Year 7 Resistant Materials Knowledge Organiser

Topic 1: User Needs

Once you have identified your target group, you also need to think about their **specific needs**. The **disabilities, culture** or **religion** of users may have an impact on how you **design** a product.

Products need to be accessible to everyone.

1. Lots of product are specifically designed to help people with **disabilities**. Some packaging (e.g. for medication) has **Braille** labelling to give blind people information.
2. Control buttons can be made brightly coloured and extra large, so they're easy to find and press. E.g. tv remotes, calculators.
3. Products such as smoke alarms can be designed with **visible** signals as well as audible ones so that deaf people can be alerted to fires.
4. **Instructions** can be given in **picture** or **diagram** form so that people who have difficulty reading text can still use the product.
5. Designers also have to think about **wheelchair users**. E.g. trains and bus-

People have different cultural and religious values.

Designers need to cater for people with different customs and beliefs and must consider; **Dietary needs, clothing styles, symbols** and **colours**.

Designers need to think about age groups.

People in different **age groups** have different **physical limitations**. Small children and elderly people may not be able to use **small parts** and might struggle undoing **fastenings** and opening **packaging**. Small parts can also be a **choking hazard** for children. Elderly people might have difficulty **holding** and **using** products. Designers can thik about putting large, easy to grip handles on, say, cutlery. Age groups also need to be considered in the **aesthetics** of a product. Adults might not want something that's too **brightly coloured** and childish.

Topic 2: Tools & equipment

Tools and equipment are used to **cut**, s**hape** and **form** materials.

Materials can be **cut** using **hand tools**. **Saws** are the main cutting tools. There are **different saws** for different materials.

E.g. tenon saw for cutting straight lines in wood and a coping saw for cutting curves in wood or plastic.

Rough edges from sawing can be tidied up by **sanding**.

Materials can also be **cut** using **machine tools**.

E.g. circular saws, band saws and a jig saw.

Drills make holes

Depending on how hard the material is is, you can do the atual drilling with a bace, hand rill or a power drill (e.g. pillar drill)

All drills work by rotating a **drill bit** against the material.

Twist bits are used to drill **small holes** in wood , metal or plastic.

Flat bits are used on **wood** to drill **large** flat bottomed holes

Countersink bits widen the **opening** to an **existing hole**, allowing **screw heads** to sit **flat** on the **surface.**

Twist bit

Flat bit

Countersink bit

Year 7 Resistant Materials Knowledge Organiser

Topic 3: Classifying materials & selecting materials

Metals

can be **ferrous** or **non ferrous**. They are extracted from the earth's crust as metal ore. Metals can be mixed together to make new materials with different properties. These are called **alloys.**

- **Ferrous metals contain iron** which make them **magnetic.**
- Non ferrous metals don't contain iron and are non magnetic.

Wood

There are two types: **softwood** and **hardwood**

- Softwood—from ever green trees (fast growing). Used for furniture, garden shed, floorboards
- Hardwood—from deciduous trees like oak, ash and beech (slow growing) Used for more expensive furniture, tool handles and toys.

Plastics

Plastics are man made using crude oil

1. **Thermo plastics** can be formed into shapes when hot and can be **reformed** by heating.
2. **Thermosetting plastics** can be formed into shape but once they have set, they **can't be changed**.

Composites are made by combining materials to create a new material with different properties.

Materials are chosen for their properties. E.g the material used for a bridge needs to be strong and durable. Lego bricks are made from plastic. Plastic is used because it is cheap, durable, easily formed into complex shapes, non toxic and colourful.

Topic 4: Quality, accuracy, manufacturing and processing.

Quality assurance (QA) is all about standards. Standards are set before a product us made to make sure that the final product comes out the way the manufacturer wants it to.

Quality control (QC) happens on the product during or after, it has been made. It is the checking process that goes to make sure the quality assurance standards are met and the final product is up to scratch. Quality control involves inspection, sampling and testing. Inspections are made for variations from the standard size, colour, and surface characteristics and to make sure the product works properly.

Manufacturing aids ensure repetitive quality

Manufacturing aids like jigs, moulds and templates ensure accuracy when producing a batch of identical products.

1. Jigs are used to position materials and give you a guide for where you should saw and drill.
2. Templates are things you draw or cut around to get the same shape and size each time.
3. Mould (also called formers and dies) can be used to create several copies of a 3D shape. E.g. when vacuum forming.

CAD/CAM improves accuracy because it is very accurate. A design is sent to the machine such as a laser cutter and will guarantee identical results.

Year 7 Resistant Materials Knowledge Organiser

Topic 5: Environmental concerns

Manufacturers can carry out a **life cycle analysis** to find out what effect a product has on the environment. It includes all stages of the product's life from the design, raw materials, manufacture, packaging, storage , transport, sale, use and disposal.

Remember the 6Rs od sustainability

The 6Rs help manufacturers think about how to reduce a product's impact on the environment.

Reduce	Is there a way of reducing the amount of material?
Rethink	Is there an alternative to this product that is less damaging to the environment?
Refuse	This means refusing to use methods or materials that are bad for the environment.
Recycle	Could the product be made from recyclable materials?
Reuse	Could the product be reprocessed to make something else?
Repair	Is the product easy to repair?

Packaging can be a lot more environmentally friendly

1. Use recycled materials—so you are not using up new resources.
2. Use recyclable materials so that the consumer can recycle them.
3. Use biodegradable materials which decay quickly after being thrown away.
4. Use refillable containers e.g. plastic washing liquid bottles that can be refilled from recyclable cardboard cartons.
5. Use only the minimum packaging necessary .
6. Include a note on the packaging reminding the consumer to reuse or recycle it after use.

Topic 6: keywords, terms and definitions

Aesthetics	The shape, look, colour and style of a product or material.
Batch production	When manufacturers produce a group of identical products in one go.
CNC (computer numerically con-trolled)	The machines used in CAM are CNC. Data is sent to the machine in the form of numbers.
Components	The parts that make up a product.
Design specification	A list of requirements for a product that is decided at the design stage.
Ergonomics	Making a product comfortable and fit the user .
Function	The purpose and use of a product.
Iterative design	A design process in which a single prototype is made, repeatedly tested and improved until all problems with it have been fixed.
Jigs	Guide tools—they make cutting and shaping materials quicker and more accurate.
Manufacturer	A person or company that makes products to sell.
Mass production	When manufacturers produce in large quantities. Also called high volume production.
Properties	The features of material e.g. strength, durability, absorbency and colour
System	Various parts that work together to perform a function. They are made up of an input, process and output.
Target group	The group of people you think will use a product.

Year 7 Textiles Technology Knowledge Organiser

Topic 1: Natural fibres & synthetic fibres

You can classify materials by their **source**—whether they are **natural** or **man-made.**

Natural Fibres	Synthetic fibres
1. **Animal**—wool from animals, e.g sheep, alpaca, Angora goats and cashmere goats. 2. Vegetable—fibres from plants, e.g linen, cotton, hessian	1. **Regenerated**—natural fibres that have been industrially processed e.g viscose, acetate. 2. **Synthetic**—fibres completely man-made using chemicals e.g. nylon, polyester, acrylic, elastane

Synthetic fibres can have the **appearance** of natural fibres but with **improvements** in **price** or **properties**:

1. **Polyester** looks like **cotton**, but it **creases less easily** and is **cheaper** to produce.

2. **Nylon** looks like **silk**, but it's generally much **stronger** and more durable.

World materials

Local needs, **resources** and **culture** affect Textiles.

Denim clothing was originally made in **America** to provide **hard-wearing** work clothes for farm labourers. It is made of **cotton**—which was cheap and produced locally.

In **traditional Indian textiles**, **colour** was **symbolic**—different colours had different meanings, e.g. red was associated with good luck, and saffron (yellow) with spring.

The **Inuits** made clothes using **leather** and **fur**. These materials were **available** and suited the environment because they were very **warm**.

Topic 2: Research & the internet including analysis

Research **what people want and need.**

There are lots of sources you could use to gain information:

- Books and fashion magazines
- Analysing existing products
- The internet (manufacturers websites)
- Phone apps
- Surveys of shoppers

The point of research is to:

1. Check that people will actually **want your product.**
2. Find **similar products** are on sale, and what people like/dislike about them.
3. Find out what **materials** and **techniques** would be suitable for making your product.
4. Find out how much the product is likely to **cost to make** and **how much** you think it will **sell for**.

Using the **internet** is a good method of **research** for finding information about materials, processes and inspiration for designs. Be careful of websites that seem **biased** (only give one side of an **argument)** or that don't give any evidence to back up what they say. Always check that it is **accurate** before using it in your work.

Product analysis can give you **ideas** for your design and help you **understand** a product. We use **ACCESS FM** and **FACE** when analysing a product.

Year 7 Textiles Technology Knowledge Organiser

Topic 3: Textiles techniques, CAD/CAM and equipment

Patterns are templates you cut around. They help you cut fabric accurately. A seam allowance is added to patterns so there is room to make a seam. It is normally 1.5cm on a commercial pattern.

Decorating techniques personalise products

Tie dye	Batik	Fabric pens
Stencilling	Applique	Block printing

CAD/CAM is used to help with designing and making so it is easier and quicker.

CAD– Computer aided design

CAM—computer aided manufacture

Sewing machines use two threads. One is on a bobbin or spool under the sewing plate. The other (top thread) is on a reel on top of the machine. The machine interlocks the two threads to make **stitches**.

Seams join pieces of fabric together. There are flat, corner and curved seams.

Textiles tools and equipment are used for marking and measuring, cutting, sewing and pressing. Examples include;

Tailor's chalk	Dressmaking scissors	Pinking shears	Pins	Dry irons
Measuring tapes	Embroidery scissors	Steam rippers (un-pickers)	Needles	Steam irons

Topic 4: Understanding user needs, cultural and religious values

Products need to be accessible to everyone.

Lots of products are specifically designed to help people with disabilities. E.g. Medication packaging has **braille** labelling to give blind people information.

Components can be made **brightly coloured** and **extra large** so they are easy to find and press. E.g. buttons on coats, zips and poppers on clothing and textile products.

Instructions can be given in **picture** or **diagram** form so that people who have difficulty reading text can still use the product.

People have different cultural and religious values.

- Clothing styles vary in different cultures
- Colours can have meanings. E.g. in China red is thought to be lucky

Designers need to think about age groups

1. People in different **age groups** have different physical limitations.
2. Small children and elderly people may not be able to use **small parts** and might struggle undoing fastenings and opening packaging
3. Age groups also need to be considered in the l**ooks** of a product. Adults might not want something that is too **brightly coloured** and childish.

Year 7 Textiles Technology Knowledge Organiser

Topic 5: Environmental considerations

Manufacturers can carry out a **life cycle analysis** to find out what effect a product has on the environment. It includes all stages of the product's lifefrom the design, raw materials, manufacture, packaging, storage , transport, sale, use and disposal.

Remember the 6Rs od sustainability

The 6Rs help manufacturers think about how to reduce a product's impact on the environment.

Reduce	Is there a way of reducing the amount of material?
Rethink	Is there an alternative to this product that is less damaging to the environment?
Refuse	This means refusing to use methods or materials that are bad for the environment.
Recycle	Could the product be made from recyclable materials?
Reuse	Could the product be reprocessed to make something else?
Repair	Is the product easy to repair?

Consumers can help the environment too.

1. Materials can be recycled to make new textile products.
2. Old textiles can be given a new lease of life with new decoration.
3. Synthetic fibres can sometimes be regenerated into new fabric.
4. Cellulose and protein fibres like cotton are biodegradable—they break down into the soil. This means they are environmentally friendly to dispose of because they won't take up space in a waste dump for years.
5. Consumers can also help by buying environmentally friendly products.

Topic 6: Keywords, terms and definitions

Aesthetics	The shape, look, colour and style of a product or
Biomimicry	Copying nature to come up with designs.
CAD	Using computers to design a product.
CAM	Using a computer to control the machine making the product.
Components	The parts that make up a product.
Design specification	A list of requirements for a product that is decided at the design stage.
Ergonomics	Making a product fit the user.
Fibre	A natural or manmade material that can be spun into yarn.
Iterative design	A design process in which a single prototype is made, repeatedly tested and improved until all problems with it
Properties	The features of a material e.g strength, durability, absorbency and colour.
Seam	The join between two pieces of fabric.
Smart fabrics	Materials change their properties in response to changes in their environment.
Target group	The group of people you think will use the product.
Textile	A fibre, yarn or fabric.

Year 7 Food Technology Knowledge Organiser

Topic 1: Cooking equipment

The main tools you will use for **chopping** and **slicing** are **knives**. It is important to use **sharp** knives so they cut food **easily**. **Serrated knives** have a jagged edge, which makes them really useful for cutting soft foods wit a harder outer layer e.g. crusty bread.

Spoons and **whisks** can be used to mix and whip ingredients.

Spatulas have a **bendy head** which means they can get right against the side of a container making them great for **scraping** mixtures from bowls and pans.

Palette knives are **blunt**, **flexible** knives with a rounded tip. They are used for **scraping, spreading** and **mixing** ingredients. They can also be used to **lift** and **turn** food during cooking.

Ladles are spoons with a long handle that can hold a lot of liquid.

It is important if you are following a recipe to make sure you measure out all of your ingredients **correctly**. You need different equipment to **measure** different amounts/ingredients.

Weighing scales—for weighing solid ingredients e.g. flour.
Measuring spoons—for measuring small amounts of ingredients e.g. salt.
Measuring jugs—for measuring liquids e.g. milk

Electrical equipment can get jobs done faster and help you chop, mix etc. more quickly and easily.

A food processor— a jug with a rotating blade used to cip, blend or mix.
Blenders—are very similar to food processors, but they are designed to blend foods to a smooth texture, such as soups or smoothies.
Electric whisks— makes whisking quicker and easier than whisking by hand.

Steamers are a good way to cook food **instead of boiling** in water.

Non stick pans—have a special **coating** to **stop** food **sticking** to the pan so you don't have to use as much fat whe frying—so it is **healthier**.

Topic 2: Nutrition and healthy eating

It is important to have a healthy diet. Having too little or too much of some nutrients can lead to health problems. A healthy diet should be;

- **Low** in fat, especially saturated fat
- **Low** in **salt**
- **Low** in **sugar**
- **High** in **fibre**
- **Varied**—eating lots of different foods means you are more likely to get all the nutrients you need.

Use the Eatwell Plate to check your diet is right. The Eatwell plate is a way of showing how much of each type of food you should eat.

If your diet is **unhealthy**, you may become **obese**. Obesity increases the **risk** of type 2 diabetes, high blood pressure, heart disease and other **diseases**.

Year 7 Food Technology Knowledge Organiser

Topic 3: Selecting ingredients

Choose ingredients with properties that suit your product.

1. Function
2. Nutritional values
3. Specialist diets
4. Aesthetic properties
5. Cost
6. Shelf life
7. Availability
8. Environmental and ethical issues

You have to compromise when selecting ingredients.

It is often difficult to find ingredients that have all the properties and characteristics you are looking for, e.g ingredients which have the right taste, smell and look may be expensive or not easily available. You often have to compromise when selecting ingredients. Decide which properties and characteristics are most important for your product and choose an ingredient that has those.

Healthy eating guidelines are increasingly important.

Food designers should aim to create foods which give the consumer a healthy choice. In order to increase the healthiness of a food, five things need to be focussed on:

Increasing fibre content	Reducing salt content	Reducing fat content
Increasing fruit and vegetable	Reducing sugar content	

Topic 4: Properties of Ingredients

Ingredients have useful properties.

1. **Protein foods (eggs, nuts, meat and cheese)**

Eggs are great for lots of reasons. They help set to give **strength** to a product. Eggs can be added to sauces to **thicken** a product. Eggs can also be whisked to create a foam making products **light** and **fluffy**.

2. **Carbohydrate foods**

Flour adds **texture** and **structure**. Flour can be used to **thicken** sauces. Sugary carbohydrates **sweeten** foods and can **caramelise**, thicken food and add flavour.

Fibre found in carbohydrate foods help to give products **bulk**. Fibre **absorbs** liquid added to the product and makes it bigger and easier to digest.

3. **Fatty foods**

Fatty foods in general add flavour, as well as **colour** and **texture**.

Butter gives pastry a nice **flavour** and lard helps to **shorten** the pastry. This gives the pastry a nice crumbly texture.

Year 7 Food Technology Knowledge Organiser

Topic 5: Sourcing ingredients

Some foods have travelled thousands of miles.

Most fruits and vegetables grown in the UK are available to buy at different times of the year—they are seasonal.

A food is in **season** when it is ready to be **harvested**.

Different foods are in season for different lengths of time. For example, apples are in season October to December and carrots between May and October.

Meats and seafood in the UK are seasonal too. E.g. lamb is in season during the spring.

Some processed foods are also only available at certain **times of the year** because they're linked to a particular **celebration**. E.g. hot cross buns and Easter eggs are only available around Easter.

A lot of the food we eat was grown in other countries.

Shops buy food from **abroad** when it is out of season at home. They also buy things from abroad that just can't be grown here, like bananas.

It is best to buy **local**, seasonal produce if you can. Food grown locally will be fresher.

The lorries, ships and planes used to transport food burn **fossil fuels**, which is bad for the **environment**. The further food has to transported, the more fossil fuels get burnt and the more polluted the environment becomes.

Unusual ingredients may need to be sourced from specialist stores e.g. Chinese supermarkets.

Topic 6: Keywords, terms and definitions

Keyword	Definition
Aesthetics	The look, taste, feel and smell of a product.
Batch production	When manufacturers produce a group of identical products in one go.
Consumer	The user of the product.
Design specification	A list of requirements for a product that is decided at the design stage.
Macronutrients	Nutrients the body needs in large amounts.
Mass production	When manufacturers produce a product in large quantities. Also called high-volume production.
Micronutrients	Nutrients that the body needs in very small amounts.
Quality control	The physical checks a manufacturer makes to parts and products to make sure they are the right standard.
Risk assessment	Identifying stages of the production process where there are hazards.
Seasonal	Foo that is only available at certain times of the year.
Seasoning	Ingredients added to food to flavour it.