

Design Technology - Clocks

Year 8 Curriculum

ASPIRE – ENDEAVOUR - SUCCEED

Purpose and aims

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.

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.

Threshold concepts

The Design Process

- Analyse - Research purposefully: Using a range of sources showing selectivity and analytical skill.
- Design - Visual Communication: Demonstrate innovation and creativity in response to a client's need/problem, using a range of 2D and 3D techniques.
- Make - Safe working Practice: Select and use tools and equipment safely and accurately in order to manufacture a high-quality prototype that demonstrates a range of skills.
- Evaluate - Critical Reflection: Demonstrate the ability to reflect critically throughout the design process showing an understanding for modification and improvement.
- Technical Knowledge
- Mathematical knowledge
- Impact on Society: Understand developments in Design and Technology, their ecological and social footprint with an awareness of the impact on society.
- ACCEESSFMM

These threshold concepts appear repeatedly throughout the curriculum.

Sequence of learning

In line with the faculty guidance students will begin the project with the design process. This provides consistency and helps student link the wider areas of faculty and hopefully allow them to transfer knowledge between faculty areas more easily. Students will also be tested on Word Power in the first lesson to ascertain their current knowledge and understanding of key terms. Students will then be reminded of ACCEESSFMM and introduced the

five foci words of ACCEESSFMM for the project (**Aesthetics, Environment, Ergonomics, Function and Materials**) so that students now what to expect a deeper insight into during the project.

Materials will then be covered by learning the origins, of plastics, the subgroups of plastics. This sets up the next part of the project **Environment** that will focus on sustainability, environmental factors and impact different materials have about finite and non-finite resources and the importance of the 6Rs for extending product life cycles and natural resources. This is covered here as it allows the next part of the project (Art Deco) to be fresh in students minds when they begin to design their clocks.

Aesthetics becomes the next focus as students analyse and identify key features of the Art deco design movement. This is important so that students know what “look” they are aiming to achieve when they start writing their design specification and designing their clock.

Next the students write their design specification focusing on the five foci for this unit (**Aesthetics, Environment, Ergonomics, Function and Materials**). This allows students to be clear about what their outcomes need to be.

The above naturally leads to students coming up with initial designs to try and answer the specification. A teacher marked task assesses this before DIRT is used to address misconceptions, re-examine the specification students produced and develop their designs further. This **iterative design** process is an important concept students will need for future study in the subject.

After designs have developed the students will further engage with **iterative design** by learning about modelling and why it is important. This is covered here as they will be able to apply learning to their own design, making it more relevant and accessible. Any flaws with designs will be picked up in this 2D to 3D transition.

With a final, working design produced students will now be able to begin to learn about using CAD and CAM methods and processes to transfer their model onto 2D Design. This is here as once again they can learn kinaesthetically and apply learning to their own designs.

Students will then receive their clock design after CAM has taken place and learn practical hand tool skills. They will use techniques such as sanding, line bending and drilling as well as learning about production aids such as bending jigs and apply these to their own clock design. This is taught here so it can apply to the students’ own designs and the application of theory will help this become long term memory.

The project will conclude with students looking retrospectively at their specification and model and comparing this to their outcome looking for possible improvements.

Subject knowledge

Subject knowledge - Students should know that...	procedural knowledge – Students should know how to...
Design is a process that is cyclical/iterative Careers/Employment in the industry are explicitly linked to all or some aspects of the design process. Different careers focus on key areas of the design process. Term 1: Costume Designers - Film Term 2: Food Nutritionist Term 3: Electrician	
The order of the design process	
What the acronym ACCEESSFMM stands for. A – Aesthetics - The appearance of a product	Remember the individual points of ACCEESSFMM using the acronym as a reminder

<p>C – Cost - The money paid to cover materials, equipment, labour, buildings and services so a product can be manufactured</p> <p>C – Customer - A single person or a target market group that a product or service is aimed at.</p> <p>E – Environment - The positive or negative impact a product may have on the environment. Including the materials and energy used for manufacturing.</p> <p>E – Ergonomics - the process of designing or arranging workplaces, products and systems so that they fit the people who use them. Body measurement data is used. (Anthropometrics)</p> <p>S – Safety - How safe a product is to manufacture and use</p> <p>S – Size - The physical dimension and measurement of a product and how appropriate it is for the user.</p> <p>F – Function - What a product does and how it works</p> <p>M – Manufacture - Techniques and processes used to manufacture/make a product.</p> <p>M – Materials - A resource used to manufacture a product.</p>	
<p>The origins, processing and sub-groups of plastic</p> <p>Materials:</p> <ul style="list-style-type: none"> -Plastic is derived from crude oil. - crude oil is refined and mixed with acids to produce plastics -Plastic is a finite resource Environment -plastic is split into two sub-groups: * Thermoplastics – plastics that can be reshaped when heated *Thermosetting – plastics that will not change shapes when heated. 	
<p>The definition of sustainability within the context of Design Technology Environment</p>	<p>Apply the definition sustainability within the context of the subject</p>
<p>A finite resource will run out and is non-renewable. A non-finite resource will not run out if managed correctly and is renewable. Environment, Materials</p>	<p>Recall definitions and examples of non-finite and finite natural resources</p>
<p>What the 6Rs are and how they impact sustainability Recycle, reuse, reduce, refuse, rethink, repair</p>	<p>Remember the 6Rs, identify an example for each R and know how this R affects sustainability.</p>
<p>Art Deco is a design movement originating in the first half of C20 and that The four key visual features of Art Deco – Bold lines, geometric shapes, repetition and symmetry. Aesthetics</p>	<p>Recognise examples of Art Deco design</p>
<p>A task analysis breaks the design on the specific elements of a clocks design</p>	<p>Students can perform a task analysis of the clock ACCEESSFMM foci words – Aesthetics, Environment, Ergonomics, Function and Materials</p>
<p>A design constraint is a limitation or something that must be followed in a design.</p>	<p>Students know and apply the constraints for the clock</p>
<p>Anthropometrics is how humans interact with their environment and how this is designed to meet their needs. Ergonomics</p>	

A design specification needs to be produced to focus a designer's intentions in designing a product for a certain audience. Function	Write a design specification they can follow to meet an audience's needs. Specification
	Use knowledge of Art Deco and Specification to generate multiple symmetrical initial clock designs. Initial Design solutions/ ideas
Designs are developed using an iterative process and what an iterative design process is	Interrogate their design ideas to improve designs Evaluate and develop ideas
	How to develop designs to meet a design specification Evaluate and develop ideas
Designers model, test and iterate designs and why they do this	Turn a flat drawn design into 3d relief design made of separate pieces Modelling and prototyping
CAM stands for computer aided manufacture – the process of using computer programs and machinery to manufacture products. CAD stands for computer aided design – the process of using computers to design products. A CAD program is used to digitally output a design. Where to find a range of tools on a CAD program and how to use each tool appropriately and successfully.	How to translate a final model and its dimensions onto 2D Design, scaling where necessary
The pros and cons of CAD and CAM processes	Use CAD and CAM processes appropriately and know when another method is more suitable
What the correct process colours are for outputting to CAD machinery (laser cutter)	Identify and apply correctly the relevant colours to aspects of design
Sandpaper is manufactured in differing grades or grits, wood has a grain and sanding needs to be done along the grain	Select and use sandpaper effectively to get desired outcome of smooth work that is not scratched.
What a production aid is and that production aids increase the speed and consistency during production	Use a bending jig to bend their clock bases correctly and safely
That line bending is a process for bending thermoplastics using localised heat to soften the area of plastic bending is desired	Safely line bend their clock base using the line bender and a production aid
That all designs have strengths and weaknesses and that the iterative design process is a continuous cycle where improvements can be made	Evaluate their clock outcome against model and design specification Testing and improving design solutions.

Curriculum links to careers

Unit: All – Lesson completed at beginning of each term/rotation.

Term 1: Costume Designers - Film

Term 2: Food Nutritionist

Term 3: Electrician

Links: How careers across the industry link with the design process. Looking at the daily roles of specific people/careers and how their job is reliant on the iterative design process, an integral part of each project students' study in the rotation of D&T, textiles and food.

Outcome: Students identify links and explain how the employees work individually or as a team to meet the needs of the consumer/target market. Listing skills required for the role.

The Design Process	<p>Specification</p> <p>Initial Design solutions/ ideas</p> <p>Evaluate and develop ideas</p> <p>Modelling and prototyping</p> <p>Testing and improving design solutions.</p>
Word Power	<p>Art Deco</p> <p>Prototype</p> <p>Sustainability</p> <p>Reuse</p> <p>Recycle</p> <p>Anthropometrics</p> <p>Production Aids</p> <p>Thermoplastics</p> <p>Thermosetting plastics</p>
ACCEESSFMM	<p>Aesthetics</p> <p>Environment</p> <p>Ergonomics</p> <p>Function</p> <p>Materials</p>
Homework tasks	<p>Art Deco mood board</p> <p>KO – Word power definitions</p> <p>ACCEESSFMM – definitions</p> <p>Completing design ideas</p> <p>SMHW quizzes (knowledge)</p>