PoaP additional planners for Key Stage 2: guidance 2016

Introduction

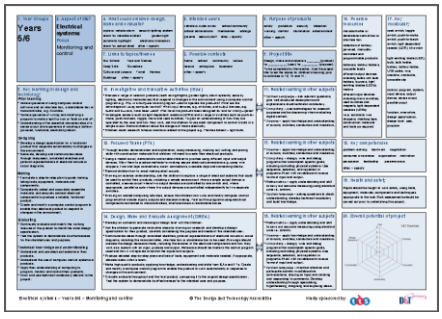
Projects on a Page: A national scheme of work for design and technology at Key Stages 1 and 2

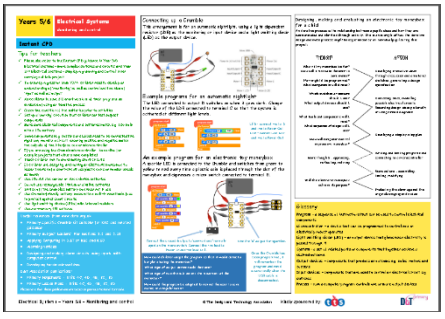
Projects on a Page was introduced in 2014 to help primary schools in England implement the National Curriculum for D&T in an imaginative way. Based on universal principles of effective teaching and learning in D&T, it is also a valuable resource for schools in other parts of the UK and further afield.

The following six additional project planners for Key Stage 2 add to and supplement the original fifteen planners. Two can be taught as alternatives to existing planners and the other four should be read alongside Side 2 of the equivalent planners in original scheme of work, as indicated below.

Age group	Aspect of D&T	Focus	Description
Year 3/4	Mechanical Systems	Pneumatics	Exploring simple mechanisms and using a range of materials to help children design and make appropriate products using syringes, tubes, plastic bottles etc. This can be taught as an alternative to the original Projects on a Page 'Levers and Linkages'.
Year 3/4	Structures	Shell structures using computer-aided design	Using simple CAD tools such as Microsoft Word and Techsoft 2D Primary to create nets for packaging and other shell structures in products that children design and make. Please read in conjunction with Side 2 of the original 'Shell Structures' planner.
Year 3/4	Electrical Systems	Simple programming and control	Introducing simple programing and control using the example of a Crumble controller and different output devices that children might include in their products. Please read in conjunction with Side 2 of the original 'Simple Circuits and Switches' planner.
Year 5/6	Mechanical Systems	Cams	Using cams in a range of ways to generate different kinds of movement. This can be taught as an alternative to the original Projects on a Page 'Pulleys or Gears'.
Year 5/6	Electrical Systems	Monitoring and control	Developing more complex programmable circuits with a wider range of applications using different input and output devices and the example of a Crumble controller. Please read in conjunction with Side 2 of the original Y5/6 planner 'More Complex Switches and Circuits' and Side 2 of the additional Y3/4 planner 'Simple Programming and Control'.
Year 5/6	Textiles	Using computer-aided design in textiles	Applying software such as Wild Things to generate accurate patterns for a range of possible textile products that children might design. Please read in conjunction with Side 2 of the original 'Combining different Fabric Shapes' planner.

Each planner has 20-step planning guidance and accompanying teacher tips, a glossary, an example of iterative design appropriate to the project, and practical advice on using resources.





The original fifteen Projects on a Page planners comprise the following:

Age group	Focus	Title
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
Year 3/4	Textiles	2-D shape to 3-D product
Year 3/4	Food	Healthy and varied diet
Year 3/4	Mechanical Systems	Levers and linkages
Year 3/4	Structures	Shell structures
Year 3/4	Electrical Systems	Simple circuits and switches
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

The following guidance is adapted from the original teachers' handbook for Projects on a Page.

Aims

The scheme of work has four main aims:

a. To enable you to use your creativity and professional judgment to plan and teach successful D&T projects each term.

b. To help schools cover the National Curriculum 2014 requirements.

c. To provide helpful sketches, diagrams, tips and techniques that will make teaching D&T easier and more rewarding.

d. To ensure that all the D&T taught in your school enables children to design, make and evaluate functional products with users and purposes in mind.

How is this scheme of work different?

Projects on a Page is different from schemes of work you may have used before in D&T or other subjects. Compared to the widely used QCA scheme of work, Projects on a Page has a number of advantages:

- **More flexibility and less prescription** – you, in discussion with the children in your class, decide what products they will design and make, who their products will be for and what purposes they will perform.
- **Making links to topics and themes** – the Project Planners are context-free to make it much easier to link D&T to cross-curricular topics or themes.
- **Essentials of good practice in D&T** – each Project Planner emphasises the essentials of good practice in D&T to ensure children receive a genuine D&T experience.
- **Projects on a page** – all the elements or 'building blocks' of a project can be seen together on one side of the Project Planner.
- **Instant CPD** – on the other side of the Project Planner is user-friendly guidance with sketches, diagrams, tips and techniques.
- **Year groups** – projects are suitable for single year group classes and mixed-age classes.
- **Cross-curricular links** – there is more emphasis on making links to other National Curriculum subjects as children carry out their D&T projects.

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.

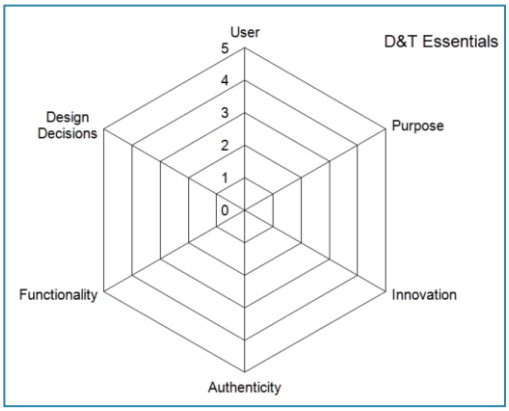
D&T essentials

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 new 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.



Using the scheme to meet National Curriculum requirements

Projects on a Page has been written to help primary schools implement all aspects of the National Curriculum programmes of study for KS1 and 2:

Structure of the programmes of study

The National Curriculum for D&T has a 'purpose of study' statement which explains what the subject is about and why it is important for children's learning. This is followed by four broad 'aims' that set out the goals for learning over the course of Key Stages 1 to 3. 'Subject content' sets out what should be taught at each key stage. In D&T there are two strands of subject content: designing and making, and cooking and nutrition. As well as addressing the subject content for KS1 and 2, Projects on a Page reflects the purpose of study and meets the aims in a way that is appropriate to children's ages.

Process and breadth

At the heart of Projects on a Page is the designing and making process in the programmes of study. The scheme of work ensures children design, make and evaluate products using the broad range of materials and components specified in the statutory requirements. These include construction materials, textiles, food, mechanical components and, in Key Stage 2 only, electrical components. Each Project Planner lists a range of possible resources to use including tools, equipment and materials which you should adapt as appropriate. This will also help you meet the needs of the children in your class and ensure you comply with health and safety policy and guidance.

Coverage and progression

Projects on a Page provides progression and coverage of the new NC programmes of study for KS1 and 2. For each planner, National Curriculum coverage is indicated in *Key Learning in D&T*, setting out what children should have previously learnt and summarising what they will learn through the project. This provides more detail than the programmes of study to indicate an appropriate expectation for children's learning according to their ages.

Three types of D&T activities

The new programmes of study state what should be taught in KS1 and 2, but do not provide detail on how it should be taught. Building on current good practice, each Project Planner includes three types of activity:

- *Investigative and Evaluative Activities (IEAs)* where children learn from a range of existing products and find out about D&T in the wider world;
- *Focused Tasks (FTs)* where they are taught specific technical knowledge, designing skills and making skills;
- *Design, Make and Evaluate Assignment (DMEA)* where children create functional products with users and purposes in mind.

For children to understand the context for their project, it is advisable to give them an overview of what they will be designing, making and evaluating before they undertake any activities.

Through IEAs and FTs children are equipped with the knowledge, understanding and skills to engage successfully and with increasing independence in a DMEA. IEAs and FTs do not have to be followed in sequence and it is good practice to dip in and out of these activities to meet children's needs.

More than the National Curriculum

The new programmes of study set out only the essential, core knowledge, understanding and skills. To promote best practice in schools, Projects on a Page includes some important, additional elements which are not in the statutory requirements (e.g. planning the sequence in which products are made). It also adds to the list of non-statutory examples (e.g. imaginary contexts in KS1).

Food technology

In Projects on a Page, designing and making, and cooking and nutrition are linked in children's learning. This means that as part of their food technology projects they will apply the principles of nutrition and healthy eating, learn how to prepare dishes at KS1 and prepare and cook dishes at KS2. The food technology Project Planner in KS1 requires them to prepare dishes with fresh fruit and vegetables without using a heat source. In the KS2 projects, children prepare and cook dishes, using a wider range of ingredients, using a heat source where appropriate.

New curriculum content

Projects on a Page incorporates these new elements of the programmes of study:

- using design criteria at KS1
- encouraging innovative designing at KS2
- ensuring the process of designing and making is iterative in both key stages
- using cross-sectional and exploded diagrams at KS2
- learning about key events and individuals in design and technology at KS2
- applying computing at KS2 to programme, monitor and control products
- using computer-aided design at KS2
- understanding and using the concept of a system at KS2
- working within a range of relevant contexts such as domestic, local and industrial in both key stages
- understanding and applying principles of a healthy and varied diet
- understanding where food comes from at KS1
- at KS2, understanding seasonality and where and how a variety of ingredients are grown, reared, caught and processed.

Through www.data.org.uk the Design and Technology Association will be providing more detailed guidance on specific areas of the new requirements, such as programming, monitoring and control, and key events and individuals in D&T.

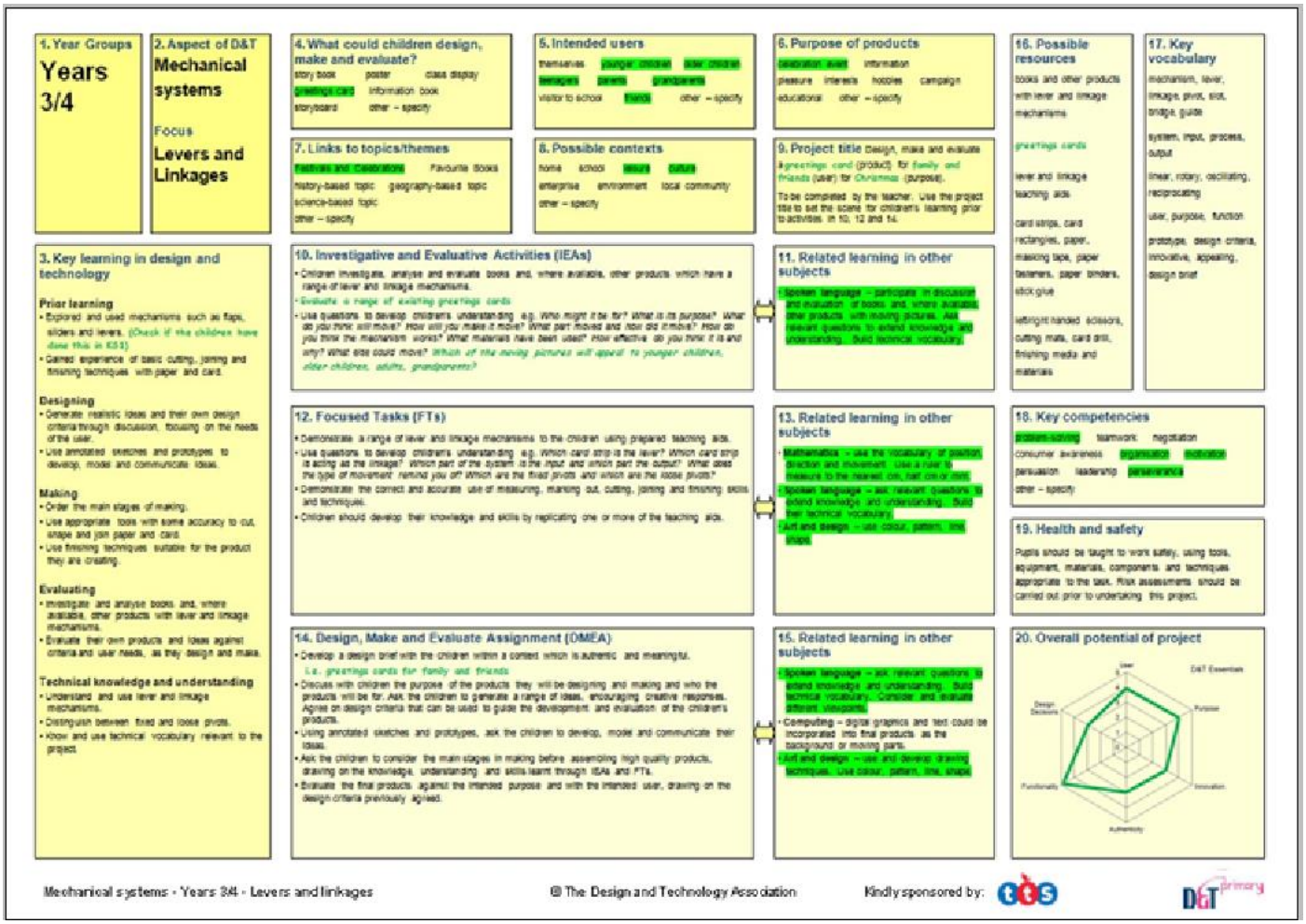
Health, safety and hygiene

The new National Curriculum programmes of study do not include references to safety and hygiene. When using Projects on a Page schools should ensure that practice in the subject is healthy, safe and hygienic. Children 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 D&T projects. In food technology identify whether there are any children who are not permitted to taste or handle any food ingredients or products. School, employer and local authority policy and guidance on health and safety should be followed.

Using the project planners

Build your own projects

Side one of each Project Planner provides the kit of essential 'building blocks' that should be included to achieve good practice in D&T. The planners come to life in the classroom when teachers engage with them by highlighting, completing or adding to the text as appropriate. There are twenty blocks of text to consider and edit as required. This is a relatively quick and straightforward process, particularly with the electronic versions, with lots of helpful ideas to choose from.



The building blocks for each planner are numbered so that you follow a logical procedure from point 1 to point 20, leading to high quality projects that are customised to meet local needs and interests. The highlighted and annotated example shows that there is plenty of detail and many options to choose from. The idea is to tailor it so that it works for you and your class.

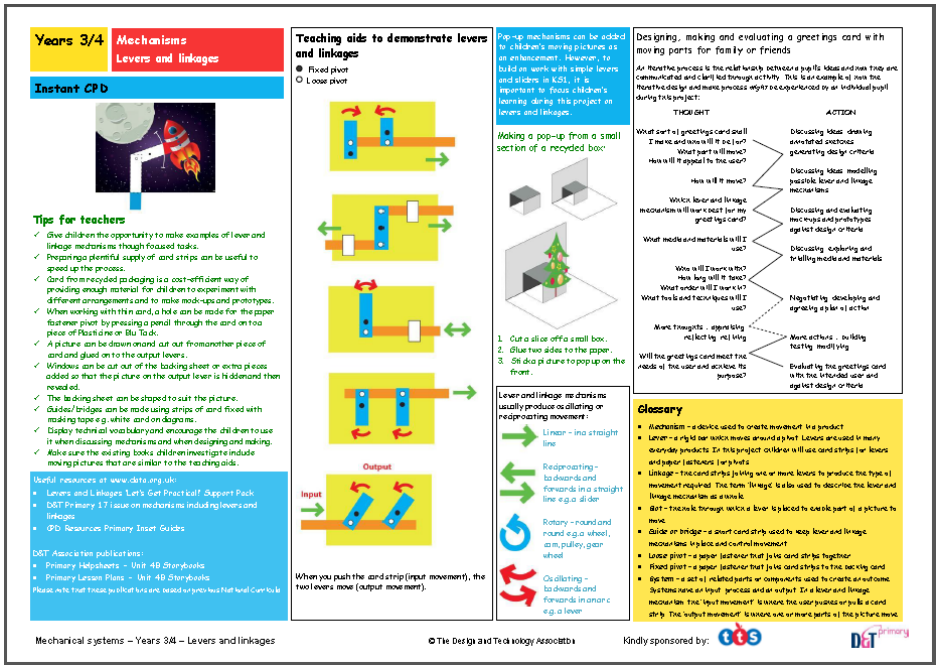
The procedure for each project planner is the same:

1. **Year groups** – referring to the school's D&T long-term plan, select a Project Planner appropriate to the year group(s) you teach.
2. **Aspect of D&T and Focus** – this clearly states what aspect of D&T is being covered and the focus for children's learning according to their age.
3. **Key learning in D&T** – this starts by stating what children should have previously learnt, then summarises the key learning within designing, making, evaluating and technical knowledge and understanding, including what is covered in the new programmes of study. You may need to adapt this if prior learning has been missed or if more challenge is required to move children's learning on.
4. **What could children design and make?** This is where you select from the range of products recommended or suggest an alternative that is consistent with the key learning for the project.

5. **Intended users** – you select the intended user or users for the children's products from the list or suggest an alternative.
6. **Purpose of products** – you select a purpose for the children's products from the list or suggest an alternative.
7. **Links to topics and themes** – when selecting what children might design and make, think about what would fit well with your termly or half termly topic or theme. Select from one of the topics or themes listed or add your own.
8. **Possible contexts** – select the broader context or contexts that children will work in when carrying out the project.
9. **Project title** – on the basis of all the above, you decide upon and complete the title for the project, including in general terms what children will design and make, who it will be for and what purpose it will fulfil.
10. **12. 14. IEAs, FTs and DMEA** – having established the key learning, context, purpose and user, you need to consider the main D&T activities suggested and annotate these to suit what children will be designing and making.
11. **13. 15. Related activities in other subjects** – you make selections from the list of possibilities or suggest your own.
16. **Possible resources** – these are possible resources for the project, not a definitive list.
17. **Key vocabulary** – this is a list of the key technical vocabulary, not a complete list.
18. **Key competencies** – select from those which children are likely to develop through the project.
19. **Health and safety** – a general reminder about risk assessment and health and safety.
20. **Overall potential of project** – here you rate the project prior to carrying it out to ensure that each of the D&T essentials has been adequately addressed.

Instant CPD

Side two of each planner provides Instant CPD in a helpsheet format to support you in teaching the project in the classroom. It includes sketches and diagrams, teaching tips and techniques, suggestions on class organisation, links to resources and a glossary of technical terminology related to the project. It also provides an example of how children might engage in an 'iterative' designing and making process, which is a requirement of the programmes of study in KS1 and 2. During an iterative process children's ideas are communicated and clarified through action. In contrast to a rigid design-make-evaluate process, in an iterative process thought leads to action, resulting in further thought and action as children create their products.



Long-term planning

To ensure that children receive the breadth of learning required by the National Curriculum and that they increase their knowledge, understanding and skills over time, it is essential to devise a long-term plan. When revising or developing the plan, it is advisable to consider the principles illustrated in the example plan:

- To ensure that the requirements of the programmes of study are met effectively, aim to complete one project per term or six projects in KS1 and twelve in KS2.
- As long as projects are covered within the two year block (e.g. Early Key Stage 2), they can be taught in any order. This means that projects can be matched with termly topics or themes and links can be made with related learning in other subjects, such as science, mathematics or art and design.
- Ensure that each term's project addresses a particular aspect of the subject. At KS1, these are mechanisms, structures, food and textiles, and at KS2 mechanical systems, electrical systems, structures, food and textiles.
- To ensure coverage with mixed-age classes, use a two year rolling programme or cycle, where all children in KS1 and 2 complete Year A, and then Year B, at the same time. Where the whole of KS2 is taught in one class, consider using a four year rolling programme.
- Identify the focus for children's learning in each project you are undertaking e.g. the focus for the Y1/2 Project Planner on textiles is 'templates and joining techniques'.
- Teach two mechanisms projects in KS1 – one on sliders and levers, and the other on wheels and axles. This will ensure the necessary prior learning for mechanical systems projects in KS2 on lever and linkages, and pulleys or gears.
- Build the requirements for 'cooking and nutrition' in each key stage into projects on food. These requirements have been incorporated into each of the Project Planners on food.
- There are fifteen Project Planners in total, with five for Y1/2, five for Y3/4 and five for Y5/6. This means that there are three terms across KS1 and 2 where schools can carry out an additional project. To comply with the 'cooking and nutrition' requirements that children should 'prepare dishes' (i.e. more than one dish) in KS1 and a 'prepare and cook a variety of predominantly savoury dishes' (i.e. several dishes) in KS2, schools may wish to reuse the food Project Planners to carry out an additional project with food in Y1/2, Y3/4 and Y5/6, identifying different products, user and purposes. This is particularly advisable if no additional, standalone food preparation and cooking activities have been planned.

Example long-term plan including the six additional KS2 planners

Key Stage 1

Y1 or A

Mechanisms Sliders and levers	**Structures** Freestanding structures	**Food** Preparing fruit and vegetables (including cooking and nutrition requirements for KS1)

Y2 or B

Mechanisms Wheels and axles	**Food** Preparing fruit and vegetables (including cooking and nutrition requirements for KS1)	**Textiles** Templates and joining techniques

Early Key Stage 2

Y3 or A

Structures Shell structures using computer-aided design	**Food** Healthy and varied diet (including cooking and nutrition requirements for KS2)	**Textiles** 2D shape to 3D product

Y4 or B

Mechanical Systems Pneumatics	**Electrical Systems** Simple programming and control	**Food** Healthy and varied diet (including cooking and nutrition requirements for KS2)

Late Key Stage 2

Y5 or A

Structures Frame structures	**Food** Celebrating culture and seasonality (including cooking and nutrition requirements for KS2)	**Electrical Systems** Monitoring and control

Y6 or B

Textiles Using computer-aided design in textiles	**Mechanical Systems** Cams	**Food** Celebrating culture and seasonality (including cooking and nutrition requirements for KS2)

Cross-curricular links

As well as having its own body of knowledge, understanding and skills, D&T can helpfully draw on learning from a range of other subjects.

Cross-curricular long-term planning

At the long-term planning stage it is important to identify and map major connections between D&T and other subjects so that opportunities to enhance children's learning are not missed.

Children's knowledge and understanding in science is often closely related to D&T projects. An example in KS1 is using children's knowledge of the simple physical properties of materials to help select the textiles they will use for a coat for Teddy and in KS2, using their understanding of electricity to help design and make a battery-powered night light. Where there are significant links of this type, it would be advisable to move the D&T project into a term which capitalises on the equivalent learning in science. Similarly, some D&T projects have a particular bias towards mathematical understanding (e.g. 2-D and 3-D shapes when creating packaging), art and design (e.g. finishing techniques when creating bags) and computing (e.g. programming, monitoring and control of alarm systems).

Within each Project Planner ongoing opportunities for related learning in other subjects have been suggested. Spoken language is included in every project as it is fundamental to the development, communication and evaluation of children's design ideas, their ability to use technical vocabulary, ask and answer questions about a range of existing products, state who and what their products are for, and explain how they work.

When to make the link

Think carefully about when to establish a link between D&T and other subjects. If you can answer 'yes' to each of the questions below then it is probably a link worth making!

Does the link:

- enhance children's ability to design, make and evaluate products?
- provide a natural overlap in children's learning?
- maintain the distinctive nature of D&T?
- match learning in the same year groups in both D&T and the other subject?
- make sense to children?

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.

Assessment and progression

Projects on a Page enables you to check what children have learnt and determine whether they are on track to meet National Curriculum expectations by the end of each key stage.

Using the Project Planners

Building a picture of what children know, understand and can do in each D&T project is essential for moving their learning forward. Each planner lists the 'key learning' in designing, making, evaluating and technical knowledge and understanding that most children should develop as they undertake the project. This addresses and extends National Curriculum requirements at KS1 and 2 and is consistent with the Progression Framework.

The knowledge, understanding and skills specified in key learning should form the basis of learning objectives for each D&T session and should be used to help focus your discussions with children and inform your observations. The information you gather during projects about the performance of individual children and groups will enable you to provide carefully tailored feedback, questioning, explanation and support, according to their needs. When each project has been completed, it is important to think about those children whose progress is markedly different from the expectations in the Project Planner. You may wish to make a note of these children and use this information to offer them additional support or challenge, as required, in the next project they carry out.

Using the Progression Framework

The Progression Framework provides a series of developmental steps intended to help schools with curriculum planning. It may also help schools to assess whether children are on track to meet end of key stage expectations in the National Curriculum.

The Framework comprises age-related expectations across KS1 and KS2, with specific expectations for early KS2 (Y3/4) and late KS2 (Y5/6). Importantly, the framework also includes elements of D&T which are not included in the programmes of study which are considered by the Design and Technology Association to be fundamental to children's learning in KS1 and 2.

The Framework works most effectively if a cumulative approach to progression is adopted. This means that, where appropriate, children's learning from KS1 is revisited in early KS2 and their learning from KS1 and early KS2 is revisited in late KS2, each time using the knowledge, understanding or skills in a more sophisticated way. This is particularly relevant for aspects of learning that are only mentioned once but would need to be re-visited e.g. using mock-ups only appears in KS1 but should also feature in children's learning in KS2.

A 'clickable' version of the Progression framework is freely available from the D&T Association's website. This enables subject leaders and classroom teachers to click on particular expectations that need further exemplification. Clicking on a link causes a 'vignette' to pop up which provides a commentary on what each expectation means, with examples of what children might say or do to meet the expectation and/or how teachers might support children's learning in the classroom.