

The importance of design and technology

In design and technology pupils combine practical and technological skills with creative thinking to design and make products and systems that meet human needs. They learn to use current technologies and consider the impact of future technological developments. They learn to think creatively and intervene to improve the quality of life, solving problems as individuals and members of a team.

Working in stimulating contexts that provide a range of opportunities and draw on the local ethos, community and wider world, pupils identify needs and opportunities. They respond with ideas, products and systems, challenging expectations where appropriate. They combine practical and intellectual skills with an understanding of aesthetic, technical, cultural, health, social, emotional, economic, industrial and environmental issues. As they do so, they evaluate present and past design and technology, and its uses and effects. Through design and technology pupils develop confidence in using practical skills and become discriminating users of products. They apply their creative thinking and learn to innovate.

1. Key concepts

There are a number of key concepts that underpin the study of design and technology. Pupils need to understand these concepts in order to deepen and broaden their knowledge, skills and understanding.

1.1 Designing and making

1. Understanding that designing and making has aesthetic, [environmental](#), technical, [economic](#), ethical and social dimensions and impacts on the world.
2. Applying knowledge of materials and production processes to design products and produce practical solutions that are relevant and fit for purpose.
3. Understanding that products and systems have an impact on quality of life.
4. Exploring how products have been designed and made in the past, how they are currently designed and made, and how they may develop in the future.

1.2 Cultural understanding

1. Understanding how products evolve according to users' and designers' needs, beliefs, ethics and values and how they are influenced by local customs and traditions and available materials.
2. Exploring how products contribute to lifestyle and consumer choices.

1.3 Creativity

1. [Making links](#) between principles of good design, existing solutions and technological knowledge to develop innovative products and processes.
2. Reinterpreting and applying learning in new design contexts and communicating ideas in new or unexpected ways.

3. Exploring and experimenting with ideas, materials, technologies and techniques.

1.4 Critical evaluation

1. [Analysing existing products and solutions](#) to inform designing and making.
2. Evaluating the needs of users and the context in which products are used to inform designing and making.
3. Exploring the impact of ideas, design decisions and technological advances and how these provide opportunities for new design solutions.

2. Key processes

These are the essential skills and processes in design and technology that pupils need to learn to make progress.

Pupils should be able to:

1. [generate, develop, model and communicate ideas in a range of ways](#), using [appropriate strategies](#)
2. respond creatively to briefs, developing their own proposals and producing specifications for products
3. [apply their knowledge and understanding of a range of materials, ingredients](#) and technologies to design and make their products
4. [use their understanding of others' designing to inform their own](#)
5. [plan and organise activities](#) and then shape, form, mix, assemble and finish materials, components or ingredients
6. evaluate which hand and machine tools, equipment and computer-aided design/manufacture (CAD/CAM) facilities are the most appropriate to use
7. solve technical problems
8. [reflect critically when evaluating and modifying their ideas and proposals to improve products](#) throughout their development and manufacture.

3. Range and content

This section outlines the breadth of the subject on which teachers should draw when teaching the key concepts and key processes.

1. The curriculum should include resistant materials, systems and control and [at least one of food or textiles product areas](#).

In each product area the study of **designing** should include understanding of:

2. [users' needs and the problems arising from them](#)
3. [the criteria used to judge the quality of products](#), including fitness for purpose, the extent to which they meet a clear need and whether resources have been used appropriately
4. the impact of products beyond meeting their original purpose and how to [assess products in terms of sustainability](#)

5. aesthetic, technical, [constructional](#) and relevant wider issues that may influence designing, selection of materials, making and product development.

The study of making in **food** should include:

6. a broad range of practical skills, techniques, equipment and standard recipes, and how to use them to develop, plan and cook meals and single or multiple products
7. how to plan and carry out a broad range of practical cooking tasks [safely and hygienically](#)
8. healthy eating models relating to a [balanced diet](#), the nutritional needs of different groups in society and the factors affecting food choice and how to take these into account when planning, preparing and cooking meals and products
9. the characteristics of a broad range of ingredients, including their [nutritional, functional](#) and [sensory properties](#).

The study of making in **resistant materials** and **textiles** should include:

10. a broad range of techniques, including handcraft skills and [CAD/CAM](#), and how to use them to ensure consistency and precision when making single and multiple products
11. the behaviour of [structural elements](#) in a variety of materials
12. how to use [materials, smart materials, technology and aesthetic qualities](#) to design and make products of worth
13. how to prepare and assemble components to achieve functional results.

The study of making in **systems** and **control** should include:

14. [the practical application of systems and control](#) in design proposals
15. electrical, electronic, mechanical, microprocessor and computer control systems and how to use them effectively
16. using systems and control to [assemble subsystems into more complex systems](#)
17. [feedback](#) and how a variety of inputs can give rise to a variety of outputs.

4. Curriculum opportunities

During the key stage pupils should be offered the following opportunities that are integral to their learning and enhance their engagement with the concepts, processes and content of the subject.

In ways appropriate to the product area, the curriculum should provide opportunities for pupils to:

1. [analyse products](#) to learn how they function
2. undertake focused tasks that develop knowledge, skills and understanding in relation to [design and make assignments](#)

3. engage in design and make assignments in different and progressively more complex contexts, including for purposes and uses beyond the classroom
4. work individually and in teams, taking on different roles and responsibilities
5. work with [designers and makers](#) where possible to develop an understanding of the product design process
6. [use ICT as appropriate](#) for image capture and generation; data acquisition, capture and handling; controlling; and product realisation
7. make links between design and technology and [other subjects and areas of the curriculum](#).