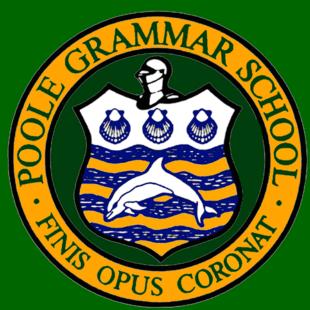
Poole Grammar School - Key Stage 3 (Year 7, Year 8 & Year 9)

DESIGN TECHNOLOGY

'Meeting expectations' criteria, programme of study and curriculum content



Key Stage 3 DESIGN TECHNOLOGY 'meeting expectations' descriptors

	Year 7*	Year 8*	Year 9*
Research	Identify the important features that will be needed in my design. Identify the constraints (the things that limit what can be made). State at least 6 needs in my specification.	Explain why a few of the identified features are important. Carry out research into a few of the features needed by the design. Describe the features of at least two similar products/processes. Use my research to identify some of the design criteria. State at least 8 needs in my specification.	Carry out research into some of the features needed by the design. Use product analysis to investigate some features of at least two similar products/processes. State at least 10 needs in my specification, some of which are measurable. Explain why some of the identified design features are important. Show how most of the design criteria link to my research.
Developing an idea	Make a comment about how my design ideas have been influenced by environmental or sustainability considerations. Comment about how well my design ideas will meet the needs of the users. Comment about how well my designs satisfy a few of the design criteria. Use modelling to test at least one feature of the proposed design. Choose at least one of the materials, components or ingredients that I plan to use based on some of its properties. Describe some of the main stages needed to make my product. Identify the tools and equipment that could be used to make my product.	Make comments about how my design has been influenced by either a social, moral, environmental or sustainability issue. Comment about how well my designs satisfy most of the design criteria. Identify a number of different techniques and modelling methods that could be used in my development work. Use modelling to test a few features of the proposed design against the design criteria. Generate a final design proposal that satisfies a few of the design criteria. Use knowledge of their working properties to choose a few of the materials, components or ingredients that I plan to use. Generate a step-by-step list of the stages needed to make the product. Include, in the instructions for making, details of how to use a few of the processes and techniques. Include safety notes wherever they are needed in the instructions for making. Identify which activities during making could affect how well my final product will meet the general requirements of the design.	Explain how my design ideas address at least 5 different types of need. Give reasons for the main features of my design ideas. Describe how my design ideas have been influenced by either a social, moral, environmental or sustainability consideration. Evaluate my design ideas against the design criteria. Use more than one type of modelling (including CAD where appropriate) to develop and evaluate my design. Describe how my design ideas have changed during the development of my final design proposal. Generate a final design proposal that satisfies some of my design criteria. Use knowledge of their working properties to choose some of the materials, components or ingredients that I plan to use. In the instructions for making, include alternative tools and processes that could be used. Include some quality control checks in my instructions for making. Identify some of the individual activities during making that could affect how well my final product will meet each of the design criteria.
Fitness for purpose	Make a finished product. Carry out all practical work safely. Work independently, without help. Use a few tools or processes correctly (including CAM if appropriate), demonstrating some basic skills in their use. Test whether my final product can do what it is needed to do. Explain any differences between the design I was making and my final product.	Make a product that has (at least) a medium level of challenge. Use a wide variety of different tools or processes correctly including CAD/CAM), demonstrating fair skills in their use. Make a final product that is generally well assembled and with a good finish. Test at least one feature of the final product against the design criteria or the product manufacturing specification. Explain how I tested the product and why I tested it this way. Comment about how suitable the final product is for the target user. Suggest simple improvements that could be undertaken to make it function better.	Make a product that has (at least) a medium level of challenge, with some parts having a high level of challenge. Select and use a wide variety of different tools or processes correctly (including CAM if appropriate), demonstrating good skills in their use. Carry out quality control checks for some features during the making of my product. Make a final product that is well assembled and to a good overall standard. Test a few features of the final product against the design criteria or the product manufacturing specification. Suggest at least three improvements to the final product and explained why these are needed. Sketch these and annotate clearly.

^{*}Note: not all of these aspects will need to be covered in any one year. For example: as the Year 7 materials unit is largely an introduction to tools and processes when working with the materials provided they will not produce a specification, but have to meet certain demands to make the product function correctly.

Design & Technology Department Year 7 programme of study

In Design & Technology during Key Stage 3 (Years 7, 8 & 9) students undertake a three-year course to build upon their experience at Key Stage 2 and prepare them for their GCSE options at Key Stage 4. This will include research, design and manufacture tasks, focussed practical tasks together with investigation and evaluation tasks to develop their understanding and subject knowledge. Design & Technology encompasses; Electronics, Food Preparation & Nutrition, Graphics and Materials (including; Wood, Metal and Plastic).

The range of Design & Technology subjects is delivered to each year group in using a 'carousel' over the school year. The information below shows the subjects a typical **Year 7**, **however**, **students may undertake these in any order** over the course of the year.

Subject	ELECTRONICS	FOOD PREPARATION & NUTRITION	GRAPHICS / 3D Design	MATERIALS
	Fuse Tester	Breakfast	Designing characters	Joining Materials
			Uniteres to next?	Mortise
Duration	9 weeks	9 weeks	9 weeks	9 weeks
Project	Design & make a product to test a fuse.	Making activities based upon investigations on the theme of 'breakfast'.	Produce a front cover of a comic, creating a super hero or villain.	Manufacture of a metal hook and wood joint.

Curriculum Content for Year 7 Design & Technology

Theme	Content	Assessment
1. ELECTRONICS	Developing a range of design ideas for a fuse tester. Circuit theory and basic LED circuits. The need for a fuse as a safety device. Use of copper tape and joining components using soft-soldering. Use CAD (2D-Design) to produce a design for manufacturing using CAM (Laser cutter). Cutting, thermo-forming, shaping and edge finishing acrylic using hand tools and jigs. Use fastenings to join components together. The need to recycle batteries and materials.	4 focussed homework tasks, related to the lesson work. Final outcome. End of unit test.
2. FOOD PREPARATION & NUTRITION	Investigate existing products. Understand the requirements for a balanced diet and GDA. Appropriate use of utensils and equipment. Food hygiene and safety, including washing and tidying-up at the end of a practical lesson. Budget planning for food production. Analysis of products to explore if they are fit-for-purpose. Prepare ingredients to allow for the demonstration of practical skills.	4 focussed homework tasks, related to the lesson work. (Can include buying ingredients). Final outcome. End of unit test.
3. GRAPHICS / 3D Design	Studying the work of artists and designers. Using recognised formal drawing techniques; such as isometric and perspective. Typography. Composition. Rendering Techniques. Using CAD to enhance presentation.	4 focussed homework tasks, related to the lesson work. Final outcome. End of unit test.
4. MATERIALS	Safe working when undertaking practical work with hand or machine tools. Wood: Using joints to increase the effective gluing area. Metals: Riveting & brazing Surface finishing materials. Using annotated sketches. Accuracy and skill in specific and appropriate tool use, including quality control. Learning new tool names and how to use them safely. The production of quality products. Testing products for suitability in use.	4 focussed homework tasks, related to the lesson work. Final outcome. End of unit test.

Above all the key skill is to work safely at all times and appreciate the processes involved in some projects present potential danger if not undertaken as instructed. It will be a lot of new techniques, tools, processes and environments.

DESIGN &TECHNOLOGY DEPARTMENT YEAR 8 PROGRAMME OF STUDY

In Design & Technology during Key Stage 3 (Years 7, 8 & 9) students undertake a three-year course to build upon their experience at Key Stage 2 and prepare them for their GCSE options at Key Stage 4. This will include research, design and manufacture tasks, focussed practical tasks together with investigation and evaluation tasks to develop their understanding and subject knowledge. **Design & Technology encompasses**; **Electronics, Food Preparation & Nutrition, 3D Design (Graphics) and Product Design (Materials -including; Wood, Metal and Plastic).**

The range of Design & Technology subjects is delivered to each year group in using a 'carousel' over the school year. The information below shows the subjects a typical **Year 8**, **however**, **students may undertake these in any order** over the course of the year.

Subject	ELECTRONICS	FOOD PREPARATION & NUTRITION	3D DESIGN (GRAPHICS)	PRODUCT DESIGN (MATERIALS)
	AMP IN A CAN	LUNCHES	MODULAR HOUSING	GRABBER/LITTER PICKER
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Duration	9 weeks	9 weeks	9 weeks	9 weeks
Project/ Design & Manufacture an electronic product to amplify sound		Making activities based upon investigations on the theme of 'Lunches'.	Design modularised solutions to housing requirements.	Design & Manufacture of a novelty mechanical grabber/litter picker.

Curriculum Content for Year 8 Design & Technology

Theme	Content/unit of work	Assessment
1. ELECTRONICS 2. FOOD PREPARATION & NUTRITION	 MP3 Amp in a can: The project as the assembly of three component parts, one of which will be made and evaluated - (circuit) and two which will be designed, made and evaluated (wrapper and top designs). Circuit Theory -recap Y7 and Introduce concept of amplifier- force/ power/ current and voltage. circuit symbols- loudspeaker, capacitor, polarised capacitor and amplifier. The amplifier is, in itself a whole circuit -an "integrated circuit" or IC, or "chip" -which is polarised component along with the loudspeaker, the LED and the electrolytic capacitors Practical Circuits -the PCB introduced and explained. Production of circuit, testing and evaluation. Recap soldering theory- mechanical and electrical combination of METAL parts, H&S and clean soldering iron tips and good contact. Using "third/helping hands" device to help place and solder on-board components (not loudspeaker/LED/battery clip) clipping off excess legs from the solder side. Fault finding Wrapper ("label") design, manufacture and evaluation -Produce a Design Specification. Model the design and analysis of wrapper idea. Produce a Range of developed wrapper ideas -using iterative design approach. Use 2DDesign software to produce/print their chosen design. Evaluation their design to the specification and for "quality". Top panel (speaker holder) design, manufacture and evaluation -using 2D design software (CAD) and laser cutter to produce it (CAM) Assembly of project and testing/evaluation overall against specification. Lunches: Refresh/Revisit knowledge of hygiene and safety. Produce a time plan to follow to ensure efficient use of time. Understand the functions of the nutrient groups in the body. Read and interpret any food labels Understand what the legal requirements are. 	4 focussed homework tasks, related to the lesson work. Final outcome. End of unit test. 4 focussed homework tasks, related to the lesson work. (Can include buying ingredients). Final outcome. End of unit test.
3. 3D DESIGN (GRAPHICS)	Understand how meat reaches our table the names of the different meat cut types. Understand why recipes may need to be adapted and how they can adapt them. Know the types of milk and how its processed and what are the alternatives. Understand the function of ingredients used in making shortcrust pastry. Look at British cuisine and traditional/ regional recipes, ingredients and methods. • Make pizza and salad within the time frame allowed. • Make home-made soup or 'all in one' hot dogs • Make BBQ chicken wraps, which includes marinating and heat control. • Make shortcrust pastry cheese triangles using the 'Rubbing – In' method Design modular housing: To help solve the UK housing shortage and perhaps be an affordable home for them to live in one day. The challenge is that our factory can only manufacture one shape or 'unit' and we need to prove to investors/potential buyers of the houses that they can be configured and finished in different ways to looks unique. • Introduction / isometric practice - practice isometric skills in preparation for the design tasks focus upon making designs look 3D	4 focussed homework tasks, related to the lesson work. Final outcome. End of unit test.

	 Initial Ideas and design development- Drawing different ideas for how the single unit could be stacked in different ways using two or three of the same shape or 'unit' -drawn in a scale. Once done, details can be drawn in heavier pencil of where doors and windows might be, balconies and pergolas could go and how the garden might look, etc. Final Design -Isometric Master Drawing, Tracing Final Design, Drawing Detail of Final Design Continuation of the work on the final design, sketching in details of doors, windows, balconies, etc. Colour / Render Extension Tasks - Build a Tower Block on 'portrait' isometric paper, adding detail and colour as necessary. Google SketchUp 	
4. PRODUCT DESIGN (MATERIALS)	Grabber/litter picker Project: To develop knowledge of anthropometrics, mechanisms and linkages together with developing their designing and manufacturing skills through the design and manufacture of novelty grabber designed for sale in a souvenir shop such as Monkey World or other appropriate location. The grabber will be constructed largely of manufactured board (MDF) with a shaped handle and trigger based upon a template, a 'head' (jaws) that will be designed along an appropriate theme decided upon by the student. Ongoing testing against a set criteria with evaluation is an important aspect of this project. Students must use appropriate annotated sketches, in the form of sequence diagrams, to record specified processes during this module. The other focus will be to increase their awareness of Health and Safety in a workshop environment and produce a high-quality functioning outcome that can be practically tested Safe working when undertaking practical work with hand or machine tools. Mechanisms -levers, linkages, cams/cranks, gears, pulleys Design development and using annotated sketches. Accuracy and skill in specific and appropriate tool use, including quality control. The production of quality products. Testing products for suitability in use.	4 focussed homework tasks, related to the lesson work. Final outcome. End of unit test.

Above all the key skill is to work safely at all times and appreciate the processes involved in some projects present potential danger if not undertaken as instructed. It will build upon year 7 with more new techniques, tools, processes and environments and lead towards year 9.

DESIGN &TECHNOLOGY DEPARTMENT YEAR 9 PROGRAMME OF STUDY

In Design & Technology during Key Stage 3 (Years 7, 8 & 9) students undertake a three-year course to build upon their experience at Key Stage 2 and prepare them for their GCSE options at Key Stage 4. This will include research, design and manufacture tasks, focussed practical tasks together with investigation and evaluation tasks to develop their understanding and subject knowledge. **Design & Technology encompasses; Electronics, Food Preparation & Nutrition, 3D Design (Graphics) and Product Design (Materials -including; Wood, Metal and Plastic).** A focus that leads towards GCSE DT options is also included along with end of year team project to focus upon Year 10 and build upon the KS3 skills

The range of Design & Technology subjects is delivered to each year group in using a 'carousel' over the school year. The information below shows the subjects a typical **Year 9**, **however**, **students may undertake these in any order** over the course of the year.

Subject	ELECTRONICS	FOOD PREPARATION & NUTRITION	3D DESIGN (GRAPHICS)	PRODUCT DESIGN (MATERIALS)	END OF YEAR MINI PROJECT
	TAKING CONTROL	MAIN MEALS	IN THE STYLE OF	'HOT PROPERTY' PEWTER CASTING	DOLPHINS DEN- ENTREPRENEUR
				,,,_,,	PROJECT
Duration	9 weeks	9 weeks	9 weeks	9 weeks	2-3 weeks
Project/ unit of work	Use GENIE PCB to Design/programme and electronic system	Making activities based upon investigations on the theme of Main meals.	Architectural design based/inspired by selected architectural styles	Design & Manufacture of a cast pewter number/symbol/letter for hotel door/table inspired by art/design style.	Short project where students develop a proposal for the y10 entrepreneur scheme (work in teams)

Curriculum Content for Year 9 Design & Technology (all Four DT areas)

Theme	Content/unit of work	Assessment
1. ELECTRONICS 'taking control' (with CAD module) Approx 9x weeks	USE GENIE PCB TO DESIGN/PROGRAMME AND ELECTRONIC SYSTEM (with additional CAD add on module) Overview: Students will build upon Year 7 and 8 electronics to understand systems and control within programable electronic systems. The activities to support this include: Introduction and recap of Year 7 and 9 electronics knowledge and understanding including Input/process/ output model for systems Control Systems and Microcontrollers. Circuits from discrete components, PCBs, ICs, Programmable ICs. Programmable ICs Differences between microprocessor and microcontroller. PIC Family: GENIE and PICaxe. Use of microcontrollers: Flowchart microcontroller microprocessor (PCB) (IC/Chip/Microchip) Microcontroller based systems: different systems and their inputs/ outputs. The main flowchart shapes used for computer coding and what function each has. Coding: High-level and low-level flow- charts and text-based Input-process-output High Level Code Low Level Code Flowchart Language Instruction set compiler, Coding Outputs. Students produce, run, print out and annotate a simple flowchart code turning on (and off) a sequence of LEDs and upload it onto the project boards. Understand: Digital Terminator box Process and data box Responding to Inputs, cascading inputs, and decision box subroutine, digital and Analogue Signals, Responding to Analogue inputs. Analogue (U.S. Analog) Digital Binary Bit Analogue to Digital Using and Comparing Variables. Using and Comparing Variables Use of circuit Wizard to simulate the use of a LCD display, 'Simon Says' project: The add on CAD Module: This uses an online CAD modelling Package called OnShape, which has functionalities in common with Sketchup, but is more resistant materials based. The content is covered in a folder at Sharepoint/DT/Year09/Electronics-systems and control/OnShape CAD Stuff The activities to support this include: CAD1: Introduction: The concept of 2D CAD using vector drawing as opposed to 3D CAD using solid modelling and how both can be used with CAM to produce	4 focussed homework tasks, related to the lesson work. Final produced/manufactured outcome. End of unit test.

2. FOOD PREPARATION & NUTRITION 'Main meals' Approx 9x weeks

ACTIVITIES BASED UPON INVESTIGATIONS ON THE THEME OF MAIN MEALS.

<u>Overview</u>: Produce a balanced tasty recipe (four times) suitable for a main meal. Building on understanding and experiences from Y7/8 looking at wider food and nutrition knowledge and understanding The activities to support this include:

- Produce a time plan to follow to ensure efficient use of time.
- Understand the functions of the nutrient groups in the body.
- Refresh/Revisit knowledge of hygiene and safety.
- Cooking choices: To understand the different methods of heat transfer and how they cook the food.
- Equipment: To refresh the knowledge about what equipment should be used for a variety of preparation techniques including electrical equipment. Also 'bridge and claw' method for safe use of knives.
- Safe storage of food: Recognised storage methods and the related temperatures and understand the significance of the 'danger zone'
- Food waste: Watch the documentary 'Hugh's War on Waste and answer the questions
- Eating/Diets through life: Understanding dietary requirements at each stage of human life.
- What is a curry: Common ingredients and spices with layering flavouring? Different curries and their origins.
- International cuisine and British Cuisine and its unique characteristics. Students will select a cuisine and prepare a presentation about what makes the cuisine unique, types on ingredients and cooking methods used and the types of dishes produced.

Manufacturing- recipes on SharePoint/Teams: students provide ingredients and apron/containers

- Make 'Racy Rice' recipe from the selection of approximately 4x rice-based recipes
- Make 'magic with mince' recipe from the selection of approximately 4x recipes
- Make 'Curry crazy' recipe from the selection of approximately 4x recipes
- Make 'international cuisine' recipe from the selection of approximately 4x recipes or appropriate recipes sourced by students

4 focussed homework tasks, related to the lesson work. (Can include buying ingredients). Final produced/manufactured outcome. End of unit test.

3. 3D DESIGN (GRAPHICS) 'In the style of...' Approx 9x weeks

ARCHITECTURAL DESIGN BASED/INSPIRED BY SELECTED ARCHITECTURAL STYLES

<u>Overview</u>: Students are going to study two vastly different buildings, and then use this to inspire a range of their designs in a similar style -using various techniques such as isometric and CAD. This will lead to a final overall 'ideation sheet' with their designs and own logo etc.

The activities to support this include:

- Drawing the Hearst Tower.
- Shape & form developments 1: A range of experimental shapes that develop the geometry of the Hearst Tower.
- Drawing the Sarpi Border Checkpoint.
- Shape & form developments 2: Students continue with development shapes and forms in the style of The Hearst Tower AND Sarpi checkpoint. With a focus on the experimental shapes that develop the Curves and ellipses of the Sarpi Border Checkpoint.
- Design Development Hearst Tower and Sarpi checkpoint: Students select the best shape from the pages of 'shape and form developments. They then draw out the shape again, more carefully this time in pencil, full sized A4. When done, they go over the pencil drawing in a thicker black pen (Sharpie or Broad marker) so that the shape can be more easily traced onto a blank sheet of paper and add detail that could turn the

4 focussed homework tasks, related to the lesson work. Final produced/manufactured outcome. End of unit test.

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	shape into a creative and unusual products or architectural designs. Students will later enhance their	
	 designs with pen & coloured pencil. Final Design 1. Selection of best ideas to take forward to render as a final outcome. Using all the skills they 	
	picked up, students present more than one iteration of the final design to the best of their ability, adding	
	details such as doors, windows, balconies, or switches, plugs and details of their product and complete	
	their drawing in colour.	
	and an analysis of the analysi	
4. PRODUCT	DESIGN & MANUFACTURE OF A CAST PEWTER NUMBER/SYMBOL/LETTER FOR HOTEL	4 focussed homework
DESIGN	DOOR/TABLE INSPIRED BY ART/DESIGN STYLE.	tasks, related to the
(MATERIALS)	Overview: Students will build upon Year 7 and 8 product design skills and understanding and apply understand	lesson work.
	of the impact of historical Art/design styles (e.g. Art Deco) in designing and to manufacturing a product for a	Final
'Hot property'	client (hotel owner/property developer) manufactured from, cast pewter, and finished to a high standard.	produced/manufactured
Approx 9x weeks	The activities to support this include:	outcome.
	Recap of year 7 and 8 workshop expectations and safe practice/health and safety. Safe working when	End of unit test.
	undertaking practical work with hand or machine tools. The focus to increase student awareness of Health	
	and Safety in a workshop environment and produce a high-quality functioning outcome that can be	
	practically tested	
	Analysing end user/client needs Identifying design enperturities	
	Identifying design opportunities Creating design appoints to develop designs from	
	 Creating design specifications to develop designs from Properties of metal and states of matter (gas, liquid, solid) and how this applies to design and 	
	manufacturing activities in metal	
	What is pewter and its suitability for the project focus	
	What is casting –health and safety and best approaches/methods and equipment used	
	What is CAD/CAM	
	Manufacturing techniques: Effective use of laser cutter (CAM) and casting	
	 Design strategies –understanding design iterations and design development. Modelling, hand drawing and 	
	application of CAD (TechSoft 2D design). Students must use appropriate annotated sketches, in the form	
	of sequence diagrams, to record specified processes. Design development and using annotated sketches.	
	Accuracy and skill in specific and appropriate tool use, including quality control.	
	The production of quality products.	
	Ongoing testing against a set criterion with overall evaluation, suitability in use, suggesting improvements	
'DOLPHINS DEN'-	SHORT TEAM-BASED ENTREPRENEUR PROJECT WHERE STUDENTS DEVELOP AND PRESENT A	
ENTREPRENEUR	PROPOSAL FOR THE Y10 ENTREPRENEUR SCHEME	
PROJECT	Overview: With the annual launch of the Year 10 DT ENTREPRENEUR COMPETITION, all Year 9 students	
Approx. 2-3	are required to research and design a product proposal in a 'dragons' den' type competition, that has the	
weeks	potential/could be developed for entry next school year. This DOES NOT MATTER if a student is planning to	
MACCUO	do a DT subject at GCSE –as there are opportunities for marketing, advertising, accounting, and leadership/management within the competition.	
	The product should be either a food, electronics, graphics, or materials (or a mix of these) based design to	
	reflect one of the Design & Technology subjects covered over Y9 or may intend to study for GCSE. Students	
	DO NOT have to manufacture what they design. But design proposals need to be justified in terms of cost,	
	viability, suitability for the market etc. Credit will be given for teamwork, quality of presentation, innovation,	
	imagination, and flair.	

The activities to support this include:

- Working in teams of up to FOUR students.
- Understanding time management, division of tasks and teamwork is essential –Students can do the task individually they wish
- Understanding that any resources used or proposed must consider environmental and ethical factors and be responsibly sourced
- There is no manufacturing required –although students are welcome to create samples/examples/try-outs etc. in their own time away from school
- Presenting proposals to the class teacher for about 5min. Presentations do not have to use PowerPoint
- The best entries from each group will go forward to be judged by the Head of DT and (possibly) the Head teacher/Head of year

Above all the key skill is to always work safely and appreciate the processes involved in some projects present potential danger if not undertaken as instructed. It will build upon year 7 and 8 with more new techniques, tools, processes and environments and lead towards year 9.