DESIGN AND TECHNOLOGY DEPARTMENT

CURRIULUM IMPLEMENTATION

This implementation document outlines the structure and key components of the Design and Technology curriculum at Penwortham Priory Academy. The curriculum is designed to provide students with a comprehensive foundation in designing and manufacturing skills and knowledge. With a total of 12 hours dedicated to each topic in each year, we aim to create engaging and immersive learning experiences that promote creativity, critical thinking, and practical skills development.

STRUCTURE

In Design and Technology, the curriculum is planned and sequenced so that pupils cumulatively build skills and knowledge across all aspects of Design and Technology in Key Stage 3, building on prior learning from Key Stage 2, and specialising when necessary, in Key Stage 4 in to a wide range of areas within the subject.

Within the subject in Key Stage 3, all pupils study:

- Food Preparation and Nutrition
- Graphic Design
- Resistant Materials
- Product Design
- Textiles Technology
- Engineering

Pupils study the subject in groups of mixed prior attainment, adhering to the Key Stage 3 national curriculum. At the end of Year 9, pupils are able to opt for the following Key Stage 4 subjects:

- GCSE AQA Food Preparation and Nutrition
- NCFE Level 1/2 Engineering
- NCFE Level 1/2 Graphic Design

These subjects are rigorous and provide a wide range of different paths for students to take, in particular these subjects are relevant to major employers in the area, with links to the Lancashire Advanced Manufacturing and Energy Cluster, which is part of the Northern Powerhouse scheme. These subjects link to many job sectors within the local area, such as; Advanced manufacturing, engineering, aviation, energy, and chemical and polymer engineering.

Design and Technology has long term plans for every area that is taught within the subject – mapping out delivery from Years 7 through to 11. The long-term plans are broken down into schemes of learning, each underpinned by ‘big questions’. These ‘big questions’ are set per topic in each year. We follow the school policy of ‘quality first teaching’, and all teachers within Design and Technology plan thoroughly, pitch challenge high, and sequence and scaffold learning.

KEY STAGE 2 TRANSITION

During Key Stage 2, students should have engaged in a variety of creative and practical activities which introduced them to the iterative design process of designing and making. They should have worked within a range of relevant contexts such as; the home, school, leisure, culture, enterprise, industry and the wider environment.

At Key Stage 2 students should be able to develop design criteria to inform the design of innovative, functional and appealing products that are fit for purpose and aimed at particular individuals or groups. They should be able to generate, develop, model and communicate their ideas through discussion, annotated sketched, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer aided design.

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Students should have prior knowledge of tools and equipment to perform practical tasks, such as cutting, shaping, joining and finishing, using materials and components such as construction materials, textiles and Penwortham Priory Academy Design and Technology ingredients taking into account their functional and aesthetic qualities. Students should have learnt how to investigate and analyse a range of existing products, and should be able to evaluate their ideas and products against their own design criteria, considering the views of others to improve their work. They should also be aware of key events and individuals in design and technology which have helped shape the world.

Prior understanding and skills should include how strengthen, stiffen and reinforce more complex structures, how to use mechanical systems in their products (such as gears, pulleys, cams, levers and linkages), how to use electrical systems in their products (such as series circuits, incorporating switches, bulbs, buzzers and motors) and apply their understanding of computing to program, monitor and control their products.

At Priory we actively engage in transition projects with feeder Primary Schools to allow Key Stage 2 pupils to experience the broadest rage of skills before attending Secondary School. These transition projects include; Gifted and talented days, day visits to Priory for each feeder school, and engagement with Key Stage 2 teachers to reinforce their knowledge and delivery of the Design and Technology curriculum.

KEY STAGE 3 DELIVERY

Each year students will complete three units of work throughout the year, two in Design and Technology and one in Food Preparation and Nutrition. These units can be studied in any order, and are all designed to complement each other and build on previous skills learnt in the year. Every unit of work that students study is designed to complement and deliver the Key Stage 3 National Curriculum for Design and Technology.

In Key Stage 3, students study Design and Technology for one hour per week, with 12 hours in each subject area. Extra hours are dedicated to retrieval practice throughout the year, ensuring that students retain knowledge whilst moving through different projects and topics.

KEY STAGE 4 DELIVERY

In Key Stage 4 students are able to opt for several different courses within the subject. In Design and Technology, we offer three different GCSE and GCSE equivalent courses, which all build on knowledge gained at Key Stage 3. These courses are chosen to offer the broadest range of possibilities for each student's future careers.

- NCFE Level 1/2 Engineering
- NCFE Level 1/2 Graphic Design

Lessons are a combination of theory-based and practical lessons.

TEACHING PEDAGOGY

To ensure knowledge is memorised and available for retrieval and application, strategies such as these are used in lessons:

- Low stakes testing of prior learning on entry to the classroom using quick fire questions / answers on whiteboard.
- Spelling and definition tests.
- Interleaving – revisiting prior knowledge in a timely fashion.
- Repetition of activities.

- Creating knowledge organisers.
- Creating schemata of knowledge and updating it as new knowledge is learned.

Teachers demonstrate techniques and introduce new materials in small steps whilst questioning pupils to enhance engagement and ensure pupils can demonstrate their understanding. The use of the visualiser to provide models and guide students practice is commonplace.

Learning is scaffolded through activities such as:

- Activating prior knowledge. This strategy reminds of what they have already learned, often through brief reviews. This helps reduce students' anxiety as they move on to new subjects.
- Offering a motivational context to pique student interest or curiosity in the subject at hand.
- Breaking a complex task into easier, more "doable" steps to facilitate student achievement.
- Showing students an example of the desired outcome before they complete the task.
- Modelling the thought process for students through "think aloud" talk.
- Offering hints or partial solutions to problems.
- Using verbal cues to prompt student answers.
- Facilitating student engagement and participation through engaging delivery.
- Using graphic organisers (visual aids) to offer a visual framework for assimilating new information.
- Teaching key vocabulary terms before reading.
- Guiding the students in making predictions for what they expect will occur in a story, experiment, or other course of action.
- Asking questions while reading to encourage deeper investigation of concepts.
- Suggesting possible strategies for the students to use during independent practice.
- Modelling an activity for the students before they are asked to complete the same or similar activity.
- Asking students to contribute their own experiences that relate to the subject at hand.

Independence is encouraged and confidence is built in both theory and practical work by

- Having some autonomy over how to demonstrate understanding when working in books e.g., translating a written passage into a diagram.
- Using a wider variety of materials, techniques, and processes.
- Providing wider reading and promoting wider research around a topic.

Work in books must be to ‘Priory Standard’ to ensure pupils present work legibly so that they can use it to revise. High standards of presentation are also to be encouraged so that pupils demonstrate that which will be asked of them in a future working environment. Reading is built into lessons, homework and wider reading and research.

YEAR 7 CURRICULUM OVERVIEW:

Year 7 students will rotate through three main topics: Product Design, Graphic Design, and Food Preparation and Nutrition. Each topic will be taught for a period of 12 hours, allowing students to explore the core concepts, techniques, and processes associated with each area.

TOPIC 1: PRODUCT DESIGN (12 HOURS)

During the product design module, students will be introduced to the fundamental principles of design thinking and problem-solving. They will learn about the design process, including research, sketching, prototyping, and evaluating. Students will have the opportunity to develop their creativity by designing and making a product that solves a real-world problem. They will explore different materials, tools, and

techniques to bring their ideas to life. Safety procedures and ethical considerations will be emphasized throughout the module.

TOPIC 2: GRAPHIC DESIGN (12 HOURS)

In the graphic design module, students will delve into the world of visual communication and digital design. They will learn about the elements of design, typography, colour theory, and layout principles. Through hands-on activities and projects, students will develop their skills in using industry-standard graphic design software. They will explore different design briefs and create visual artifacts such as posters, logos, and digital illustrations. Emphasis will be placed on effective communication, aesthetics, and digital citizenship.

TOPIC 3: FOOD PREPARATION AND NUTRITION (12 HOURS)

The food preparation and nutrition module will provide students with essential knowledge and skills in food hygiene, safety, and nutrition. Students will explore the principles of a balanced diet, food groups, and the impact of food choices on health and well-being. They will learn about food preparation techniques, recipe development, and presentation skills. Practical sessions will be conducted to allow students to develop their culinary skills and gain confidence in creating nutritious meals. Allergies, dietary restrictions, and cultural considerations will be considered during this module.

The Year 7 Design and Technology curriculum at Penwortham Priory Academy offers an exciting and comprehensive learning experience that equips students with the foundational skills and knowledge required for future studies and careers in design and technology fields. By engaging in hands-on activities, projects, and real-world problem-solving, students will develop their creativity, critical thinking, and practical skills. The implementation strategies outlined in this document aim to create a supportive and enriching learning environment that fosters a love for design and technology among Year 7 students.

YEAR 8 CURRICULUM OVERVIEW:

Year 8 students will rotate through three main topics: Textiles, Resistant Materials, and Food Preparation and Nutrition. Each topic will be taught for a period of 12 hours, allowing students to explore the core concepts, techniques, and processes associated with each area.

TOPIC 1: TEXTILES (12 HOURS)

In the textiles module, students will develop their understanding of fabric properties, construction techniques, and design principles. They will explore various textile decoration methods, such as dyeing, printing, and appliqué. Students will have the opportunity to create their own textile products, such as bags, cushions, or garments, incorporating design elements and demonstrating practical sewing skills. Emphasis will be placed on creativity, precision, and the ability to follow patterns and instructions.

TOPIC 2: RESISTANT MATERIALS (12 HOURS)

During the resistant materials module, students will work with materials such as wood, metal, and plastic to design and manufacture functional products. They will learn about woodworking techniques, computer aided manufacturing processes, and the safe use of tools and machinery. Students will develop their problem-solving skills by designing products that meet specific needs and considering factors such as aesthetics, functionality, and sustainability. They will have the opportunity to create prototypes and refine their designs through iterative processes.

TOPIC 3: FOOD PREPARATION AND NUTRITION (12 HOURS)

Building upon the foundational knowledge from Year 7, the food preparation and nutrition module in Year 8 will delve deeper into culinary skills and knowledge. Students will explore advanced cooking techniques, recipe development, and menu planning. They will learn about the cultural and historical aspects of food and explore global cuisines. Emphasis will be placed on developing practical cooking skills, nutritional understanding, and the ability to adapt recipes to meet dietary needs and preferences.

The Year 8 Design and Technology curriculum at Penwortham Priory Academy offers an enriching and comprehensive learning experience that builds upon the foundational knowledge and skills developed in Year 7. Through engaging practical activities, design thinking processes, and interdisciplinary connections, students will further develop their creativity, critical thinking, and practical skills in the areas of Textiles, Resistant Materials, and Food Preparation and Nutrition. The implementation strategies outlined in this document aim to create a supportive and dynamic learning environment that fosters a passion for design and technology among Year 8 students.

YEAR 9 CURRICULUM OVERVIEW:

Year 9 students will rotate through three main topics: Graphic Design, Engineering, and Food Preparation and Nutrition. Each topic will be taught for a period of 12 hours, allowing students to explore advanced concepts, techniques, and processes associated with each area.

TOPIC 1: GRAPHIC DESIGN (12 HOURS)

In the graphic design module, students will deepen their understanding of design principles, typography, and layout. They will explore advanced digital design software and techniques to create more complex visual communication materials. Students will engage in projects that focus on branding, advertising, and digital media, allowing them to apply their skills to real-world scenarios. Emphasis will be placed on creativity, visual storytelling, and effective communication.

TOPIC 2: ENGINEERING (12 HOURS)

During the engineering module, students will learn about the principles of engineering design, including problem identification, research, and solution development. They will explore various engineering disciplines, such as civil, mechanical, and structural engineering, and gain an understanding of how engineering contributes to society. Students will engage in hands-on activities, designing and building prototypes, and applying scientific principles to solve engineering challenges. Emphasis will be placed on critical thinking, teamwork, and innovation.

TOPIC 3: FOOD PREPARATION AND NUTRITION (12 HOURS)

Building upon the foundational knowledge from Year 7 and Year 8, the food preparation and nutrition module in Year 9 will focus on advanced culinary skills and techniques. Students will explore international cuisines, gastronomy, and the cultural significance of food. They will develop their understanding of food sustainability, food industry practices, and the impact of food choices on health and the environment. Students will undertake complex cooking projects, experiment with flavours, and refine their presentation skills. Emphasis will be placed on creativity, nutritional understanding, and culinary innovation.

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The Year 9 Design and Technology curriculum at Penwortham Priory Academy offers an advanced and comprehensive learning experience that builds upon the knowledge and skills developed in previous years. Through practical activities, design thinking processes, and interdisciplinary connections, students will further develop their creativity, critical thinking, and practical skills in the areas of graphic design, engineering, and food preparation and nutrition. The implementation strategies outlined in this document aim to create a supportive and dynamic learning environment that prepares Year 9 students for future studies and careers in design and technology.

KEY STAGE 4 ENGINEERING CURRICULUM OVERVIEW:

The Key Stage 4 Engineering course is a two-year program with three hours of study per week for both Year 10 and Year 11. The curriculum overview is as follows:

SEQUENCING: The curriculum has been carefully sequenced to ensure a logical progression of learning throughout Years 10 and 11. Each topic builds upon the previous one, allowing students to develop a solid foundation of knowledge and skills in engineering. The sequencing ensures that students have a clear understanding of core concepts before moving on to more advanced topics, promoting depth of understanding and effective learning.

METACOGNITION: The Key Stage 4 Engineering course encourages metacognitive strategies, enabling students to reflect upon and regulate their own learning. Students will be explicitly taught metacognitive skills, such as goal setting, self-assessment, and reflection. They will develop an awareness of their own strengths and areas for improvement, allowing them to take ownership of their learning journey and make effective progress.

DISCIPLINARY LITERACY: The curriculum places a strong emphasis on disciplinary literacy, enabling students to understand and communicate effectively within the field of engineering. Students will engage in activities that enhance their understanding of specialized engineering vocabulary, technical terminology, and concepts specific to the subject. This focus on disciplinary literacy empowers students to become proficient in reading, writing, and speaking about engineering topics, fostering their ability to access and engage with engineering texts and resources.

READING IN THE CURRICULUM: Reading plays a crucial role in the Key Stage 4 Engineering course. Students will be exposed to a variety of engineering texts, including textbooks, technical manuals, research papers, and case studies. They will develop reading skills that enable them to comprehend and analyse complex engineering texts, extracting relevant information and applying it to real-world scenarios. The curriculum will incorporate guided reading activities, discussions, and projects that promote critical thinking and deep engagement with engineering literature.

YEAR 10 ENGINEERING OVERVIEW:

In Year 10, students will study a range of core engineering topics to build a strong foundation in the subject. The curriculum includes:

ENGINEERING DISCIPLINES: Students will explore various engineering disciplines, such as civil, mechanical, electrical, and structural engineering. They will gain an understanding of the different branches of engineering, their applications, and their contributions to society.

APPLIED SCIENCE AND MATHEMATICS IN ENGINEERING: Students will learn how scientific principles and mathematical concepts are applied in engineering design, analysis, and problem-solving. They will develop a deeper understanding of the STEM subjects and their applications in real-world engineering scenarios.

READING ENGINEERING DRAWINGS: Students will develop skills in interpreting and analysing engineering drawings, including schematic diagrams, technical illustrations, and assembly drawings. They will learn how to interpret dimensions, symbols, and annotations, enabling them to understand the design intent and communicate effectively within an engineering team.

PROPERTIES, CHARACTERISTICS, AND SELECTION OF ENGINEERING MATERIALS: Students will study the properties and characteristics of engineering materials, such as metals, polymers, and composites. They will learn how to evaluate material properties and select appropriate materials for specific engineering applications based on factors such as strength, durability, cost, and environmental impact.

ENGINEERING TOOLS, EQUIPMENT, AND MACHINES: Students will gain practical experience with a range of engineering tools, equipment, and machines commonly used in engineering workshops. They will learn proper handling and usage techniques, as well as safety precautions.

YEAR 11 ENGINEERING OVERVIEW:

In Year 11, students will deepen their understanding of engineering concepts and develop their practical skills. The curriculum includes:

HAND-DRAWN ENGINEERING DRAWINGS: Students will refine their skills in creating accurate hand-drawn engineering drawings. They will further develop their proficiency in sketching, dimensioning, and annotating drawings using manual drafting techniques.

COMPUTER-AIDED DESIGN (CAD) ENGINEERING DRAWINGS: Students will expand their knowledge of computer-aided design (CAD) software and its applications in engineering. They will learn how to create, edit, and annotate engineering drawings digitally, enhancing their technical drawing skills and allowing for greater precision, efficiency, and flexibility in the design process.

PRODUCTION PLANNING TECHNIQUES: Students will study production planning techniques, including scheduling, inventory management, quality control, and cost analysis. They will develop skills in planning and optimizing engineering projects to meet time, cost, and quality requirements.

APPLIED PROCESSING SKILLS AND TECHNIQUES: Students will acquire practical skills and techniques related to manufacturing processes commonly used in engineering, such as machining, welding, casting, and fabrication. They will further develop their hands-on understanding of these processes through practical workshops and projects.

SYNOPTIC COURSEWORK PROJECT: From September to December of Year 11, students will engage in a synoptic coursework project that integrates their knowledge and skills across multiple areas of engineering. This project will require students to apply their understanding of engineering principles, employ metacognitive strategies, and demonstrate disciplinary literacy. It will serve as a capstone experience, allowing students to showcase their abilities in problem-solving, critical thinking, and effective communication.

END-OF-YEAR EXAM: At the end of Year 11, students will sit an exam that assesses their overall understanding of engineering concepts, their ability to analyse engineering problems, and their application of disciplinary literacy skills. The exam will require students to demonstrate their depth of knowledge, their metacognitive awareness in approaching exam questions, and their proficiency in reading and interpreting engineering-related texts.

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KEY STAGE 4 GRAPHIC DESIGN CURRICULUM OVERVIEW:

The Key Stage 4 Graphic Design course is a two-year program with three hours of study per week for both Year 10 and Year 11. The curriculum overview is as follows:

SEQUENCING: The curriculum is carefully structured to enable students to make steady progress and acquire a depth of understanding over the two-year course. In Year 10, students will begin by exploring the components of graphic design, understanding colour theory, typography, layout principles, and visual communication techniques. They will then delve into the work of graphic designers, studying influential designers and analysing their techniques and impact. Year 10 will also introduce students to the requirements of a graphic design brief, emphasising client needs, project constraints, and ethical considerations. In Year 11, students will progress to planning, development, and experimentation, where they will learn how to generate and refine design concepts. They will then move on to graphic design production, using industry-standard software and tools to create professional-level designs. Finally, students will focus on displaying, presenting, and promoting their graphic design work, honing their communication skills and showcasing their talents.

YEAR 10 GRAPHIC DESIGN OVERVIEW:

In Year 10, students will study a range of core graphic design topics to build a strong foundation in the subject. The curriculum includes:

1. COMPONENTS OF GRAPHIC DESIGN: In Year 10, students will explore the fundamental components of graphic design. They will learn about colour theory, understanding how colours interact and create visual impact. Typography will be studied, focusing on the different types of fonts, their characteristics, and their effective use in design. Students will also delve into layout principles, understanding how to arrange elements on a page to achieve balance, hierarchy, and visual harmony. Visual communication techniques will be introduced, exploring how to effectively convey messages through visual elements.

2. WORK OF GRAPHIC DESIGNERS: Students will study the work of influential graphic designers from different historical periods and contemporary contexts. They will examine the styles, techniques, and contributions of these designers to the field of graphic design. Through analysis and critique, students will gain insight into the creative processes, innovative approaches, and the impact of graphic design on various industries and society as a whole.

3. REQUIREMENTS OF A GRAPHIC DESIGN BRIEF: This topic focuses on developing an understanding of the requirements of a graphic design brief. Students will learn how to effectively interpret client needs, project constraints, and desired outcomes. They will explore the ethical considerations involved in graphic design, such as copyright, intellectual property, and cultural sensitivity. Through practical exercises and case studies, students will develop the ability to analyse design briefs, propose design solutions, and justify their creative choices.

YEAR 11 GRAPHIC DESIGN OVERVIEW:

In Year 11, students will deepen their understanding of engineering concepts and develop their practical skills. The curriculum includes:

1. PLANNING, DEVELOPMENT, AND EXPERIMENTATION: Year 11 builds upon the knowledge acquired in Year 10 by focusing on the planning, development, and experimentation phase of the graphic design process. Students will learn how to generate design concepts, conduct research, and explore different approaches to solving design problems. They will engage in sketching, prototyping, and iterative refinement, honing their ability to think creatively and critically evaluate design options. Emphasis will be placed on generating original ideas, taking risks, and developing a personal design style.

2. GRAPHIC DESIGN PRODUCTION: This topic centres on the production phase of graphic design. Students will develop proficiency in using industry-standard software and tools to create professional-level designs. They will learn techniques for image editing, digital illustration, layout composition, and typography manipulation. Practical exercises and projects will allow students to apply their skills and create visually compelling graphic design works. Attention will be given to technical proficiency, attention to detail, and adherence to design principles.

3. DISPLAY, PRESENT, AND PROMOTE GRAPHIC DESIGN WORK: Students will explore strategies for effectively displaying, presenting, and promoting their graphic design work. They will learn how to curate and organize design portfolios, considering different formats and platforms for showcasing their work. Students will develop skills in verbal and written communication, effectively articulating design concepts, and providing rationale for their design decisions. They will also explore techniques for promoting their work through digital and print media, understanding the importance of marketing and self-promotion in the graphic design industry.

ASSESSMENT STRUCTURE:

In Year 11, students will undertake a synoptic coursework project in the first term. This project will require them to apply their knowledge and skills acquired throughout the course to create a comprehensive graphic design project that addresses a specific brief. The coursework project will assess their ability to plan, develop, produce, and present a professional-level design. At the end of Year 11, students will sit an exam that tests their understanding of the course content, their analytical and evaluative skills, and their ability to apply design principles in response to given scenarios. The exam will also assess their ability to communicate and present their design work effectively.

By covering these topics in a sequenced manner over the two years, we aim to provide students with a well-rounded understanding of graphic design principles, techniques, and industry practices. Through a combination of theoretical knowledge, practical application, and critical thinking, students will be equipped with the skills and confidence to pursue further studies or embark on a career in the dynamic field of graphic design.