### Importance of Design and Technology Key Stage 3

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 of Design and Technology Key Stage 3

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

a. Understanding that designing and making has aesthetic, environmental, technical, economic, ethical and social dimensions and impacts on the world.

b. Applying knowledge of materials and production processes to design products and produce practical solutions that are relevant and fit for purpose.

c. Understanding that products and systems have an impact on quality of life.

d. 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

a. 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.

b. Exploring how products contribute to lifestyle and consumer choices.

#### 1.3 Creativity

a. Making links between principles of good design, existing solutions and technological knowledge to develop innovative products and processes.

b. Reinterpreting and applying learning in new design contexts and communicating ideas in new or unexpected ways.

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

#### 1.4 Critical Evaluation

a. Analysing existing products and solutions to inform designing and making.

b. Evaluating the needs of users and the context in which products are used to inform designing and making.

c. Exploring the impact of ideas, design decisions and technological advances and how these provide opportunities for new design solutions.

### 2. Key Processes of Design and Technology Key Stage 3

These are the essential skills and processes in design and technology that pupils need to learn to make progress. Pupils should be able to:

a. Generate, develop, model and communicate ideas in a range of ways, using appropriate strategies

b. Respond creatively to briefs, developing their own proposals and producing specifications for products

c. Apply their knowledge and understanding of a range of materials, ingredients and technologies to design and make their products

d. Use their understanding of others' designing to inform their own

e. Plan and organise activities and then shape, form, mix, assemble and finish materials, components or ingredients

f. Evaluate which hand and machine tools, equipment and computer-aided design/manufacture (CAD/CAM) facilities are the most appropriate to use

g. Solve technical problems

h. Reflect critically when evaluating and modifying their ideas and proposals to improve products throughout their development and manufacture.
3. Range and content of Design and technology key stage 3

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

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

b. Users’ needs and the problems arising from them.

c. **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.

d. The impact of products beyond meeting their original purpose and how to **assess products in terms of sustainability**.

e. Aesthetic, technical, **constructional** and relevant wider issues that may influence designing, selection of materials, making and product development.

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

j. 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.

k. The behaviour of **structural elements** in a variety of materials.

l. How to use materials, **smart materials, technology and aesthetic qualities** to design and make products of worth.

m. How to prepare and assemble components to achieve functional results.

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

n. **The practical application of systems and control** in design proposals.

o. Electrical, electronic, mechanical, microprocessor and computer control systems and how to use them effectively.

p. Using systems and control to **assemble subsystems into more complex systems**.

q. **Feedback** and how a variety of inputs can give rise to a variety of outputs.

4. Curriculum opportunities of Design and technology key stage 3

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:

a. **Analyse products** to learn how they function

b. Undertake focused tasks that develop knowledge, skills and understanding in relation to **design and make assignments**

c. Engage in design and make assignments in different and progressively more complex contexts, including for purposes and uses beyond the classroom

d. Work individually and in teams, taking on different roles and responsibilities

e. Work with **designers and makers** where possible to develop an understanding of the product design process

f. **Use ICT as appropriate** for image capture and generation; data acquisition, capture and handling; controlling; and product realisation

g. **Make links between design and technology and other subjects and areas of the curriculum**.

Assessing design and technology

Assessment is an essential part of teaching and learning in all subjects. It can take many forms and be used for a range of purposes.

To be effective assessment must be ‘fit for purpose’; being clear about what you want the assessment to achieve will help you decide what form the assessment should take.

This section gives pointers on planning assessment in design and technology. Further support on gathering evidence, integrating assessment and different types of assessment (periodic, day-to-day and peer assessment) is available in the assessment section. Exemplification of standards materials are also available.

When planning assessment opportunities consider the following:

**Purpose – What is the assessment for and how will it be used?**

Does it form part of ongoing assessment for learning to provide individual feedback or targets so that the pupil knows what to do next? Is it to provide an overall judgement about how the pupil is progressing against national curriculum levels? Related to this is the need to consider how the purpose of the assessment affects the frequency of assessment. For example, there should be sufficient time between level-related judgements to allow a pupil to show progress, whereas to be effective the assessment of ongoing work should be embedded in day-to-day teaching and learning.

**Evidence – What are the best ways to gather the evidence needed to support the purpose of the assessment?**

Assessment shouldn’t be limited to a narrow range of evidence. Any meaningful judgement of progress or attainment should be based on a range of activities, outcomes and contexts This could include assessing the learning as it’s happening through observation, discussion or focused questioning; involving pupils in the process through peer or self-assessment; or sampling a range of work over a period of time. If there are areas where you don’t have sufficient
evidence you could either adjust your planning or use a more focused task to fill the gap. The gathering of evidence also needs to be manageable. With care, the same evidence may be used for a variety of purposes.

**Outcome – What form will the assessment outcome take and how will it be used?**
Depending on the purpose of the assessment the outcome could be a level judgement of progress over time or a specific and measurable improvement target for the pupil. Effective use of the assessment outcome results in actions, such as providing an instant response or planning for the longer term. The best means of communicating assessment outcomes should be considered. For example, it might be through written feedback or a discussion. The outcome may also provide you with valuable information for your future planning, by identifying areas that need to be revisited by a class or individuals to secure understanding, or by revealing gaps in curriculum coverage where there is no evidence of achievement in a particular area to assess.

**Design and Technology at AMVC**
Design and technology develops confident individuals who become increasingly independent and able to take the initiative as they plan and organise activities, and then shape, form, assemble and finish materials and components. Design and technology enables pupils to try new things and to make the most of opportunities relating to the made world. Pupils can recognise their own and others’ ideas and values, pupils respond resourcefully as they anticipate and overcome difficulties when implementing their ideas. All this increases their confidence in their own abilities and opinions, enhances their feelings of self-worth and prepares them to live safe, healthy and fulfilling lives. A range of technology is available to students which have broadened the scope of design at AMVC – Laser Cutting, CNC engraving and Routing, CAD/CAM, Cutter Plotters, thermoforming and metal fabrication.

**Assessment**
During each project a range of skills are assessed. These include: researching the task, developing ideas, making high quality accurate products using a range of tools, equipment and processes. Other areas that are also assessed include: quality of presentation and finish, effort, planning and evaluation. Homework is set using extended tasks, based around a particular theme or topic related to the project being worked on. These are graded together with the complete project.

**Marking and Grading**
Work is marked using the following scales:
- National Curriculum levels (NC) are awarded at the end of each project. NC Levels are used for attainment with student having access to what the levels mean and how they can improve. Students are expected to be working between levels 4-8 throughout the key stage.
- Grades are awarded on a scale of 1 to 10
- Effort is marked in accordance with the whole school policy 1 = excellent 4=poor
- Comments alongside each grade, it is usual for the teacher to add comments to inform the pupils about their work might be improved.

**How Can Parents Help?**
Parents can help by checking on the quality of work undertaken and to ask questions about the work set. Many tasks involve research and the completion of design based work. It is a great help if parents can support students to collect information from a variety of sources and also to help them in selecting/searching and purchasing any materials they may need for their project.

The use of a computer is a tremendous advantage. Students can e-mail work home and do internet searches as well as use various software to help complete folio work and homework tasks. It is also important that students come to lessons with the correct equipment for their studies. A good set of colouring pencils, basic drawing equipment and a selection of fine liner pens and drawing pencils are the minimum requirements.

Useful websites which are an excellent source of information are:
- www.technologystudent.com
- www.design-technology.info/
- www.dtonline.org/
- www.designandtech.com/
- www.bbc.co.uk/schools/gcsebitesize/design/
- www.howstuffworks.com/
### National Curriculum Levels

#### Level 3
Pupils generate ideas and recognise that their designs have to meet a range of different needs. They make realistic plans for achieving their aims. They clarify ideas when asked and use words, labelled sketches and models to communicate the details of their designs. They think ahead about the order of their work, choosing appropriate tools, equipment, materials, components and techniques. They use tools and equipment with some accuracy to cut and shape materials and to put together components. They identify where evaluation of the design and make process and their products has led to improvements.

#### Level 4
Pupils generate ideas by collecting and using information. They take users’ views about aesthetic and technical issues into account as they respond to briefs. They communicate alternative ideas using words, labelled sketches and models, showing that they are aware of constraints. They apply their knowledge and understanding of materials, ingredients and components, and work with them with some accuracy, paying attention to quality of finish and to function. They use some ideas from others’ designing to inform their own work. They produce step-by-step plans and then select and work with a range of tools and equipment. They identify what is working well and what could be improved to overcome technical problems. They reflect on their designs as they develop, recognising the significance of knowledge and previous experience.

#### Level 5
Pupils develop ideas by drawing on and using various sources of information. They clarify their ideas through discussion, drawing and modelling, showing understanding of aesthetic and economic dimensions. They respond to briefs showing understanding of how culture and society are reflected in familiar products when developing and communicating their own ideas. They show that they are aware of constraints as they apply knowledge and understanding of materials, ingredients and techniques. They use understanding of others’ designing as they develop their work. They work from their own detailed plans, modifying them where appropriate. They work with a range of tools, materials, ingredients, equipment, components and processes with some precision. They check their work as it develops, solve technical problems and show some evidence of creativity as they modify their approach in the light of progress. They test and evaluate their products, showing that they understand the situations in which the products will function.

#### Level 6
Pupils draw on and use a range of sources of information, and show that they understand the form and function of familiar products as they develop and model ideas. They respond creatively to briefs, exploring and testing their design thinking. They develop detailed criteria for their products and use these to explore proposals. They apply their knowledge and understanding by responding to several aspects of the problem. They recognise the significance of others’ designing and modify their approaches accordingly. They produce plans that outline alternative methods of making progress. They work with a range of tools, materials, ingredients, equipment, components and processes, showing that they understand their characteristics. They check their work as it develops and solve technical problems by modifying their approach in the light of progress. They evaluate how effectively they have used information sources, using the results of their research to inform their judgements when developing products. They evaluate their products as they are being used, and identify ways of improving them.

#### Level 7
Pupils use a wide range of appropriate sources of information when developing and modelling ideas. They investigate form, function and production processes as they respond creatively to briefs. They apply their knowledge and understanding, recognising the different needs of a range of users, and search for trends and patterns in existing solutions as they develop fully realistic products. They use their understanding of others’ designing to inform their own as they communicate creative ideas. They produce plans that predict the time needed to carry out the main stages of making products. They work with a range of tools, materials, ingredients, equipment, components and processes, taking full account of their characteristics. They adapt their methods of manufacture to changing circumstances as they solve technical problems, providing a sound explanation for any change from the design proposal. They select appropriate techniques to evaluate how their products would perform when used and modify their products in the light of this evaluation to improve their performance.

#### Level 8
Pupils use a range of strategies to fully develop and model appropriate ideas, responding to information they have identified. They identify conflicting demands on a product and respond creatively to briefs, suggesting ways forward and explaining how their ideas address these demands. When applying knowledge they make decisions on materials, ingredients and techniques based on their understanding of physical properties and working characteristics. They use their understanding of others’ designing by reinterpreting and applying learning in new contexts. They organise their work so that they can carry out processes accurately and consistently, and use tools, equipment, materials, ingredients and components with precision. They use accurate testing to inform their judgements when solving technical problems. They identify a broad range of criteria for evaluating their products, clearly relating their findings to environmental, ethical, and social and cultural dimensions.

### Exceptional performance
Pupils seek out information to help their design thinking. They recognise how products contribute to lifestyle and choices of a variety of client groups as they develop and model ideas in an innovative way. Responding creatively to briefs, they are discriminating in their selection and use of information sources to support their work. They interpret and apply knowledge and understanding creatively in new design contexts and communicate ideas in new or unexpected ways. They use understanding of others’ designing in innovative ways. They work with tools, equipment, materials, ingredients and components to a high degree of precision. They make products that are reliable and robust and that fully meet the quality requirements given in the design proposal. They reflect critically and effectively throughout designing and making processes.