

CLAYTON HALL ACADEMY

Faculty and Department Curriculum and Assessment Handbook

Name of Faculty/Department: **Engineering**

Our Curriculum Intent

Engineering derives from the word Ingenium meaning cleverness. Using this as the class mantra, it is the intention that all students learn independent thought to action real world problems by creating feasible solutions. The course is designed to track industry practices, standards and methodology, with the idea of preparing learners for their next stage in their learning life whether it is an apprentice, work or higher education.

Gold Standard Teaching and Learning in Engineering

Goal Orientated (Planning for Progress)

- Data driven Seating plans (highlighting DP, HAPs, MAPs, LAP, SEN)
- Students will engage in a Starter Task in every lesson (this can be a written or an oracy task).
- Differentiated Blooms, learning objectives displayed clearly.
- Students understand the Big Picture, what they are learning and why: links to prior learning made clear.
- Clearly identified links to Personal Development (RIC).
- Highly effective questioning to identify and address misconceptions.
- Formative and Summative Assessment to diagnose and inform next steps.
- Model excellence and how to achieve it.
- Revisit and 'low stakes' testing e.g. Starter and Plenary quizzes to make connections and support recall.

Open dialogue (Feedback for improvement)

- High quality feedback is given in response to specific pieces of work.
- Progress tracked on student's assessment maps.
- Regular formative assessment will be varied and impactful e.g. framed as a question as opposed to a comment.
- Live marking is encouraged to manage workload and teachers are encouraged to have 'purple pen in hand' when they are intervening with students during the lesson.
- Literacy corrections in line with stickers.
- Student response to feedback (DIRT) using green pen.
- Self and peer-assessment used to develop independence.

Learning Environment

- Positive Learning Environment created by mutually respectful relationships (staff/pupil + pupil/pupil).
- Adults consistently model the values of the school and support curriculum intent.
- Engaged, enthused and independent learners- Lighting Fires Curriculum.
- Reward effort and resilience by providing opportunities for students to speculate, investigate, and make mistakes.

- Consistent application of the Consequence and Achievement system.
- Students show pride in their learning through the presentation of their work:
 - o Neat organised books/folders with Assessment maps and Target stickers
 - o Date and title underlined with a ruler- classwork and home study clearly identified
 - o Support should be provided for students who miss lessons, either through Teams or via email.

Differentiation for Challenge and support

- Use of data and student information to plan for individual needs. (Prior Attainment, FFT 20/5 Target data, SEND)
- Differentiated learning outcomes (these can be verbalised or displayed in the classroom)
- Stretch and challenge- upholding high expectations for HAPs (Over 50% of our cohort)
- Targeted questioning- include all students and make students think, using open and follow up questions to expand understanding. No hands up.
- Improve oracy in the classroom; students respond to questions or contributions in full sentences (talk for writing).
- Additional intervention for disadvantaged, Vulnerable, VIP, with a particular focus on Narrowing the Word Gap.

Long Term Curriculum and Assessment Plan – Key Stage 3

Year 7

When?	What we are Learning and Assessing e.g. Topics/ Skills etc	How we are Assessing e.g. Extended writing, Project, exam etc	Links Backwards and Forward When was it last covered & when next?
Rotation 1,2,3	Situation and brief	Verbal questioning and responses	Future studies on material choice and recycling
	Reading engineering information	Written responses	All projects require the need to extract information from a drawing. Links to unit 1 WJEC in engineering.
	Tools used in mechanical engineering	Written responses (strength target response)	Tools used throughout engineering 7-11.
	Practice safety and accuracy	Teams' assignment photo	KS4 students have to work to real standards in engineering.
	Method (planning)	Written responses (strength target response)	Supports further understanding on how to do a process or products.
	Safety using powered machines	Self-assessment using RAG	For unit 1 WJEC engineering students need to be able to plan the sequence of how to make a given item
	Machine settings	Written responses (strength target response)	Safety is always reinforced and practiced to current legislations and operations procedures.
	CAD	Self-assessment using RAG	Teach's students' independence and leadership qualities
	Product research and use (mechanical arm)	Teams' assignment using STR	For future use of machines throughout their time at clayton
	Packaging design for mechanical arm	Peer assessment compared to examples	Unit 2 for WJEC engineering requires students to completed own CAD solution which is an improvement upon a given drawing.
	Mechanisms and movement. Pivots, levers, fulcrums. Also riveting process	Written responses (strength target response)	
	Design development.	Self-assessment compared to the brief	
	Bottle opener practical	Photo evidence on teams STR feedback	
End point assessment	Teams quiz on material taught over the term		

Year 8

When?	What we are Learning and Assessing e.g. Topics/ Skills etc	How we are Assessing e.g. Extended writing, Project, exam etc	Links Backwards and Forward When was it last covered & when next?
Rotation 1,2,3	Situation and brief	Verbal Q&A on understanding	Y7 brief on different item
	Reading engineering information	Written responses	Y9 future brief on more complex item
	Tools used in mechanical engineering	Faculty STR (strength target response)	Drawings used throughout all engineering projects and assignments 7-11
	Practice safety and accuracy of hand tools working to +/- 0.5%	Photographic and measuring evidence in books	Unit 1 (Y10/11) need to work to given standards
	Using powered machines	Faculty STR (strength target response)	Students use variety of machines in the past and future years to develop solutions
	Using a design brief	Peer assessment challenges understanding and encourages collaboration	Unit2 in Y11 students must use a brief to come up with their own solution
	Design solutions	Self-assessment whether work meets the requirement outlined	CAD is an on-going skill which is used in all projects 7-11
	CAD practice	RAG (red, amber green skills assess)	Self-assessment skills transfer to future projects that use the same methods
	Coat hook and Spanner practical	Team's assignment with photo evidence and STR feedback	
End point assessment	Teams quiz on material taught over the term		

Long Term Curriculum and Assessment Plan – Key Stage 4

Year 9

When?	What we are Learning and Assessing e.g. Topics/ Skills etc	How we are Assessing e.g. Extended writing, Project, exam etc	Links Backwards and Forward When was it last covered & when next?
<p>Rotation 1, 2,3</p>	<p>Understanding a situation and brief</p>	<p>Verbal Q&A on understanding</p>	<p>Y7 and 8 brief on different item</p>
	<p>Taking information from engineering drawings</p>	<p>Written responses from drawing</p>	<p>Y11 future brief given by the exam board</p>
	<p>Hand tools used</p>	<p>Written answers with STR marking</p>	<p>Drawings used throughout all engineering projects and assignments 7-11</p>
	<p>Secondary machining techniques (turning)</p>	<p>RAG current targeted skills on machine</p>	<p>Unit 1 (Y10/11) need to work to given standards Using specialist tools that they select</p>
	<p>Machined features</p>	<p>Photo evidence using teams' assignment</p>	<p>Students use variety of machines in the past and future years to develop solutions</p>
	<p>Following manufacture plans</p>	<p>Written answers with STR marking</p>	<p>Unit2 in Y11 students must use a brief to come up with their own solution</p>
	<p>Finishing techniques</p>	<p>Written answers with STR marking</p>	
	<p>Practical evaluation</p>	<p>Self-assessment using RAG</p>	<p>Self-assessment skills transfer to future projects that use the same methods</p>
	<p>Maths used in engineering</p>	<p>Written answers with STR marking</p>	<p>Students will learn electronic systems for their unit 3 exam in Y11</p>
	<p>Electronic component, systems and design</p>	<p>Teams assignment using STR</p>	
<p>End point assessment</p>	<p>Teams quiz on material form the term.</p>		

Year 10

When?	What we are Learning and Assessing e.g. Topics/ Skills etc	How we are Assessing e.g. Extended writing, Project, exam etc	Links Backwards and Forward When was it last covered & when next?
Autumn 1	Engineering materials Alloys Polymers Composites Practical assessment tyre lever	Individual material types STR marked (strength target response) End of unit assessment out of 20 Photo evidence STR based on the outcome. RAG skills Self assess successes and outline future improvements / targets	In Y7-9 use steel to produce items, reflect and evaluate other alternatives such as aluminium. Forging techniques would have been used in Y8 for the coat hook practical
Autumn 2	Engineering properties Mechanical Electrical Material costs and qualities		Links to unit 3 exam but in the context of bike frames and rollercoasters
Spring 1	Engineering processes Turning Polishing Drilling Milling Shearing Folding Riveting Laser cutting CAM Cutting Practical assessment of ear plug case	Individual processes, STR marked (strength target response) End of unit assessment out of 20 Photo evidence STR based on the outcome. RAG skills Self assess successes and outline future improvements / targets	Links to unit 3 exam where they select processes for given products Reflect on past learning of tools in KS3 Revisit teams' assignment on processes (Y7-9)
Spring 2	Mechanical systems Hydraulic Pneumatics	End of using assessment out of 20	Links to unit 3 as they explain the rollercoaster technologies and describe what they do.

When?	What we are Learning and Assessing e.g. Topics/ Skills etc	How we are Assessing e.g. Extended writing, Project, exam etc	Links Backwards and Forward When was it last covered & when next?
Summer 1	Electronic systems Electronic component names Function Animatronics Wireless technologies Wireless products Practical assessment of RC car service stand	Individual technologies, STR marked (strength target response) End of unit assessment out of 20 Photo evidence STR based on the outcome. RAG skills Self assess successes and outline future improvements / targets	Links to unit 3 exam as they will need to identify components, calculate the cost and describe the function
Summer 2	CAD skills 2d, 3d, isometric, orthographic, electronic schematics Unit 1 & 2 topics released by exam board June of Y10. Unit 3 understanding engineering achievements	Individual processes, STR marked (strength target response) Unit 1 assessed to the standard outlined by the exam board. (20 hours) PPE1 – past paper timetabled exam in the hall. 1hr 30mins. 80 marks	Unit2 requires students to submit a design portfolio of their solution. Past skills from Y7 and 8 can contribute to their repertoire

Year 11

When?	What we are Learning and Assessing e.g. Topics/ Skills etc	How we are Assessing e.g. Extended writing, Project, exam etc	Links Backwards and Forward When was it last covered & when next?
Autumn 1	Continued work on unit 1 (practical product set by exam board, 20hours)	Written project Internally assessed then externally moderated. Deadline Jan of Y11	Follows on from Y10
Autumn 2	Unit 2 CAD (10 hours)	Written project Internally assessed then externally moderated. Deadline Jan of Y11	Collates learning from past year project when they have used tinker CAD and 2d design v2
Spring 1	Review y10 work but in the following context in preparation for the external exam Mountain bikes Rollercoaster Wireless home technology Outdoor play areas Unit 3 understanding engineering achievements	Verbal Q&A sessions to embed knowledge and reinforce long term recollection. Externally assessed by exam board. 1hr 30. 80 marks	Links to Y10 PPE exams and should be used for revision for this
Spring 2	Unit 1 and 2 (resubmissions)	Unit 1 and 2 internally assessed then externally verified. Unit 3 externally assessed.	Future links to college courses and applications
Summer 1	Unit 1 and 2, 3 (resubmissions)	Unit 1 and 2 internally assessed then externally verified. Unit 3 externally assessed.	

Key Stage 4 Examination Overview

Exam Board Details: Edexcel BTEC Level 1/2 Tech Award in Engineering

Component 3.1 - Q1 setting up and carrying out engineering experiment and recording the data. Q2 explaining findings Q3 evaluating the methodology and accuracy of a test

Component 3.2 - Q1 critique and existing design, Q2 design improvements Q3 spotting flaws in engineering data

What resources could I buy or borrow that will help my child?

Tech award in Engineering (Pearson)

Revise BTEC Tech Award in Engineering ISBN 9781 292 27272 6

In school blue theory books

Teams revision folder created by MHO

What are the key websites or Apps that my child could use?

technologystudent.co.uk

What can I do to encourage my child to take a further interest in Engineering?

Plan to do work experience during half term holidays

Visit Museums such as RAF Cosford, science museum, industrial museum

Join model engineering clubs such as stoke R/C club or staffs model railway

RAF Careers open day and Newcastle college open day

Google 'engineering in midlands' to gain insight into the scope and importance of our industry

What after school or other extracurricular activities are available in Engineering and when are they?

Year 10 students take part in STEM competition (Enrichment)