To put together

Practical activity

1. Assemble
2. Build
3. Construct

MAKE

In Year 8 we will be **making** a light.

You will use tools to **make** the parts.

It will be **made** from acrylic.

Computer Aided Design & Computer Aided Manufacture

Computer Aided Design (CAD) and Computer Aided Manufacture (CAM) are used to design and manufacture products. Both have helped in the transition from product design to product manufacture and have greatly affected workplace efficiency.

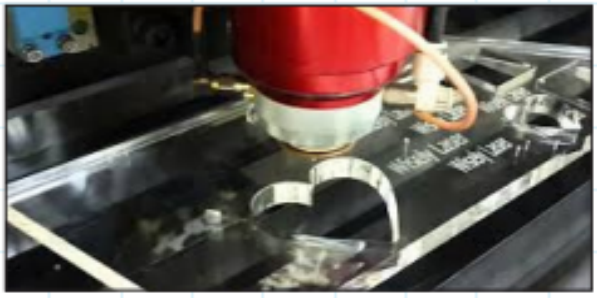
CAD = Designing using a Computer

CAD allows users to draw, design and model products in both 2D and 3D using specialist software.

- CAD stands for **Computer Aided Design**.
- It involves designing products on a computer, rather than using a pencil and paper.
- CAD software packages allow you to make 2D and 3D designs. Examples of CAD software include, Fusion360, Solidworks, Illustrator and CorelDraw.
- CAD helps designers model and change their designs quickly. It is easy to experiment with alternative colours and forms and often helps to spot any problems before making anything.

CAM = Making using a Computer

- CAM stands for **Computer Aided Manufacture**.
- It is the process of manufacturing products with the help of computers.
- Examples of CAM equipment includes laser cutters and 3D printers.



Advantages of CAD

- More accurate than hand drawings.
- Enables designs to be amended and tested before production.
- Allows several designers to work on the same project at the same time.
- Offers views of models from different angles.

Advantages of CAM

- High level of accuracy.
- Increases the speed and efficiency of the production process.
- Products can be manufactured directly from CAD.
- Can operate 24 hours a day.

Disadvantages of CAD

- Can be difficult to learn.
- Can require large amounts of memory.
- Expensive software.

Disadvantages of CAM

- Expensive equipment.
- Requires maintenance.
- Replaces human workforce.

Laser Cutter (CAM)

Laser cutters use a laser to cut through materials. The machine makes cuts by following a design that's loaded into it. This then instructs where to cut the material. Laser cutters are called CAM machines and they use 2D designs made by CAD.

Laser cutters can only cut in 2D, so they have to be used on sheets of materials. These can be sheets of plastic, wood, cardboard, fabric and some metals. Laser cutting has high precision and accuracy and it is able to follow complex patterns, even on a small scale. This is helped by the tiny width of the laser beam.

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DESIGN

In Year 8 we will be **designing** a light.

You will use freehand sketches and CAD to **design** the parts.

It will be **designed** using CAD.

Sketching and Annotation

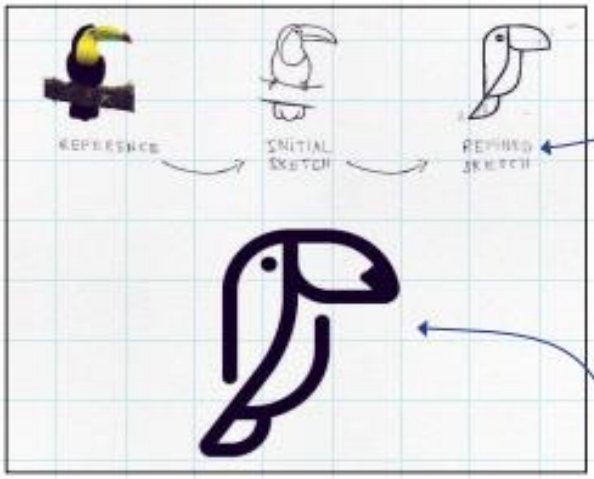
To get your design across, you're going to need to draw it on paper. Here are a few techniques to help you communicate your design in the best way possible. **Remember, pactice makes perfect....**

Freehand Sketches

Freehand means drawing without using any equipment (except a pencil).

Is the quickest way of getting your initial designs on paper before an idea is forgotten. Freehand sketches are often done without a ruler or template and instead are produced quickly and freely.

NOTE: Sketches aren't meant to be perfect - they are only needed to get your ideas across!



Formal Drawings

Are a more precise style of drawing; they can be done by hand or with Computer Aided Design (CAD) packages in either 2D or 3D.

Formal hand drawings would use tools such as rulers and set squares to ensure accuracy and neatness. Using CAD allows the user to quickly make changes, and the drawings can be digitally shared and copied with ease.

Orthographic Projection is one type of formal drawing which shows 2D views of a 3D object.

An Orthographic drawings show a 3D object as a set of 2D drawings viewed from different angles - a front view, a plan view (as seen from above) and a side view. Each 2D view is drawn accurately to scale and the dimensions are always given in millimetres.

Annotations

Annotations are written explanations or critical comments added to art or design work that record and communicate your thoughts.

There are several reasons annotation may be used, for example to:

- Analyse the work of an inspirational artist or designer
- Record a technique
- Record ideas
- Explain the thinking behind an idea
- Analyse the success of a technique, idea or composition
- Explain how a particular artist or designer's style or technique has influenced your work

Modelling + Prototyping

Modelling - A model tends to lend itself to the aesthetics side of things, used to demonstrate how a design will look and feel.

Making a model allows designers to visualise and test how a product looks and performs in 3D and is a great way of checking a product's viability.

What is a Vector drawing?

Vector graphics are computer designs made up of curved points and lines which create a clean, infinitely scalable picture when combined in vector artwork. This means that they can be scaled up or down without losing any quality.