**Skills progression – Design Technology**

**Mechanisms**

Year 1 – Moving pictures

Children learn how to:

- use paper and simple tools to create mechanisms – sliders, wheels, pivots and levers

- use tools safely – scissors, hole punch, paper fasteners

- reflect upon and evaluate their own work and that of others, looking at whether they meet the design criteria

- to use scissors to cut along – straight lines, wavy lines, zigzags

- to design their own moving picture, using the mechanisms they have learnt about

- to make a product based on their own design

Year 2 – Vehicles

Children will learn how to:

- use labelling to show features within their drawings

- classify vehicles based upon their features

- attach wheels to axles to make the wheels move around

- use card and other materials (straws, dowelling, discs, etc) to make chassis

- use different materials and tools to create the body of a vehicle

- design their own vehicle and label it with the features that it needs

- reflect upon and evaluate their own work and that of others, looking at whether they meet the design criteria

Year 3 – Moving monsters

Children will learn how:

- to use labelling to show features within their drawings

- different objects use air to help them work

- to sketch their own pneumatic system and label it to show how it works

- to plan and design their own moving monster using the new skills and knowledge that they have learnt about pneumatic systems

- reflect upon and evaluate their own work and that of others, looking at whether they meet the design criteria

Year 4 – Storybooks

Children will learn how to:

- Sketch pictures and write a description about how they were made

- create a moving picture using a variety of techniques – levers, pivots, concertinas, flaps,

- use different fonts and lettering styles to create impact

- create a more in-depth plan of how they would like their end product to look, thinking about different design features.

- reflect upon, and evaluate their own work in greater detail

**Textiles**

Year 1 – Delightful decorations

Children learn how to:

- use a running stitch

- use an overstitch

- thread a needle

- cut fabric

- attach buttons to a piece of fabric

- join fabric to a larger piece using a needle and thread

- evaluate different decorations based on look, materials used, type of stitch used, how they have been made, whether they are fit for purpose

- use scissors safely

- practice their cutting skills – cutting along a straight line, cutting along a zigzag, cutting along a curved line

- reflect upon and evaluate their own work

Year 2 – Flying kites

Children will learn:

- to evaluate a range of objects based upon their design features

- to design a kite using a specific list of instructions

- about materials and their properties

- about what materials are best to use for a specific purpose

- to follow instructions to help them construct a carp kite and a diamond kite

- to use the skills and knowledge they have learnt in the topic to help them to design and make their own diamond kite

- reflect upon and evaluate their own work and that of others, looking at whether they meet the design criteria

**Food technology**

Key stage 1

Across KS1 pupils should know:

- that all food comes from plants or animals

- that food has to be farmed, grown elsewhere (e.g. home) or caught

Across KS1 pupils should know:

- how to name and sort foods into the five groups in The Eatwell Guide

- that everyone should eat at least five portions of fruit and vegetables every day

- how to prepare simple dishes safely and hygienically, without using a heat source

- how to use techniques such as cutting, peeling and grating

In KS1 children should be able to name and sort foods into the five groups from the Eatwell Guide. They should know that a healthy diet comprises food and drinks from each of the food groups.

Key stage 2

Across KS2 pupils should know:

- 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

In late KS2 pupils should also know:

- that seasons may affect the food available

- how food is processed into ingredients that can be eaten or used in cooking

Across KS2 pupils should know:

- 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

In early KS2 pupils should also know:

- that a healthy diet is made up from a variety and balance of different food and drink, as depicted in The Eatwell Guide

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

In late KS2 pupils should also know:

- that recipes can be adapted to change the appearance, taste, texture and aroma

- that different food and drink contain different substances – nutrients, water and fibre – that are needed for health

Year 1 – Teddy bears picnic

Children will learn how to:

- Peel with a swivel peeler (with adult support)

- Spread soft ingredients e.g. hummus

- Shape with accuracy for a desired effect – using shape cutters

- Use a rolling pin

- Mix/ stir with increasing thoroughness to combine ingredients

- Whisk foods using a fork

- Rub in fat to flour

- Knead dough

- Spoon ingredients into different containers with increasing accuracy and minimal spillage

- Measure using different size measuring spoons, e.g. liquids

- Refer to ingredients in simple fractions, e.g. half, quarter

- Cut out ingredients neatly with a cutter

- Use a table knife to cut dough in equal portions

- Grate soft foods – e.g. cheese, cucumber

- Snip fresh herbs, spring onions

- Sift flour in to a bowl

- Thread soft foods onto cocktail sticks, e.g. fruit kebab

- Cut low resistance foods with a table knife in to equal size pieces/ slices, e.g. canned pineapple slices, sticks of pepper, mushrooms

- Use a fork to secure foods

- Follow a simple recipe supported by an adult

- Carryout instructions with a little support

Utensils that children may use: potato masher, fork, peel by hand, rolling pin, mixing spoons, spoons, cups, butter knife, cutters, swivel peeler (adult support), whisk, measuring spoons of different sizes, table knife, kitchen scissors (adult supervision), grater

Year 2 – perfect pizzas

Children will learn to:

- Peel with a swivel peeler (with adult support)

- Spread soft ingredients e.g. hummus

- Use a garlic press

- Spread ingredients evenly over another food

- Shape and mould to create visually appealing products

- Mix/ stir any ingredients thoroughly

- Mix/ stir – whisk foods using a hand-whisk

- Be able to use two spoons to transfer ingredients into different size/ shape containers with minimal spillage, e.g. liquid food into baking cases

- Measure using a measuring jug with support to obtain accuracy

- Measure using digital scales with support to obtain accuracy

- Cut out by placing the cutter in positions to make good of the material available and reduce waste

- Grate firmer foods, e.g. carrots, apples

- Snip with greater dexterity and control, e.g. to shred lettuce or cabbage leaves for salad

- Thread medium resistance foods onto kebab sticks, e.g. mushrooms, courgettes

- Cut medium resistance foods with a vegetable knife, e.g. cucumber

- Use a fork or the claw grip to secure foods

- Cut medium resistant or partly prepared foods using a bridge hold, e.g. cut half a tomato into a quarter, halve canned potatoes, have large grapes

Utensils that children may use: potato masher, fork, peel by hand, rolling pin, mixing spoons, spoons, cups, butter knife, cutters, swivel peeler (adult support), whisk, measuring spoons of different sizes, table knife, kitchen scissors (adult supervision), grater, garlic press, swivel peeler (adult supervision), blender (adult supervision), measuring jug, digital scales, vegetable knife (adult supervision), grater (adult support), toaster (with adult supervision), hob (with adult supervision).

Year 3 – Sandwich snacks

Children will learn how to:

- Peel with a swivel peeler (with adult support)

- Spread soft ingredients e.g. hummus

- Use a garlic press

- Spread ingredients evenly over another food

- Shape and mould to create visually appealing products

- Mix/ stir any ingredients thoroughly

- Mix/ stir – whisk foods using a hand-whisk

- Be able to use two spoons to transfer ingredients into different size/ shape containers with minimal spillage, e.g. liquid food into baking cases

- Measure using a measuring jug with support to obtain accuracy

- Measure using digital scales with support to obtain accuracy

- Cut out by placing the cutter in positions to make good of the material available and reduce waste

- Grate firmer foods, e.g. carrots, apples

- Snip with greater dexterity and control, e.g. to shred lettuce or cabbage leaves for salad

- Thread medium resistance foods onto kebab sticks, e.g. mushrooms, courgettes

- Cut medium resistance foods with a vegetable knife, e.g. cucumber

- Use a fork or the claw grip to secure foods

- Cut medium resistant or partly prepared foods using a bridge hold, e.g. cut half a tomato into a quarter, halve canned potatoes, have large grapes

- Follow a simple recipe with guidance from an adult

- Carryout instructions independently

Utensils that children may use: potato masher, fork, peel by hand, rolling pin, mixing spoons, spoons, cups, butter knife, cutters, swivel peeler (adult support), whisk, measuring spoons of different sizes, table knife, kitchen scissors (adult supervision), grater, garlic press, swivel peeler (adult supervision), blender (adult supervision), measuring jug, digital scales, vegetable knife (adult supervision), grater (adult support), toaster (with adult supervision), hob (with adult supervision).

Year 5 – Great British Bread bake off

Children will learn how to:

- Peel with a swivel peel to create food ribbons to be used in a dish, e.g. courgette/ carrot ribbons with supervision

- Fold ingredients together carefully by mixing or stirring

- Be able to gauge the quantities spooned to ensure an equal amount of ingredient in each container

- Measure using a measuring jug independently and accurately

- Measure using digital and analogue scales accurately and independently

- Grate using the zesting part of a grater, e.g. lemon, orange

- Thread higher resistance foods onto kebab sticks, e.g. peppers, onions

- Cut higher resistance food with a vegetable knife, using the claw grip, e.g. celery, carrots

- Cut higher resistant foods from whole using the bridge hold, e.g. halve an apple, raw potato

- Follow a simple recipe independently

- Carryout modifications to recipes

Utensils that children may use: potato masher, fork, peel by hand, rolling pin, mixing spoons, spoons, cups, butter knife, cutters, swivel peeler (adult support), whisk, measuring spoons of different sizes, table knife, kitchen scissors (adult supervision), grater, garlic press, swivel peeler (adult supervision), blender (adult supervision), measuring jug, digital scales, vegetable knife (adult supervision), grater (adult support), toaster (with adult supervision), hob (with adult supervision), analogue scales, grater (light adult supervision), kettle (with adult supervision), grill (with adult supervision), oven (with adult supervision).

Year 6 – Come dine with me: Great British dishes

Children will learn how to:

- Peel with a swivel peel to create food ribbons to be used in a dish, e.g. courgette/ carrot ribbons with supervision

- Fold ingredients together carefully by mixing or stirring

- Be able to gauge the quantities spooned to ensure an equal amount of ingredient in each container

- Measure using a measuring jug independently and accurately

- Measure using digital and analogue scales accurately and independently

- Grate using the zesting part of a grater, e.g. lemon, orange

- Thread higher resistance foods onto kebab sticks, e.g. peppers, onions

- Cut higher resistance food with a vegetable knife, using the claw grip, e.g. celery, carrots

- Cut higher resistant foods from whole using the bridge hold, e.g. halve an apple, raw potato

- Follow a simple recipe independently

- Carryout modifications to recipes

Utensils that children may use: potato masher, fork, peel by hand, rolling pin, mixing spoons, spoons, cups, butter knife, cutters, swivel peeler (adult support), whisk, measuring spoons of different sizes, table knife, kitchen scissors (adult supervision), grater, garlic press, swivel peeler (adult supervision), blender (adult supervision), measuring jug, digital scales, vegetable knife (adult supervision), grater (adult support), toaster (with adult supervision), hob (with adult supervision), analogue scales, grater (light adult supervision), kettle (with adult supervision), grill (with adult supervision), oven (with adult supervision).

**Structures**

Year 2 – Flying kites

Children will learn:

- to evaluate a range of objects based upon their design features

- to design a kite using a specific list of instructions

- about materials and their properties

- about what materials are best to use for a specific purpose

- to follow instructions to help them construct a carp kite and a diamond kite

- to use the skills and knowledge they have learnt in the topic to help them to design and make their own diamond kite

- reflect upon and evaluate their own work and that of others, looking at whether they meet the design criteria

Year 3 – Photograph frames

Children will learn:

- about materials and design properties of photograph frames

- sketching skills

- different ways to strengthen and join paper – layering, twisting, rolling, folding

- test out the paper techniques they have learnt about by making prototypes of different structures – table, chair, pyramid, etc.

- how to use pipe cleaners to create a variety of 3d shapes and structures

- to design their own photograph frame, looking closely at materials, tools and other design features

- reflect upon and evaluate their own work and that of others, looking at whether they meet the design criteria

Year 5 – Building bridges

Children will learn how:

- to cut, fold, roll and stick sheets of card or paper to make beams with cross-sections

- to test beam strength using weights

- to build a truss bridge using the skills learnt so far

- to create an arch to support weight and load

- to build an arch bridge using the skills learnt so far

- to design a model suspension bridge for a toy car

- to sketch and plan to a 100:1 scale model, using a specific design criteria, label it and then build a prototype

- reflect upon and evaluate their own work and that of others, looking at whether they meet the design criteria

Year 6 – Fairgrounds

Children will learn:

- how different fairground rides work and the mechanisms that they use

- to use their circuit-making skills to make a circuit that could power a variety of fairground rides

- to design a way of transferring motion from the circuit to the moving parts using a cotton reel, dowelling and card

- how to attach dowelling or straw to a circle of card

- how to make a wheel with spokes

- how to create a spoked wheel that is able to stand on its own and still able to spin

- to create different structures for a variety of rides

- to plan, sketch and label a design for their own fairground ride, using the skills and knowledge that they have already learnt.

- to create their own designs based upon their earlier plans.

- reflect upon and evaluate their own work and that of others, looking at whether they meet the design criteria

**Electrical circuits**

Year 4 – Torches

Children will learn:

- about how torches work and the different components of a torch

- about the different ways in which torches can be used

- how to draw a diagram and label it

- how to make a switch for a circuit using a variety of different materials – paperclips, split pins, card, drawing pins, staples, rubber etc

- about different torch casings and why certain materials are used

- how to use a net to make a 3d structure

- to design their own torch, thinking about the different techniques and design criteria

- to create their own designs based upon their earlier plans.

- reflect upon and evaluate their own work and that of others, looking at whether they meet the design criteria

Year 6 – Fairgrounds

Children will learn:

- how different fairground rides work and the mechanisms that they use

- to use their circuit-making skills to make a circuit that could power a variety of fairground rides

- to design a way of transferring motion from the circuit to the moving parts using a cotton reel, dowelling and card

- how to attach dowelling or straw to a circle of card

- how to make a wheel with spokes

- how to create a spoked wheel that is able to stand on its own and still able to spin

- to create different structures for a variety of rides

- to plan, sketch and label a design for their own fairground ride, using the skills and knowledge that they have already learnt.

- to create their own designs based upon their earlier plans.

- reflect upon and evaluate their own work and that of others, looking at whether they meet the design criteria

**Knowledge of design**

Year 4 – British inventors

Children will learn:

- about telephones, their uses, who invented them and how they were invented

- how to make a string telephone

- to plan, design and label a new, futuristic phone and describe it

- about the world wide web, its uses, who invented it and how it was invented

- how to sketch models that they will be testing

- about the properties of Modroc, its use, who invented it and how it was invented

- how to use Modroc to reinforce things by using different techniques

- how to build a structure strong enough to hold the weight of a dictionary using just newspaper and tape, using the design criteria.

- about reinforcing paper structure using different techniques – rolling, folding, layering, weaving

- about waterproofing methods and the mackintosh coat, how waterproofing works and why it was invented

- origami techniques

- about how different inventions have changed people’s lives and been influential

- how to solve a problem using the methods that they have learnt about

Year 5 – Chinese inventions

Children will learn:

- about different properties of materials – strength, absorbency, opacity etc

- about paper, how it is made and why it was made

- how to test a paper’s strength

- how to test a paper’s absorbency

- how to test a paper’s opacity

- to look at close features of paper through a microscope or magnifying glass

- how to make recycled paper following instructions

- about different types of compass, what they are used for and how to make a hanging compass and a floating compass, and look closely at the advantages and disadvantages of these.

- about water clocks and what they are used for/ how to make a water clock

- how to make a transmission with different gears of the same size

- how to make a transmission with different features

- create transmissions – drawing and labelling diagrams

- to make and test out different prototypes, and make predictions for which material will make the best sail

- to design a kite using a template, labelling the materials and different parts of the kite

- reflect upon and evaluate their own work and that of others, looking at whether they meet the design criteria

**Designing skills**

Understanding contexts, users and purposes

Key stage 1

Across KS1 pupils should:

- Work confidently within a range of contexts, such as imaginary, story-based, home, school, gardens, playgrounds, local community, industry and the wider environment

- state what products they are designing and 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

- use simple design criteria to help develop their ideas

Key stage 2

Across KS2 pupils should:

- work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment

- 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

In early KS2 pupils should also:

- gather information about the needs and wants of particular individuals and groups

- develop their own design criteria and use these to inform their ideas

In late KS2 pupils should also:

- 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

Generating, developing, modelling and communicating ideas

Key stage 1

Across KS1 pupils should:

- generate ideas by drawing on their own experiences

- use knowledge of existing products to help come up with ideas

- 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 information and communication technology, where appropriate, to develop and communicate their ideas

Key stage 2

Across KS2 pupils should:

- 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

In early KS2 pupils should also:

- generate realistic ideas, focusing on the needs of the user

- make design decisions that take account of the availability of resources

In late KS2 pupils should also:

- generate innovative ideas, drawing on research

- make design decisions, taking account of constraints such as time, resources and cost

**Making skills**

Planning

Key stage 1

Across KS1 pupils should:

- 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

Key stage 2

Across KS2 pupils should:

- 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

In early KS2 pupils should also:

- order the main stages of making

In late KS2 pupils should also:

- produce appropriate lists of tools, equipment and materials that they need

- formulate step-by-step plans as a guide to making

Practical skills and techniques

Key stage 1

Across KS1 pupils should:

- 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

Key stage 2

Across KS2 pupils should:

- 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

In early KS2 pupils should also:

- 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

In late KS2 pupils should also:

- 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

**Evaluating**

Own ideas and products

Key stage 1

Across KS1 pupils should:

- 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

Key stage 2

Across KS2 pupils should:

- identify the strengths and areas for development in their ideas and products

- consider the views of others, including intended users, to improve their work

In early KS2 pupils should also:

- refer to their design criteria as they design and make

- use their design criteria to evaluate their completed products

In late KS2 pupils should also:

- 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

Existing products

Key Stage 1

Across KS1 pupils should explore:

- what products are

- who products are for

- what products are for

- how products work

- how products are used

- where products might be used –

- what materials products are made from

- what they like and dislike about products

Key Stage 2

Across KS2 pupils should investigate and analyse:

- how well products have been designed

- how well products have been made

- why materials have been chosen

- what methods of construction have been used

- how well products work

- how well products achieve their purposes

- how well products meet user needs and wants

In early KS2 pupils should also investigate and analyse:

- who designed and made the products

- where products were designed and made

- when products were designed and made

- whether products can be recycled or reused

In late KS2 pupils should also investigate and analyse:

- 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

Key events and individuals

Key stage 2

Across KS2 pupils should know:

- about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products.

**Technical knowledge**

Key stage 1

Making products work

Across KS1 pupils should know:

- 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 shapes

- that food ingredients should be combined according to their sensory characteristics

- the correct technical vocabulary for the projects they are undertaking

Key stage 2

Making products work

Across KS2 pupils should know:

- how to use learning from science to help design and make products that work

- how to use learning from mathematics 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

In early KS2 pupils should also know:

- 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

In late KS2 pupils should also know:

- 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 ingredient