Richard Lander School

Statement of Intent

Every subject maximises the potential of each student, enabling them to become successful learners, confident learners and responsible citizens. We will ensure that all students are well prepared for life and work and are keen to make a positive difference to the world they live in.

Design Technology

Intent *Explain what is distinct about DT and why it is important for our students to study it.*
We believe that the design process is different for each individual, consequently we try to create an environment suitable for students to be creative in a number of different ways. Design Technology not only teaches students coordination skills and the satisfaction of making things with your hands, it teaches problem solving skills, which can be applied to all areas of life. Dyson famously said he "failed" over 3000 times during the development of his vacuum cleaner, we want our students to recognise the positivity of failure and understand it is part of the process to design success.

Skills *Detail the wider skills that DT can deliver to our students, helping to prepare them for leaving RLS.*
DT teaches a range of skills that are vital for student success after RLS. They will obviously gain the experience of working with materials, a range of machines and tools to produce 2D and 3D products. But they will learn many more transferrable skills that can be applied in a range of different areas of life; when given problems students are taught how to research around the problem, looking for solutions and inspiration. They will develop analysis and evaluation skills, considering the good and bad things about materials, processes and even their own ideas. Students will develop communication skills, especially when explaining their own design solutions. They will learn how to come with up imaginative solutions to problems and avoid stereotypical responses. They will develop confidence when trying new things and resilience if they don't succeed first time.

Purpose of Study *Look at the DT programmes of study in the National Curriculum and define what this means for our students and their future*
DT is not only a creative subject, but an essential one for providing us with the designers and makers of the future. Now more than ever there is a need to consider the moral, social and environmental impact our lifestyles have on the planet and how intelligent design can provide the solution to many of the current problems we are experiencing.

Aims *Look at the DT programmes of study in the National Curriculum and define what this means for our students and their future*
The national curriculum for Design Technology aims to ensure that all students:

- Are aware of the global responsibility of future designers
- Learn a variety of approaches to enable them to design imaginative and innovative solutions to problems
- Develop practical skills with a range of tools, materials and machines
- Can analyse and evaluate their own and the work of others

We believe that, along with developing students' practical skills, it is vital to encourage students to consider the wider world in design technology and carefully consider this when making design decisions. This includes looking at the work of others, social awareness campaigns and social movements, exploring other cultures and investigating the need for bodies like FSC, Fairtrade, and equality issues within this area of study. In conjunction with this, we regularly discuss potential career opportunities with our students from Year 7 through to Year 11. Either through projects where they are the "graphic designer" or "engineer" in a company, references to job links/local companies and visits from potential employers such as A&P, Teagles and Pendennis Shipyard.

Assessment *Explain how students are assessed at Key Stage 3 and 4 and what impact this has on their future learning***.**

KS3 – Each term students are assessed on a variety of tasks including; spelling tests, starter activities, homework tasks, design task and practical outcome. This is to ensure the higher marks are awarded to students who demonstrate a range of skills. Following the assessments and end of term ranking, teachers will review and identify any students who are making less than expected progress. These students are then focused on during the following term to ensure that performance improves. Previous year's data is available on SIMs for teachers to make sure progress continues from one year to another.

KS4 – Students are assessed throughout the year using; class tests, 3x PPEs across the 2 years, practical outcomes, design work and homework tasks. Following assessments and end of term anticipated grade assessments, teachers will compare grades with FFT05 targets and identify any students who are making less than expected progress. These students are both focused on in future lessons or invited to intervention sessions after school.

Projects and individual lesson plans are continually reviewed throughout the year and often modified or changed to ensure the focus of learning meets all curriculum needs.

Rationale *Explain DTs' rationale for the sequencing of the DT curriculum. Why are KS3 and KS4 taught in the order that they are?*

Throughout KS3 the projects are designed to build on student's ability and knowledge of machines. Projects will become more challenging as students move through the school and repetition of machines will enable students to become more competent and confident when using them.

The very first project in Year 7 is a full design and make project to allow students to understand the stages of design, however this is the only time in KS3 it is taught in this linear way. In all other projects students will focus in more detail on only one or two areas of the design process, enabling us to focus in more depth on each skill. In the second term in Year 7 we focus on 3d drawing skills both in CAD and hand drawing techniques, which is vital for communicating design ideas as they progress through the key stages. The products we make are in 3d, it is important that students can draw in 3d to show what they propose making. The next project is "trinket box" a focussed practical task which introduces students to a second manufactured board plywood, building on the knowledge of MDF covered in the "jewellery" project. This project is designed to develop skills and confidence on the 3 main pieces of equipment in the workshop; scroll saw, pillar drill and Linisher. Lastly, the final "doorhanger" project gives students more creative responsibility, with a focus on user centred design and cultural awareness, starting them on the path of considerate design.

During the first two terms in Year 8, students complete a rotation of projects (so resources, equipment and rooms can be shared in the department). The "birdfeeder" project is designed to introduce students to the world of engineering, focusing on metals and polymers as the material focus. Students are also taught tolerances and quality control, this builds on marking and measuring skills taught in Year 7. The "clock" project develops understanding of a specification and is designed to reinforce practical skills learnt in the previous year to develop competence and confidence when using the 3 main machines in the workshop. The "endangered species" project encourages students to fully embrace the design process through CAD, building on knowledge of CorelDraw learnt during the graphics project in the second term of Year 7. This project teaches students how to research and develop ideas through to a final design.

The final project "bug box" in Year 8 introduces students to natural timber for the first time and focuses on the environmental impact of design. This is a new project in the department and has been designed by us to try to reduce the amount of MDF and material carbon footprint (the main material of the box being locally sourced timber). The initial stages of manufacture will be teacher led, with opportunity for students to use their knowledge of materials and processes to customise the rest. This builds on the customisation skills taught during the "doorhanger" in Year 7 and prepares them for more complex design and make tasks at the end of Year 9.

In Year 9 the focus changes from the projects we are making, to the theory we are learning. Names of products on the booklet are replaced with topics e.g.; polymers, systems and control, timbers, sustainable design – during the first project we introduce students to the iterative design process. We teach this in year 9 as it is a more advanced way of designing and will be the main way of designing in KS4. Along with making projects, which continue to develop skills with machines and equipment, we cover the life cycle of polymers and timbers from sourcing, to production, to disposal; soldering and control systems and sustainable design. Students will also complete a mini graphic design task building on CAD skills learnt in Y7 and Y8.

KS3 DT at RLS has been designed to take into account two things: Firstly, for students planning to pick DT, Engineering or Graphics as an option, the KS3 curriculum will provide them with the foundation of tools and knowledge they will need to become successful, innovative, competent designers and makers during their GCSE years. Secondly, for students not wanting to continue the subject into KS4, they will gain transferrable work skills (such as problem solving, resilience and creativity), an understanding of the moral responsibility of design, along with increased practical competence.

In Year 10 and Year 11 we very much are guided by the exam boards and follow the order of delivery that they suggest.

GCSE Design and Technology

In Year 10 during term 1 students work on a “timber” project which builds on knowledge of the material covered in Year 9. In addition, they learn more about how the material is sourced how it is changed from raw form to stock form. Students are taught to use more advanced tools and processes, standard components and material finishes.

During term 2 students are introduced to new and emerging technologies such as new and smart materials, CNC and CIM. They look at designers and design movements past and present and develop design skills including the use of CAD CAM.

Lastly, in term 3 students look at commercial production and companies such as IKEA and Dyson, and consider the impact designers have on the environment and their moral and social obligations.

The content covered in these areas will give students the knowledge and techniques needed to complete the NEA (Non-Examination Assessment) in Year 11 with independence and confidence. After completion of the NEA in Year 11, students will revisit the content areas numbered above as part of their revision program in preparation for the exam.

NCFE GRAPHICS

In Graphics students will cover the following content in Year 10:

1. Components of Graphic design – This is where students will look at the basics of graphic design such as line and colour, which will form the foundation of all future analysis and design.
2. Work of graphic designers – will give students the opportunity to look at the work of others and identify employment opportunities.
3. Requirements of a graphic design brief
4. Planning, development and experimentation – These two areas will be delivered together, students can now apply all they have learnt in the first two areas through a range of design tasks.
5. Graphic design production – Students will learn about digital technical skills whilst completing design work.
6. Display, present and promote graphic design – Students will use all of the work generated throughout the year as they learn how graphic designers present their work to others.

The content covered in these areas will give students the knowledge and techniques needed to complete the NEA (Non-Examination Assessment) in Year 11 with independence and confidence. After completion of the NEA in Year 11, students will revisit the content areas numbered above as part of their revision program in preparation for the exam.

NCFE ENGINEERING

There are 9 content areas to cover during the course. Due to the amount of students opting for the course, there will be a rotation of projects to allow for safe use of equipment in the department. All Engineering students will cover the following content areas in the first term of Year 10:

1. Engineering disciplines – where students will learn about the different disciplines and sectors involved in Engineering.
2. Applied science and mathematics in engineering – students will be introduced to SI units and be expected to apply them during their project work.

Group 1 will also cover the following content areas during the first term in Year 10:
4. Properties and characteristics of engineering materials – in particular metals
5. Engineering tools, equipment and machines – in particular the centre lathe, pillar drills, braising hearth, polisher, hacksaw.
6. Hand-drawn engineering drawings – in particular exploded views in isometric
8. Production planning techniques – Specifically risk assessments

Group 2 will also cover the following content areas during the first term in Year 10:
3. Reading engineering drawings – in particular third angle projection
4. Properties and characteristics of engineering materials – in particular polymers and hardwoods
5. Engineering tools, equipment and machines – in particular CNC router, laser cutter, pillar drill, scroll saw, linisher.
7. Computer-aided-design (CAD) engineering drawings – in particular software to operate the CNC router and laser cutter.

During term 2, the groups will swap to ensure all content is taught all students.

During term 3, both groups will build on knowledge gained over the previous two terms and will cover the remaining content area:
9. Applied processing skills and techniques – in particular casting

They will also re-visit the following content areas, to imbed prior knowledge:
3. Reading engineering drawings – comparing third angle projection to first angle projection and discussion of BS8888.
4. Properties and characteristics of engineering materials – wood metal and plastic with a focus on sustainability, introduction to composites.
5. Engineering tools, equipment and machines – use of machines and processes already covered to build on prior learning and develop competency.
6. Hand-drawn engineering drawings – in particular freehand sketches and isometric.
8. Production planning techniques – in particular production plans.

The content covered in these areas will give students the knowledge and techniques needed to complete the NEA (Non-Examination Assessment) in Year 11 with independence and confidence. After completion of the NEA in Year 11, students will revisit the content areas numbered above as part of their revision program in preparation for the exam.