# DESIGN AND TECHNOLOGY

**LINK** – To lesson resources

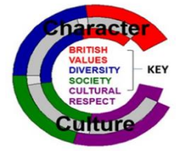
## YEAR 9 – Advanced CAD Unit (KS3) – Engineering Drawing (Wireless Charger)

**INTENT:**
To play a part in developing knowledge and understanding of the Design and Technology National Curriculum.
**Students are to…** apply CAD knowledge creating a range of Engineering drawings of a wireless charger that will support the use of new TV equipment.

**The bigger picture:**
This scheme plays an important role within the technology curriculum as it is essentially teaching skills from the National Curriculum and preparing students for the challenges of key stage 4.

**The Next Step:** This unit is preparation for the Engineering Design Course at Key stage 4. It focusses predominantly on Unit R107 / R039 which is based upon designing ideas using CAD Software.

| Lesson | British Standards | | European Standards | | User requirements | | Tolerance | | Diversity | | British Standards | | Society | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| Retrieval Task: | Why do designers draw in 2 dimensions? | | What is the purpose of an Engineering Drawing? | | Why are dimensions important? | | Why do we have standards? EU/BSI | | What is the purpose of engineering drawing? | | Why is a 3D CAD drawing used for a final design? | | Why is there a need for CAD in 2023? | |
| **Objective:** I do, we do & you do… | **2D CAD – Design** – (1) Top view of wireless charger, focus on the outline shape. Layout your design accurately to fit within the maximum scale 0f 220mm x 80mm. | **2D CAD Design** – (2) Focus on the buttons and details. (Find some buttons using google, then vectorise, edit, and explode. | **3rd angle ortho – graphic.** (1) Use the template on the shared area to align the other 2 views to complete your 3rd angle orthographic. The maximum width is 220 x 80 x 30 | **3rd angle ortho - graphic.** (2) Add dimensions to your 3-view drawing. Copy your drawing into PowerPoint then add a border grid reference and standard style title block. | **3rd angle ortho – graphic**. (3) Finish off<br><br>*Allow students time to respond to the actions and marks given the lesson previous. | **Assembly drawing** – Exploded View (1)<br><br>Create your separate layers. | **Assembly drawing** – Exploded View (2)<br><br>Make your layers 3D and arrange, align these in the correct way | **Assembly drawing** – Exploded View (3)<br><br>Put on your PowerPoint with labels to identify each layer, add a border grid reference and standard style title block. | **Overspill Lesson** – Finish off / catch up.<br><br>* Mentor each student – Give feedback and set actions for improving. Students can start their responses if they have time. | **Isometric drawing** – Use your 2D plan view and the 3D tool - Use the 3D tool and the distort tool to achieve a realistic 3D affect | **Isometric drawing** – Finish off your 3D view<br>- Add a coloured background to make the design stand out. – Present your drawing on your PowerPoint as your final design. | **Isometric drawing / Extension Task 1 –**<br><br>Create separate 3D CAD components of each sperate button, render these in colour. | **Isometric drawing / Extension Task 2 –**<br><br>Create separate 3D CAD components of the top shell and bottom shell, render these in colour. | **Isometric drawing / Extension Task 3 –**<br><br>Create a new and improved Remote controller idea. (Use what you have learned over the previous weeks.) |
| Silent Study: | B M E | B M E | B M E | B M E | B M E | B M E | B M E | B M E | B M E | B M E | B M E | B M E | B M E | B M E |
| Assessment | | | FAR 1 | | | | | | FAR 2 | | | | INPUT GRADES | |
| Homework | TEAMS INTERACTIVE | | | | | | TEAMS INTERACTIVE | | | | | | End of year assessment - quizziz | |
| Key Vocab | 2D Design software, google SketchUp, dimension, vectorise, bitmap, explode, user requirements, 3 dimensions, 2 dimensions, laser cutter, plot, accuracy, precision, professional, health and safety. | | | | | | | | | | | | | |
| Cultural Capital | **Applying CAD:** Using CAD software to design projects inspired by real life architectural landmarks helps students acquire essential knowledge and skills, fostering an appreciation of their local heritage in line with cultural capital. Students have a CAD project within Year 7, 8 and 9 to introduce and embed these skills. | | | | | | | | | | | | | |
| Connected Knowledge | **This is a unit designed to…** prepare students for the future of design and technology at Bilton School as having CAD/CAM skills is a priority and plays a big part of the future curriculum. Following this it supports the journey into KS4 and 6th form Art and Design. **Across the school** this supports the Art, ICT and Business departments as these skills are transferable and are beneficial in the curriculum plan. **Beyond school**, the world of work is becoming more increasingly automated, and we are in an area of the country with a huge amount of engineering companies and potential future jobs. CAD/CAM is a perfect steppingstone to further education, apprenticeships, and university. | | | | | | | | | | | | | |
| **IMPACT** | Students measure progress using the department F.A.R tracking sheets which are in the Assessment Booklets, Teachers track the marks given using the department shared mark book and SIMS. This will show progress over time and prepare students for future learning at Bilton School. | | | | | | | | | | | | | |




* Link to C&C

**Character & Culture**
Character and Culture is embedded within the curriculum map and coded as shown.

**Society**
Design and Technology can lead to many careers in society. An example of this is within the **STEM** routes.

**CROSS CURRICULAR LINKS:**
- **Art:** Within this unit students will develop their 3D drawing skills and making skills which will benefit the art curriculum.
- **ICT:** This unit will give students an understanding of how you can design in 3D using CAD/CAM

**LESSON STRUCTURE:**
- ALL lessons will use the whole school strategy I DO, WE DO, YOU DO
- ALL lessons will have a retrieval task that engages learners immediately after arrival. In practical settings this may not use a PowerPoint.
- All lessons will have a period of SILENT STUDY.
- All lessons will have Learning objectives visible.

(TOPIC SHEET INFORMATION)

**WHAT SKILLS WILL BE DEVELOPED:**
- To be able to understand, apply and create using computer aided design.

**WHY WE ARE LEARNING THIS:**
- To apply the use of Computer Aided Design into your designing.
- To learn how to create complex engineering drawings that meet BSI and EU regulations.

**HOW TO BECOME AN EXPERT IN THIS TOPIC:**
- Watch this YouTube clip to stretch yourself -Techsoft 2D Design V2: Advanced Skills Tutorial
- Read this book from Amazon - 100 CAD Exercises! Learn to design 2D and 3D Models by Practicing with these 100 CAD Exercises! Kindle Edition
- Practice the software 2D design and Google Sketchup in the library at lunch or after school.



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