

Unit 4

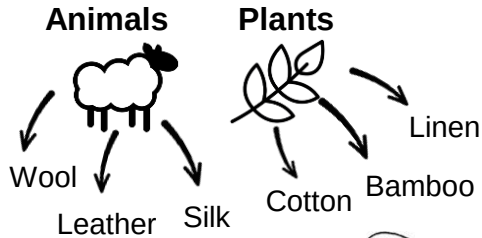
4a - Inclusive Design - Paratriathlete Design Challenge

User Centred Design
This design process involves putting the intended user at the centre of every decision made whilst designing. A user is someone who intends to use a product or is the person who the product is designed for. Utilising user-centred design ensures that products are more likely to fit their users needs.

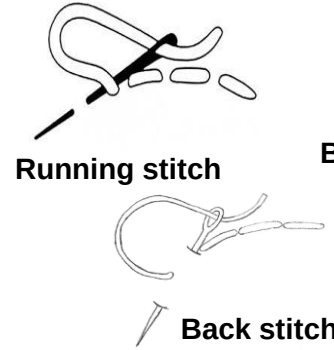
Para-Triathlete
Our intended user for this design challenge is a para-triathlete, an athlete that has a disability/impairment that makes them eligible to compete in multiple para sports.

4b - E-Textiles - Smart, Modern and Composite Materials

Natural fibres are grown in nature from:



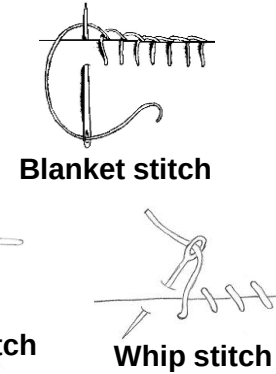
Synthetic fibres, such as polyester, acrylic and spandex, are man-made usually from crude oil or different chemicals.



Smart materials exhibit a physical change in response to some external stimuli e.g. heat.

Modern materials have been engineered to have improved properties

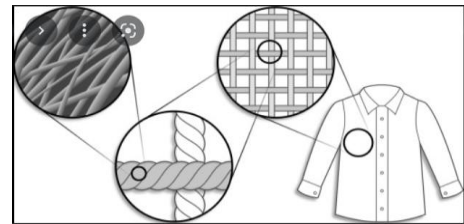
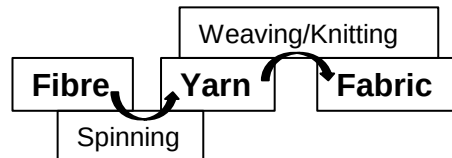
Composite materials are a combination of two or more materials with different physical and chemical properties.



Conductive thread can carry current the same way that wires can, which means it can be used to create a circuit. This allows the user to sew a circuit together, creating flexible circuits that require no soldering.

4c - Mini Monsters

Fabric construction



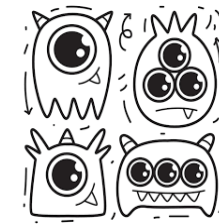
Weaving Knitting Bonding



Primary sources of information are gathered by the designer first hand and used to help improve their designs.



Secondary sources of information use data already found by other people or organisations that are relevant e.g. internet websites.



Design features are the parts of the design that stand out the most and make the biggest impact.

Applique



Applique is the decorative process of attaching a fabric design to a fabric surface.

A	is for	Aesthetics
C	is for	Cost
C	is for	Customer
E	is for	Environment
S	is for	Size
S	is for	Safety
F	is for	Function
M	is for	Material

4d - Wearable Technology



Wearable technology is any kind of electronic device designed to be worn on the user's body.

These are becoming popular technologies in the healthcare, sports, gaming & fashion industries.

Types of Wearable technology devices:

- virtual reality headsets (VR)
- embedded smartphone controlled sensors
- activity trackers like fitbits/smart watches

Examples of incorporated Technology

- Light Emitting Diodes or LEDs
- Thermochromic pigments
- Photochromic pigments
- Body sensors

Unit 5

5a - Fidget Spinner - Onshape

Simulation: Tests how a design will work in real life.

Part Studio: Where you make individual 3D parts.

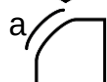
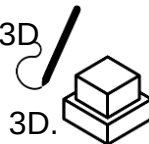
Sketch: A flat (2D) drawing used to build 3D shapes.

Extrude: Pulls or cuts a sketch to make it 3D.

Fillet/Chamfer: Smooths or angles edges of a part.

Assembly: Joins parts together into one model.

Mate: Makes sure parts line up and fit together.



5b - Does it Connect?



Scales of Production refers to the different sizes of production. Each scale makes a different quantity of products. The four scales of production include one-off, batch, mass & continuous production.

Batch Production is where a specific small quantity (a batch) of a product is made, usually between 2-100. Products can be repeated easily whilst still allowing elements to be changed. This type of production utilises assembly lines & manufacturing aids.

Assembly Lines are where production is broken down into small repetitive tasks. The product is completed a piece at a time and then moved down the assembly line.



Manufacturing Aids are tools & techniques used to aid the many different manufacturing processes and make it a lot easier to replicate designs.

Advantages of using Manufacturing Aids:

- The aids help speed up production
- The aids can help simplify a process
- They provide a controlled level of accuracy
- Manufacturing aids can be kept and used time and time again

Manufacturing Aids include:

- Templates
- Jigs
- Moulds
- Formers

5c - Such a Mess



A **design brief** is a short paragraph that explains what the designer must do in the project.

It will explain what problem the product will solve, who it will be suitable for, an overview of what it will do and possibly where the product will be used.



Product analysis is used by designers to develop new ideas and to evaluate products that have already been designed.

Product analysis can help designers to identify problems or flaws in a product as well as also identifying its successes.

Health and Safety

Always wear an apron & use goggles whilst using machines. Always follow the workshop safety rules. Ask for help if you need it.

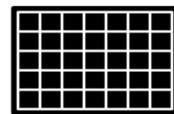
Craft knives should only be used to cut paper or cardboard

- Always cut away from your body.
- Always keep fingers away from the blade.
- Always use a craft knife with a metal safety rule and cutting mat.

The glue inside a hot melt glue gun melts at between 180°C & 200°C.

- Never touch the nozzle of a glue gun.
- Do not touch the molten glue.
- Allow a couple of minutes for the glue to cool.

Use a Tenon saw for straight cuts. Use a Coping Saw to cut curves.



5d - Knight Rider Computerised Vehicles

New and emerging technologies refers to the latest developments in tools, materials & techniques within Design and Technology.

Computer control in a car can be used to manage and regulate the vehicles operation. They are often referred to as Engine Control units (ECUs) or Electronic Control Modules (ECMs) to monitor and control functions like:

- Engine performance
- Transmission
- Braking
- Safety features



A **processor**, short for central processing unit or CPU, is like the brain of a computer or electronic device. It's the key component responsible for executing instructions & performing calculations.

Unit 6

6a - Multicultural Meals



Multicultural cuisine is very popular in the UK, due to the diversity and availability of ethnic takeaways and restaurants in villages and towns throughout the country.



Costing recipes - Working out the cost of a dish per person. This helps people budget & plan out different meals.



Oven Health & Safety

- Always use protective clothing & equipment e.g. oven gloves.
- Always be aware of hot & fire hazards.
- Always switch off the oven when not in use.
- Report any concerns immediately to staff.



6b - Protein Foods



Proteins are macronutrients that are needed by all animals, including humans. Proteins are made of amino acids & are essential for the growth, maintenance and repair of body tissue. Protein is part of every living cell & some tissues like skin, muscle, hair and our bones & teeth.

Functions of protein



Growth - To help the body grow



Repair - To repair the body



Energy - To give energy to the body

Excess protein



Weight gain - Can lead to weight gain & obesity



Organ strain - Puts strain on how the kidneys and liver works

Deficiency of protein



Growth - Children don't grow properly



Hair loss - Hair is more prone to falling out



Weakness - Skin and nails are weak and brittle

Health - More likely to become sick or unwell

Examples of protein rich foods can include meats, fish, eggs, beans, pulses, lentils, chickpeas & nuts. Dishes can be adapted for different dietary needs to include proteins from different sources.

6c - School Food Standards - School Lunches



School Food Standards are a set of resources to be used by schools. The food-based standards specify which types of food should be served at school and how often. The school food standards are underpinned by the Eatwell guide. This gives schools guidance on how to plan healthy balanced meals for all students.

Food Standard Requirements

From January 2015, all schools must meet these food standards:

- Ensure that all food and meals provided is healthy, balanced and nutritious for the students
- Provide students with an appropriate amount of the energy and nutrients they need in a school day
- Help develop healthy eating habits for the students



Benefits of a balanced school lunch

- **Concentration** - Students concentration and focus improves
- **Behaviour** - Students behaviour and engagement improves
- **Health** - Students see an improvement in their health
- **Results** - Students see better results when they have healthy diets
- **Enjoyment** - Students enjoy the variety of balanced healthy meals

6d - The Appliance of Science



Molecular gastronomy investigates the physical & chemical transformations of ingredients that occur while cooking.

Molecular gastronomy Techniques

- **Spherification** - creating a sphered gel around a liquid.
- **Gelification** - the process of turning a substance into a gel or jelly.
- **Emulsification** - combination of oily & watery liquids together.
- **Foams** - trapping bubbles in liquids or solids.
- **Airs** - incorporating air using an immersion blender on the surface of a liquid.

