Jitterbug

Key knowledge

CAD means using computer drawing and modelling packages instead of a pen and pencil.

CAD software can be 2D or 3D.

Vector-based drawing is where the image is made up of individual lines or shapes.

A laser cutter uses a laser to vaporise materials to cut through or etch a design.

The laser can draw an outline (vector) or fill a shape (scan).

3D printers make objects by adding layers of material on top of one another to make a 3D part.

3D printed objects are often not solid to save materials.

The advantages of CAM are accuracy, speed and they can do repetitive tasks such as batch production. They can be used to process hazardous materials.

The disadvantages of CAM are the initial cost is high for the software and the hardware and operators must be trained.

Prototypes are working models that can be made before production to see if a product works. This can save money, materials, time and energy.

If a motor is unbalanced it will make a product shake or bounce.

Thermoforming polymers can be heat-formed.

Key Skills

Annotate designs: sketch your design and label with features. Describe the features and then explain why you have added them and how they will work.

When using equipment follow the safety instructions given. If heating acrylic, use gloves and clamps.

Tidy away all equipment to the correct place so that others can find it. Report any damage or wear and tear of equipment.

Put all scrap materials in the bin (or appropriate recycling container.)

Use the minimum amount of material possible by positioning pieces of your project close together before cutting.

Make a prototype out of card before using expensive materials to check that it works before cutting in order to reduce waste.

Choose a material that is suitable for your project—acrylic can be heated and formed—wood can be etched to changed its colour. Think about the limitations of the materials.

The motor circuit must be complete to work.

Check the size and scale before cutting.

Make the slots the width of the material that will go in them.

Key vocabulary

CAD—Computer Aided Design

CAM—Computer Aided Manufacture

Design—a plan or specification for the construction of an object or product.

Evaluate—to assess or determine the quality of a product against its specification.

Prototype—working models that are made to see if a design works.

2D—2 dimensional shapes are completely flat.

3D—3 dimensional shapes have length, width and depth and use the axes x, y and z.

Polymer—a material made from large molecules.

Plastic—synthetic material containing polymers.

Acrylic sheet—a widely used polymer that can be cut using a laser cutter.

Laser ply—layered wooden sheets produced for cutting using a laser.

Motor—a machine that turns on an axis.

Circuit—a circular route made from a conductor that connects a power supply to a component.

Electrical Conductor—a material that allows current to pass through.

Electrical insulator—a material that does not allow current to pass though.