

## Year 9 Design SoW Unit 2 – CAD/CAM

### Objectives

- Be able to draw accurately using SketchUp
- Understand what CAD/CAM is and how it can be used
- Be able to use their CAD drawings to control a CAM machine

### Expectations

By the end of this unit:

<p>All students will:</p> <ul style="list-style-type: none"> <li>• be able to use words and sketches to communicate more than one idea</li> <li>• be able to make judgements about their ideas</li> <li>• use 3D CAD software to model their design with assistance</li> <li>• be able to produce a 3D CAD model to be 3D printed</li> </ul>	<p>Most students will:</p> <ul style="list-style-type: none"> <li>• be able to sketch and annotate a range of ideas (more than 4)</li> <li>• be able to explain the decisions they have made</li> <li>• be able to use 3D CAD software independently</li> <li>• be able to produce a correctly sized 3D CAD model</li> </ul>	<p>Some students will:</p> <ul style="list-style-type: none"> <li>• be able to sketch and explain a wide range of ideas</li> <li>• be able to justify decisions they have made</li> <li>• be able to use 3D CAD software</li> </ul>
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Lesson	Learning objective	Starter	Main task	Plenary	Homework	Differentiation and Extention	Resources
1.	<p>What is CAD/CAM?</p> <p>How can you generate a wide range of ideas that meet a brief?</p>	<p>What is CAD/CAM?</p>	<p>Introduce Brief: Design a range of promotional materials for home town – including a 3D printed keyring.</p> <p>Sketch ideas for the keyring – 10by 10.</p>	<p>Peer assessment</p>	<p>Find 4 examples of keyrings</p>	<p>All add notes to sketches.</p> <p>Most add description.</p> <p>Some add explanation.</p>	<p>Their design books</p>

2.	<p>What is 3D printing?</p> <p>How suitable are your ideas for this process?</p>	<p>What features do the examples you have collected have?</p>	<p>Demo 3d printer – discuss opportunities and limitations of the process.</p> <p>Now consider how suitable chosen idea is for process.</p> <p>Choose final design and explain choice.</p> <p>Introduce SketchUp.</p> <p>Students start exploring SketchUp</p>	<p>Peer assessment of ideas to assess suitability.</p>		<p>All to identify features of examples and give a reason for choice of final design.</p> <p>Most to identify features, give reasons for choice of final design and improve it.</p> <p>Some will identify features, give reasons for choice of final design, linking these to the features and then improve their design.</p>	<p>3D printer connected to computer</p> <p>Computer room</p>
3.	<p>How can I develop and improve my design?</p> <p>How can I overcome problems?</p>	<p>What problems did you identify last lesson?</p>	<p>Students to continue to use SketchUp to develop their ideas</p>	<p>Review suitability of first couple of SketchUp models as a group</p>	<p>Research 3D printing: history, technologies available and applications.</p>	<p>All to create a model in SketchUp</p> <p>Most to get this within the required shape.</p> <p>Some to create a design which makes excellent use of the medium</p>	<p>3D printer connected to computer</p> <p>Computer room</p> <p>SketchUp template available with max size of keyring marked out.</p>
4.	<p>What features would make a successful 3D printed keyring?</p>	<p>What features would make a successful 3D printed keyring? -</p>	<p>Students to continue creating and printing keyrings.</p> <p>When they have completed the keyring design, they should move onto the extension task: What other promotional products could be</p>	<p>Peer assess first few 3D printed keyrings.</p>		<p>All to be able to identify at least 1 feature.</p> <p>Most to be able to explain features.</p> <p>Some to be able to</p>	<p>3D printer connected to computer</p> <p>Computer room</p>

		Discussion	created?  Sketch ideas for products  Evaluate ideas and			justify a range of features.	
5.	What types products could we make on a 3D printer?  What are the stages of creating something on the 3D printer?	Card sort activity on steps for creating something on the 3D Printer.	Students to continue with making keyrings on 3D printer and extension task.		Write up step by step for	All to be able to identify key stages of the process.  Most to be able to get them in the correct order.  Some to be able to include QC checks.	3D printer connected to computer  Computer room  Cards to sort for starter
6.	What have you learnt about 3D printing?  What makes a good keyring?	You have one lesson left, what do you plan to do by the end of the lesson?  Write on Post It note	Print off any unprinted keyrings.  Students work on the extension task and print off any of the products they have created through this if there is an opportunity.	Line up keyrings and peer assess.	Evaluate the keyring you have made. How suitable is it for the process? How well does it work at promoting your home town? How well does it work as a keyring?	All students to be able to identify at least one thing they have learnt.  Most will be able to explain what they have learnt.  Some will be able to say how they could apply what they have learnt.	3D printer connected to computer  Computer room  Post It notes