how they can affect health \*prepare and cook a variety of savoury dishes safely and hygienically including, where appropriate, the use of heat source.\*use a range of techniques confidently such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking |
| Technical knowledge - – Electrical Systems |  |  |  |  | \*use simple circuit in product \*learn about how to program a computer to control product. | \*use number of components in circuit \*program a computer to control product | \*incorporate switch into product \*confidently use number of components in circuit \*begin to be able to program a computer to monitor changes in environment and control product | \*use different types of circuit in product \* think of ways in which adding a circuit would improve product \* program a computer to monitor changes in environment and control product |

 Add vocab.

**End of School Expectations**

*By the time a child leaves Forest & Sandridge CE Primary they will:*

* Significant levels of originality and the willingness to take creative risks to produce innovative ideas and prototypes.
* An excellent attitude to learning and independent working.
* The ability to use time efficiently and work constructively and productively with others.
* The ability to carry out thorough research, show initiative and ask questions to develop an exceptionally detailed knowledge of users’ needs.
* The ability to act as responsible designers and makers, working ethically, using finite materials carefully and working safely.
* A thorough knowledge of which tools, equipment and materials to use to make their products.
* The ability to apply mathematical knowledge.
* The ability to manage risks exceptionally well to manufacture products safely and hygienically.
* A passion for the subject and knowledge of, up-to-date technological innovations in materials, products and systems.