**What is CAD modelling**

**Teacher notes**

**Resources:**

* Teacher powerpoint
* Example STL file of hollowed out cube. Print this to use as an example for the lesson.
* Fusion 360

**Pre-preparation**

* Print out the student worksheets – These are to be used throughout the lesson to reinforce the key learning.
* Ensure you are registered to use Fusion 360

**Learning Objectives**

* To define the term CAD and CAM
* To create basic 3D models in Fusion 360.

**Starter task 10 minutes**

* Ask students ‘what is the difference between 2D and 3D’ Can they draw a square in 2D and then in 3D?
* Show the student the slides with the difference between 2D and 3D to reinforce the concept.
* Explain to the students that by designing in 3D allows you to see more than one side of the design and you can visual what the final outcome will look like.
* Explain to students that to be able to create designs for 3D printing they need to be able to create models in 3D.

**Objective 1 – To define the term CAD**

**Task 1 – 10 minutes**

* Show the students the slide with the definition of CAD and CAM on it.

CAD – Computer aided design – designing with the help of a computer

CAM – Computer aided manufacture – making with a machine controlled by a computer.

* Explain the advantages of designing in 3D and how a 3D printer can print the models that you design.
* Ask students to name any computer software that they might have used to before and any examples of CAM that they might have used before e.g. 2D design and lasercutting.
* Also what are the advantages of using CAD in the design process?

**Objective 2 To create basic 3D models in Fusion 360.**

**Task 2 – 35 minutes**

Students to log onto fusion 360.

Demonstrate to students some of main features of fusion 360 e.g.

1. How to zoom in and out,
2. The view cube in the top right corner
3. What the features in the tool bar are used for.
4. Reference the backwards arrow for undoing mistakes.
5. The difference between create and sketch
6. How to start a sketch and select a workplane

Then sketch a basic 3D shape and extrude it. Use the fillet tool to round the edges and then add a shell to hollow the shape out.

**Student task – allow students to practice this concept of sketching basic shapes and then extruding them and adding shells. Students are to refer to the tasks on the student worksheet.**

Explain to students that if they were to send this model to the 3D printer then it would print out the shape exactly as it appears in the powerpoint.

**5 minute Plenary**

* Recap the initial objectives with the class.
* Students are to answer these two questions
1. Describe the difference between 2D and 3D.
2. Explain three features that you have learnt today on Fusion 360.