CURRICULUM OVERVIEW
Design & technology

A Lakelands Design and Technology student should be able to participate confidently and successfully in an increasingly technological world.

Lakelands Whole Academy Curriculum Intent:

Our aim is to provide a diverse, accessible, challenging and inspiring curriculum for the students of Lakelands, our core purpose to develop well-rounded, confident young people, with the integrity, resilience and high aspirations to thrive in the future. The curriculum is designed to provide them with the core knowledge they need to succeed in education, and to become successful members of society. We encourage them to be curious and open-minded, and develop the necessary critical, creative and problem-solving skills to be able to make a difference in their future lives. All students benefit from a culturally enriching curriculum that has depth, breadth and regular revisiting of knowledge to give them the confidence to succeed. It is a curriculum designed to encourage learners to step outside their comfort zone and embrace challenge. By drawing on the best that's been thought, said and done in each subject, we hope that our curriculum enables our young people to appreciate and participate in the full richness of the human experience.

D & T Curriculum Intent:

Students will gain awareness and learn from wider influences on Design and Technology including historical, social, cultural, environmental and economic factors. Students will have the opportunity to work creatively when designing and making and apply technical and practical expertise.

How the D & T curriculum links to our core Curriculum Principles:

Lifelong Learning	Practical hands-on skills are developed that should last a lifetime – the iterative design process develops critical thinking and evaluation skills essential for success in the world of work.
Aspiration to succeed	Design and Technology projects judged by industry professionals; links to careers are made as appropriate in lessons.
Knowledge building	Theory is embedded into practical lessons so that pupils can physically apply theory where possible. There is regular questioning to help reinforce learning. KS3 projects develop key making skills and processes that will be used to complete coursework in KS4.
Empathy for others	Collaborative design encourages teamwork and helping others in both the process of and creating products that are inclusive and can be used by all.

IMPLEMENTATION

Year 7 Curriculum Implementation

In Year 7, students develop the core skills of design and the fundamentals of technical drawing. They will develop their understanding of structures and materials and explore a variety of practical making skills and joining methods. Pupils will also learn the safe use of tools and equipment and the correct application of workshop health and safety. Pupils will also be introduced to 2D CAD software and develop their understanding of CAM equipment and how it can be used to improve and create practical outcomes.

	Knowledge and skills	**Assessment**
1	Autumn first half term - Pupils will begin by learning the fundamentals of good sketching, using pen rather than pencil to get them used to making mistakes and adapting them. Pupils will learn about making lines with and without a ruler, creating 1- and 2-point perspective drawings and using isometric grids. Pupils will be creating increasingly complex drawings.	2 point perspective street scene as practical assessment.
2	Autumn first half term -Pupils will be taught classroom and workshop health and safety and be expected to document how each piece of equipment in the workshop is used safely. Pupils will complete a health & safety training booklet to document when they have had training on each piece of equipment. Literacy and presentation of written work will also be a focus during this module.	Correct completion of health and safety booklet and quiz.
3	Spring first half term -Using their knowledge of health & safety, pupils will then complete a short practical task by making a skills block to practise measuring and marking out, and develop accuracy when using the tools and equipment in the workshop.	Accuracy of skills assessed on final outcome.
4	Spring first and second half term -Using the skills developed so far, pupils will design and make a timber pencil holder with a specific customer in mind. Pupils will develop understanding of materials theory with a focus on manufactured and natural timbers. Pupils will also evaluate their final project against their design specification.	Accuracy of practical skills. Quality of design specification and evaluation.
5	Summer first half term -Pupils will create their own specification based on design brainstorming and consideration of ACCESS FM. This specification will then be used to create design ideas using the drawing skills developed in the first project. Pupils will learn to use key vocabulary relating to materials with a focus on plastics and polymers. A 2D design package will be taught, using increasingly challenging lessons to give pupils the skills to model their design idea for laser cutting.	Design specification and 2D design file.
6	Summer second half term -Pupils will develop their understanding of man-made and natural structures and develop important card modelling skills for projects in Year 8 and KS4. Pupils will research different types of bridges and use this research to formulate a specification and some initial ideas. These will be peer assessed and changes made from the feedback. Pupils will use this information to develop a final design and create a 3D model bridge that they will then test to destruction. Pupils will need to use maths skills to cost their bridges and aim to achieve the best outcome based on cost and strength.	Research homework. Cost efficiency. Strength to weight ratio.

Cross-curricular links in Y7: Links to maths with costing and measuring; literacy and critical thinking skills useful in both English and History; forces covered in Structures Project links to science; design sketching skills useful in Art.

Careers: Health and safety discussions in industry. Links to architecture in Structures project. Various tools and equipment links to trades and industry.

Year 8 Curriculum Implementation

In Year 8, our students will develop their understanding of design considering ergonomics, anthropometrics and biomimicry. They will the skills from 2D CAD to work in 3D CAD to create architecture inspired by Biomimicry and develop their understanding of electronics components and systems. They will use knowledge from Year 7 so select appropriate materials based on their working properties. Design work will be produced from their own specifications and creative risk will be encouraged. Pupils will use prior knowledge to select from the appropriate tools and equipment to produce their products.

	Knowledge and skills	**Assessment**
1	Autumn term - Pupils will look at the work of current designers to formulate a design specification and generate ideas. New equipment and theory will be introduced - pupils will use their prior knowledge of 2D CAD and the laser cutter to create and package a product. Ideas will be tested using card models to assess viability. Prior knowledge of polymers will be developed considering thermosetting and thermoforming plastics though the practical application of moulds and forms.	Accuracy of packaging and mould making. Designer research homework.
2	Spring term - Pupils will consider environmental factors to create lighting, using recycled components. Pupils will be introduced to electronic circuits and components. They will use flow diagrams and production systems to develop knowledge of how circuits function and are programmed. Existing lighting will be used to inform design decisions. They will also be using soldering irons with appropriate health & safety to create circuits as a practical test of their skills.	Circuit flow diagrams. Quality of soldered circuits.
3	Summer first half term - Pupils will develop their CAD skills from 2D to 3D by using modern, industry standard software to create 3D model buildings based on natural forms (biomimicry). Pupils will develop these skills by creating increasing difficult 3D models over a series of lessons and then using that prior knowledge to create a final 3D model of their building. Pupils will complete a thorough written evaluation to develop the analytical skills they used in Year 7.	Biomimicry research task. Effective use of Biomimicry in their 3D CAD model of their building. Written evaluation.
4	Summer second half term - Pupils will develop their practical making skills by completing a series of one-off skill tests based on the tools and equipment they have used so far and recapping the tools and equipment they have used in Year 7 and the start of Year 8. Tests include: measuring and marking out; cutting and shaping; materials selection; correct use of tools; health and safety.	Tick box assessment for each specific skill. RAG rated.

Cross-curricular links in Y8: 3D CAD work and electronic circuits and soldering link to Science; measuring links to Maths; literacy and critical thinking skills useful in both English and History; recycling and environmental factors link to Geography.

Careers: Industrial practices discussed in autumn and spring term. Use of CAD in industry and different job roles explored.

Year 9 Curriculum Implementation

In Year 9, our students will focus on developing the knowledge, theory and practical skills to succeed at GCSE. They will develop knowledge of mechanical devices, how to adjust the setting on machinery and equipment. Pupils will develop their knowledge of materials with a focus on metals and combining this with a mixture of timbers drawn from existing knowledge. Pupils will learn how to cast materials in moulds and use specialist PPE and equipment to do so safely. They will develop existing knowledge and skills to create highly detailed specifications using ACCESS FM that meet the needs of their target market. Pupils will produce short reports to suggest

possible improvements to further develop analytical and evaluation skills learned in previous years. Pupils will also analyse existing products in detail and use this information to develop ideas and specifications.

	Knowledge and skills	Assessment
1	Autumn term - Pupils are encouraged to blend a mixture of materials and practical and CAD skills to design and manufacture a passive amplifier. Pupils will further develop their knowledge of materials by looking at different ways to apply surface finishes to the materials that they have selected by fitness for purpose. Pupils will analyse made and shop bought products side by side to assess their suitability and to inform the design process. Pupils will create a final report to suggest improvements to their completed products.	Quality of surface finish. Finishes and materials test. Improvement report.
2	Spring first half term - Pupils will develop their materials knowledge further by investigating the properties of a variety of ferrous and non-ferrous metals. Pupils will embed DT theory into practice by creating moulds to create pewter cast products. Practical hand skills from prior learning will be utilised to create single or mixed material hardwood handles or the creating of box moulds for the more complex sand-casting process. Pupils will conduct detailed health and safety assessments of the process and how to wear the correct PPE to do so safely.	Materials/Metals quiz. Mould/Casting quality. Surface finish.
3	Spring second half term - Pupils will learn about a variety of mechanical devices and systems and how they are incorporated into everyday life to make it easier. They will then be shown a miniature siege engine and will work in teams to create their own. Pupils will be encouraged to use mathematical modelling to work out how to improve the efficiency of the engine and will have to organise themselves to work effectively in teams to make manufacture and test the product. Design and practical skills will be developed further. CAD use will be encouraged to manufacture components to high quality.	Efficiency of engine. Distance achieved. Teamwork/organisation.
4	Summer first half term - Pupils will develop their practical making skills by completing a series of one-off skill tests based on the tools and equipment they have used so far and recapping the tools and equipment they have used in Year 8 and the start of Year 9. Tests include: marking out using tessellation; materials selection for specific products; modelling a chair for a client with specific needs; programming a microcontroller; life cycle analysis.	Tick box assessment for each specific skill. RAG rated.
5	Summer second half term - In the last term of the year Pupils will work independently to plan for the Mini NEA in Year 10 with a focus on Flat Pack furniture. Pupils will complete a task analysis, client survey with data analysis and high design specification. Some will work on initial ideas.	Tracking document.

Cross-curricular links in Y9: Metals theory related to the periodic table in Science; mechanisms also covered in the Science curriculum; CAD skills relate to ICT; measuring and mathematical modelling links to Maths; literacy and critical thinking skills useful in both English and History; sketching used in Art; teamwork in PE.

Careers: Architecture careers a main focus in the CAD project. Mini NEA links to iterative design, working with clients and industrial practice.

Year 10 Curriculum Implementation

In Year 10, our students undertake weekly theory lessons that build on the prior knowledge of KS3 but with the addition of more technical detail and advanced smart materials and components. Alongside the theory, pupils will undertake a mini version of the GCSE NEA. This will focus on the more difficult pages of the portfolio and embed the theory through practice where possible.

	Knowledge and skills	Assessment
1	Weekly theory lessons to cover the following areas: • Production Techniques and Systems • Industry and Enterprise • Sustainability • People and Culture • Informing design decisions • DT Core Knowledge	End of unit tests. Mock exam.
2	Students will consolidate skills learned in KS3, ready to succeed at GCSE by developing the following skills: • demonstrate their understanding that all design and technological activity takes place within contexts that influence the outcomes of design practice. • develop realistic design proposals as a result of the exploration of design opportunities and users' needs, wants and values • use imagination, experimentation and combine ideas when designing • develop the skills to critique and refine their own ideas whilst designing and making • communicate their design ideas and decisions using different media and techniques, as appropriate for different audiences at key points in their designing • develop decision making skills, including the planning and organisation of time and resources when managing their own project work • develop a broad knowledge of materials, components and technologies and practical skills to develop high quality, imaginative and functional prototypes • be ambitious and open to explore and take design risks in order to stretch the development of design proposals, avoiding clichéd or stereotypical responses • consider the costs, commercial viability and marketing of products • demonstrate safe working practices in design and technology • use key design and technology terminology including those related to: designing, innovation and communication; materials and technologies; making, manufacture and production; critiquing, values and ethics. Mini NEA covers the more difficult pages of the DT NEA portfolio. Pupils will be given the design context of Flat Pack Seating (no glue or screws allowed). They will then use their own thinking and peer feedback to develop some ideas considering different target markets and WHO, WHAT and WHERE the product could be used to identify problems/opportunities. They will then interview a relevant client and use that data to assess need and some possible specification points. One this has been done, the thinking so far will be used to create a detailed design specification. Design ideas will be generated using the spec and models made to test their viability. Peer and client feedback will be used to test the product and create a final design which will be modelled in 3D for the client to give final feedback. Once this is done, pupils will create a detailed plan of making. Pupils will then create a life size model of their final prototype using all the practical skills gained so far. The client will evaluate the product and a detailed analysis will be completed. Finally suggested improvements will be added to complete the portfolio.	Tracking document and diagnostic detailed feedback.
Cross-curricular links in Y10: CAD skills relate to ICT; measuring and mathematical modelling links to Maths; literacy and critical thinking skills useful in both English and History; sketching used in Art.		

Careers: Practice and actual NEA link to iterative design, working with clients to develop specifications and industrial practices.

Year 11 Curriculum Implementation

In Year 11, our students focus primarily on the completion of the Non-Exam Assessment (NEA) which comprises half of the overall grade. This gives them a chance to showcase the skills and knowledge that they have learned so far. Theory recapping is delivered in starter and plenary questions and quizzes. Once the NEA is completed, then revision lessons will be the students' sole focus until the final exam.

	Knowledge and skills	**Assessment**
1	DT theory embedded in starter questions and plenary exercises. Once the NEA is complete, pupils will be surveyed about any areas they feel need to be recapped. Revision lessons will be delivered with this in mind.	Low stakes tests and Mock exam.
2	GCSE final NEA. This part of the course is the most challenging and must be pupil-led. They will be given the design context by the exam board. They will then use their own thinking to develop some ideas considering different target markets and WHO, WHAT and WHERE the product could be used to identify problems/opportunities. They will consider the work of others by evaluating a relevant existing product. They will then Interview a client and use that data to assess need and generate some possible specification points. One this has been done, the thinking so far will be used to create a detailed design specification. Design ideas will be generated using the spec and models made to test their viability. The modelling process will then be refined and suggested improvements documented form the test results. Peer and client feedback will be used to test the prototype models and create a final design which will be modelled in 3D using CAD software for the client to give final feedback. Once this is done, pupils will create a detailed plan of making. Pupils will begin making the final prototype and complete a making diary to document the process and any issues or changes. The client will evaluate the product and a detailed analysis will be completed by the pupil. Finally, suggested improvements will be added and possible methods of commercial manufacture to complete the portfolio. Pupils are given support materials and guidance to work through each stage of the extended design and make task. Guidance is provided on each of the major sections as to what the examiner is looking for. Portfolio pages are broken down in turn. The marking criteria is used as a guide to ensure that each portfolio page has the required content to maximise marks. Practical techniques are modelled where appropriate. Materials and resources are discussed as a class.	Tracking document and generic non-specific feedback given in line with exam regulations.

Cross-curricular links in Y11: CAD skills relate to ICT. Measuring and mathematical modelling Links to Maths. Literacy and critical thinking skills useful in both English and History. Sketching used in Art.

Careers: NEA links to iterative design, working with clients to develop specifications and industrial practices.

IMPACT OF THE DESIGN AND TECHNOLOGY CURRICULUM

Progress is measured within lessons by questioning and the close monitoring of students' work and regular checking of understanding. It is also measured through formative assessment, including recall quizzes and skill tests to assess the practical ability and application of skills learned. Homework is used predominantly as a tool for researching projects as well as developing theory recall. Feedback plays a crucial role in assessing depth of student understanding and analysing other students' work. Feedback is also critical for and developing the progression of practical hand skills in the moment when making and afterwards, when reflecting and evaluating. Feedback also allows students to assess their own progress, based upon the comments from the teacher.

Mastery is achieved through regular opportunities to practise recalling key information, and redrafting and improving written work based on feedback from the teacher. Skills tests provide opportunities to identify areas for practical improvement. Gaps are addressed and closed at the end of each project to ensure students have a solid understanding before moving on.

Engagement is evident through the uptake for GCSE. The engaging, practical curriculum should produce well rounded pupils with a range of design, analytical and practical skills applicable to the world of work. We want them to continue to develop their skills throughout their lives and contribute to the wider world as responsible and thoughtful designers using the incredibly useful and practical skills they have developed.

WIDER CURRICULUM OFFER

The following sections clarify how areas such as Personal development, Careers and Cultural Capital are woven into the intention, implementation and impact of the subject curriculum.

Personal Development within the Design and Technology curriculum	
Personal Development	Design and Technology is a multidisciplinary subject that not only equips pupils with practical skills but also supports their overall personal development. It nurtures essential life skills, fosters creativity and innovation, and prepares students to be thoughtful, capable, and responsible individuals. **Project-Based Learning:** D&T encourages pupils to engage in project-based tasks where they identify problems, brainstorm solutions, and evaluate their outcomes. This enhances their ability to think critically and solve problems creatively. **Iteration and Reflection:** Through designing and making products, students learn the importance of testing, refining, and improving their ideas, which builds resilience and a growth mindset. **Design Thinking:** Pupils are encouraged to think outside the box, leading to the development of innovative ideas. They learn to balance functionality with aesthetics, fostering both creative and logical thinking. **Hands-on Experience:** Working with different materials and tools enables students to express themselves creatively and brings their ideas to life, boosting self-confidence and a sense of achievement. **Group Projects:** Many D&T activities are collaborative, requiring pupils to work together, share ideas, and delegate tasks. This helps develop teamwork and communication skills, which are essential for personal and professional life. **Presentations and Feedback:** Students often present their projects and receive peer and teacher feedback. This process enhances their ability to communicate ideas clearly and to accept and learn from constructive criticism. **Skill Development:** D&T provides pupils with practical skills in areas such as woodworking, electronics, textiles and digital design. These skills not only prepare them for future careers but also give them a sense of competence and self-reliance.

	Technology Literacy: As technology becomes increasingly integral to daily life, D&T helps students develop digital literacy, equipping them with the ability to use modern tools and software effectively. **Project Management:** D&T tasks often require students to plan and manage their time effectively to meet deadlines, teaching them personal responsibility and organizational skills. **Accountability:** Taking ownership of their projects helps students understand the importance of accountability and the impact of their decisions and actions. **Overcoming Challenges:** Pupils face various challenges in D&T, from technical difficulties to design failures. Learning to overcome these challenges builds resilience and the ability to adapt to changing circumstances. **Learning from Mistakes:** The iterative nature of design teaches students that failure is a part of the learning process, encouraging them to view mistakes as opportunities for growth. **Sustainable Design:** D&T often includes lessons on sustainability and the ethical implications of design choices. Pupils learn to consider the environmental impact of materials and processes, fostering a sense of responsibility towards the planet. **Social Impact:** Understanding the broader social impact of design, such as accessibility and inclusivity, helps students develop empathy and a sense of social responsibility. **Achieving Tangible Results:** Completing a design and seeing it work as intended can be incredibly empowering for students, boosting their confidence and belief in their abilities. **Personal Expression:** D&T allows students to express their identity and ideas through their work, contributing to their sense of self and personal growth. **Exploration of Interests:** Through exposure to various fields like engineering, fashion, architecture, and graphic design, pupils can explore their interests, which helps in career planning. **Real-World Applications:** Understanding how their skills can be applied in real-world situations gives students a sense of purpose and direction, helping them connect education with future aspirations.
SMSC	Health and Safety and safe working practice that mirror industry practices. Social, moral and environmental aspects of design are explored and discussed in KS3 and KS4. Students explore the impact that design decisions can have on the wider world. The responsibilities of designers are explored and discussed to encourage good design role models.
British Values	Pupils are introduced to the work of existing designers from an approved list by the exam board. The majority of these are British and their work is discussed regularly in lesson and used to inspire creative design ideas and avoid stereotypical responses to design problems.
Extracurricular & Enrichment	Pupils have workshops by Bosch tools to demonstrate the latest kit available and the correct usage and health and safety twice in the school year.

Careers in the Design and Technology curriculum

Through exposure to various fields like engineering, fashion, architecture, and graphic design, pupils can explore their interests, which helps in career planning.

The iterative design process mirrors successful working industrial practices.
Pupils are encouraged to explore careers in design and ask questions.
Pupils learn practical skills that can be used in later life.
They develop an understanding of how tools and equipment work and how to use them safely.
Use of industry standard CAD software give pupils a skillset that is directly applicable to industry.
There are opportunities to work with and talk to industry professionals.

Cultural Capital in the Design and Technology curriculum

The essential knowledge that pupils need to be educated citizens, introducing them to the best that has been thought and said and helping to engender an appreciation of human creativity and achievement

Design and Technology plays a significant role in fostering cultural capital, which refers to the knowledge, skills, education, and advantages that a person needs to succeed in society. Here's how D&T contributes to this:

D&T introduces students to a wide range of design styles, techniques, and technologies from various cultures. By studying different design movements, traditional crafts, and modern innovations from around the world, students develop a deeper understanding and appreciation of global cultural diversity. It encourages students to solve real-world problems through design, considering social, environmental, and cultural impacts. This teaches them to think critically about how design can address the needs and values of different communities, fostering empathy and social responsibility. Students also learn how historical events, cultural trends, and technological advancements influence design. This helps them understand the cultural significance of design decisions and their impact on society.

D&T equips students with practical skills, such as woodworking which are often rooted in cultural traditions. These skills not only prepare students for careers but also enable them to preserve and innovate within cultural practices. It provides a platform for students to express their creativity through design, allowing them to explore and reinterpret cultural symbols, practices, and values. This creative process helps students build a sense of identity and cultural belonging.

Collaborative projects in D&T often require students to work in teams, fostering social skills and connections. These experiences help build social capital, as students learn to navigate different cultural perspectives and work effectively in diverse groups.

The D&T curriculum encourages sustainability, teaching students to design with environmental and cultural sustainability in mind. This awareness helps students understand the long-term cultural impact of design choices and the importance of preserving cultural heritage through responsible practices. Students are also encouraged to consider the ethical implications of their designs, including how they affect different cultural groups. This helps foster a sense of moral responsibility and a commitment to culturally sensitive design. Through D&T, students learn to recognize and understand the significance of cultural symbols, patterns, and aesthetics in design. This cultural literacy enriches their ability to communicate and create designs that resonate with diverse audiences.

D&T promotes a global perspective, encouraging students to look beyond their immediate environment and consider how design can influence and be influenced by global cultural trends.