



D&T Objective Overview (2016-17): KS1

Purpose of study

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

Aims

The national curriculum for design and technology aims to ensure that all pupils:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

Attainment targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

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.

KS1

Designing

- 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

Understanding contexts, users and purposes

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

Generating, developing, modelling and communicating ideas

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/*selecting pictures*
- model ideas by exploring materials, components ,construction kits *and reclaimed materials* and by making templates and mockups
- use information and communication technology, where appropriate, to develop and communicate their ideas
- *follow verbal instructions*
- *name the tools they are using*
- *describe their models and drawings of ideas and intentions*
- *discuss their work as it progresses*

Making

- select from and use a range of tools and equipment to perform practical tasks [for example, 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

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| | <p>Across KS1 pupils should:</p> <ul style="list-style-type: none"> • <i>plan by suggesting what to do next</i> • select from a range of tools and equipment, <i>explaining their choices</i> • select from a <i>limited</i> range of materials and components according to their characteristics <i>that will meet the design criteria</i> • <i>select appropriate technique explaining First.....Next.....Last....</i> • <i>explore ideas by rearranging materials</i> • <i>use pictures and words to convey what they want to design and make</i> • <i>use drawings to record ideas as they are developed</i> • <i>add notes to drawings to help explanations</i> | |
| <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Practical skills and techniques</p> | <p>Across KS1 pupils should:</p> <ul style="list-style-type: none"> • 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 | |
| | <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Where food comes from</p> | <p>Across KS1 pupils should know:</p> <ul style="list-style-type: none"> • that all food comes from plants or animals • that food has to be farmed, grown elsewhere (e.g. home) or caught |
| | <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Food preparation, cooking and nutrition</p> | <p>Across KS1 pupils should know:</p> <ul style="list-style-type: none"> • how to name and sort foods into the five groups in The eatwell plate • 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 , grating and chopping with a range of ingredients • <i>develop a food vocabulary using taste ,smell, texture and feel</i> • <i>understand the need for a variety of foods in a diet</i> • <i>measure and weigh food items, non-statutory measures e.g. spoons, cups</i> |
| | <ul style="list-style-type: none"> • Colour fabrics using a range of techniques e.g. fabric paints, printing, painting • Cut out shapes which have been created by drawing round a template onto the fabric • Join fabrics by using running stitch, glue, staples ,over sewing, tape • Decorate fabrics with buttons, beads, sequins, braids, ribbons | |

- *make vehicles with construction kits which contain free running wheels*
- *use a range of materials to create models with wheels and axles e.g. tubes, dowel, cotton reels*
- *attach wheels to a chassis using an axle*
- *join appropriately for different materials and situations e.g. glue, tape,*
- *mark out materials to be cut using a template*

- *fold, tear and cut paper and card*
- *roll paper to create tubes*
- *cut along lines, straight and curved*
- *curl paper*
- *use hole punch*
- *insert paper fasteners for card linkages*
- *create hinges*
- *use simple pop ups*
- *investigate strengthening sheet materials*
- *investigate joinings- temporary, fixed and moving*

Technical Knowledge

- *build structures, exploring how they can be made stronger, stiffer and more stable*
- *explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.*

Making products work

Across KS1 pupils should know:

- DT1/1.4a** • *how freestanding structures can be made stronger, stiffer and more stable*
- *about the simple working characteristics of materials and components*
 - *about the movement of simple mechanisms such as levers, sliders, wheels and axles*
 - *that a 3-D textiles product can be assembled from two identical fabric shapes combined according to their sensory characteristics*
 - *the correct technical vocabulary for the projects they are undertaking*

Evaluating

- *explore and evaluate a range of existing products*
- *evaluate their ideas and products against design criteria*

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| | <p>Across KS1 pupils should:</p> <ul style="list-style-type: none"> • talk about their design ideas and what they are making • make simple judgements about their products and ideas against design criteria • <i>say what they like and do not like about items they have made and attempt to say why</i> • <i>talk about their designs as they develop and identify good and bad points</i> • <i>suggest how their products could be improved</i> • <i>talk about changes made during the making process</i> |
| Existing products | <p>Across KS1 pupils should explore:</p> <ul style="list-style-type: none"> • 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 events and individuals | |



D&T Objective Overview (2016-17): Lower KS2

Purpose of study

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

Aims

The national curriculum for design and technology aims to ensure that all pupils:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

Attainment targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

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.

Lower KS2

Designing

- 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

Understanding contexts, users and purposes

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

& for LKS2:

- gather information about the needs and wants of particular individuals and groups
- develop their own design criteria and use these to inform their ideas

Generating, developing, modelling and communicating ideas

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/ **to help analyse and understand how products are made**
- use computer-aided design to develop and communicate their ideas

& for LKS2:

- generate realistic ideas, focusing on the needs of the user
- *make design decisions that take account of the availability of resources*
- *investigate similar products to the one to be made to give starting points for a design*
- *think ahead about the order of their work and decide upon tools and materials*
- *plan a sequence of actions to make a product*
- *record the plan by drawing (labelled sketches) or writing*
- *develop more than one design or adaptation of an initial design*
- *propose realistic suggestions as to how they can achieve their design ideas*
- *add notes to drawings to help explanations*

Making

- 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

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| Plan | Across KS2 pupils should: <ul style="list-style-type: none">• select tools and equipment suitable for the task• <i>explain their choice of tools and equipment in relation to the skills and techniques they will be using</i>• <i>select materials and components suitable for the task</i>• <i>explain their choice of materials and components according to functional properties and aesthetic qualities</i> & for LKS2: <ul style="list-style-type: none">• <i>order the main stages of making</i> | |
| | Practical skills and techniques | Across KS2 pupils should: <ul style="list-style-type: none">• 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 |
| Where food comes from | | Across KS2 pupils should know: <ul style="list-style-type: none">• 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 |
| F o o d | | 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

& for LKS2:

- that a healthy diet is made up from a variety and balance of different food and drink, as depicted in The eatwell plate
- that to be active and healthy, food and drink are needed to provide energy for the body
- *develop sensory vocabulary/knowledge using, smell, taste, texture and feel*
- *analyse the taste, texture, smell and appearance of a range of foods*
- *follow instructions*
- *analyse the taste, texture, smell and appearance of a range of foods*
- *follow instructions • join and combine a range of ingredients e.g. snack foods*
- *work safely and hygienically*
- *measure and weigh ingredients appropriately*

- Understand seam allowance
- Join fabrics using running stitch, over sewing, back stitch
- Explore fastenings and recreate some e.g. sew on buttons and make loops
- Prototype a product using J cloths
- Use appropriate decoration techniques e.g. appliqué(glued or simple stitches)
- Create a simple pattern
- Understand the need for patterns

- 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
- *incorporate a circuit with a bulb or buzzer into a model*
- *create shell or frame structures, strengthen frames with diagonal struts*
- *make structures more stable by giving them a wide base*
- *prototype frame and shell structures*
- *measure and mark square selection, strip and dowel accordingly to 1cm*
- *use glue gun with close supervision (one to one)*

- *cut slots*
- *cut internal shapes*
- *use lolly sticks/card to make levers and linkages*
- *use linkages to make movement larger or more varied.*
- *use and explore complex pop ups*
- *create nets*

Technical Knowledge

- 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.

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*

& for LKS2:

- 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

DT1/1.4a • 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*

Evaluating

- 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

Own ideas and products

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

& for LKS2:

- refer to their design criteria as they design and make
- use their design criteria to evaluate their completed products
- *decide which design idea to develop*
- *consider and explain how the finished product could be improved*

Existing products

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

Key events and individuals

Across KS2 pupils should know:

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



D&T Objective Overview (2016-17): Upper KS2

Purpose of study

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Aims

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- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

Attainment targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

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.

Upper KS2

Designing

- 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

Understanding contexts, users and purposes

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

& for UKS2:

- 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

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/ *to help analyse and understand how products are made*
- use computer-aided design to develop and communicate their ideas

& for UKS2:

- generate innovative ideas, drawing on research
- *make design decisions, taking account of constraints such as time, resources and cost*
- *investigate products/images to collect ideas*
- *sketch and model alternative ideas*
- *develop one idea in depth*
- *combine modelling and drawing to refine ideas*
- *plan the sequence of work using a storyboard*
- *record ideas using annotated diagrams*
- *use models, kits and drawings to help formulate design ideas*
- *make prototypes*
- *use found information to inform decisions*
- *use a computer to model ideas*
- *draw plans which can be read/followed by someone else*
- *give a report using correct technical vocabulary*

Making

- 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

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| | <p>Across KS2 pupils should:</p> <ul style="list-style-type: none"> • select tools and equipment suitable for the task • <i>explain their choice of tools and equipment in relation to the skills and techniques they will be using</i> • select materials and components suitable for the task • <i>explain their choice of materials and components according to functional properties and aesthetic qualities</i> <p>& for UKS2:</p> <ul style="list-style-type: none"> • <i>produce appropriate lists of tools, equipment and materials that they need</i> • <i>formulate step-by-step plans as a guide to making</i> | | | |
| <p>Practical skills and techniques</p> | <p>Across KS2 pupils should:</p> <ul style="list-style-type: none"> • 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 | | | |
| | <table border="1"> <tr> <td data-bbox="224 660 387 1117"> <p>Where food comes from</p> </td> <td data-bbox="387 660 2150 1117"> <p>Across KS2 pupils should know:</p> <ul style="list-style-type: none"> • 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 <p>& for UKS2</p> <ul style="list-style-type: none"> • that seasons may affect the food available • how food is processed into ingredients that can be eaten or used in cooking </td> </tr> <tr> <td data-bbox="224 1117 387 1173"> <p>F o o d</p> </td> <td data-bbox="387 1117 2150 1173"> <p>Across KS2 pupils should know:</p> </td> </tr> </table> | <p>Where food comes from</p> | <p>Across KS2 pupils should know:</p> <ul style="list-style-type: none"> • 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 <p>& for UKS2</p> <ul style="list-style-type: none"> • that seasons may affect the food available • how food is processed into ingredients that can be eaten or used in cooking | <p>F o o d</p> |
| <p>Where food comes from</p> | <p>Across KS2 pupils should know:</p> <ul style="list-style-type: none"> • 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 <p>& for UKS2</p> <ul style="list-style-type: none"> • that seasons may affect the food available • how food is processed into ingredients that can be eaten or used in cooking | | | |
| <p>F o o d</p> | <p>Across KS2 pupils should know:</p> | | | |

- 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

& for UKS2:

- *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
- *prepare food products taking into account the properties of ingredients and sensory characteristics*
- *select and prepare foods for a particular purpose*
- *taste a range of ingredients, food items to develop a sensory food vocabulary for use when designing.*
- *weigh and measure using scales*
- *cut and shape ingredients using appropriate tools and equipment e.g. grating*
- *join and combine food ingredients appropriately e.g. beating, rubbing in*
- *decorate appropriately*
- *work safely and hygienically*
- *show awareness of a healthy diet from an understanding of a balanced diet*

- Create 3D products using pattern pieces and seam allowance
- Understand pattern layout
- Decorate textiles appropriately often before joining components
- Pin and tack fabric pieces together • Join fabrics using over sewing, back stitch, blanket stitch or machine stitching (closer supervision)
- Combine fabrics to create more useful properties
- Make quality products

- 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
- *use bradawl to mark hole positions*
- *use hand drill to drill tight and loose fit holes*
- *cut strip wood, dowel, square section wood accurately to 1mm*
- *incorporate motor and a switch into a model*
- *control a model using an ICT control programme*
- *use a cam to make an up and down mechanism.*
- *build frameworks using a range of materials e.g. wood, card corrugated plastic to support mechanisms*
- *use glue gun with close supervision*

- *cut slots*
- *cut accurately and safely to a marked line*
- *join and combing materials with temporary, fixed or moving joinings*
- *use craft knife, cutting mat and safety ruler under one to one supervision if appropriate*
- *choose an appropriate sheet material for the purpose*

Technical Knowledge

- 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.

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*

& for UKS2:

- 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

DT1/1.4a • 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

- 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

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| Own ideas and products | <p>Across KS2 pupils should:</p> <ul style="list-style-type: none"> • identify the strengths and areas for development in their ideas and products • consider the views of others, including intended users, to improve their work <p>& for UKS2:</p> <ul style="list-style-type: none"> • critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make • <i>evaluate their ideas and products against their original design specification</i> • <i>use the design criteria to inform their decisions about ways to proceed</i> • <i>justify their decisions about materials and methods of construction</i> • <i>reflect on their work using design criteria stating how well the design fits the needs of the user</i> • <i>identify what does and does not work in the product.</i> • <i>make suggestions as how their design could be improved</i> |
| Existing products | <p>Across KS2 pupils should investigate and analyse:</p> <ul style="list-style-type: none"> • 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 <p>& for UKS2</p> <ul style="list-style-type: none"> • 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 | <p>Across KS2 pupils should know:</p> <ul style="list-style-type: none"> • about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products |