## Design and Technology – Resistant Materials

Cambridge IGCSE Design and Technology (Course Code: 0445)

### Description

The Cambridge IGCSE Design and Technology syllabus enables learners to identify, consider and solve problems through creative thinking, planning and design, and by working with different media, materials and tools. As a result, learners gain greater technical and design awareness, while developing skills such as initiative, resourcefulness, enquiry and ingenuity. They also develop the communication skills central to design making and evaluation.

In year 9, students work on higher level practical skills using a range of materials, tools and machinery and learning new processes and techniques that enable them to create their own products. They develop their knowledge of material properties and applications, industrial processes and the design process to solve problems and create high quality outcomes. They are introduced to the assessment criteria for portfolio work, and the style and layout of the exam papers.

In year 10, students look to consolidate their knowledge of materials and processes by designing user centered products that combine a variety of materials and high-level manufacturing techniques. They look closer at the iterative design process and develop their reflective and evaluative skills to develop products that best fit the needs and wants of their user. They become more familiar with the assessment criteria as they develop portfolio pages alongside their practical project work. Theoretical content will be mostly completed by the end of year 10, with exam questions being practised.

In year 11, students are working full time on their personal portfolio project independently, using the skills and knowledge gained from year 9 and 10. They complete the entire design cycle from finding a problem and a client, writing a brief, conducting research, writing a specification, designing, developing, prototyping, planning their production, manufacturing their final piece, and evaluating throughout and at the end. This is worth 50% of their overall grade and will be completed by March.

### Assessment Breakdown

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| Exam | Paper 1 | Product Design, 50 marks<br>Questions will be based on the Common content:<br>Product Design Written/drawing paper<br>Externally assessed | 25% |
| Exam | Paper 3 | Resistant Materials, 50 marks<br>Questions will be based on Resistant Materials content and the Common content.<br>Section A: answer all questions<br>Section B: answer one question<br>Written paper Externally assessed | 25% |
| Coursework | Component 2 | Component 2 Project, 100 marks<br>School-based assessment Internally assessed and externally moderated | 50% |

**Course Outline**

| Year | Michaelmas Term | Lent Term | Trinity Term |
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| 9 | **Introduction to the course. Workshop Health & Safety.** Assessing levels of existing D&T Knowledge within the class. **Project 1, Timbers** Introduction to RM theory with specific focused practical tasks. Woods, tools, machinery, manufacturing, Health and Safety, Quality Control and Evaluation skills Focus on criterion 6 & 7 of assessment criteria | **Project 2, Metals & Alloys** Introducing the complete Design Cycle. With a focus metals, soldering, casting and brazing, enameling, quality of finish and Manufacturing techniques, analysis of products and writing of specifications. RM theory with specific. Focused practical tasks. Focus on criterion 1,2, 6 & 7 of assessment criteria | **Project 3, Polymers, Smart & Modern Materials.** Developing the complete Design Cycle. With a focus on plastic, thermoforming, resin casting, CAD, laser cutting, 3D printing, quality of finish and Manufacturing techniques, analysis of products and writing of evaluations. RM theory with specific. Focused practical tasks Focus on criterion 2,5,6 & 7 of assessment criteria |
| 10 | **Project 4, User Centered Design, Creativity and Production Planning** focusing on Generation and exploration of design ideas, development of proposed solutions assessment criteria. RM and Design theory with focus on prototyping and creativity and combining materials. Focus on criterion 1,2,3&4,5,6,7 of assessment criteria. | **Project 5, User Centered Design and Problem solving** Design theory with focus on problem finding and solving, inclusive design, user centered design and prototyping, CAD, 3D printing and laser cutting. Focus on criterion 1,2, 3&4 of assessment criteria.<br><br>Full theory past papers. | **Coursework** Internally assessed based on task selected from exam board. Past paper questions.<br><br>Start work on Criterion 1,2,3 |
| 11 | **Coursework** Internally assessed based on task selected from exam board. Past paper questions. Start work on criterion 3,4,5, 6 | **Coursework** Internally assessed based on task selected from exam board. Past paper questions. Start work on criterion 3,4,5, 6 | **Study Leave**<br><br>**GCSE Exams** |

Additional Information

Due to the nature of project work and term lengths, the timeline above is an estimated guide and may be subject to change slightly. Knowledge and examination skills required for the Paper 1 & 3 are delivered throughout the duration of the course, through practical focussed tasks, project work, mock examinations and practice questions, to enable students to be fully prepared for their final assessments. Students are encouraged to practice their 3D drawing continually throughout the course to help communicate their ideas well, not only for their coursework, but also for their paper 1 exam.