Design Technology Subject Overview

The Appleton School

Subject: Design Technology.

Overall curriculum **intent**- our vision and aims (link to the national curriculum and specifications)

Studying Design Technology includes the use of a broad range of knowledge, skills and understanding, and prompt engagement in a wide variety of activities. Design Technology is an inspiring, rigorous and practical subject that encourages students to learn to think and intervene creatively to solve problems, both as individuals and as members of a team. We aim regardless of background, ability and additional needs to enable the students to flourish to become the best version of themselves that they can possibly be.

At The Appleton School, we encourage students to use their creativity and imagination; to design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. We also aim to make links to design and designers throughout history, providing opportunities for students to critically reflect upon and evaluate their designs. In the Department we want to create a diverse curriculum which is intrinsically linked to and fully embodies the learning ethos; resilience, resourcefulness, and reflectiveness.

Our intention is to inspire our students with a love for all things D&T, allowing them to become confident individuals with inquisitive minds. We want students to have the skills and knowledge to thrive in the 21st-century as resourceful, innovative, enterprising citizens.

As a department, we are passionate about our subject and wish to instil a curiosity within our students. We want students to ask questions and seek answers when creating new ideas, acquiring new skills and drawing on disciplines such as mathematics, science, engineering, computing and art. We challenge students with engaging design briefs and instil a sense of curiosity within the students by enabling them to create work of their own inspired by well-known designers, architects or engineers such as Philippe Starck, Charlotte Perriand and, Zaha Hadid to name but a few.

Finally, our aim is to develop our student's sense of appreciation for the design/creative industry supporting them in finding their own identity as young designers; enabling them to develop a greater sense of self-awareness and affirming their own ideologies or perception of what design really is. Design Technology gives the students a chance to use creative thinking within a defined purpose and tangible outcome. Technology can be found in many of the objects children use each day and is a part of children's immediate experiences.

How is the curriculum delivered?

Key Stage 3

The Design Technology curriculum is divided into projects, modules and stand-alone lessons. At key stage 3 these are delivered by specialist staff on a termly rotation, with the students studying one term Food and Nutrition and two terms of Design Technology. Currently in year 9 due to staff numbers rotation is now one term arts one term Food and nutrition, and one term design technology

The teaching occurs in specialised rooms; either workshops, a computer CAD cam workshop or in specialised food rooms.

The Appleton School has a large catchment area and has many feeder schools. Students' experiences of Design Technology at key stage 1 and 2 are very varied and to help the students transition from key stage 2 to 3 the units of study are designed to be mainly teacher led in the opening lessons, before the students' own enthusiasm and design ideas enable them to inspire their own learning.

In Design Technology each project allows access to a range of different practical learning opportunities with a focus on health and safety, outcomes and processes. All units aim to raise the students' sense of achievement by creating finished products of high quality. Students gain understanding on the importance of accuracy in making to create outcomes valued by them. Working in a workshop environment together, sharing tools and equipment means students need be taught an awareness of health and safety implementations. Design Technology promotes a sense of teamwork, allowing students to create together, help each other and take inspiration from each other.

Key stage 4.

At key stage 4 we ensure that we are inclusive for all students who wish to follow a Design Technology based route. We offer AQA 3D Design, a flexible course where we are able to tailor projects to a student's interests and expertise. The course comprises of two components, a portfolio selected from a course of study and an externally set assignment. Both provide the students with a range of creative, exciting and stimulating opportunities to develop and explore their personal interest in 3-D Design.

The GCSE course in year 9 -11 is taught by subject specialists who enable students to look at the design problems and teach knowledge so that the pupils can solve these problems/needs. We want students to learn how to define design problems for themselves and address the solutions independently. The design activities undertaken will enable our students to consider the needs of individuals and societies within both our own community and the wider world. We give students opportunities to use a wide range of materials and processes and to work both individually and part of a team.

How is the curriculum assessed?

Across all year groups, formal summative assessments take place three times a year, testing students on the knowledge and skills that they have developed recently, as well as in previous units. Homework is set and marked regularly by the department. At KS3 we follow the schools mastery marking system and at KS4 we use GCSE grades, level descriptors and grade boundaries to assess the students' work. In year 9 we use end of unit tests to assess the pupils learning as well as assessing their practical work/portfolio. When assessing GCSE work we mark across a number of projects, rewarding marks for best practice. Where assessment shows gaps in learning, students will be invited to attend catch up or intervention sessions. We review and standardise all KS3 and KS4 marking to ensure consistency throughout the department.

How is the curriculum enriched through speakers, visits or clubs to generate a love of learning?

Most pupils enjoy making products that they can see have a purpose to enrich their lives. The projects we teach the students currently are designed to inspire a love of design and making. They tend to start designing products for themselves and progressing to making products to suit the needs of family and friends and finally a target audience. The school is fortunate to have a laser cutter which enables students to produce some very professional looking outcomes, of which the students are justly proud.

The department run a KS3 and a KS4 after school club as well as lunchtime intervention for those students who require the extra help. The department uses the school's reward system of merits and postcards home, as well as students obtaining their Design Technology department badge. The department also works hand-in-hand with the business and enterprise students in producing artefacts for their trade fairs. The Design Technology area is fortunate to have many display cases to exhibit students', teachers, or design icons work as well as many colourful posters outside the workshop areas, all acting as a source of inspiration. Revision intervention sessions normally take place before and after school, students are invited to attend these if their work demonstrates a particular area of weakness however some students choose to attend voluntarily to increase their knowledge/confidence.

What **skills and knowledge** the students bring with them from **key stage 2 to Year 7**?

The Appleton school has a large number of feeder schools and the pupils' experiences of Design Technology at key stage I and 2 are incredibly varied. For most students unless they were lucky enough to be in Design Technology on a taster day this is their first experience of a purpose-built Design Technology workshop, where desks are replaced by benches. With regards to the DoE national curriculum students should be able to:

Design

- Use research and design criteria to design innovative, functional appealing products that are fit for purpose
- Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams prototypes and computer aided design.

Make.

- Use a wide range of tools and equipment to perform practical tasks accurately.
- Select from and use a wide range of materials and components.

Evaluate.

- Investigate and analyse a range of existing products
- Evaluate their ideas and products against their own design criteria
- Understand how design technology has helped shape the world

Technical knowledge.

- Apply their understanding of how to strengthen stiffen and reinforce more complex structures.
- Understand and use mechanical systems in products.
- Understand and use electoral systems and products.
- Apply their understanding of computing to program, monitor and control their products.

As you can see the skills and knowledge are very open-ended. Typically, students from KS2 have experience in modelling ideas in card and plasticine. We then introduce Design Technology with health and safety in the workshop and enhance their technical knowledge with practical elements which in year seven are teacher led.

Where students join us in key stage 3 below the expected levels, often we are able to teach in smaller groups, enabling us to spend more one-to-one time with the students enhancing and developing their skills.

What **skills and knowledge** to students bring with them from **year 7 into year 8?**

- Understand and implement the Health and Safety rules in Design Technology.
- Spell correctly key design technology words.
- Demonstrate an understanding of using mind maps
- Demonstrate an understanding of designing for clients, listing their needs and wants.
- Demonstrate and understand the need for accuracy.
- Demonstrate the ability to measure in millimetres accurately.
- Demonstrate the ability to use a range of hand tools safely and with a degree of accuracy.
- Demonstrate the ability to use a range of hand power tools safely and with a degree of accuracy.
- Understand where the materials they use originate from.
- Understand the difference between softwood and hardwood trees.
- Develop an understanding of using manufactured boards and the advantages and disadvantages these have over solid wood.
- Develop models and prototypes to test their design ideas.
- Demonstrate different fixing methods, both permanent and non-permanent, in similar and non-similar materials.
- Demonstrate cut and assemble a lap joint.
- Develop skills in using CAD/CAM, 2 D design and laser etching.
- Add finishes to enhance their projects.
- Evaluate their projects and give feedback to others on next step improvements.
- Develop an understanding of manufacturing techniques used in industry.
- Develop ideas in 2-D and 3-D sketches.
- Demonstrate the ability to draw and explode isometric drawings.
- Develop an understanding of how basic electrical circuits work.
- Develop skills in soldering.
- Demonstrate an understanding of the two main plastic types.
- Develop an understanding of how to modify and work with thermoplastics.
- Develop an understanding of trialling and testing ideas independently.
- Develop skills in group working and sharing equipment and ideas with others.
- Develop skills in working as a team.
- Develop skills in understanding the design process.
- Develop skills in analysing existing products.
- Develop an understanding of the 6R’s.

What **skills and knowledge** to students bring with them from **year 8 into year 9**.

In design and technology repetition is often used to help young people gain greater mastery in developing making skills. Without practice it is impossible to become secure at using hand and machine tools.

A related repetition is used in the context of becoming adept at designing. The teacher as curriculum developer, promotes different design strategies to enable young people to use them in more and more demanding ways as they move through the Design Technology curriculum. Students re-visit design strategies at successively higher levels of demand throughout their learning journeys, akin to a spiral of development.

In addition to the previous list of skills and knowledge (which will continue to be revisited and reinforced) students should now be able to:

- Develop skills working with metal; hollowing and planishing, cutting, drilling, shaping, welding, brazing, riveting, filing, spray-painting, plastic coating, oil dipping, casting in pewter.
- Develop new skills working on the lathe.: Facing off, parallel turning, setting up the lathe, sitting the machine to the correct speed.
- Develop skills in marking out metal: using still rule, scribe, engineers square, centre punch, engineers hammer, odd leg calipers, spring dividers.
- Enhance their designing skills by using research of existing designers, using biomimicry to turn these designs into three-dimensional card models.
- Develop skills in redesigning after product evaluation in small teams.
- Develop intuitive design skills.
- Learn a new awareness of different types of metals and how the mining from metals is costly in terms of the environmental damage and the reliance on large energy supplies to extract them.
- Develop an understanding of the importance of recycling and the benefits to society.
- Enhance their wooden joint skills in making a frame for the automata project.
- Develop an awareness of the three types of levers.
- Develop an awareness and understanding of motion through the use of gears and cams.
- Improve the need for accuracy in marking out and making.
- Generate ideas for an item considering its purpose and the user's needs.
- Identify a purpose and establish criteria for a successful product plan the order of their work before starting.
- Explore, develop and communicate design using two-dimensional drawing, isometric sketching, orthographical drawing and card modelling.
- Be able to select tools and techniques for making their product. Measure, mark out, cut, score and assemble components with more accuracy.
- Work safely and accurately with a range of simple tools.
- Think about their ideas as they progress and be willing to change things if this helps them improve their design.
- Use finishing techniques, strengthen and improve the appearance their product using a range of equipment including ICT. Evaluate their product against the original design criteria.
- Evaluate familiar products using access FM

What **skills and knowledge** to students bring with them from y9 into GCSE.

For many students this will be their last rotation of formal design technology lessons we are attempting to open their eyes to a lifelong learning why and how products are made, the effects on the planet of making many products, and the effects these have on society in use, finding raw materials, and their disposal. In a way we're just trying to open their eyes to the world about them.

- Should know better range of sensors, control devices and output devices that can be used to create electronic systems.
- Should have some knowledge of where materials used to make electronic products come from and the effects of the planet of this mining.
- They should develop skills in soldering, and be able to trace faults in their electrical circuits and repair(a good life skill)
- They will develop working to a tight tolerance and improve their measuring skills and accuracy in making.
- This should develop social awareness as some of electronic components use scarce elements.
- Should develop knowledge of ecological footprint as we look at the effect our product has on the natural environment including the product life-cycle from mining and processing materials to manufacturing, to use of the product, to disposal of the use.
- We look at the disposal of electronic products and how hard they are to recycle because they contain too many components made from many different materials, however products are dismantled and circuit boards are heated to extract the precious metals for example gold.
- We look at colour psychology and how colour affects our mood and how influential it is in our product choice.
- Cultural and ethical factors. Avoiding offence we attempt to show students and develop an understanding different cultures and religions so that they can avoids causing offence with certain word symbols or pictures. And we look at suitability of the product for the intended market.
- The electronics are assembled on a pre-printed circuit board (surface mounted technology) but we use stock forms of electronics.
- Students are made aware of the effects of using plastics(oils) rather than plywood for their casing.
- Students use a template created for them want to do design to enable their components to fit together

What **skills and knowledge** to students bring with them from **Year 1 GCSE into year 2**?

In addition to the previous list the skills and knowledge (which will continually be revisited and reinforced) students should now also be able to:

- Communicate their ideas through detailed annotated drawings.
- Explore, develop and communicate aspects of their design proposals by modelling their ideas in a variety of ways.
- Plan the order of their work, choosing appropriate materials tools and techniques.
- Assemble components, make working models.
- Use tools competently safely and accurately and with a degree of skill.
- Make modifications as required as they work on their portfolio and final piece explaining why these changes are required.
- Achieve a quality product.
- Be able to present their drawings in isometric, one point, two point perspective exploded diagrams where required and fully detailed orthographical drawings.
- Students should be able to use CAD to produce drawings and also to enhance their making skills by using the laser and plotter cutter.
- Evaluate their products, identified strengths and areas for development and carrying out appropriate tests.
- Recall their evaluation using drawings with labels and for annotation.
- Evaluate against their original criteria and suggest ways that their product could be improved.
- Be aware of the ecological and social footprint of the materials used.
- Develop an awareness of designing and designers, empirical designing, intuitive designing, systematic designing, nature, geometric mathematics, Islamic design, Celtic design, Fibonacci series, geometric form, geodesic domes, retro design, Philippe Starck, James Dyson, Jonathan Ive, Robin Day, Mary Quant, Charles Rennie Mackintosh, Alessi, Apple, Neville.
- Develop an awareness of design movements, Art and Craft movement, Art Nouveau, Art Deco, Bauhaus, De Stijl, Modernism, Memphis, Post-modernism.
- Basic electronics - lighting and soldering skills.
- Generate ideas, considering the purpose for which they are designing.
- Make labelled drawings from different views showing specific features.
- Develop a clear idea of what has to be done, planning how to use materials, equipment and processes and suggesting alternative methods of making.
- Use results of investigations, information sources, including ICT when developing design ideas.
- Evaluate products and identify criteria can be used for their own designs.
- Show skills in using the appropriate tools and techniques for making their products.
- Measure, mark out, cut and shape a range of materials using appropriate tools and equipment and techniques.
- Join and combine materials and components accurately in temporary and permanent ways.
- Use graphical communication techniques.
- Evaluate their products carried out the appropriate tests and seek evaluation from others.

What will the students **study** and **when?**

	3 Half Terms: Students will study either the Pencil Box project or Car Project. Non-specialist staff deliver the Design Challenge Project			**3 Half Terms:**
Year 7	Unit: Pencil Box (pine, hardboard, plywood, 2D design, laser etching) Health & Safety in a workshop Mind mapping 5WH Designing to solve a problem Analysing existing products Isometric drawing (from 2D to 3D) Rendering skills Measuring accurately in mm Using hand tools to mark out a lap joint How to use a tenon saw How to cut and prepare the 4 joints Softwood and hardwoods Manufactured boards Designing for a target market Presenting ideas Developing ideas on CAD Laser etching (CAM) Nailing Sanding by hand and machine Lid design and curved cutting Pivot points Drilling Designing an opening lid Finishing	Unit: Car Project (pine, dowels, MDF, rubber, Forces) Health & safety in the workshop. Analysis of existing products in groups. Analyse problems & how to overcome them. Develop ideas Develop a design brief Develop a specification. Use annotation on ideas Develop evaluation skills. Understanding how different forces affect motion Problem solving within each design Cutting and making individual car Frame Sanding and finishing techniques Calculating distance and speed Recycling Drilling Permanent fixing of non-similar material Testing and evaluation.	Unit: Design Project Understanding of Function and Aesthetics Designing for different users Taking inspiration from different design movements Initial ideas Developing ideas 1- and 2-point perspective Isometric drawing Exploded drawings Nets Cardboard modelling Evaluating	Food & Nutrition

	Evaluating. Basic Circuit design How electricity flows Soldering Leds and other electronic components Designing a greetings card Working with thermoplastic Line bending End of unit test			

What will the students **study** and **when?**

	3 Half Terms: Students will study either the Tea Light Holder project or Automata Project. Non-specialist staff deliver the Design Challenge Project			**3 Half Terms:**
Year 8	Unit :Tea light Holder (mild steel plate, steel rod or square section, casting, bending, metal finishes) Design Brief Metal properties ferrous and nonferrous Alloys Research of existing products and evaluation Target market Access fm Product specification. Ideas Develop ideas into 3 d drawings Annotate and evaluate Technical drawing skills Card modelling skills Recording work Evaluating as teams Developing ideas into final card model. Marking out metal Cutting and filing Using the lathe to face off and parallel turn Planishing and shaping Cold metal bending Health and safety Hot metal bending	Unit: Automata (Mdf,cams,levers axle, movments , direction of movement) Health and safety What are mechanisms Types of motion Levers and mechanical advantage Design brief Target Market Access Fm Ideas Dev. Ideas Isometric Drawing skills Practical wood joining skills Drilling Understanding different tools and machinery Sanding Central axle Spindle Crank handle Types of cams, gears and pulleys Background Working to a high degree of accuracy Understanding CAD/CAM Vectorising bitmaps in 2 D design Testing product against their specification.	Unit: Design Project Understanding of Function and Aesthetics Designing for different users Taking inspiration from different design movements Initial ideas Developing ideas 1- and 2-point perspective Isometric drawing Exploded drawings Nets Cardboard modelling Evaluating	Food & Nutrition

	Using jigs and formers Welding Brazing Casting in pewter Finishing Evaluating. End of unit test	Evaluations End of unit test		

What will the students **study** and **when?**

	Half term 1	Half term 2	Rotation
Year 9	Electronic packaging: Colour psychology. How colour affects our mood and life. Branding. Why package? Materials used in packaging. Modern packaging and recycling. Product specification Logo developments. Net developments. Colour design work using 2-D design. Printing in card leaving registration marks. Using the plotter cutter to cuts and produce fold lines.	Electronics: Project is to design and make an audio amplifier for use with a personal stereo. The project will enable students to experience the design and manufacture of amplification circuit. The need to investigate the back ground to a problem. How to select appropriate components to build an electronic circuit. Safe and competent soldering. Importance of planned manufacture. Designing for a target market. The ethic ethical choices of plastic verse wood. Product assembly using pre-brought components and spaces.	**Art / Food & Nutrition**

	Symbols used in packaging / legal requirements Assembling developments. Product evaluation.	Working to a templates for specific sizes. Accurate measurement and marking out. CAD for designing case to house electronics. Drawing and presentational techniques to help represent ideas for casing designs Identify and use criteria to judge the quality of other people's products, including the extent to which they meet a clear need, their fitness of purpose, whether resources have been used appropriately, and they impact beyond the purpose for which they were designed.	

What will the students **study** and **when?**

	Term 1	Term 2	Term 3
GCSE Year 1 (2 year course) Art design.	<u>Coursework Project 1</u> - Mind mapping - Product analysis - Research design movements and designers - Design brief and specification - Generating ideas (initial sketches, One-point perspective, Two-point perspective, Isometric, exploded isometric, Orthographical drawing techniques) - Modelmaking/ prototyping/ experimenting with different materials - Developing and refining ideas - 2D Design - Component research - Final outcome - Evaluation		<u>Coursework Project 2-</u> - Mind mapping - Product analysis - Research design movements and designers - Design brief and specification - Generating ideas (initial sketches, One-point perspective, Two-point perspective, Isometric, exploded isometric, Orthographical drawing techniques) - Modelmaking/ prototyping
GCSE Year 2 (2 year course)	<u>Coursework Project 2- Continued</u> - Modelmaking/ prototyping/ experimenting with different materials. - CAD/ CAM experiments - Developing and refining ideas - 2D Design - Component research - Final outcome - Evaluation	<u>Externally set task:</u> This is set by the exam board. Students will complete a folder of preparatory work, leading to the final outcome which will be completed in a 10-hour exam. - Mind mapping - Product analysis - Research design movements and designers	**<u>Externally set task continued</u>**

		- Design brief and specification - Generating ideas (initial sketches, One-point perspective, Two-point perspective, Isometric, exploded isometric, Orthographical drawing techniques) - Modelmaking/ prototyping/ experimenting with different materials - Developing and refining ideas - 2D Design - Component research - Final outcome - Evaluation	

Why has learning been **sequenced** this way?

As students' progress through the school we are continually developing their skills as the projects are developed in a way that they are each more challenging and complex.

Drawing techniques start using straight lines and grid of underlays before developing in complexity to either using drawing boards and technical drawing equipment, and then further developing it into more complex and curved shapes. Rendering is developed to give shadow rather than just colour.

Cutting for example starts with straight cuts before developing into curved angular, undercuts. The joints start with the easiest one developing into more complex joints

Year	**3 Half Terms:**			**3 Half Terms:**
7	Wooden Box / Electronics Depending on the rotation each design technology group will spend a term on each. This unit is designed to link from the key stage II maths with the need to accurately measure. The students develop skills in peer assessment, and by using softwood or working with a material that they are familiar with. As this project progresses students develop their hand tool skills and start using power tools. Depending whether this is their first or second rotation in technology is the time spent on product analysis. Students develop their designing skills leading onto their final design been laser etched. The electronic product if this is the first term lends itself seamlessly into producing a flashing electronic Christmas card, if not the first term an Easter card or other	Maze Game This unit is mainly based on design and designing products for themselves, so looking at product specification led by user wants. This unit uses industrial processes i.e. the vacuum former so the students use an industrial process which demonstrates to them a mass production technique. More time is spent developing the pupil skills in product evaluation.	Design Challenge This project is focussed around developing recording skills, linking to A03 of the GCSE criteria. Students are taught a number of different techniques they can use to communicate both initial and developed ideas. The project also looks to develop their contextual understanding (A01 of the GCSE criteria), encouraging students to respond and take inspiration from different design movements and artists. Students are also taught how to model and prototype out of card, developing their understanding of nets.	Food & Nutrition

8	Tea light holder. Again pupils rotate and will study all three units. Having worked with wood and plastics in year seven students now study the third material, metals. Students develop their designing skills mainly in symmetry as well as developing one-to-one scale models of their intended product. Metals are inherently harder to work with by wood which is why this is taught in year 8. Due to the nature of the machines and the hot metal working it also requires a higher level of maturity and awareness of health and safety.	Automata project Having already produced a wood joint in year seven students enhance that skill by producing a finger joint. Students learn about motion, levers, and cams. Students develop their drawing skills in presenting design ideas. Annotation skills are developed from y7 projects. Students begin to design projects based on their ideas rather than teacher input.	Design Challenge This project is focussed around developing recording skills, linking to A03 of the GCSE criteria. Students are taught a number of different techniques they can use to communicate either initial and developed ideas. The project also looks to develop their contextual understanding (A01 of the GCSE criteria), encouraging students to respond and take inspiration from different design movements and artists. Students are also taught how to model and prototype out of card, developing their understanding of nets.	Food and nutrition
9	Packaging. During key stage III pupils use a wide range of materials to design and make products stop they work out their ideas with some precision, take into account how products will be used, who will use them, how much they cost and their appearance. They develop their understanding of designing and making by investigating products and finding out about the work of professional designers and the manufacturing industry. These computers including computer aided design and manufacture (CAD /CAM) as well as software packages used in this project.	Electronics. Electronic systems have developed a lot, and have become an essential part of our everyday life, so this unit is trying to show the students wonder of electrical components. Ever since electricity was first discovered, scientists and engineers have been designing new and better ways to use it to improve our lives. Modern electronic systems have develop very quickly in quite a short space of time and the things that they	N/A	Food and Nutrition/ Art and Design

	They draw knowledge and understanding from other areas of the curriculum. Students now been taught how to identify relevant sources information using a range of resources including ICT. They now are developing a response to design briefs and produce their own design specification for products. They develop criteria for the designs to guide their thinking and form a basis for evaluation. They are able to generate design proposals that should matchlock their criteria. They are now considering the ascetics and other issues influence their planning and making and are able to suggest plans the designing and making and modify as necessary. They are developing skills in prioritising actions and reconcile decisions as the project develops, take into account the use of time and cost when selecting materials, components, tools, equipment and production methods they develop the skills in using graphical techniques and ICT including computer aided design to explore develop model and communicate design proposals. We look at the ecological benefits of using wood as a natural resource rather than using the planet of oil by using plastics. We discussed the impact of using plastics and the development of plant-	can do now would have seemed amazing hundred years ago. We attempt to recreate that amazement with use of LDR's, resistors micro switches, microprocessors ,loudspeaker, capacitors etc to produce an amplifier system capable of connecting to their phone. This is housed in either a plastic or wooden cases system that uses standard components to assemble. The case is laser etched to tie it in with the packaging part of the project. The students will learn about modern electronics and will develop skills in soldering and system repairs that they can take with them into their future life as the world becomes more dependent upon electronics.		

	based plastics in light of smaller plastic choose and the long life of the product made.			
GCSE Year 1 (2-year course)	Here students will be guided through a coursework project from start to finish, covering all 4 GCSE assessment objectives. They will also have the opportunity to apply the skills they have learnt from Years 7-9. For example they will need to apply their drawing skills to generate ideas in response to the brief. Students will also apply their understanding of wood, metal, plastic and CAD/CAM from their KS3 lessons when prototyping and making their final outcome. New learning will also take place; they will learn how to take inspiration from a design movement, work to a brief and refine ideas. During this project students will be guided through step by step and will have the opportunity to draw on prior learning as well as develop their understanding further. For example, generating and recording ideas students were introduced to at KS3. Now in project 1, students will be taught more advanced drawing techniques, increasing in difficulty. This is a practice project where students will be able to test out a range of different skills and techniques, leading to their final coursework project.		Students will now apply all they have learnt to date to produce their 2nd coursework project. At this stage students will be more competent in the designing and making process and will be able to work much more independently. They will have the skills to problem solving, take risks and make constructive and informed decisions.	
GCSE Year 2 (2 year course)	Project 2 continued	<u>Exam component</u> This is set by the exam board, with starting points released in January. The project will follow the same format as projects 1 and 2 but		Revisit coursework projects, making improvements where needed.

		students will be expected to work independently, from mind mapping to final outcome.	

What **cross-curricular themes** have been identified?

Art-key terminology, drawing techniques, colour will design techniques, rendering, fashion designer/textile artist inspire creativity. The use of line tone pattern, perspective drawing

Maths- conversion centimetres to millimetres, measuring calculations, costings, tessellation, nets, surface area, ratio, patterns, templates, scaling, conversions, analysing data, velocity, ratio, flowcharts, graphs.

IT- research using Internet sources, mood boards made on PowerPoint, 2-D design, computer drawing, research using the Internet, packaging design, prodesktop, sketch up, videoing smart material reaction to stimuli, use of ICT to create illustrations and technical drawings and put together portfolios.

Geography. Deforestation, sustainability, recycling, location of timber, environmental issues reducing waste, global warming, carbon footprint, power generation, fossil fuels, renewable energies.

Science- deforestation, sustainability recycling material science, investigating material properties and functions, electrical components physics, biomimicry, leavers linkages, energy, types of movement , forces and stresses, mechanical devices, energy generation.

English- opportunities for extended writing within product analysis, evaluations, justify their decisions orally and through annotation.

PSHE- sourcing of materials, awareness of moral, social, environmental, sustainability, the 6R's, cultural traditions, environmental issues including waste and recycling, social and moral issues exploring the ethical decisions made by companies to be more sustainable, product obsolescence.

How would this unit be **assessed** to show the students are making progress?

In addition to the formal assessments which take place at least twice across the year during ”whole school exam weeks”, students will be assessed and their progress will be tracked and monitored.

Year	Term 1	Term 2	Term 3
7	- Questioning - Feedback - Peer assessment - Self-assessment - Teacher assessment - Homework tasks assessed - End of unit test.		
8	- Questioning - Feedback - Peer assessment - Self-assessment - Teacher assessment - Homework tasks assessed - End of unit test.		
9	- Questioning. - Feedback. - Peer and self-assessment - teacher assessment. - End of unit test - Quality of making - Quality of sound		
GCSE Year 1	- Questioning - Feedback - Peer assessment	- Questioning - Feedback - Peer assessment	• Questioning • Feedback • Peer assessment

(2 year course)	- Self-assessment - Teacher assessment - Homework tasks assessed - Topic test sustainability. - Knowledge recall activities - Marking for literacy in annotation books - Portfolio marked to exam board specification	- Self-assessment - Teacher assessment - Homework tasks assessed - Knowledge recall activities - Marking for literacy in annotation books - Portfolio marked to exam board specification, with 1-9 grades shared	• Self-assessment • Teacher assessment • Homework tasks assessed • Knowledge recall activities • Marking for literacy in annotation books • Portfolio marked to exam board specification, with 1-9 grades shared
GCSE Year 2 (2 year course)	• Questioning • Feedback • Peer assessment • Self-assessment • Teacher assessment • Homework tasks assessed • Knowledge recall activities • Marking for literacy in annotation books • Portfolio marked to exam specification with 1-9 grades shared. • Practical mock exam will be completed at Christmas of year 2.	- As this is their externally set task only general class comments will be provided.	

Are there any **extra-curricular links, visits or speakers** linked to units of work?

Currently the D&T department are developing ways for students to learn, explore and engage with the subject outside of the classroom. We plan to organise in the coming year guest speakers to support units of work, as well as organise a trip to the Design Museum for Year 1 GCSE students. Below is what we currently offer:

Year	Term 1	Term 2	Term 3
7	Design Technology Club for KS3 After school on Tuesday.	Design Technology Club for KS3 After school on Tuesday.	Design Technology Club for KS3 After school on Tuesday.
8			
GCSE Year 1 (2 year course)	Monday-Thursday before school for extra help.	Monday-Thursday before school for extra help	Monday-Thursday before school for extra help
GCSE Year 2 (2 year course)	As above plus Monday after school	As above plus Monday after school	

What will students be expected to know and remember?

Design technology at Appleton school introduces the students to the world of design and manufacture. They learn how to be creative and how ideas can be translated into the real world using a wide range of skills. Students are encouraged to think outside the box approach design problems from different angles. We have tried hard in the Department in developing the schemes of work so that the students can build on their knowledge as they progress through the school. Students need to be encouraged to demonstrate their understanding that all DT activities take place within contexts that influence future design. We have moved away from schemes of work that were purely craft-based focus. The students are now examine solving context rather than closed design briefs. The context and example of which would be *extending human capacity, improving living and working spaces* show that we need to develop our students so they are adaptable and able to think freely with freedom and creativity.

	3 Half Terms:			**3 Half Terms:**
Year 7	Wooden Box: • Introduced to wood as a material.	Maze Game • Introduced to plastic as a material.	Design Challenge: • The importance of considering both the function and	Food Rotation

	• Develop practical skills. • Introduced a sawing, drilling and finishing techniques. • Experience using a laser cutter. • Start to develop design technology vocabulary. • The design cycle	• Using CAD for design work. • Looking at industrial mass production techniques. • Product analysis • Product evaluation	aesthetics of an object when generating design ideas. • How to take inspiration from a design movement • How to communicate ideas in isometric and 1- and 2-point perspective • How to develop ideas • Cardboard modelling techniques	
Year 8	Tea light holder • Introduced to working with metal as a material. • Develop an understanding of deforestation, mining implications, recycling, and carbon footprint. • Develop modelling skills. • Learn to work with metal	Automata project • Learn to design for clients. • Understand mechanisms. • Learn to develop ideas. • Begin to learn skills in trialling and testing ideas. • Growing ability to use subject terminology accurately.	Design Challenge • The importance of considering both the function and aesthetics of an object when generating design ideas. • How to take inspiration from a design movement • How to communicate ideas in isometric and 1- and 2-point perspective • How to develop ideas • Cardboard modelling techniques	Food Tech
Year 9 Half term rotation	• Psychology using packaging. • Importance of colour in everyday life • The purpose of packaging. • Branding and logo • Sustainable packaging. • Designing nets. • Writing specification.	• Safe soldering. • Learn to select and use tools and equipment and processes including computer aided design and manufacturing shape and form material safely and accurately and finish them appropriately.		

	• Design and make packaging suitable for target market	• To join and combine materials and ready-made components accurately to achieve functional results. • 2-D design software package. • Laser cutting and laser etching. • Designing within constraints.		
GCSE Year 1 (2 year course)	• Learn how to research effectively. • Develop skills in analysing craftspeople/designers and using these as an inspiration for their own designs. • Understand how to record ideas using a range of different drawing techniques. • Develop skills in modelling and prototyping, selecting and experimenting with a range of materials. • Understand the iterative design process, refining and developing work as it progresses. • Develop annotation skills • Understand how to plan and execute a final outcome. • Understand how to evaluate a final outcome.			• Learn how to research effectively. • Develop skills in analysing craftspeople/designers and using these as an inspiration for their own designs. • Understand how to record ideas using a range of different drawing techniques. • Develop skills in modelling and prototyping, selecting and experimenting with a range of materials.
GCSE Year 2 (2 year course)	• Develop skills in modelling and prototyping, selecting and experimenting with a range of materials.	• Students here will be expected to know and remember all previous skills, applying these to the exam portfolio.		

	• Understand the iterative design process, refining and developing work as it progresses. • Develop annotation skills • Understand how to plan and execute a final outcome • Understand how to evaluate a final outcome.			

By the end of key stage 3/4 our students have the skills to develop realistic design proposals as a result of the exploration of design opportunities and user needs, wants and values. They are able to use imagination, experimentation and combined their ideas when designing. The schemes of work have been developed so they develop the skills to critique and refine their own ideas while designing and making and are able to communicate their design ideas and decisions using different media and techniques as appropriate that different points in their designing. They have developed the skills in being able to plan and organise time and resources well and manage their own project work. We try hard to enable our students to be ambitious and open to exploring, taking design risks in order to stretch the development of design proposals, avoiding clichéd or stereotypical responses.


pneumatics
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