Engineering	Autumn Term		Spring term		Summer term	
Year 9 Engineering	1	2	3	4	5	6
Topic Summary	Woods: Storage box		Types of Drawing - CAM Toys		CAD/CAM: Lanterns	
Thinking Hard	**Mindfulness -** Pupils should show mindfulness when practising drawing techniques and following the process of making something 3D.	**Being Creative-** Pupils will be able to develop their own design based on a standard tool box, how can they make this personal to them?	**Mastery of learning** - Exploring different drawing techniques and understanding the different types.	**Curiosity** - Making a product based around a personalised theme.	**Mastery of Learning -** Developing core skills that will be needed in year 11. Understanding software. Working with nets and 2d layouts.	**Curiosity -** Developing their own design and product IE a lantern, developing some independence and creative ideas.
Developing Character	**Curiosity -** Developing new knowledge on the machines in the workshop, scroll saw/pillar drill and belt sander.	**Grit -** Showcasing grit whilst in the workshop, pupils will develop resilience towards practical elements going wrong and improving them.	**Optimism** -Transforming their initial ideas from sketch to working drawings and made products.	**Grit -** Showing high level design skills based off working drawings	**Optimism -** Developing their own design and idea for their project.	**Grit -** Showing resilience and development of grit when trying out and testing their idea.
Understanding Diversity	**Self Control -** Developing control when working with practical machinery and tools. Working safely and accurately.	**Self Assurance -** Following step by step instructions and diagrams enabling pupils to build up more confidence in the workshop.	**Self Assurance -** Developing their ideas further	**Self assurance** - Revisiting materials and techniques that have been tested before.	**No Limits to your destination -** Creative control of their product in comparison to recent projects.	**Understanding mental and physical democracy -** Working with others/ showing examples of new software in DT.
Literacy Reading, Oracy	**Reading-** Step by step instructions and methods, practising different stages of joints.	**Oracy -** Using oracy to use specific language and terms, IE wood/tools/equipment/techniques	**World citizen -** the common signs that are used around the world from road signs to hazard signs.	**Oracy -** Being able to communicate different techniques and skills learnt.	**Literacy -** CAD/CAM key terms is a focus for the start of the project.	**Oracy -** Being able to communicate different ideas and work with different materials.
Gatsby, Careers	**Careers -** Engineering disciplines, case studies into designers and engineers	**KS5 preparation -** Working against a design brief, good practice for college university of apprentice.	**Development** - Understanding the process of designing and making a product.	**Careers**- trip to production of Xbox controllers?	**Careers -** linking to software and use of CAD CAM in industry.	**KS5 Preparation -** Stem trips have been completed by this year group, new trips in new year.
Mental and Physical Well-being	**Problem Solving -** Using independence to practice solving their own problems, or working in groups.	**Machinery work -** Physical use of machines, links to practical work and positive well being. Using safety equipment to keep them safe.	**Physical** - working with practical guides.	**Mental -** Working on a theme linked to personalisation of each pupil. Encouraging a love of designing.	**Mental -** Working with others. Developing creative ideas.	**Physical -** learning to use the laser cutter.
Cross-Curricular Links	**English** - Links to terminology used in the project and practical step by steps written out.	**Maths/Science -**Marking and measuring out	**Maths** - measurements	**Maths** - measurements	**Maths -** working with measurements and drawing styles.	**Art -** Developing own design and creative ideas IE engraving/cutting.
Extra-Curricular Links	**Black History Month -** Links to Technology around the world.	**Anti Bullying Week -** Showcasing team work in lessons. Positive assessment feedback	**Random Acts of Kindness -** Lead learner for drawing lessons showcasing skills.	**Pride Month -** possible theme?	**Random Acts of Kindness -** Product could be given to someone as a gift	**International Women's day -** Looking at female designers/ successful companies
RSHE	**SMSC -** Cutting out materials which links to being self employed, understanding material and running costs.	**Practical work -** Working as a team	**IT -** Use of ICT/software - links to business.	**SMSC -** Giving the pupils an ownership over their own work. Creating something personal. Opportunities to use machines that they wouldn't have at home.	**IT -** Use of ICT/software - links to business.	**Software -** New software being used.
Extended learning checkpoint			**Whole school assessment**		**Whole school assessment**	
Precise Learning Endpoints. We want students to learn/be able to:	**1,** Demonstrate knowledge of joints. **2.** Accurately mark out pieces of wood which are the same size. **3.** Draw a tool box or joint using 3D drawing techniques.	**1.** Explain the difference between soft and hardwoods. **2.** Demonstrate how to use a hack and tenon saw. **3.** Mark out using a try square. **4.** Join wood demonstrating a lap or box joint.	**1.** Demonstrate hand drawn techniques using grid paper. **2.** Demonstrate software drawing using CAD/CAM. **3.** Understand what a CAM is. **4.** Explain the four different types of movement.	**1.** Draw to scale and use measurements for working drawings. **2.** Model to scale using corrugated card. **3.** Determine how CAMS work. **4.** Demonstrate making techniques which link to cutting wood, joining wood and adding movement.	**1.** Explain what CAD/CAM is. **2.** Explain and give examples of CAM software and machinery. **3.** Design a lantern using 2D drawing techniques. **4.** Explain what isometric and oblique drawing is.	**1.** Use basic tools on 2D design, including shape, text, outline and delete. **2.** Show understanding of what a silhouette is. **3.** Create a vector image using simple silhouettes. **4.** Determine cut and engrave lines.

Engineering	Autumn Term		Spring term		Summer term	
Year 10 Engineering	**1**	**2**	**3**	**4**	**5**	**6**
Topic Summary	**Storage box & engineering disciplines**		**Materials: Scale furniture**		**Types of Engineering, Models and Prototypes**	
Thinking Hard	**Acquiring Knowledge -** To be able to show revision techniques and confidence in knowledge. To be able to compare materials.	**Acquiring Knowledge -** Understanding how materials link to the environment.	**Acquiring Knowledge -** Demonstrating knowledge based on specialist tools and materials such as metals/plastics and timbers.	**Mastery of Learning -** Showcasing knowledge learnt in year 9 which can be developed to match a design brief.	**Not fearing failure -** To be able to practice and repeat practical skills.	**Acquiring Knowledge** -Understanding the different types of engineering and how they relate to everyday life.
Developing Character	**Self Assurance -** To be able to show understanding of theory knowledge and topics and link them to practical skills.	**Self Control -** Showing independent practical skills in the workshop.	**Curiosity -** Showing curiosity for working with new materials and making products out of woods/plastics and metals.	**Self Control -** Showing self control in a practical room, and following a step by step plan in order to meet the correct measurements and materials. Showing that pupils can log and work	**Grit -** To be able to persist with practical techniques if they do not go right straight away.	**Curiosity -** Clear links to jobs that students may go onto after KS4.
Understanding Diversity	**Awareness of where you live -** Links to where materials come from and what products are made from.	**Environmental Diversity -** Understanding the environmental impact of using materials and resources.	**Being a world citizen - U**nderstanding the impact that products and materials have on our planet, understanding about where they go when finished with.	**Environmental Diversity -** Showing pupils can measure and mark out without wasting materials and how we can recycle materials if needed.	**Mental and Physical Diversity -** Understanding different workshop surroundings in different jobs. IE production methods.	**Optimism -** Developing optimism as a team by applying practical skills to knowledge learnt.
Literacy Reading, Oracy	**Literacy -** key terms/ theory/ equipment.	**Oracy -** development of key terms/ use of language links to Technology specification	**Reading - R**eading step by step instruction and design brief for the project.	**Oracy -** Using technical language and knowledge when creating their sweet dispenser. Practical logs are used during practical lessons to keep track of each practical stage.	**Oracy -** Developing confidence on machines**.**	**Literacy/Legal** - Use of Health and Safety Legislation
Gatsby, Careers	**Careers -** Identifying the various careers available under the umbrella terms of engineering disciplines, applying to real life roles /visits from local design firms, engineering	**Industry-** Understanding the design process, how different roles apply to the task (designer, engineer, product v industrial	**College/University -** difference between vocational and academic	**Develop portfolios -** Making products for life after school. Professional photos taken of their products. Use of CAD/CAM	**Careers -** Independent working, dexterity, attention to detail, COSHH, RIDDORR, PPE	**Careers**- HSE inspector or manufacturing/designing prosthetics, Pharmaceutical engineer
Mental and Physical Well-being	**Mental -** Topics of theory has been broken up to prepare pupils for year 11.	**Well being -** working as a team.	**Physical well being -** Working with materials and equipment that can be heavy, showing that they can use them in a safe and secure way.	**Well being -** How making products can impact on your mental health in a positive way and well being.	**Physical -** practical segments and skills have been put into place for pupils to see the links between both.	**Mental** -Revision techniques for assessments.
Cross-Curricular Links	**Business -** links with software and machinery used IE careers.	**Food -** Practical elements and exam questions are similar	**Art -** Creative use of drawing, and developing a visual product.	**Food -** Step by step methods for how to make a product, similar to food processes.	**Art -** showing creative elements to practical skills.	**Art -** building and modelling
Extra-Curricular Links	**Random Acts of Kindness -** Working with others/sharing machines.	**International Women's day -**Female Designers homework	**Black History Month -** New and emerging Technology links.	**Anti Bullying Week -** Showing kindness to others, giving feedback on practical work.	**International Women's day -** Encouraging women in all specialisms	**English** - Key word links
RSHE	**Jobs -** Trip to an Engineering workshop Spring term	**Industry -** Industry trip to see how products are made?	**Jobs -** Promoting pupils learning valuable skills that can develop into their further education or job.	**Finance -**Links to money and spending/rise in material cost.	**SMSC-** linking lessons to industry work, showcasing pupils that opportunity.	**Education** - preparing with exam knowledge and techniques
Extended learning checkpoint		**Whole school assessment**			**Whole school assessment**	
Precise Learning Endpoints. We want students to learn/be able to:	**1.** Work with wood and plastics confidently. **2.** Develop and show high quality making skills. **3.** Determine the different types of joints. 4. Compare handmade and CAD techniques.	**1.** List the basic equipment in the workshop. **2.** Explain the function of each piece of equipment. **3.** Demonstrate finishing and cutting techniques. **4.** Include personal adjustments or amendments to different designs.	**1.** Research and understand the working properties of materials. **2.** Develop an understanding of engineering disciplines. **3.** Demonstrate health and safety routines through independence. **4.** Cut and join wood together.	**1.** Understand the difference between thermoforming and thermosetting plastics. **2.** Show evidence of third projection drawing techniques. **3.** Independently use a line bender to fold and bend acrylic.	**1.** Acknowledge and explain the different papers and boards. **2,** show knowledge of what a gear and a pulley is. **3.** Demonstrate how to make a working gear and pulley.	**1.** There are 10 engineering disciplines that have helped shape the modern world. **2.** Health and safety at work legislation protects employers and employees in the workplace **3.** Can summarise properties of materials. **4.** Demonstrate knowledge of working drawings.

Engineering	Autumn Term		Spring term		Summer term	
Year 11 Engineering	**1**	**2**	**3**	**4**	**5**	**6**
Topic Summary	**Practical: Coursework Brief/Synoptic Project**		**Theory: Revision for Written Exam**		**Theory: Revision for Written Exam**	
Thinking Hard	**Acquiring Knowledge -** Developing knowledge through revision and going through each section for exam.	**Development Of Literacy -** Written Exam. Release of the Synoptic Project / Interactive tasks for revision.	**Creating ambition** - Coursework will allow pupils to develop ambition when making and completing coursework to a high grade.	**Creating Independence -** Independence will be shown through practical work and working towards a specific brief or product.	**Development of Literacy** - Revision for exams, development in knowledge for key terms and specific knowledge.	
Developing Character	**Self Control - Focussed revision and theory knowledge.**	**Self Assurance -** Timelines and revision for unit 1 examination	**Understanding Democracy -** Processes including manual skills and techniques CAD development	**Critical evaluation -** Reflecting on their own progress within practical.	**Mindfulness -** Working with strategies to help revise.	
Understanding Diversity	**Grit -** that involves given coursework guidelines.	**Environmental Diversity -** Working under strict guidelines demonstrating all school values	**No Limits to your destination -** Engineering drawings	**Critical evaluation -** Reflecting on practical work/Making improvements to practical work when in different stages of making.	**Being a world citizen -** Thinking about future career choices and jobs that they could possibly go into**.**	
Literacy Reading, Oracy	**Literacy -** Project planning to maximise the effect of the outcomes on a given project from NCFE	**Environmental impact -** Using processes and materials, understanding project brief.	**Environmental impacts** - Using a range of materials and techniques	**Reading -** Written work and literacy terms featured in making log.	**Literacy** - using key terms	
Gatsby, Careers	**Careers -** Electrical engineer/Carpentry	**Careers -** College/University courses	**Careers -** Working with machinery and following workshop guidelines	**Careers -** Working with machinery and following workshop guidelines	**Further Education -**College/University further careers talk	
Mental and Physical Well-being	**Mental -** revision tasks, sections of theory / workload	**Mental -** different exam techniques	**Physical -** showing safe practical in the workshop	**Physical -** working with appropriate materials	N/A	
Cross-Curricular Links	**Maths/Science - Topics/keywords**	**English -** Written /exam preparation	**Maths -** Measuring out	**Food -** step by steps/pictures	N/A	
Extra-Curricular Links	**Black History Month -** Looking at designers and how work has developed.	**Anti Bullying Week -** Working as a team	**Random Acts of Kindness -** Routines of the workshop	**International Women's day -** Female designers/engineers	**World day for Cultural Diversity -** Looking at production methods	
RSHE	**Healthy relationships -** Working with others in revision techniques	**Education -** Further education courses	**Education** - Creating a product linked with everyday products.	**SMSC -** Working with others in a timed exam, sharing the room and workspace!	**Teamwork -** Working with others to revise, techniques on google classroom. Mental health well being.	
Extended learning checkpoints		NEA Coursework	Mock exams		NCFE examinations	
Precise Learning Endpoints. We want students to learn/be able to:	**1.** Demonstrate a series of different joining methods using a range of engineering materials. - hand sanders, disc sanders, buffing wheel , files. **2.** Demonstrate a range of different finishing methods using a range of materials - varnish, paint, wax **3.** Explain the purpose of ventilation in an engineering environment	1. Produce a project portfolio based on the criteria set out in the synoptic project: to include: 2. Produce Hand and CAD drawings 3. Research and test different materials to use in the project brief. 4. Select correct tools to manufacture the project	1. Explain the thermal, optical and mechanical properties of ceramics such as: glass, cement, brick, and pottery. 2. Evaluate the properties of oak, ash, balsa, Scots pine MDF and Plywood. 3. Evaluate how the characteristics of these woods affect the selection for an application.			