Design and Technology Progression of Skills

Six, interrelated principles have been agreed by the National Curriculum Expert Group for D&T experience from the pupil's perspective and can be applied to all material areas and aspects of the subject. Each principle should be evident to a greater or lesser degree in each project that pupils undertake. The six principles consist of: ~ user ~ purpose ~ functionality ~ design decisions ~ innovation ~ authenticity.

Curriculum Principles for design and technology	Questions to support teachers' reflection. To what extent does your practice enable pupils to:
Purpose Pupils should be able to clearly communicate the purpose of the products they are designing and making. Each product they create should be designed to perform one or more defined tasks. Pupils' products should be evaluated through use.	**KS1 and KS2** ~ state what their products are for? ~ suggest the purposes of a range of existing products? ~ develop design criteria that take account of the intended purpose of their products? **KS2** ~ clarify the purpose of the products they are designing and making? ~ evaluate how well existing products meet their intended purose? ~ understand the concept of 'fitness for purpose' in the context of their own designing and making. ~distinguish between how well products are designed and how well they are made? ~ discuss whether their own and existing products have an impact beyond their intended purpose? ~ recognise when products have to fulfil conflicting requirements?
Functionality Pupils should design and make products that work/function effectively in order to fulfil users' needs, wants and purposes.	**KS1 and KS2** ~ know that their products should work in some way? ~ know how a range of existing products work? ~ develop specific technical knowledge and understand in order to ensure their products work well? **KS2**

	~ understand the meaning of 'functionality' and its importance to design and technology? ~ know how functionality is relevant to the product they are designing? ~ know how the materials and components they use assist the functionality of the product? ~ contrast the functional properties of materials and components with their aesthetic qualities? ~ understand that how products work affects how they are used?
Design Decisions Pupils need opportunities to make their own design decisions. Making design decisions allows pupils to demonstrate their creative, technical and practical expertise, and draw on learning from other subjects. Through making decision decisions pupils decide on the form their product will take, how their product will work, what task or tasks it will perform and who the product will be for.	**KS1 and KS2** ~ make their own decision decisions? ~ discuss the design decisions that have been made in existing products? ~ take into account users' needs when making design decisions? ~ develop their technical and practical expertise in order that they can make informed design decisions? ~ use D&T-related visits and inputs from experts to make informed design decisions? **KS2** ~ discuss the effectiveness of the design decisions made in existing products? ~ discuss effectiveness of the design decisions made in their own products?
Innovation When designing and making, pupils need some scope to be original with their thinking. Projects that encourage innovation lead to a range of design ideas and products being developed and are characterised by engaging open-ended starting points for learning.	**KS1 and KS2** ~ respond creatively and imaginatively to design briefs and problems? **KS2** ~ demonstrate some originality when designing and making? ~ learn how to take creative risks? ~ understand the meaning of 'innovation' within design and technology? ~ understand how innovation is an important part of the process of designing and making products?

Authenticity	KS1 and KS2
Pupils should design and make products that are believable, real and meaningful to themselves and others.	~ carry out projects that are real and meaningful to them and others? ~ work within a range of relevant contexts, ranging from domestic to industrial? ~ work towards realistic and credible outcomes that can be evaluated in use? ~ engage in activity that mirrors design and technology in the wider world? ~ create products with a genuine purpose and for a real user? ~ create products that need to work in some way in order to be successful? **KS2** ~ understand the difference between genuine D&T products and outcomes created in other areas of the curriculum?
User	KS1 and KS2
Pupils should have a clear idea for who they are designing and making products for, considering their needs, wants, values, interests and preferences. The intended users could be themselves or others, an imaginary or story based character, a client, a consumer or specific target group.	~ identify who their products will be for? ~ suggest possible users of a range of existing products? ~ explore how existing products are used? ~ consider where and when their own and others' products might be used? ~ evaluate whether users' needs and preferences have been met effectively? ~ appreciate the importance of the 'user' within design and technology? **KS2** ~ explore users' needs in a range of contexts? ~ use research to identify potential problems and opportunities for users? ~ analyse findings and draw conclusions from their research? ~ distinguish between needs, wants, values, interests and preferences? ~ design products for individuals, clients, consumers and target groups?

Progression of skills EYFS

Early Years Foundation Stage: In this unit, children will be taught to:				
Knowledge	Skills	Tier 3 Vocab	Tier 2 Vocab	Possible links to SMSC (inc cultural capital)
Early Learning Goals

Physical Development
~Moving and Handling
~Children show good control and co-ordination in large and small movements. They move confidently in a range of ways, safely negotiating space. They handle equipment and tools effectively, including pencils for writing.
~Health and Self Care
~Children know the importance for good health of physical exercise, and a healthy diet, and talk about ways to keep healthy and safe.

Understanding the World
~The World
Children know about similarities and differences in relation to places, objects, materials and living things. | Characteristics of effective Learning

Finding out and exploring
~Showing curiosity about objects, events and people
~Using senses to explore the world around them
~Engaging in open-ended activity
~Showing particular interests
Playing with what they know
~Pretending objects are things from their experience
~Representing their experiences in play
~Taking on a role in their play
~Acting out experiences with other people
Being willing to 'have a go'
~ Initiating activities
~Seeking challenge
~Showing a 'can do' attitude | join, template, develop, textile, evaluate, model, structure, make, material, draw, tool, build, product, computer, design, cut, shape, cooking, equipment, practical, finish, ingredient, construct, sew, knit, weave, hinge, sketch, drill, screw. | Process, research, purchase, create, similar, estimate, comment, link, sequence, label, predict, error, draft, image, unique, adapt, innovation, select, design | Spiritual
~ Curriculum is planned to offer exciting experiences that enable children to show curiosity, use imagination and creativity and inspire and fascinate learners.
~ Learning environment provides opportunities for children to reflect upon, consider, ask questions and celebrate the world around them.
~Areas of the learning environment promote talking and thinking |

They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes. ~Technology Children recognise that a range of technology is used in places such as homes and schools. They select and use technology for particular purposes.	~Taking a risk, engaging in new experiences, and learning by trial and error **Being involved and concentrating** ~Maintaining focus on their activity for a period of time ~Showing high levels of energy, fascination ~Not easily distracted ~Paying attention to details **Keeping on trying** ~Persisting with activity when challenges occur ~Showing a belief that more effort or a different approach will pay off ~Bouncing back after difficulties **Enjoying achieving what they set out to do** ~Showing satisfaction in meeting their own goals ~Being proud of how they accomplished something – not just the end result ~Enjoying meeting challenges for their own sake rather than external rewards or praise **Having their own ideas** ~Thinking of ideas ~Finding ways to solve problems ~Finding new ways to do things **Making links** ~ links and noticing patterns in their experience ~Making predictions ~Testing their ideas ~Developing ideas of grouping, sequences, cause and effect			~ Opportunities provided for reflection about learning **Moral** ~ Discussions and debates around matters in the world ~ Continuous provision allows for co-operation and collaboration, self-regulation and self-motivation. **Social** ~ Continuous provision – opportunities to be responsible for their own learning journey ~ Learning environment promotes cooperative work, peer work, making relationships, resolving conflicts ~ high expectations of oracy empower children to communicate effectively **Cultural** ~ sharing experiences of own and other cultures

		Choosing ways to do things ~Planning, making decisions about how to approach a task, solve a problem and reach a goal ~Checking how well their activities are going ~Changing strategy as needed ~Reviewing how well the approach worked **Early Learning Goals** **Expressive Arts and Design ~ Exploring and using Media and Materials** Children sing songs, make music and dance, and experiment with ways of changing them. They safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. **Being Imaginative** Children use what they have learnt about media and materials in original ways, thinking about uses and purposes. They represent their own ideas, thoughts and feelings through design and technology, art, music, dance, role play and stories.			~ awareness of national and global issues that impact on children's lives eg. Plastic pollution

KS1 National Curriculum objectives: In this unit, children will be taught to:					
	Knowledge	Skills	Tier 3 Vocab	Tier 2 Vocab	Possible links to SMSC (inc cultural capital)
	<u>Designing – Understanding contexts, users and purposes</u> ~state what products they are making ~say whether their products are for themselves or other users ~ describe what their products are for ~ say how their products will work ~ say how they will make their products suitable for their intended users <u>Designing - Generating, developing, modelling and communicating ideas</u> ~generate ideas by drawing on their own experiences ~ use knowledge of existing products to help come up with ideas	<u>Designing – Understanding contexts, users and purposes</u> ~ D1 work confidently within a range of contexts, such as imaginary, story-based, home, school, gardens, playgrounds, local community, industry and the wider environment. ~ use simple design criteria to help develop their ideas <u>Designing - Generating, developing, modelling and communicating ideas</u> ~develop and communicate ideas by talking and drawing ~ model ideas by exploring materials, components and construction kits and by making templates and mock-ups ~ use ICT, where appropriate, to develop and communicate their ideas	Function, join, template, develop, textile, evaluate, model, structure, make, material, mechanism, draw, tool, build, product, computer, design, cut, shape, cooking, equipment, practical, mock-up, finish, ingredient, construct, sew, knit, weave, hinge, sketch, drill, screw.	Process, research, purchase, evidence, create, similar, benefit, estimate, comment, link, sequence, label, predict, error, draft, image, unique, adapt, innovation, select, design	Spiritual ~ Curriculum is planned to offer exciting experiences that use imagination and creativity to inspire and fascinate learners. ~ Learning environment provides opportunities for children to show curiosity and ask questions about the world around them. ~Areas of the learning environment promote talking and thinking ~ Opportunities provided for reflection about learning

Making – Planning	Making – Practical skills and techniques			~Awe around natural phenomena in our world.

Making – Planning
~plan by suggesting what to do next
~ select from a range of tools and equipment, explaining their choices
~ select from a range of materials and components according to their characteristics

Technical knowledge – Making products work
~ about the simple working characteristics of materials and components
~ about the movement of simple mechanisms such as levers, sliders, wheels and axles
~ how freestanding structures can be made stronger, stiffer and more stable
~ that a 3-D textiles product can be assembled from two identical fabric shape
~ that food ingredients should be combined according to their sensory characteristics
~ the correct technical vocabulary for the projects they are undertaking

Making – Practical skills and techniques
~ follow procedures for safety and hygiene
~ use a range of materials and components, including construction materials and kits, textiles, food ingredients and mechanical components
~ measure, mark out, cut and shape materials and components
~ assemble, join and combine materials and components
~ use finishing techniques, including those from art and design

Evaluating – Own ideas and products
~ talk about their design ideas and what they are making
~ make simple judgements about their products and ideas against design criteria
~ suggest how their products could be improved Evaluating – Existing products
~ explore what products are and who or what they are for.
~ explore how products work and how or where they might be used.
~ explore what materials products are made from
~ explore what they like and dislike about products

~Awe around natural phenomena in our world.
Moral
~ Discussions and debates around matters in the world
~ tolerance and acceptance of others' views
Social
~ Continuous provision – opportunities to be responsible for their own learning journey
~ Learning environment promotes cooperative work, peer work, making relationships, resolving conflicts
~ high expectations of oracy empower children to communicate effectively
Cultural
~ sharing experiences of own and other cultures
~ awareness of national and global issues that impact on

				children's lives eg. Plastic pollution
	Cooking and nutrition – Where food comes from ~ that all food comes from plants or animals ~ that food has to be farmed, grown elsewhere (e.g. home) or caught **Cooking and nutrition – Food preparation, cooking and nutrition** ~ that everyone should eat at least five portions of fruit and vegetables every day	**Cooking and nutrition – Food preparation, cooking and nutrition** ~ how to name and sort foods into the five groups in The Eatwell Plate ~ how to prepare simple dishes safely and hygienically, without using a heat source ~ how to use techniques such as cutting, peeling and grating			

Lower KS2 National Curriculum objectives: In this unit, children will be taught to:				
Knowledge	Skills	Tier 3 Vocab	Tier 2 Vocab	Possible links to SMSC (inc cultural capital)
<u>Designing – Understanding contexts, users and purposes</u> ~ describe the purpose of their products ~ indicate the design features of their products that will appeal to intended users ~ explain how particular parts of their products work	<u>Designing – Understanding contexts, users and purposes</u> ~ work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment ~ gather information about needs and wants of particular individuals and groups ~ develop their own design criteria and use these to inform their ideas <u>Designing - Generating, developing, modelling and communicating ideas</u> ~ share and clarify ideas through discussion ~ model their ideas using prototypes and pattern pieces ~ use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas ~ use computer-aided design to develop and communicate their ideas	Creative, technical, practical, evaluate, nutrition, purposeful, functional, appealing, mock-ups, criteria, select, components, explore, mechanisms, research, innovative, fit for purpose, annotated, linear	Deduction, illustrated, technique, sequence, predicted, hypothesis, alter, energy, draft, precise, adjustment, facilitate, assigned, objective, cooperative, definite, comprise	<u>Spiritual</u> ~ Curriculum is planned to offer exciting experiences that use imagination and creativity to inspire and fascinate learners. ~ Learning environment provides opportunities for children to show curiosity and ask questions about the world around them. ~Areas of the learning environment promote talking and thinking ~ Opportunities provided for reflection about learning

	~generate realistic ideas, focusing on the needs of the user ~make design decisions that take account of the availability of resources **Making – Planning** ~ order the main stages of making **Making – Practical skills and techniques** ~ follow procedures for safety and hygiene ~ use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components ~ measure, mark out, cut and shape materials and components with some accuracy ~ assemble, join and combine materials and components with some accuracy ~ apply a range of finishing techniques, including those from art and design, with some accuracy			~Awe around natural phenomena in our world. **Moral** ~ Discussions and debates around matters in the world ~ tolerance and acceptance of others' views **Social** ~ Continuous provision – opportunities to be responsible for their own learning journey ~ Learning environment promotes cooperative work, peer work, making relationships, resolving conflicts ~ high expectations of oracy empower children to communicate effectively **Cultural** ~ sharing experiences of own and other cultures ~ awareness of national and global issues that impact on

Making – Planning
~ select tools and equipment suitable for the task
~ explain their choice of tools and equipment in relation to the skills and techniques they will be using
~ select materials and components suitable for the task
~ explain their choice of materials and components according to functional properties and aesthetic qualities

Technical knowledge – Making products work
~ how to use learning from science and maths to help design and make products that work
~ that materials have both functional properties and aesthetic qualities
~ that materials can be combined and mixed to create more useful characteristics

~ that mechanical and electrical systems have an input, process and output ~ use the correct technical vocabulary for the projects they are undertaking ~ how mechanical systems such as levers and linkages or pneumatic systems create movement ~ how simple electrical circuits and components can be used to create functional products ~ how to program a computer to control their products ~ how to make strong, stiff shell structures ~ that a single fabric shape can be used to make a 3D textiles product ~ that food ingredients can be fresh, pre-cooked and processed				children's lives eg. Plastic pollution
	Evaluating – Own ideas and products ~ identify the strengths and areas for development in their ideas and products ~ consider the views of others, including intended users, to improve their work ~ refer to their design criteria as they design and make ~ use their design criteria to evaluate their completed products **Evaluating – Existing products** Pupils will be taught to investigate and analyse: ~how well products have been designed and made			

<u>Evaluating – Existing products</u> Pupils will be taught to investigate and analyse: ~ how well products have been designed and made ~ why materials have been chosen ~ what methods of construction have been used ~developed ground-breaking products ~ how well products work to achieve their purposes ~ how well products meet user needs and wants ~ who designed and made the products ~ where and when products were designed and made ~ whether products can be recycled or reused <u>Evaluating – Key events and individuals</u> ~ about inventors, designers, engineers, chefs and manufacturers who have <u>Cooking and nutrition – Where food comes from</u> ~ that food is grown (such as tomatoes, wheat and potatoes), reared (such as pigs, chickens and cattle) and caught (such as fish) in the UK, Europe and the wider world <u>Cooking and nutrition – Food preparation, cooking and nutrition</u> ~ that a healthy diet is made up from a variety and balance of different food and drink, as depicted in The Eatwell Plate	<u>Cooking and nutrition – Food preparation, cooking and nutrition</u> ~how to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source ~ how to use a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking			

~ that to be active and healthy, food and drink are needed to provide energy for the body				

DT Progression of skills Upper KS2

Upper KS2 National Curriculum objectives: In this unit, children will be taught to:				
Knowledge	Skills	Tier 3 Vocab	Tier 2 Vocab	Possible links to SMSC (inc cultural capital)
Designing – Understanding contexts, users and purposes ~describe the purpose of their products ~indicate the design features of their products that will appeal to intended users ~explain how particular parts of their products work	Designing – Understanding contexts, users and purposes ~work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment ~carry out research, using surveys, interviews, questionnaires and web-based resources ~ identify the needs, wants, preferences and values of particular individuals and groups ~develop a simple design specification to guide their thinking Designing - Generating, developing, modelling and communicating ideas ~share and clarify ideas through discussion	Creative, technical, practical, evaluate, nutrition, purposeful, functional, appealing, mock-ups, criteria, select, components, explore, mechanisms, research, innovative, fit for purpose, annotated, linear, iterative, cross-sectional/exploded diagrams, aesthetic, programme, monitor, control, innovative	Deduction, illustrated, technique, sequence, predicted, hypothesis, alter, energy, draft, precise, adjustment, facilitate, assigned, objective, cooperative, definite, comprise, option, accurate, abstract, contradiction, restore, exhibit, commenced, ethical, manual	Spiritual ~ Curriculum is planned to offer exciting experiences that use imagination and creativity to inspire and fascinate learners. ~ Learning environment provides opportunities for children to show curiosity and ask questions about the world around them. ~Areas of the learning environment promote talking and thinking

		~model their ideas using prototypes and pattern pieces ~use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas ~use computer-aided design to develop and communicate their ideas ~generate realistic ideas, focusing on the needs of the user ~ make design decisions that take account of the availability of resources <u>Making – Planning</u> ~formulate step-by-step plans as a guide to making			~ Opportunities provided for reflection about learning ~Awe around natural phenomena in our world. **Moral** ~ Discussions and debates around matters in the world ~ tolerance and acceptance of others' views **Social** ~ Continuous provision – opportunities to be responsible for their own learning journey ~ Learning environment promotes cooperative work, peer work, making relationships, resolving conflicts ~ high expectations of oracy empower children to communicate effectively **Cultural** ~ sharing experiences of own and other cultures
	<u>Making – Planning</u> ~select tools and equipment suitable for the task ~explain their choice of tools and equipment in relation to the skills and techniques they will be using ~select materials and components suitable for the task ~explain their choice of materials and components according to functional properties and aesthetic qualities ~produce appropriate lists of tools, equipment and materials that they need	<u>Making – Practical skills and techniques</u> ~follow procedures for safety and hygiene ~use a wider range of materials and components than KS1, including construction materials and kits,			

	textiles, food ingredients, mechanical components and electrical components ~accurately measure, mark out, cut and shape materials and components ~accurately assemble, join and combine materials and components ~accurately apply a range of finishing techniques, including those from art and design ~use techniques that involve a number of steps ~demonstrate resourcefulness when tackling practical problems			~ awareness of national and global issues that impact on children's lives eg. Plastic pollution
<u>Technical knowledge – Making products work</u> ~how to use learning from science and maths to help design and make products that work ~that materials have both functional properties and aesthetic qualities ~that materials can be combined and mixed to create more useful characteristics ~that mechanical and electrical systems have an input, process and output ~the correct technical vocabulary for the projects they are undertaking ~how mechanical systems such as cams or pulleys or gears create movement ~how more complex electrical circuits and components can be used to create functional products				

~how to program a computer to monitor changes in the environment and control their products ~how to reinforce and strengthen a 3D framework ~that a 3D textiles product can be made from a combination of fabric shapes ~that a recipe can be adapted by adding or substituting one or more ingredients				
	Evaluating – Own ideas and products ~identify the strengths and areas for development in their ideas and products ~consider the views of others, including intended users, to improve their work ~critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make ~evaluate their ideas and products against their original design specification			
Evaluating – Existing products Pupils will be taught to investigate and analyse: ~how well products have been designed and made ~why materials have been chosen ~what methods of construction have been used ~how well products work to achieve their purposes	**Evaluating – Existing products** Pupils will be taught to investigate and analyse: ~how well products have been designed and made			

~how well products meet user needs and wants ~how much products cost to make ~how innovative products are ~how sustainable the materials in products are ~what impact products have beyond their intended purpose <u>Evaluating – Key events and individuals</u> about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products <u>Cooking and nutrition – Where food comes from</u> ~that food is grown (such as tomatoes, wheat and potatoes), reared (such as pigs, chickens and cattle) and caught (such as fish) in the UK, Europe and the wider world ~that seasons may affect the food available ~how food is processed into ingredients that can be eaten or used in cooking	<u>Cooking and nutrition – Food preparation, cooking and nutrition</u> ~how to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source ~ how to use a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking