GCSE Specification Mapping Document 2020

UNIT 1: NEW AND EMERGING TECHNOLOGIES

Lesson/s	UNIT 1: TOPIC COVERED	LESSON OVERVIEW	RESOURCES REQUIRED	TECHNICAL SUPPORT/ORDERS
1	Induction to new and emerging technologies, Industry and Enterprise. **Objectives:** • Understand how new and emerging technologies have changed the way we live and how they continue to shape the modern world. • Be aware of how computers and automation have impacted the design and organisation of the workplace through the use of robotics • Understand how innovation can drive product development.	• **Open PPT (L1 Industry and enterprise) on staff shared.** • What are new and emerging technologies? Examples. • **Task 1: Groups of 3** - Mind map on A3 paper inventions that have changed the world with justifications. **(20 minutes)** • What is an assembly line? Videos showing early assembly lines in the 1930's-60's and fully automated production line today. **Task 2 (Worksheet): Discuss/ Compare and contrast Manual Assembly line verses Robotic automated assembly lines (Pros and Cons). (15 minutes)** • **Task 3 (Worksheet): Design of the workplace-** The design and organisation of the workplace including automation and the use of robotics. **(10 minutes)** • **Task 4 Enterprise keywords (Slip of paper) – write keywords next to correct definition.** Enterprise, crowdfunding, virtual marketing and Fair trade- **(5 minutes)** • **PLENARY- list of questions to discuss in pairs.** ***Homework 1: Industry and enterprise question and answer***	**Lined paper/ A3 paper/ Coloured pencils** **Worksheets/ homework sheets to be printed:** • **Task 2; Manual assembly line VERSES Robotic worksheet** • **Task 3; Design of the workplace** • **Task 4; Enterprise keywords** • **Homework sheet 1*: Industry and enterprise question and answer*** **Log on to access YouTube on your computer. All clips are embedded onto PowerPoint.** Charlie Chaplin -- The Assembly Line https://www.youtube.com/watch?v=NT-mVVprnbs **Henry Ford Assembly Line Invention** https://www.youtube.com/watch?v=thQfzzMnU3U Awesome fully Automated BMW Car Factory https://www.youtube.com/watch?v=VpwkT2zV9H0 What is industrial automation? https://www.youtube.com/watch?v=6f-uChX5CVc	• **Printed worksheets and slips** • **Computer and projector** • **Logging on to YouTube before hand**
2	Sustainability and the environment **Objectives:** • 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 the positive and negative impacts new products have on the environment.	• **Open PPT (L2 Sustainability and the environment) on staff shared.** • **Starter (worksheet)**- Complete the sentences below using the word banks. **(10 minutes)** • **Embedded YouTube videos** about renewable and non-renewable resources **(5 minutes)** • **Task 2: Advantages and disadvantages of non-renewable resources.** Using the information remembered from the videos, students are to list the advantages and disadvantages of non-renewable and renewable resources. **(15 minutes).** • **Embedded YouTube video -** What really happens to the plastic you throw away **(4 minutes)** • **TASK 3; Life cycle assessment.** Students are to complete the table for a life cycle assessment for a paper bag verses a plastic bag. **(15 minutes)** • **TASK 4; Continuous Improvement slips:-** Students are to fill in the missing sentences using the word bank.**(5 minutes)** • **Plenary:** Positive and negative impacts of new products on the environment – Old and new TV technology ***Homework 2: Impact on the environment (mobile phones)***	**Lined paper** **Worksheets/ homework sheets to be printed:** • **STARTER; Resource consumption** • **TASK 2; pros and cons of resources** • **TASK 3; Life cycle assessment** • **TASK 4; Continuous Improvement slips** • **HOMEWORK; Impact on the environment** **Log on to access YouTube on your computer. All clips are embedded onto PowerPoint.** **Renewable Energy Resources explained in 2 Minutes** *https://www.youtube.com/watch?v=qmTH7_JUKBA#* **Non-Renewable Energy Resources | GCSE Physics | Doodle Science-** *https://www.youtube.com/watch?v=SCg81A6kwg0* **Renewable Energy 101-** *https://www.youtube.com/watch?v=T4xKThjcKaE* **What really happens to the plastic you throw away-** https://www.youtube.com/watch?v=_6xlNyWPpB8	• **Printed worksheets and slips** • **Computer and projector** • **Logging on to YouTube before hand**
3	People, culture and society **Objectives:** • Understand how technology push and market pull affect consumer choice and employment. • Be aware of changes in fashion and trends and how they affect designers and manufacturers. • To understand exclusive and inclusive design to cater for different cultures, disabled and the elderly.	• **Open PPT (L3 People, culture and society) on staff shared.** • **STARTER; Technology push market push-** Students list 3 things that are important and a must have on any mobile phone and 3 things which make them buy a new mobile phone. –**(5 minutes)** • **TASK 1; sorting activity-** Students work in pairs to place the headphones in the correct order of manufacture. - **(10 minutes)** • **TASK 2; fashion trends SLIPS –** Students annotate the changes that have taken place for each headphone, considering materials, technology and fashion. - **(10 minutes)** • **Examples of products that followed design trends** • **Moral, Cultural and religious influences on design** • **Embedded YouTube video -** Making Metro link accessible for all – **(2 mins)** • **Embedded YouTube video -** Katrin Inclusive Design Tissue Dispenser range. **(3 mins)** • **Task 3;** design a product for the disabled or the elderly. Students pick from 4 design tasks or design something of their choice. **(remainder of the lesson)** ***Homework 2: Produce a final idea for your chosen exclusive product.***	**Plain paper** **Worksheets/ homework sheets to be printed:** • **STARTER; Technology push market push** • **TASK 1; sorting activity (tiles to be printed and cut out by teacher prior to lesson)** • **TASK 2; fashion trends SLIPS** **Log on to access YouTube on your computer. All clips are embedded onto PowerPoint.** **Making Metro link accessible for all** *https://www.youtube.com/watch?v=P099SNVwPTo* **Katrin Inclusive Design Tissue Dispenser range. Designer's story.** *https://www.youtube.com/watch?v=Ox8syuK5G5M*	• **Printed worksheets and slips** • **Tiles need to be printed for the sorting activity. (one set between two students).** • **Computer and projector** • **Logging on to YouTube before hand**

UNIT 1: NEW AND EMERGING TECHNOLOGIES

Lesson/s	UNIT 1: TOPIC COVERED	LESSON OVERVIEW	RESOURCES REQUIRED	TECHNICAL SUPPORT/ORDERS
4	Production techniques and systems **Objectives:** • 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	• Open PowerPoint (L4 Production Techniques and Systems) in T:\tech\SOW\YEAR 10 NEW SPEC CORE\L4 Techniques and Systems • **STARTER Automation** – Students read through slide 2 discuss with partner then as a whole group (8 minutes) • Teacher read and discuss slides 3 and 4 • **Task 1 Advantages and Disadvantages of CAD** Using the information discussed from the previous 2 slides, students list the advantages and disadvantages of using CAD • Teacher read through slide 7. Student to think about and answer questions on where CAM is used in the D&T dept and advantages and disadvantages of using CAM • **TASK 2 Drawing and CAD activity** 1. Students create hand drawn design for a simple box packaging. 2. Using 2D Design, create a net for thier packaging design. This should be in a scale of 1:1. 3. Using Google Sketchup create a 3D representation of their packaging design. Students should print and place in sketch books *Homework 3 Read through the PowerPoint on manufacturing systems and complete the last slide on advantages and disadvantages of JIT. Students should print and place in sketchbooks by next lesson. Students should also make sure all work from this lesson is printed and placed in sketchbooks neatly.*	PowerPoint (L4 Production Techniques and Systems) in T:\tech\SOW\YEAR 10 NEW SPEC CORE\L4 Techniques and Systems TASK 1 worksheet to be printed Place homework PowerPoint on SMH	NEED TO BOOK A COMPUTER SUITE
5	Informing design decisions **Objectives:** • 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 • Be aware of ethical and environmental concerns when designing with new technologies	Open PowerPoint (L5 Informing Design Decisions) in T:\tech\SOW\YEAR 10 NEW SPEC CORE\L5 Informing design decisions. • STARTER: Watch iPhone X video. Get students to give their opinions (5 minutes)	PowerPoint (L5 Informing Design Decisions) in T:\tech\SOW\YEAR 10 NEW SPEC CORE\L5 Informing design decisions.	Empty Pringles cartons (7 per class) for group work Card Fabric Double sided tape Glue Speakers Wire
6	**Objectives:** • To present ideas of upcycling Pringles cartons, showing awareness of ethical and environmental issues. • End of unit test	Open PowerPoint in T:\tech\SOW\YEAR 10 NEW SPEC CORE\L6 Pringle presentation end of unit test • Give students 20 minutes to work together on who will say what and how to answer the questions on slide one as part of their presentation. • Each group will then present their creations. (20 minutes) • Students should be given 45 minutes to complete the test. If there is time to spare beforehand, students could use this to revise. Collect sketchbooks in before test begins. This is a good time to take books in to mark.	PowerPoint in T:\tech\SOW\YEAR 10 NEW SPEC CORE\L6 Pringle presentation end of unit test Print test (4 sheets, stapled at top left-hand corner)	

UNIT 2:ENERGY, MATERIALS, SYSTEMS AND DEVICES

Lesson/s	TOPIC COVERED	LESSON OVERVIEW	RESOURCES REQUIRED	TECHNICAL SUPPORT/ORDERS
7 NMI	Energy generation and storage **Objectives:** • Understand the generated of fossil fuels, nuclear power and renewable energy sources and arguments for and against their selection. • Be able to identify mechanical power and understand how it is stored. • Understand the functional properties of alkaline and rechargeable batteries.	• **Open PowerPoint (L7 energy generation and storage)** in T:\tech\SOW\YEAR 10 NEW SPEC CORE\Unit 2\L7 energy generation and storage • **Starter:** In pairs, discuss and list as many energy sources as you can think of. • **Task 1:** Working in pairs, complete task sheet 1 on energy generation by searching for the information on the provided photocopied. • **Task 2:** Arguments for and against sources of energy resources- In groups, discuss, research and present arguments for and against your assigned energy resource. • Introduction to mechanical power • **Task 3:** Alkaline batteries versus rechargeable batteries • **5 to 10 minutes before the lesson ends, show students a demo of using a balloon to lift a book.** • **For how to do the Hydraulic Lifter Experiment using the following link:** http://www.navigatingbyjoy.com/2013/09/29/hands-on-hydraulics-science-fun-for-kids/ **Homework: Research hydraulic Craft projects to do as a group for next lesson on YouTube.**	• **PowerPoints and worksheets can be found** in T:\tech\SOW\YEAR 10 NEW SPEC CORE\Unit 2\L7 energy generation and storage • Print out task 1 hand-out for energy generation • Photocopied pages from AQA Design and Technology textbook (pgs. 32 to 37) • Print out slips for task 2: Arguments for and against each source of energy. • Print out task 3: Batteries – Alkaline versus rechargeable batteries. • **For the demo experiment, you will need:** Tubing/ Large balloon/ Funnel/ Empty can/ Empty large cola bottle/ Heavy book/ Electric tape/ Water/ Scissors.	• Make sure all the resources needed for the lesson are available and within the department. • Printed worksheets and slips • Photocopied pages from textbook done beforehand. • Computer and projector are working.
8 NMI	Energy generation and storage (pneumatics & hydraulics) • Understanding pneumatics and Hydraulics by making a working prototype. (Group activity)	• **Open PowerPoint (L8 pneumatics and hydraulics)** in T:\tech\SOW\YEAR 10 NEW SPEC CORE\Unit 2\L8 energy gener. & stor. making task\ L8 pneumatics and hydraulics • **Starter:** What are Hydraulics and Pneumatics? What is the difference between them? • Show students YouTube videos: **DIY Cardboard Hydraulic Arm -** https://www.youtube.com/watch?v=Eqn4g2aQ70U **How to Make Hydraulic Powered Robotic Arm at Home from Coffee Shop Sticks and Syringe –** https://www.youtube.com/watch?v=YB8nwke5brk **Hydraulics Lift Made From Syringe-** https://www.youtube.com/watch?v=taq-zRm9lQg • **Making task:-** In groups of 3 or 4, make one of the hydraulic projects on the hand hand-out or find one online. Students will use Syringes, lollipop sticks, hot glue, wire to make a working model.	• **PowerPoints and worksheets can be found** in T:\tech\SOW\YEAR 10 NEW SPEC CORE\Unit 2\L8 energy gener. & stor. making task. • Print (Large prints of make tasks) For the make task, students will need: • Lollipop sticks • Small wooden cubes • Elastic bands • Glue guns • Paper clips • Syringes • 3mm tubing • Card and paper for decoration • **Workshop needed for pillar or bench drills**	• Make sure all the resources needed for the lesson are available and within the department. • Printed make tasks • Computers for students to search for other hydraulic projects • Computer and projector are working
9 JWG	Modern materials **Objectives:** • To be able to recognise a range of modern, smart and composite materials, as well as technical textiles. • Understand how the material and functional properties of modern, smart and composite materials, as well as technical textiles.			

UNIT 2:ENERGY, MATERIALS, SYSTEMS AND DEVICES				
Lesson/s	TOPIC COVERED	LESSON OVERVIEW	RESOURCES REQUIRED	TECHNICAL SUPPORT/ORDERS
10 JWG	Smart materials			
11 NLG	Composite materials			
12 JTY	Systems approach to designing **Objectives:** • Understand the principles of electronic systems. • Use systems diagrams and flowcharts to analyse and solve a given problem. • Understand the use of open and close loop systems and subsystems. • Recognise and understand common electronic input and output components.			

UNIT 2:ENERGY, MATERIALS, SYSTEMS AND DEVICES

Lesson/s	TOPIC COVERED	LESSON OVERVIEW	RESOURCES REQUIRED	TECHNICAL SUPPORT/ORDERS
13 JTY	Electronic systems processing **Objectives:** • 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.			
14 JTY	Mechanical devices: motions and linkages **Objectives:** • 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.			
15 NMI	• Mechanical devices: Cams and mechanical toy **Objectives:** • Understand the importance of cams and followers in rotary systems. • Understand the importance and function of gears and pulleys. • Outcome: To make a mechanical toy.	**Open PowerPoint (L15 Mechanical devices- cams)** in T:\tech\SOW\YEAR 10 NEW SPEC CORE\Unit 2\L15 Mechanical devices- CAMS **Starter:** Show YouTube clip of 240 year old mechanical doll – https://www.youtube.com/watch?v=bY_wfKVjuJM **Task 1:** Teacher goes through all the cams, their movements and uses. Students add notes to their cam homework. **Task 2:** Students make a mechanical toy from laser cut parts by following a step by step. **Homework:** Complete the worksheet on gears and pulleys using technologystudent.com	• **PowerPoints and worksheets can be found** T:\tech\SOW\YEAR 10 NEW SPEC CORE\Unit 2\L15 Mechanical devices- CAMS • **Print out step by step** of how to assemble the cam toy (Document is called 'mech toy st by st A3') • **For the Design and make task, students will need:** Cardboard laser cut parts for the cam toy/ a glue stick/ sellotape/ card/ paper/ a craft knife/ scissors/ colouring pencils.	• Make sure all the resources needed for the lesson are available and within the department. • Printed/ have ready step by step guide • Computers for students to search for other hydraulic projects • Computer and projector are working
16 JTY	• Revision techniques			
17 JTY	• End of unit test			

UNIT 3: MATERIALS AND THEIR PROPERTIES

Lesson/s	TOPIC COVERED	LESSON OVERVIEW	RESOURCES REQUIRED	TECHNICAL SUPPORT/ORDERS
18	Paper and board **Objectives:** • Know the primary sources of materials for producing paper and boards. • Be able to recognise and characterise different types of paper and boards. • Understand how the physical and working properties of a range of paper and board products affect their performance.			
19	Natural and Manufacture timbers **Objectives:** • 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 affect their performance.	• **Open PowerPoints (L19 Natural and manufactured timbers) in** T:\tech\SOW\YEAR 10 NEW SPEC CORE\Unit 3\L19 Timbers • **Starter:** which 3 are types of wood? 2nd slide in P.P. • **Task 1:** Colour coding the difference between a hardwood and softwood tree. • **Task 1a:** sorting out timbers into 3 categories. • **Task 2:** Research task to find a suitable hardwood, softwood and manufactured for certain wooden product with a justification. • **Homework:** Q&A of natural and manufactured timbers.	• **PowerPoints and worksheets can be found** T:\tech\SOW\YEAR 10 NEW SPEC CORE\Unit 3\L19 Timbers • **Print out:** • Task 1; hardwoods and softwood trees • Information sheets • Task 2; Research task hand-outs • Homework sheets	• **Printed worksheets, hand-outs and homework sheets.** • **Computer and projector switched on** • **Wood samples**
20	Metals and alloys **Objectives:** • 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.			
21	Polymers **Objectives:** • Know the primary source of materials for producing polymers. • Be able to recognise and characterise different types of polymers. • Understand the physical and working properties for a range of thermoforming and thermosetting polymers.			
15	Textiles **Objectives:** • Know the primary source of materials for producing textiles. • Be able to recognise and characterise different type of textiles. • Understand how physical and working properties of a range of textiles affect their performance.			

UNIT 4: COMMON SPECIALIST TECHNICAL PRINCIPLES

	TOPIC COVERED	LESSON OVERVIEW	RESOURCES REQUIRED	TECHNICAL SUPPORT/ORDERS
16	Forces and stresses on materials and objects **Objectives:** Be able to recognise and characterise tension, compression, bending, torsion and shear forces and stresses. Understand the impact of different forces and stresses on materials.			
17	Improving functionality **Objectives:** • Understand how materials may be enhanced to resist and work with forces and stresses to improve functionality			
18	Ecological and social footprint **Objectives:** • 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. • Be aware of the need for social and governmental responsibility to address safe working conditions and pollution.			
19	The six R's **Objectives:** • 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 sustainability.			
20	Scales of production **Objectives:** • 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.			