STEAM Year 9 - CAD / CAM.

Overview

You will

- Learn about drawing 2D (2D Design) and 3D (Solidworks) modelling
- Learn about and use accurate measurement equipment
- Learn to use CNC machinery to produce high quality items

STEAM SKILLS

- Accuracy
- Understanding of tools
- Logical Reasoning

Lesson Overview	Key Words
- Produce 2D drawings from models using industry standard symbols - Learn to use accurate measurement equipment to produce clear drawings with standard symbols. - Learn to use Solidworks to generate 3D models of simple objects using both extrude tools and revolve tools. - Produce 3D models of a mobile phone case. - Print products to CNC machinery, 3D printer, laser cutter, CNC lathe and mill.	Diameter Radius Dimension Vernier callipers Micrometer Parallel Perpendicular Assembly
Suggested reading or support available **2D Design tutorials** **Solidworks tutorials**	**Cross curricular** **Measurements and units (maths)** **Angles** **Circle parts** **SMSC** Sustainability Should we be able to print body parts Ethics of 3D printing **Literacy links**

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Grade Range	SUCCESS CRITERIA Highlight your starting point for each skill in PINK, at the end of the project highlight where you think you got to in BLUE.		
	Accuracy	**Understanding of tools**	**Logical reasoning**
0	I presented no work.	I presented no work.	I presented no work.
1	WWW: I have made an attempt to complete the task with some success. EBI: I need to try and take more time and care with my work to avoid mistakes.	WWW: I know which tools or software to select and can use them for basic tasks safely (with hand tools or computer software). EBI: I need to be able to choose the correct tools (hand tools or software) and understand the risks.	WWW: I understand some of the cause and effect in my work. EBI: I need to try to work out what the other possible choices and results could be in the task.
4	WWW: I have completed the task with reasonable accuracy and have created a successful piece of work EBI: I need to make sure I have planned and prepared my work beforehand and take more care to avoid errors.	WWW: I can select the correct tools (hand tools or software) and know the risks of that tool. EBI: I need to expand my knowledge and features of different tools (hand and software).	WWW: I clearly understand cause and effect and use them as I work. I make predictions whether something will or will not work and test my hypothesis out. EBI: I need to ensure that I cover more\all possibilities when I test or try to solve my problem..
6	WWW: I have consistently completed tasks with care and with few mistakes resulting in a successful piece of work. EBI: I need to ensure my work is planned and prepared thoroughly to ensure I can complete a task without any errors.	WWW: I can make good choices in my selection of tools (hand tools and software) for safe and efficient use. I have a good understanding of their purpose. EBI: I need to expand my knowledge and purpose of a wider range of tools and equipment so I can work more effectively.	WWW: I can apply clear logic thinking as part of my problem solving and regularly rely upon this to know whether something is likely to work or not. I can identify faults effectively. EBI: I should make sure that I work out the logical opposites to my work and use them to aid testing and fault finding.
8	WWW: I always complete the tasks with a high level of precision and accuracy and have produced a quality outcome which is both functional and elegant. EBI I should consider ways of producing every part of my work to a consistently high quality.	WWW: I know the pros and cons of different tools (hand tools and software) and can make clear decisions on which to use for safety and efficiency. I have an excellent understanding of how they work and their capabilities. EBI: I can expand my knowledge and understanding of tools (hand\machine and software tools) that are used in the real world.	WWW: I use logical processes and arguments to confidently ensure an efficient solution is found. I use logic for fault finding frequently and successfully. I understand that inverse operations are used for checking and proof. EBI: Make use of logic tables to prove and test more advanced ideas or concepts.