Scheme of learning
AQA GCSE (9-1) 8552 Design and Technology

Introduction

Malbank School has chosen to deliver the AQA Design and Technology 8552 syllabus as we are experienced in their operating procedures and the coursework/exam format and this knowledge is beneficial in supporting our students to make progress. Assessment is split with 50% through a single 2hour 30-minute exam and 50% through the NEA

Progression

Students are well prepared for this course having followed the Key stage 3 scheme which teaches about the main material areas of wood, metal, plastics, paper and board, Textiles along with some smart materials. Students will also have experienced electronics, mechanisms, structures and forces. All these topics are experienced through design and make tasks.

Scheme of learning

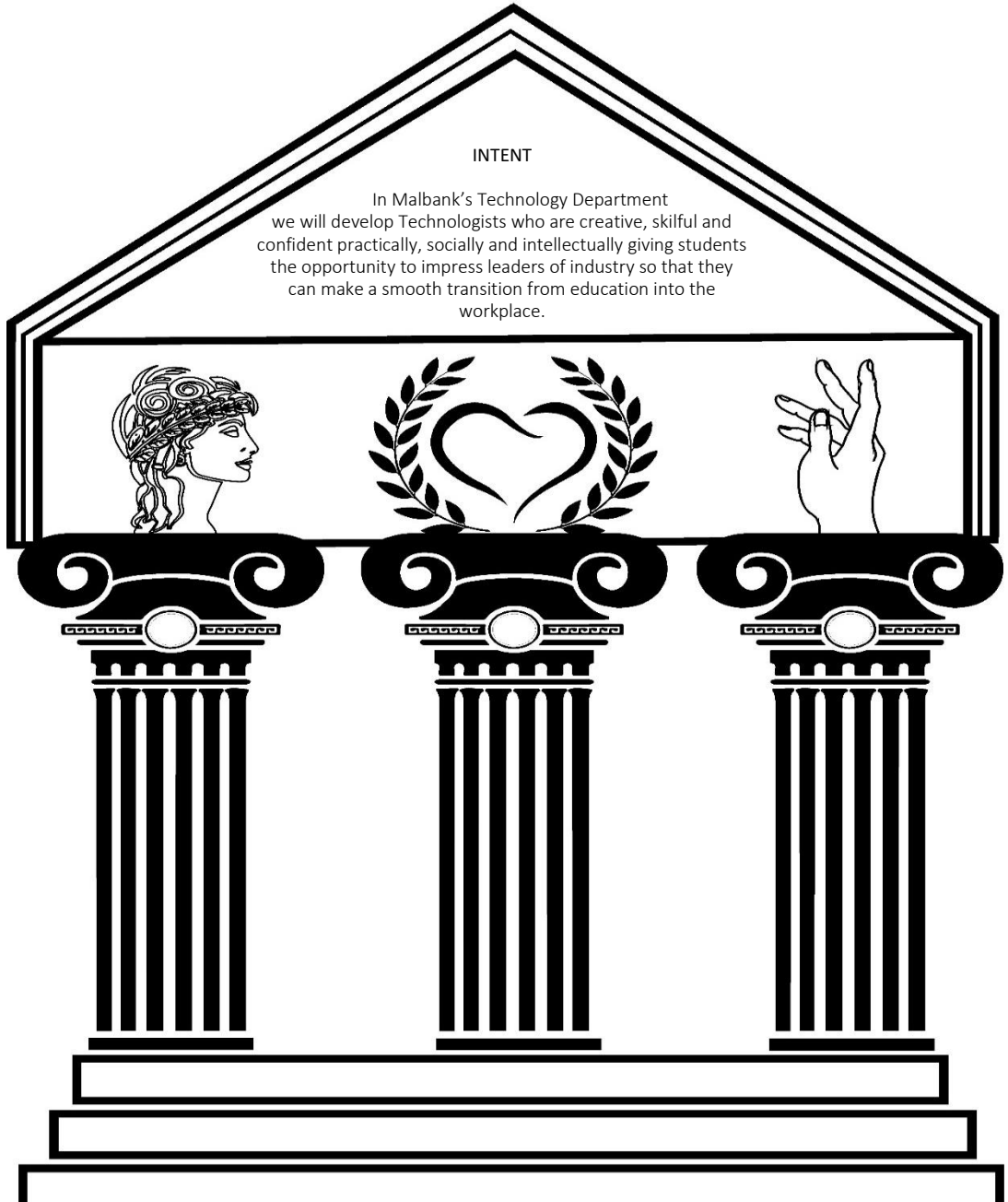
The following scheme of learning is designed to be a guide for the delivery of the theory content alongside suggested types of practical activities. This will help to develop and reinforce specialist practical skills simultaneously. This scheme is designed to be adapted to suit Mallbank School where 5hours of teaching and learning are experienced per week.

In Year 10 students receive 37 weeks and Year 11 29 weeks of learning. There are 7 main units each containing topics which vary in length. Each topic can usually be covered in approximately one week over one to two theory lessons depending on delivery method and style and the ability of the group. Unit titles are as follows:

1. New and emerging technologies
2. Energy, materials, systems and devices.
3. Materials and their working properties
4. Common specialist technical principles
5. Special material areas, choose 2 from timber, metals, plastic, textiles, electronics, paper and board.
6. Designing principles
7. Making principles

Practical activities are not necessarily linked to the theory lessons running concurrently but where possible, they have been. Teachers use their professional judgement and awareness of the facilities in their own departments as well as their specialist skill set and the specialism of their cohort, when adapting their practical activities.

Teachers will adapt the teaching order of activities set out below to allow differentiation but will ensure complete coverage.



Term 1

Week	Specification reference	Objectives and content	Teaching unit resources		Unit reference	Practical activities
Materials and their working properties					**Unit 3**	**Suggested tasks**
Prior Learning: Pupils learned about wood, metal and plastic through the Key stage 3 Scheme of Work. They worked with softwood and manufactured boards, metals and plastics on design and Make activities through years 7 to 9 as well as with Textiles in year 7 and 8. Paper and board will have been used through key stage 2 learning but will be inconsistent across primary feeder schools. Paper and board were used to model and produce packaging, for example as part of the year 8 scheme.						
1	3.1.6	**HEAD** **Introduction to material properties** The meaning of each of the physical and working properties related to all materials **Papers and boards** • Know the primary sources of materials for producing papers and boards • Be able to recognise and characterise different types of papers and boards • Understand how the physical and working properties of a range of paper and board products affect their performance	Understand the physical properties of: absorbency, density, fusibility, electrical and thermal conductivity. Understand the working properties of: strength, hardness, toughness, malleability, ductility and elasticity. PowerPoint Guide: T1 Papers and board Worksheet 1 Papers and boards Homework 1 Papers and boards	**Heart** Communicate the meaning of property terms	Topic 1	**HAND** Use a handling collection of various materials to familiarise students with a variety of specific material properties. Use of basic tools to test materials and understand properties Use a handling collection of papers and boards. Conduct an absorbency test using differently size papers. Try different media on them to test bleed and smudge resistance etc.
2	3.1.6	**Timbers**	PowerPoint Guide: T2 Timbers	Resilience and communicate	Topic 2	Use a handling collection of hard and softwoods and manufactured boards.

		• Know the primary sources of materials for producing natural and manufactured timbers • Be able to recognise and characterise different types of natural and manufactured timbers • Understand how the physical and working properties of a range of natural and manufactured timbers products affect their performance	Worksheet 2 Timbers Homework 2 Timbers Link Video Industrial felling [1m37s]	answers to worksheets Self - awareness with tools and equipment to ensure safe working		Close inspection and testing of a range of timbers to include stress tests and cutting along and across the grain, indentation and compare to boards.
3	3.1.6	**Metals** • Know the primary sources of materials for producing metals and alloys • Be able to recognise and characterise different types of metals and alloys • Understand how the physical and working properties of a range of metals and alloys affect their performance	PowerPoint Guide: T3 Metals and alloys Worksheet 3 Metals and alloys Homework 3 Metals and alloys	Resilience and communicate answers to worksheets Self - awareness with tools and equipment to ensure safe working	Topic 3	Use a handling collection of metals including ferrous non-ferrous and alloys. Show how quickly rust can occur on mild steel. Conduct magnetic testing for identification and weight testing for density.
4	3.1.6	**Polymers** • Know the primary sources of materials for producing polymers • Be able to recognise and characterise different types of polymers • Understand the physical and working properties of a range of	PowerPoint Guide: T4 Polymers Worksheet 4 Polymers Homework 4 Polymers	Resilience and communicate answers to worksheets Self - awareness with tools and equipment to	Topic 4	Use a handling collection of thermoplastics and thermosets also examples of biopolymers and manmade fabrics such as acrylic and nylon. Where possible demo or mini-project using vacuum forming or line bending process

		thermoforming and thermosetting polymers		ensure safe working		
5	3.1.6	**Textiles** • Know the primary sources of materials for producing textiles • Be able to recognise and characterise different types of textiles • Understand how the physical and working properties of a range of textiles affect their performance	PowerPoint Guide: T5 Textiles Worksheet 5 Textiles Homework 5 Textiles	Resilience and communicate answers to worksheets Self - awareness with tools and equipment to ensure safe working	Topic 5	Use a handling collection of textiles including plant based, animal based and man-made. A series of tests can be set up with samples including strength, stretch, drape, crease resistance, stain resistance, absorbency / drying time, fraying etc.
		Unit 3 Materials and their working properties	**Unit assessment**			Autumn 1 assessment with practical grades from materials testing record on DODDLE

Common specialist technical principles (Head)				Heart	Unit 4	Hand
Prior learning: **Students learned about forces in the Year 7 Structures Project whilst designing and making bridges and then testing them to destruction. This included improving functionality. Environmental factors including social and carbon footprint and the 6R's of sustainability are part of all design and make activities carried out in year 7, 8 and 9. Students start to learn about scales of production in year 9.**						
6	3.2.2	**Forces and stresses** • Be able to recognise and characterise tension, compression, binding, torsion and shear forces and stresses • Understand the impact of different forces and stresses on materials	PowerPoint Guide: T1 Forces and stresses on materials Worksheet 1 Forces and stresses Homework 1 Forces on stresses	Resilience and communicate answers to worksheets	Topic 1	Many of the concepts of this lesson will have been touched upon during the testing of the materials in Unit 3 and can be referred to. Using a selection of materials in the chosen specialism(s), compare how different stock forms resist different forces and stresses.
7	3.2.2	**Improving functionality** • Understand how materials may be enhanced to resist and work with forces and stresses to improve functionality	PowerPoint Guide: T2 Improving functionality Worksheet 2 Improving functionality Homework 2 Improving functionality	Resilience and communicate answers to worksheets	Topic 2	Using a material from the chosen specialism(s), show how lamination or another form of reinforcement increases types of strength. Folding of card is a quick and simple way to show how structures are produced through shaping.
8	3.2.3	**Ecological and social footprint** • Understand that greenhouse gases and carbon are produced during the manufacture of products • Understand the impact that a consumer society has on natural resources and the environment	PowerPoint Guide: T3 Ecological and social footprint Worksheet 3 Ecological and social footprint Homework 3 Ecological and social footprint	Group work Leadership, resilience as a leader encouraging the team to work for you. Initiative and originality the	Topic 3	Start a 4-7 week mini project in the chosen material area that has a sustainable brief. Suggest the use of upcycling, using recycled or reclaimed materials such as pallets, old clothes and other textiles, cardboard, household items turned into LED lighting projects etc.

		including deforestation, mining, drilling, farming and product miles • Be aware of the need for social and governmental responsibility to address safe working conditions and pollution	Link Carbon footprint calculator	key to a successful project		This can be delivered individually or pairs. It is aimed at developing material knowledge and basic processing tool skills and not too heavily design based.
9	3.2.3	**The 6 Rs** • Be aware of the role that consumers play in reducing waste and the demand on finite resources • Understand the hierarchy of options in responsible and sustainable designs	PowerPoint Guide: T4 The 6Rs Worksheet T4 The 6Rs Homework T4 The 6Rs Link Video Nike	Communicate new ideas with annotation	Topic 4	Continue with mini project. While covering the 6 Rs relate to the use of sustainable design within the mini project.
10	3.2.7	**Scales of production** • Understand how products are produced in different volumes • Explain when and why different manufacturing methods are used for different production volumes • Be able to link the use of relevant specialist processes to the appropriate level of production	PowerPoint Guide: T5 Scales of production Worksheet T5 Scales of production Homework T5 Scales of production	Worksheets- resilience and effective communication	Topic 5	Continue with mini project 3. Alternative to pause the mini project and conduct single lesson on a batch production activity. These take some setting up but once in place can be used year on year. Successful projects are simple automata, screen printed bags, LED touch with coin cell or super capacitor. Break the project into stations with very simple instructions. Each task to take 1-3 minutes maximum. After a few have been produced at each station rotate the workforce. Good to link to Christmas fair or similar.

		Unit 4 Common specialist technical principles	**Unit assessment**			Autumn 2 assessment to be combined with practical grade from ongoing mini project and Update DODDLE

Designing principles		Head		Heart	Unit 6	Hand
Prior Learning: Students will have covered no less than 5 design and make activities through years 7 to 9. Staring with a design brief, students analyse the brief then research into similar products, materials and who the client may be. They will have researched Design movements like Art Deco, Art Nouveau and some modernism movements. They will also have researched into key designers like Phillip Starck, Giovanni Alessi, Coco Channel and James Dyson. Progression is through the increasing number of designers and in depth knowledge of a minimum of 3 designers.						
11	3.3.1 3.3.2	**Investigation, primary and secondary data** • Understand how primary and secondary data can be collected to assist the understanding of client and user needs • Know how to write a design brief and produce a manufacturing specification • Understand how the environment, and social and economic challenges influence designing and making	PowerPoint Guide: T1 Investigation, primary and secondary data Worksheet 1 Investigation, primary and secondary data Homework 1 Investigation, primary and secondary data	Effective communication with the client	Topic 1	Continue with mini project 4. Alternative opportunity to collect data for a given task such as
12	3.3.3	**The work of others – designers** • Know how to investigate, analyse and evaluate the work of others • Understand how investigating the work of other designers can inform designing	PowerPoint Guide: T2A The work of others - designers Worksheet 2A The work of others - designers Homework 2A The work of others – designers Case study	Research and analysis	Topic 2A	Continue with mini project 5. Alternative opportunity to run through a case study of the work of a designer through a product analysis and a brief look at their life. This will reinforce the technique to be used for their own case studies.

13	3.3.3	**The work of others – companies** • Know how to investigate, analyse and evaluate the work of others • Understand how investigating the work of other design companies can inform designing	PowerPoint Guide: T2B The work of others - companies Worksheet T2B The work of others - companies Homework T2B The work of others - companies	Research and Analysis skills	Topic 2B	Complete mini project 6.
14	3.3.4	**Design strategies** • Be able to use a range of design strategies to help produce imaginative and creative design ideas • Understand how to explore and develop design ideas	PowerPoint Guide: T3 Design strategies Worksheet 3 Design strategies Homework 3 Design strategies		Topic 3	Complete mini project 7.

Term 2

Week	Specification reference	Objectives and content	Teaching unit resources	Unit reference		
Designing principles		**Head**		**Heart**	**Unit 6**	**Hand**
Prior Learning: Students learn how to communicate their ideas through various technical drawing techniques from the start of year 7. This includes free hand sketching, crating, isometric drawing and perspective drawing techniques. They learn how to produce a working drawing in orthographic projection and how to dimension their drawings using British standard notation. Design ideas are produced by free hand techniques and using CAD mainly 2D Design and Sketch-up software. Annotation is used increasingly throughout years 7 to 9.						
15	3.3.5 3.3.6	**Head** **Communication of design ideas** • Understand how to develop, communicate, record and justify design ideas • Be aware of a range of techniques to support clear communication of design ideas • Know how to design and develop prototypes in response to client wants and needs • Be able to critically evaluate prototypes and suggest modifications	PowerPoint Guide: T4 Communication of design ideas Worksheet 4 Communication of design ideas Homework 4 Communication of design ideas Link Video Two-point perspective [1m07s]	**Heart** This is all about effective communication both graphically and with the use of annotation	Topic 4	**Hand** Complete a series of drawing activities to help develop an understanding of the benefits and limitations of the various drawing styles including freehand sketching, oblique, isometric, two-point perspective, exploded and third-angle orthographic projection. Ensure students are aware of how to be selective and know how to record data for use in their portfolios. Demonstrate different portfolio techniques including digital format if appropriate.

		Unit 6 Designing principles	**Unit assessment**			1st part of Spring 1 assessment added to practical grades from Mini NEA up to assessment point on DODDLE

Making principles		Head		Heart	Unit 7	Hand
Prior Learning: **In year 7 materials are selected for the students. Through years 8 and 9 students are increasingly encouraged to select materials to suit their products functional and aesthetic features. Accuracy of manufacture is prioritised with the use of tolerances introduced at GCSE level. Efficient use of materials is taught throughout with tessellation being progression into GCSE. Waste management is planned into the design and make tasks with students progressing onto this role through GCSE. Health and safety is prioritised from year 7 with progression being through the increasing use of more tools and techniques.**						
16	3.3.7	**Selection of materials and components** • Be able to select and use materials and components appropriate to a specific task • Understand how functionality, availability and cost affect the selection of materials and components	PowerPoint Guide: T1 Communication of design ideas Worksheet 1 Communication of design ideas Homework 1 Communication of design ideas	Lateral thinking, consider all joining options for task	Topic 1	NEA skills project 12-14 wks. In the chosen specialist material area, students are to produce a prototype product and a portfolio of supporting evidence similar to the NEA. The design context can be chosen from, but not limited to the following: 1. An aid or adaptation to an existing product for the very young, the elderly or those with special needs. 2. A prototype product to enhance road safety. 3. A storage or transportation device that protects valuable or fragile contents from theft or damage and breakage.
17	3.3.8	**Tolerances**	PowerPoint Guide: T2 Tolerances Worksheet 2 Tolerances	Resilience to complete and communicate	Topic 2	NEA skills project Alternative opportunity to make a small artefact to a

		• Understand and use tolerances to ensure accuracy is considered when making a product • Understand how a range of materials are formed to designated tolerances • Understand why tolerances are applied during making activities • Understand how additional material may be required or removed by a cutting method, seam allowance or joint overlap	Homework 2 Tolerances	worksheet answers Practical accuracy requires resilience		given tolerance in the chosen specialist material. A good method for getting students to self-check their work is to create a go/no go template for the given task. Ideas may include: One half of a wood joint that needs to fit the other half that is pre-made. Create a replacement pocket to exactly cover the one on a school blazer. Create a parallel turned shaft to a specific diameter. Devise a LDR circuit with a potential divider which switches on a LED at a given LUX level. Construct a small trinket box from card where the base interference fits into the lid.
18	3.3.9	**Material management** • Understand how effective design planning can minimise waste • Be aware of how design adaptations and use of tessellation can save time and materials • Understand the value of using measurement and marking out to create an accurate prototype • Be able to recognise and characterise the appropriate tools	PowerPoint Guide: T3 Material management Worksheet 3 Material management Homework 3 Material management	Organisation, thoughtfulness and resilience required to minimise waste. Draw on cross curricular maths knowledge	Topic 3	NEA skills mini project Opportunity to investigate tessellation and nesting with a simple design layout task such as fitting a given number of parts on an A4 or A3 page in the most efficient way. Students can than calculate the waste.

		and methods to mark out a range of materials to create prototypes				
19	3.3.10	**Tools, equipment, techniques and finishes** • Understand how to select and use specialist tools, equipment, techniques and processes • Be aware of relevant health and safety issues when using specialist tools, equipment, techniques and processes to protect yourself and others from harm	PowerPoint Guide: T4 Tools, equipment, techniques and finishes Worksheet 4Tools, equipment, techniques and finishes Homework 4 Tools, equipment, techniques and finishes Link Tensol 12 Safety data sheet Link Video How NOT to use a disc sander		Topic 4	NEA skills mini project Opportunity to reinforce health and safety requirements in the workshop and link signage and PPE to the legislation and HES requirements
20	3.3.11	**Surface treatments and finishes** • Know and understand that surface treatments and finishes are applied for functional and aesthetic purposes • Understand how to prepare different surfaces for treatments and finishes • Understand how to select and apply appropriate surface treatments and finishes to a range of surfaces	PowerPoint Guide: T5 Surface treatments and finishes Worksheet 5 Surface treatments and finishes Homework 5 Surface treatments and finishes	Resilience required to get the best surface finish in wood. Quality is directly proportional to effort	Topic 5	NEA skills mini project Opportunity to demonstrate and use a variety of surface finishes relating to the chosen specialist area

		Unit 7 Making principles	**Unit assessment**			2nd part of Spring 1 assessment added to practical grades from Mini NEA so far

Specialist Units - 1		Head		Heart	Unit 5A-5F	Hand
21		**Sources, origins and properties** **Specific content detail for all specialist units can be found at the end of this document.**			Topic 1	NEA skills project 6 Opportunity for demonstration of or practice using specialist materials, techniques, equipment and machinery not previously covered Teacher to choose
22		**Working with specialist materials**			Topic 2	NEA skills project 7 Further specialist investigation, teacher to choose
23		**Commercial manufacturing, surface treatments and finishes**			Topic 3	NEA skills project 8 Further specialist investigation Metal finishes
		Unit 5A-5F Specialist Units	**Unit assessment**			Spring 2 assessment to be added to practical grades from Mini NEA so far at assessment point
New and emerging technologies					**Unit 1**	
Prior Learning: Much of this unit is new to the students. Some knowledge of computer-based systems and robotics is taught through the programming and mechanisms project in year 8. Students will also have learned about the impact of designing on people, culture and society mainly from an environmental point of view with progression through more in depth understanding at GCSE.						
24	3.1.1	**Industry and enterprise** • Understand the impact of new and emerging technologies on the design and organisation of the workplace and tools and equipment • Be aware of how computers and automation have changed	PowerPoint Guide: T1 Industry and enterprise Link Video BMW Car Manufacture [3m49s] Link Fully automated warehouse [1m59s]	Resilience	Topic 1	NEA skills project 9

		manufacturing through the use of robotics • Understand how innovation can drive product development and enterprise including the use of crowd funding and virtual marketing • Understand co-operative and fair trade organisation	Worksheet 1 Industry and enterprise Link Augmented reality [2m38s] Homework 1 Industry and enterprise			
24	3.1.1	**Sustainability and the environment** • Understand that new technologies need to be developed and produced in a sustainable way • Be aware of the impact that excessive use of certain materials has on the environment • Understand how the environment can be protected by responsible design and manufacturing • Understand how waste can be disposed of with the least impact on the planet • Understand the positive and negative impacts new products have on the environment	PowerPoint Guide: T2 Sustainability and the environment Link Video Kaizen [4m16s] Link Video Plastic entering food chain [0m59s] Worksheet 2 Sustainability and the environment Homework 2 Sustainability and the environment		Topic 2	NEA skills project 10 Investigate the emissions produced by a range of motor vehicles
25	3.1.1	**People, culture and society** • Understand how technology push and market pull affect consumer choice and employment	PowerPoint Guide: T3 People, culture and society Link Video Ford Cobots [1m04s]	Group work, team members to come to a consensus about a	Topic 3	NEA skills project 11 Investigate a range of products and decide if they were driven by technology push or market pull.

		• Understand changes in job roles due to the emergence of new ways of working • Be aware of changes in fashion and trends and how they affect designers and manufacturers • Understand how new products can have both a positive and negative impact on society	Link Video HSBC Cultural Adverts [6m27s] Worksheet 3 People, culture and society Homework 3 People, culture and society	range of products		

Term 3

Week	Specification reference	Objectives and content	Teaching unit resources		Unit reference	
New and emerging technologies Head				Heart	Unit 1	Hand
26	3.1.1	**Production techniques and systems** • Understand contemporary and potential future use of automation, Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) • Be able to recognise and characterise the use of Flexible Manufacturing Systems (FMS) • Understand how Just in Time (JIT) and Lean Manufacturing contribute to manufacturing efficiencies	PowerPoint T4: Production techniques and systems Worksheet 4 Production techniques and systems Homework 4 Production techniques and systems		Topic 4	NEA skills project 12
26	3.1.1	**Informing design decisions** • Be able to evaluate the advantages and disadvantages of planned obsolescence from different perspectives • Understand how products can be designed to be repaired and recycled	PowerPoint T5: Informing design decisions Link Built in obsolescence Link Swedish repair bills Worksheet 5 Informing design decisions Homework 5 Informing design decisions		Topic 5	NEA skills project 13

		Unit 1 New and emerging technologies	**Unit assessment**			Summer 1 assessment added to final practical grades for NEA skills project
Energy, materials, systems and devices Head				**Heart**	**Unit 1**	**Hand**
Prior Learning: Students will be aware of the generation of energy through solar, wind and other energy friendly means of generation. Progression is achieved at GCSE by learning how these methods produce usable energy though the use of turbines. Students are taught about mechanical energy in the year 8 mechanisms project where for example they will learn how rotary motion is converted into linear through the use of cams, cranks, gears and wheels.						
27	3.1.2	**Energy generation** • Understand how power is generated from fossil and nuclear fuels • Understand how power is generated from renewable energy sources such as: wind, solar, tidal, hydroelectric and biomass • Be aware of the arguments for and against the selection of fossil fuels, renewable energy and nuclear power	PowerPoint T1: Energy generation Worksheet 1 Energy generation Homework 1 Energy generation	Initiative and resilience compare power stations to the internal combustion engines found in a car.	Topic 1	Complete NEA skills project 14 Study the demonstration ford engine in the project court to see how fossil fuels are converted into kinetic energy
28	3.1.2	**Energy storage** • Be able to identify mechanical power and understand how it is stored • Understand pneumatics and hydraulics as examples of kinetic pumped storage systems	PowerPoint T2: Energy storage Link Cryogenic energy storage Link UK Battery farms Link Video Energy conversion [2m34s]		Topic 2	Review of mini NEA skills project. Analysis of former GCSE projects to foster expectations at various levels and to develop an awareness for the quality of presentation, ideas

		• Understand the functional properties of alkaline and re-chargeable batteries	Worksheet 2 Energy storage Homework 2 Energy storage			generation, modelling and the quality of finish achievable.
27	3.1.3	**Modern materials** • Be able to recognise a range of modern materials • Describe developments made through the invention of new or improved processes involving modern materials • Explain how modern materials can be used to alter functionality	PowerPoint T3: Modern materials Worksheet 3 Modern materials Homework 3 Modern materials	Resilience and communication to complete the worksheet	Topic 3	Test and handle a range of modern materials. Use of you tube where materials are not available
28	3.1.3	**Smart materials** • Be able to recognise a range of smart materials • Understand how the functional properties of a range of smart materials can be changed by external stimuli	PowerPoint T4: Smart materials Worksheet 4 Smart materials Homework 4 Smart materials	Resilience and communication to complete the worksheet	Topic 4	NEA 2 Test and handle a range of smart materials. Use of you tube where materials are not available
29	3.1.3	**Composite materials and technical textiles** • Understand how material properties can be enhanced by combining two or more materials • Recognise a range of composite materials and technical textiles	PowerPoint T5: Composite materials and technical textiles Link Video Fibreglass mould [8m13s] Link Video Problem with microfibres [2m47s]	Resilience and communication to complete the worksheet	Topic 5	NEA 3 Test and handle a range of composite materials. Use of you tube where materials are not available Kevlar jacket testing video

		• Understand how fibres can be manipulated to create technical textiles	Worksheet 5 Composite materials Homework 5 Composite materials			
29	3.1.4	**Systems approach to designing** • Understand the principles of electronic systems • Use systems diagrams and flowcharts to analyse and solve a given problem • Understand the use of open and closed loop systems and subsystems • Recognise and understand common electronic input and output components	PowerPoint T6: Systems approach to designing Worksheet 6 Systems approach to designing Homework 6 Systems approach to designing		Topic 6	NEA 4
29	3.1.4	**Electronic systems processing** • Understand the difference between analogue and digital signals • Understand how microcontrollers are programmed as counters, timers and for decision making to provide functionality to products and processes • Understand the use of buzzers, speakers and lamps to provide functionality to products and processes	PowerPoint T7: Electronic systems processing Worksheet 7 Electronic systems processing Homework 7 Electronic systems processing		Topic 7	NEA 5

30	3.1.5	**Mechanical devices** • Be able to recognise and identify a range of movements • Understand the functions of mechanical devices to produce linear, rotary, reciprocating and oscillating movements • Understand how mechanisms can be used to change magnitude and direction of force, including levers, linkages and rotary systems	PowerPoint T8: Mechanical devices Worksheet 8 Mechanical devices Homework 8 Mechanical devices		Topic 8	NEA 6 Investigate mechanisms using Focus on Mechanical Toys software.
31		**Exam week will be allocated during the Summer term**				Record exam result in Doddle
32		**NEA contexts released by exam board**				NEA1 Context analysis
		Prior Learning: Design and make task from Brief to final evaluation. Progression comes through starting from a context rather than a design brief.				
33		**Primary research methods**				NEA2 Research 1
34		**Client identification**				NEA3 Research 2
35		**Product analysis**				NEA4 Research 3
36		**Design trends**				NEA5 research 4
37		**Research selection**				NEA6 Research conclusions

Term 4 Start Year 11

Week	Specification reference	Objectives and content	Teaching unit resources		Unit reference	
Specialist Units – 2 if applicable (2 recommended) Heart				**Heart**	**Unit 5A-5F**	**Hand**
1		**Sources, origins and properties**			Topic 1	NEA 7 Produce a Design Brief focusing on client and research
2		**Working with specialist materials**			Topic 2	NEA 8 Research based of design brief
3		**Commercial manufacturing, surface treatments and finishes**			Topic 3	NEA 9 Produce a specification based on research, analysis and client needs.
		Unit 5A-5F Specialist Units	**Unit assessment**			
4						NEA 10-11
5						NEA 12-13
6						NEA 14-15
7						NEA 16-17
8						NEA 18-19
9						NEA 20-22
10						NEA 23-24
11						NEA 25-26
12		Revision				
13		Revision				

14		**Mock examination week 1 November**				

Term 5

Week	Specification reference	Objectives and content	Teaching unit resources	Unit reference		
NEA completion and revision starts				**Heart**	**Unit 5A-5F**	**Hand**
15		**Mock examination week2 February**		Initiative through revision at home. Resilience		
16				Resilience and communication		NEA 27-28
17				Resilience and communication		NEA 29-30
18				Resilience and communication		NEA 31-32
19				Resilience and communication		NEA 33-34
20				Resilience and communication		NEA Practical deadline
21				Resilience and communication		NEA Testing and evaluation
22				Resilience and communication		NEA Final hand-in
23		Revision		Resilience, organisation of revision note and revision timetable		Revision 1-2
24		Revision				Revision 3-4
25		Revision				Revision 5-6

26		Revision				Revision 7-8

Week	Specification reference	Objectives and content	Teaching unit resources		Unit reference	
Revision		**Head**		**Heart**	**Unit 5A-5F**	**Hand**
26		Revision		Resilience Organisation		Revision 9-10
27		Revision				Revision 11-12
28		Revision				Revision 13-14
29		Revision				Revision 15-16

Term 6

Specialist units

Week	Specification reference	Objectives and content	Teaching unit resources	Textbook reference	Unit reference	
Specialist material areas – Papers and Boards				**Section 5A**	**Unit 5A**	
1	3.2.1 3.2.4	**Sources, origins and properties** • Learn how the primary sources of materials for producing papers and boards are converted into products • Understand the ecological issues in the manufacture and recycling of paper and board products • Learn how different properties of papers and boards make them suitable for use in commercial products	PowerPoint Guide: T1 Sources, origins and properties Worksheet 1 Sources, origins and properties Homework 1 Sources, origins and properties Link Video Making paper [13m21s]	Chapter 24	Topic 1	
2	3.2.5 3.2.6 3.2.8	**Working with paper and board** • Know and understand the commercial stock forms, types and sizes of materials in order to calculate quantities • Understand how to cut, crease, score, fold and perforate card • Be aware of school-based cutting, forming and processing techniques, tools and equipment	PowerPoint Guide: T2 Working with paper and board Worksheet 2 T2 Working with paper and board Homework 2 T2 Working with paper and board Box net Pop-up card	Chapter 25	Topic 2	

3	3.2.9	**Commercial manufacturing, surface treatments and finishes** • Understand how the properties of different papers and boards affect their use in commercial applications • Be aware of commercial processing techniques • Understand why registration marks are used to enhance quality control • Understand how the application of surface treatments and finishes can modify the functional and aesthetic properties of paper and board products	PowerPoint Guide: T3 Commercial manufacturing Worksheet 3 Commercial manufacturing Homework 3 Commercial manufacturing	Chapter 26	Topic 3	
		Unit 5A Paper and Boards	**Unit assessment**			

Week	Specification reference	Objectives and content	Teaching unit resources	Textbook reference	Unit reference	
Specialist material areas – Timber based materials				**Section 5B**	**Unit 5B**	
1	3.2.1 3.2.4	**Sources, origins and properties** • Understand the main processes involved in producing workable forms of timber including: ▪ Conversion ▪ Seasoning and ▪ The creation of manufactured timbers • Be aware of sustainability and ethical factors in timber production and use • Understand the advantages and disadvantages of manufactured board compared with natural wood	PowerPoint Guide: T1 Sources, origins and properties Worksheet 1 Sources, origins and properties Homework 1 Sources, origins and properties Link Article Illegal teak logging Link Video Felling machinery [6m03s] Link Video Timber production [5m21s]	Chapter 27	Topic 1	
2	3.2.5 3.2.6 3.2.8	**Working with timbers** • Know and understand the commercial stock forms, types and sizes of materials in order to calculate quantities • Be aware of school-based cutting, forming and processing techniques, tools and equipment	PowerPoint Guide: T2 Working with timbers Worksheet 2 T2 Working with timbers Homework 2 T2 Working with timbers Link video Steam bending [3m26s]	Chapter 28	Topic 2	

3	3.2.9	**Commercial manufacturing, surface treatments and finishes** • Know and understand how timbers and boards are selected and processed for commercial products • Learn how materials are cut, shaped and formed to a tolerance • Learn about the preparation and application of treatments and finishes to enhance functional and aesthetic properties	PowerPoint Guide: T3 Commercial manufacturing Worksheet 3 Commercial manufacturing Homework 3 Commercial manufacturing Link video Curtain Coater [2m53s]	Chapter 29	Topic 3	
		Unit 5B Timber based materials	**Unit assessment**			

Week	Specification reference	Objectives and content	Teaching unit resources	Textbook reference	Unit reference	
Specialist material areas – Metal based materials				**Section 5C**	**Unit 5C**	
1	3.2.1 3.2.4	**Sources, origins and properties** • Know how metals are mined and extracted from raw material • Understand the processes involved in extraction and refining to produce workable forms of metal • Be aware of sustainability and ethical issues in metal production, in use and end of life	PowerPoint Guide: T1 Sources, origins and properties Worksheet 1 Sources, origins and properties Homework 1 Sources, origins and properties Link Video Recycling fridges [5m10s] Link Video Recycling iron [6m44s]	Chapter 30	Topic 1	
2	3.2.5 3.2.6 3.2.8	**Working with metal based materials** • Understand that materials and components are available in standard forms and sizes • Be aware of school-based cutting, forming and processing techniques, tools and equipment	PowerPoint Guide: T2 Working with metal based materials Worksheet 2 T2 Working with metals Homework 2 T2 Working with metals Link video Commercial casting [3m18s] Link video Punching and pressing [4m45s]	Chapter 31	Topic 2	
3	3.2.9	**Commercial manufacturing, surface treatments and finishes**	PowerPoint Guide: T3 Commercial manufacturing	Chapter 32	Topic 3	

		• Know and understand how metals are selected and processed for commercial products • Explain how aids are used to judge quality and accuracy during processing • Understand how surface treatments and finishes affect the functional and aesthetic properties of metal based products	Worksheet 3 Commercial manufacturing Homework 3 Commercial manufacturing Link video Aluminium foundry [6m41s]			
		Unit 5C Metals	**Unit assessment**			

Week	Specification reference	Objectives and content	Teaching unit resources	Textbook reference	Unit reference	
Specialist material areas – Polymers				**Section 5D**	**Unit 5D**	
1	3.2.1 3.2.4	**Sources, origins and properties** • Know the primary sources of polymers • Understand the processes involved in refining, fractional distillation and cracking to produce workable forms of polymers • Understand how plastics can be modified to enhance their properties • Be aware of sustainability and ethical issues in plastic production, in use and end of life	PowerPoint Guide: T1 Sources, origins and properties Worksheet 1 Sources, origins and properties Homework 1 Sources, origins and properties Link Video Fractional distillation [4m05s] Link Video Plastic roads [1m33s] Link Video Sustainability [3m13s]	Chapter 33	Topic 1	
2	3.2.5 3.2.6 3.2.8	**Working with polymers** • Know and understand the commercial stock forms, types and sizes of materials to calculate quantities • Be aware of school-based cutting, forming and processing techniques, tools and equipment	PowerPoint Guide: T2 Working with timbers Worksheet 2 T2 Working with timbers Homework 2 T2 Working with timbers Link video Plastic film [2m14s]	Chapter 34	Topic 2	

3	3.2.9	**Commercial manufacturing, surface treatments and finishes** • Understand how the properties of different polymers influence use and affect performance • Be aware of commercial processing techniques for plastics • Understand the application and use of quality control during manufacture • Understand how preparation and application of treatments and finishes affect the functional and aesthetic properties of polymer-based products	PowerPoint Guide: T3 Commercial manufacturing Worksheet 3 Commercial manufacturing Homework 3 Commercial manufacturing Link video Panton Chair [3m06s] Link video Hydrographic printing [5m01s]	Chapter 35	Topic 3	
		Unit 5D Polymers	**Unit assessment**			

Week	Specification reference	Objectives and content	Teaching unit resources	Textbook reference	Unit reference	
Specialist material areas – Textile based materials				**Section 5E**	**Unit 5E**	
1	3.2.1 3.2.4	**Sources, origins and properties** • Understand the processes involved in obtaining raw material from animal, chemical and vegetable sources • Be aware of sustainability and ethical issues in plastic production, in use and end of life	PowerPoint Guide: T1 Sources, origins and properties Worksheet 1 Sources, origins and properties Homework 1 Sources, origins and properties Link Video Cotton lifestyle [1m50s] Link Video Flame retardant [2m29s] Link Video Recycled polyester [1m09s]	Chapter 36	Topic 1	
2	3.2.5 3.2.6 3.2.8	**Working with textiles** • Understand how textiles and components are available in standard forms and sizes • Be aware of school-based cutting, forming and processing techniques, tools and equipment	PowerPoint Guide: T2 Working with timbers Worksheet 2 T2 Working with timbers Homework 2 T2 Working with timbers Link video Draping [5m32s] Link video Haute couture [7m41s]	Chapter 37	Topic 2	

3	3.2.9	**Manufacture and finishing, surface treatments and finishes** • Know and understand how textile based materials are selected and processed for commercial products • Understand why aids are used to judge quality and accuracy before and during processing • Understand how preparation and application of treatments and finishes affect the functional and aesthetic properties of textile products	PowerPoint Guide: T3 Commercial manufacturing Worksheet 3 Commercial manufacturing Homework 3 Commercial manufacturing Link video Commercial screen printing [3m06s] Link video DyeCoo [2m20s] Link video Jeans manufacturing [6m48s]	Chapter 38	Topic 3	
		Unit 5E Textiles	**Unit assessment**			

Week	Specification reference	Objectives and content	Teaching unit resources	Textbook reference	Unit reference	
Specialist material areas – Electronic based materials				**Section 5F**	**Unit 5F**	
1	3.2.1 3.2.4	**Sources, origins and properties** • Be able to select materials and components in relation to a range of criterion • Be able to recognise and characterise types of printed circuit boards • Understand the functional and aesthetic properties of anodised aluminium • Be aware of sustainability and ethical issues in PCB production, in use and at end of life	PowerPoint Guide: T1 Sources, origins and properties Worksheet 1 Sources, origins and properties Homework 1 Sources, origins and properties Link Video Anodising [2m29s] Link Video Drone flying [2m23s] Link Video Racing grannies [1m27s]	Chapter 39	Topic 1	
2	3.2.5 3.2.6 3.2.8	**Working with electronics** • Understand that materials and components are available in standard forms and sizes • Be aware of school-based soldering, cutting and shaping	PowerPoint Guide: T2 Working with electronics Worksheet 2 T2 Working with electronics Homework 2 T2 Working with electronics	Chapter 40	Topic 2	
3	3.2.9	**Manufacture and finishing, surface treatments and finishes** • Be aware of commercial processing techniques in PCB production	PowerPoint Guide: T3 Commercial manufacturing	Chapter 41	Topic 3	

		• Know and understand how the properties of electronic and mechanical systems influence and affect the performance of domestic appliances and motor vehicles • Understand how surface treatments and finishes affect the functional and aesthetic properties of mechanical and electronic products	Worksheet 3 Manufacturing and finishing Homework 3 Manufacturing and finishing Link video Car production [1m48s] Link video Car Spraying [5m10s] Link video Electric cars [3m02s] Link video Wave soldering [2m19s]			
		Unit 5F Electronic based materials	**Unit assessment**			