YEAR 10. Topic: Engineering Products and 3D CAD SPR 1		Duration:12 lessons	Composite:
Key vocabulary:	**Core knowledge Components**	**Powerful knowledge components crucial to commit to long term memory**	**Links to previous and future topics**
Triangles, strong – struts- support, stabilise, stiffen Steel, High Carbon Steel, Aluminium, Cast Iron, Stainless Steel, Copper. Ferrous. Non-ferrous, Alloy, thermoplastic, thermosetting, smart material, composite material Carbon fibre. Welding, brazing, Strip, bar, sheet, tube, Rod, tube, granules, sheet, Anodising, galvanising, dip coating, ABS, Acrylic, HIPS, PP, PVC Injection moulding, vacuum forming, Extrusion, Strip heater, blow moulding, compression moulding rotational moulding.	• What materials are used to manufacture a crane? Why? • Why are triangles used as struts in structures? • Why is a crane produced in modular form? • What mechanical advantage does a gear box give you? • What are driver, driven, idler and gear train in gears? • What is a gear ratio? • What materials are used on a gear box (housing /cogs) and why? • What are the component parts of a bicycle? What is the function of the separate parts of a bicycle? • What are the component parts of a bicycle made from? why? • What forces are applied to a bridge? • What materials are bridges made from? Why? • What is a keystone? • What is a skeleton frame made from in a building? Why? • What material are external parts of a building made from? Why? • How does a building lose heat? How can it be made more efficient? • What composite material is used on building structures? • What materials are used in pcb's? why? • What materials are used on the cases of electronic goods? Why? To have used a 3D Drawing Package.	• What are the 3 S's that a triangle shape supplies to a structure? • What are the 5 types of stress? Describe each? • What is the efficiency equation? • What are the properties of steel? • What are the properties of high carbon steel? • What are the properties of aluminium? • What are the properties of cast iron? • What are the properties of stainless steel? • What are the properties of copper? • What are the properties of carbon fibre? • Name 5 ways of shaping and forming plastic? • What are the properties of ABS? • What process is used to produce complex shape in ABS? • What forms can metal be bought in? • What forms can plastic be bought in? • What do ferrous, non-ferrous and alloy mean? • What do thermosetting/ thermoplastic mean? • What is a composite? • What is a smart material? What are the adv / dis-adv of CAD/CAM?	Year 7, 8 and 9 materials and properties of materials Year 9 forms of materials Year 9 plastic forming processes. Year 9/10 joining metals Year 10 Materials and the environment Year 10 electronics. Science/Geography environmental concerns. Year 8 and 9 2D drawing package.

Impressive reading	Impressive speaking	Impressive writing	Resilience	Employability via:
Ability to identify key information.	Taking part in class discussions. Use of technical language	Responses to extended questions	Find and correct own mistakes.	Problem solving skills. Understanding the composition of the world around. Engineering knowledge for interviews

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Key Vocabulary introduced using precision teaching prior to new topic.

- Linked to prior knowledge from year 7. 8, 9 and 10 to aid independence. Repeating of keywords.
- Additional curriculum time allocated to those authorised, to support processing speed.
- Project chosen so that knowledge and skills can be used at apprenticeship or engineering interviews, work-related to support the pathway into adulthood
- Project chosen to support cross curricular links maths, science, geography supporting non-verbal reasoning
- Technology: software (3D drawing package) used to support accessibility (an option for final design project
- Skills ordered logically and as individual tasks to support accessibility.