Design Technology Curriculum Progression

Projects on a Page

A national scheme of work for design and technology at EYFS and Key Stages 1 and 2

Design and Technology						
0-11 months	8-20 months	16-26 months	22-36 months	30-50 months	40-60 months/ELG	Key Vocabulary
Explore media and materials in their familiar world. Makes movements with arms and legs which gradually become more controlled.	Enjoys the sensory experience of making marks in damp sand, paste or paint. Holds pen or paint brush using whole hand grasp and makes random marks with different strokes. Picks up small objects between thumb and finger.	Makes connections between their movements and the marks they make. Beginning to balance blocks to make a small tower.	Shows control in holding and using jugs to pour, hammers, books and mark-making tools. Experiments with blocks, colours and marks.	Uses a variety of construction materials. Beginning to construct by stacking blocks vertically and horizontally, making enclosures and creating spaces. Joins construction pieces together to build and balance. Realises tools can be used for a purpose. Uses one-handed tools and equipment e.g. makes snips in paper with scissors.	Shows increasing control over an object in pushing, patting, throwing, catching or kicking. Experiments to create different textures. Constructs with a purpose in mind, using a variety of resources. Uses simple tools and techniques competently and appropriately. Selects appropriate resources and adapts work where needed. Selects tools and techniques needed to shape, assemble and join materials they are using. Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.	design, plan, model, make, build, construct **COEL links** Playing with what they know Thinking of ideas Finding ways to solve problems Making links and noticing patterns in their experience Making predictions

Raising standards and motivating children to learn

The D&T Association is very aware of the priority that primary schools attach to children's achievement in English and mathematics. The Cambridge Primary Review indicated that primary schools with a broad, balanced and well-managed curriculum often achieve the highest standards in these subjects at the end of Key Stage 2. The Review attributes this to the role of the broader curriculum in providing meaningful contexts for children to develop and apply their learning in these subjects. However, genuine breadth and balance requires depth and quality in the teaching and learning of each subject in the curriculum.

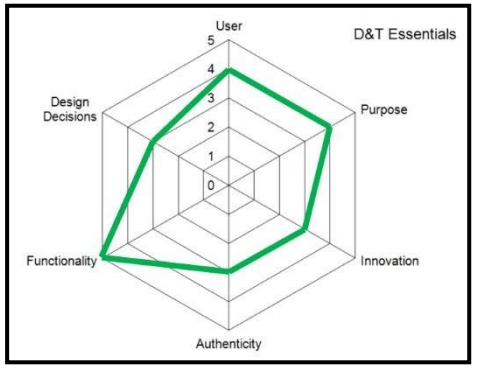
Projects on a Page ensures that D&T makes a high-quality contribution to a broad and balanced primary curriculum, helping to raise standards in English and mathematics. Research suggests D&T is one of primary-aged children's favourite subjects. Projects on a Page maximises their enjoyment by providing scope for teachers to meet children's needs and interests through creative and motivating projects within a range of contexts.

D&T essentials

Projects on a Page is based on the six essentials of good practice in D&T. These need to be in place in teachers' planning to ensure children's learning is genuinely design and technological in nature. They are consistent with the National Curriculum requirements and should be applied whenever children are designing and making products:

- **User** – children should have a clear idea of who they are designing and making products for, considering their needs, wants, interests or preferences. The user could be themselves, an imaginary character, another person, client, consumer or a specific target audience.
- **Purpose** – children should know what the products they design and make are for. Each product should perform a clearly defined task that can be evaluated in use.
- **Functionality** – children should design and make products that function in some way to be successful. Products often combine aesthetic qualities with functional characteristics. In D&T, it is insufficient for children to design and make products which are purely aesthetic.
- **Design Decisions** – when designing and making, children need opportunities to make informed decisions such as selecting materials, components and techniques and deciding what form the products will take, how they will work, what task they will perform and who they are for.
- **Innovation** – when designing and making, children need some scope to be original with their thinking. Projects that encourage innovation lead to a range of design ideas and products being developed, characterised by engaging, open-ended starting points for children's learning.
- **Authenticity** – children should design and make products that are believable, real and meaningful to themselves i.e. not replicas or reproductions or models which do not provide opportunities for children to make design decisions with clear users and purposes in mind.

The six essentials are embedded into the Project Planners, each of which has suggestions for users and purposes, and a list of authentic products that children could design and make. Each Planner has a star diagram that enables you to evaluate the overall potential of the project to ensure each of the D&T essentials has been addressed. Different projects will have a different profile. Schools may wish to evaluate projects in long-term planning to ensure each essential is adequately addressed over the course of a year or key stage.



1. Year Groups

Years 3/4

2. Aspect of D&T

Mechanical systems

Focus

Levers and linkages

3. Key learning in design and technology

Prior learning

- Explored and used mechanisms such as flaps, sliders and levers.
  [Check if the children have done this in KS1]
- Gained experience of basic cutting, joining and finishing techniques with paper and card.

Designing

- Generate realistic ideas and their own design criteria through discussion, focusing on the needs of the user.
- Use annotated sketches and prototypes to develop, model and communicate ideas.

Making

- Order the main stages of making.
- Select from and use appropriate tools with some accuracy to cut, shape and join paper and card.
- Select from and use finishing techniques suitable for the product they are creating.

Evaluating

- Investigate and analyse books and, where available, other products with lever and linkage mechanisms.
- Evaluate their own products and ideas against criteria and user needs, as they design and make.

Technical knowledge and understanding

- Understand and use lever and linkage mechanisms.
- Distinguish between fixed and loose pivots.
- Know and use technical vocabulary relevant to the project.

4. What could children design, make and evaluate?

story book poster class display
greetings card information book
storyboard other – specify

5. Intended users

themselves younger children older children
teenagers parents grandparents
visitor to school friends other – specify

6. Purpose of products

celebration event information
pleasure interests hobbies campaign
educational other – specify

7. Links to topics/themes

Festivals and Celebrations Favourite Books
history-based topic geography-based topic
science-based topic
other – specify

8. Possible contexts

home school leisure culture
enterprise environment local community
other – specify

9. Project title

Design, make and evaluate a **greetings card** (product) for **family and friends** (user) for **Christmas** (purpose).

To be completed by the teacher. Use the project title to set the scene for children's learning prior to activities in 10, 12 and 14.

10. Investigative and Evaluative Activities (IEAs)

- Children investigate, analyse and evaluate books and, where available, other products which have a range of lever and linkage mechanisms.
- Evaluate a range of greetings cards.
- Use questions to develop children's understanding e.g. *Who might it be for? What is its purpose? What do you think will move? How will you make it move? What part moved and how did it move? How do you think the mechanism works? What materials have been used? How effective do you think it is and why? What else could move?*
  Which of the moving pictures will appeal to younger children, older children, adults, grandparents?

11. Related learning in other subjects

- **Spoken language** – participate in discussion and evaluation of books and, where available, other products with moving pictures. Ask relevant questions to extend knowledge and understanding. Build technical vocabulary.

12. Focused Tasks (FTs)

- Demonstrate a range of lever and linkage mechanisms to the children using prepared teaching aids.
- Use questions to develop children's understanding e.g. *Which card strip is the lever? Which card strip is acting as the linkage? Which part of the system is the input and which part the output? What does the type of movement remind you of? Which are the fixed pivots and which are the loose pivots?*
- Demonstrate the correct and accurate use of measuring, marking out, cutting, joining and finishing skills and techniques.
- Children should develop their knowledge and skills by replicating one or more of the teaching aids.

13. Related learning in other subjects

- **Mathematics** – use the vocabulary of position, direction and movement. Use a ruler to measure to the nearest cm, half cm or mm.
- **Spoken language** – ask relevant questions to extend knowledge and understanding. Build their technical vocabulary.
- **Art and design** – use colour, pattern, line, shape.

14. Design, Make and Evaluate Assignment (DMEA)

- Develop a design brief with the children within a context which is authentic and meaningful.
  i.e. greetings cards for family and friends.
- Discuss with children the purpose of the products they will be designing and making and who the products will be for. Ask the children to generate a range of ideas, encouraging creative responses. Agree on design criteria that can be used to guide the development and evaluation of the children's products.
- Using annotated sketches and prototypes, ask the children to develop, model and communicate their ideas.
- Ask the children to consider the main stages in making before assembling high quality products, drawing on the knowledge, understanding and skills learnt through IEAs and FTs.
- Evaluate the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.

15. Related learning in other subjects

- **Spoken language** – ask relevant questions to extend knowledge and understanding. Build technical vocabulary. Consider and evaluate different viewpoints.
- **Computing** – digital graphics and text could be incorporated into final products as the background or moving parts.
- **Art and design** – use and develop drawing techniques. Use colour, pattern, line, shape.

16. Possible resources

books and other products with lever and linkage mechanisms

greetings cards

lever and linkage teaching aids

card strips, card rectangles, paper, masking tape, paper fasteners, paper binders, stick glue

left/right handed scissors, cutting mats, card drill, finishing media and materials

17. Key vocabulary

mechanism, lever, linkage, pivot, slot, bridge, guide

system, input, process, output

linear, rotary, oscillating, reciprocating

user, purpose, function

prototype, design criteria, innovative, appealing, design brief

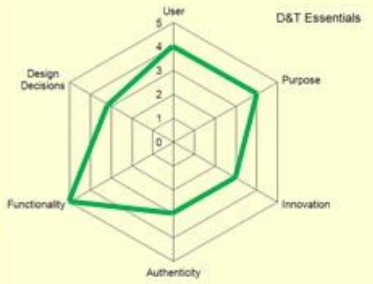
18. Key competencies

problem-solving teamwork negotiation
consumer awareness organisation motivation
persuasion leadership perseverance
other – specify

19. Health and safety

Pupils should be taught to work safely, using tools, equipment, materials, components and techniques appropriate to the task. Risk assessments should be carried out prior to undertaking this project.

20. Overall potential of project



Building on the Early Years Foundation Stage

The statutory Early Years Foundation Stage (EYFS) framework for England clearly identifies the role of design and technology in young children's learning and the subject is specifically named in the area of learning 'Expressive Arts and Design'. It is therefore extremely important to build on children's prior learning in the EYFS when planning D&T projects in KS1.

D&T in the EYFS
The early learning goals for Expressive Arts and Design indicate what children should know, understand and be able to do by the end of the reception year. A significant proportion of this learning should be delivered through high quality D&T experiences and activities, enabling children to 'safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function' and 'use what they have learnt about media and materials in original ways, thinking about uses and purposes'. D&T also makes an important contribution to young children's learning across the remaining six areas of the EYFS framework, including Understanding the World, Physical Development, Literacy, Mathematics, Personal, Social and Emotional Development, and Communication and Language.

Identifying prior learning
Children's experience of D&T in the EYFS may have included some or all of the following elements:

- Designing by talking about what they intend to do, are doing and have done.
- Saying who and what their products are for.
- Drawing what they have made, with some children drawing their ideas before they make.
- Opportunities to make their own choices and to discuss the reasons for these.
- Learning procedures for safety and hygiene.
- Developing practical skills and techniques using a range of materials including food, textiles and construction materials.
- Developing their knowledge and understanding in relation to mechanisms, structures, food and textiles.
- Exploring and using a range of construction kits.
- Asking questions about a range of existing products.
- Exploring the designed and made world through the indoor and outdoor environment, and through roleplay.
- Learning and using appropriate technical vocabulary.

The Y1/2 Project Planners specifically identify what children should ideally have learnt in the EYFS before carrying out the project. Early years teachers will have used the flexibility available in the EYFS framework to ensure curriculum content is appropriate to young children's developmental needs. Y1/2 teachers may therefore need to adjust the pitch of Project Planners – either where prior learning from EYFS has not been covered or where more challenge is required in KS1 to move children's learning on.

EYFS

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Designing	Key Stage 1	Key Stage 2
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	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	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	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	**Key Stage 1**	**Key Stage 2**
Planning	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	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	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	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	Key Stage 1	Key Stage 2
Own ideas and products	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*	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	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	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	Not a requirement in KS1	Across KS2 pupils should know: • about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products
Technical knowledge	**Key Stage 1**	**Key Stage 2**
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*	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 ingredients*
Cooking and nutrition	**Key Stage 1**	**Key Stage 2**
Where food comes from	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 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
Food preparation, cooking and nutrition	Across KS1 pupils should know: • 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 and grating	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 plate • 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

Full list of 21 planners

Key Stage 1

- Year 1/2 Mechanisms – Sliders and levers
- Year 1/2 Structures – Freestanding structures
- Year 1/2 Food – Preparing fruit and vegetables
- Year 1/2 Textiles – Templates and joining techniques
- Year 1/2 Mechanisms – Wheels and axles

Early Key Stage 2

- Year 3/4 Mechanical Systems – Levers and linkages
- Year 3/4 Mechanical Systems – Pneumatics
- Year 3/4 Structures – Shell structures using computer-aided design
- Year 3/4 Electrical Systems – Simple programming and control
- Year 3/4 Textiles – 2-D shape to 3-D product
- Year 3/4 Food – Healthy and varied diet
- Year 3/4 Structures – Shell structures
- Year 3/4 Electrical Systems – Simple circuits and switches

Late Key Stage 2

- Year 5/6 Food – Celebrating culture and seasonality
- Year 5/6 Textiles – Combining different fabric shapes
- Year 5/6 Structures – Frame structures
- Year 5/6 Electrical Systems – More complex switches and circuits
- Year 5/6 Mechanical Systems – Pulleys or gears
- Year 5/6 Mechanical Systems – Cams
- Year 5/6 Textiles – Using computer-aided design in textiles
- Year 5/6 Electrical Systems – Monitoring and control