Year 8 Resistant Materials Knowledge Organiser

Topic 1: New products and Technologies

People like to buy the **latest gadgets**—like wireless headphones or a top of the range tablet computer. There's always **new stuff** on the market to make you think, ''oooh I definitely **need** one of those".

There are **lots** of **new products** on the **market**

1. There is **consumer demand** for new and improved products. This is called **'market pull'** - manufacturers produce what people want to buy.
2. Advances in **technology** mean that new products can be designed e.g smart phones and GPS watches.
3. **Restyled** versions of **existing products** are produced to keep up with fashion. **Appearance** has a huge part to play in what consumers will and won't buy.
4. **Manufacturers** are in **competition** with each other to get consumers to buy their products. Producing new and improved products is a way of keeping consumers **loyal** to their brand.

Some products fail or are replaced regularly

1. Some products **aren't marketed successfully**—so consumers aren't aware of the product and what is good about it.
2. Sometimes another, **similar product** is available which is cheaper or more stylish, so consumers buy that instead. 3. **Advances** in t**echnology** mean that products become outdated.

Topic 2: The impact of technology

An **advantage** of technology means a **team** can work in **different places**

The people designing a product no longer have to work in the **same area**., e.g. a **design team** can work in different places and use the **internet** to exchange design ideas. This is called **remote working**.

Advantages of remote working

1. Good for designers because it means they can work for a **broader range** of **clients** and on a broader range of **projects**.
2. Good for **manufacturers** because it means they can use the **best designers** available, worldwide.
3. It allows **home-working** and **flexible hours** for workers who want it.
4. It saves on **transport costs** and pollution.

Disadvantages of remote working

1. It takes **more effort** to c**oordinate** a team working in different areas.
2. Some people may prefer a more **sociable** working environment.
3. Coming up with ideas and **developing them** as a team is often easier **face to face.**

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Topic 3: Computer aided manufacture

CAM—Computer aided manufacture

1. It is the process of **manufacturing products** with the help of computers.

2. CAM is linked to **CAD (computer aided design)**. Products are designed with CAD software. Then data from CAD software is downloaded into the control unit of a manufacturing machine which makes each component or product.

CAM is great for mass production.

They are used as part of the production line to do repetitive tasks o a reliable standard of accuracy.

Advantages:

1. CAM makes production quicker and more efficient. Machines do not need to rest.
2. CAM is very accurate
3. It can be used to process materials and chemicals which are hazardous to humans.

Disadvantages:

1. The initial cost of computer hardware and software and CNC machines is high.
2. Training programmers and operators is expensive.
3. The use of computers and automated machines means fewer workers (and fewer skilled workers) are needed. Some people have been made unemployed because of this.

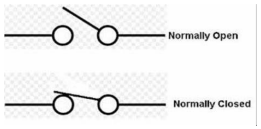
Topic 4: Systems and control

Systems are made up of an input, process and output.

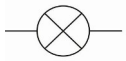
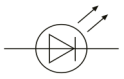
1. The i**nput** is a signal, change in the environment, component or process that starts the system off. E.g a button on a mobile being pressed.
2. The **process** is what happens to the input to change it into an output. E.g skills and labour of workers in a factory or working of a computer processor.
3. The **output** is the result of the system. E.g the final product on a production line or sound of a fire alarm.
4. **Electronic systems** often contain a **user interface**. This includes the number of inputs and outputs that the user can interact with e.g. the touchscreen of a smart phone.
5. In electronic systems, inputs and outputs can be a number of things, including movement (e.g a fan), heat (e.g a thermostat), sound (eg an electric keyboard), or light (e.g. safety lights)

Common electrical inputs include switches and sensors.

Switch



Switch symbol

1		A lamp	
2		A buzzer	
3		A motor	
4		LED (light emitting diode)	

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Topic 5: Changing properties and Forming

Thermoforming processes change the properties of a material by **heating**, cooling, **moulding** and reinforcing it combining it with another material. These include, injection moulding, blow moulding and **vacuum forming.**

The **properties** of **metals** can be changed with heat, **hardening** (hardens) **annealing** (softens) and **tempering** (makes tougher).

Combining materials creates new properties.

Materials can be **combined** by sandwiching them in **layers** to create a new material.

1. Gluing thin sheets of **aluminium** on each side of a paper **honeycomb** creates a new material that is very **strong** and lightweight. It was designed for train floors and aeroplane parts.
2. **Plywood** is made of **layers of wood** stuck together. Although it is **thin**, its very strong because layers are arranged with the grain going in **alternate directions**. To make plywood even stronger, a layer of fibre glass can be added.

Deforming and reforming are different.

1. **Forming** - this means shaping a material
2. **Deforming**— changing the shape of a material without any loss of material.
3. **Reforming**—this involves changing the state of a material e.g from liquid to a solid, as in casting.

Topic 6: keywords, terms and definitions

Block diagram	Each block shows a 'subsystem' - one part of the whole system
Feedback (in electronic systems)	Feedback means checking the quality of the output, ad if it isn't right, changing the input. This is sometimes called feedback control.
Forming	Shaping a material
Deforming	Changing the shape of a material without any loss of material.
Reforming	Changing the state of a material e.g from liquid to a solid e.g. casting.
Thermoforming plastics	A type of plastic that can be melted and remoulded over and over again.
Thermosetting plastics	A type of plastic that undergoes a chemical change when heated, which makes it permanently hard and rigid. Thermosetting plastics can't be remoulded.
thermostat	A thermostat turns heating systems on an off depending on how hot it is.
Composite	A material made by bonding two or more different materials together.
CAD/CAM	Computer aided design/manufacture. Designing and making using a computer.

Year 8 Textiles Technology Knowledge Organiser

Topic 1: Design brief and specification

Designing starts with a design brief. The design brief is a starting point for the development of the product. It should include:

1. What kind of product is needed (and why)
2. How the product will be used, and where (what environment)
3. Who the product is for (the target market)

Design briefs don't always have to come from a client.

You might have come up with an idea or design brief yourself because you saw a gap in the market or you want something that isn't available.

It is still important to write things down that a design brief includes. This stops you forgetting important points further down the line, and makes it easier for anyone helping you out on the project to understand your aims.

A design specification is a list of product features.

Questions to ask when writing a design specification.

1. How can you ensure it matches the design brief?
2. Can you make the product safe?
3. Can you make the product cheap enough for consumers to afford?
4. What shapes, textures, colours will the consumer prefer>

Use ACCESS FM to write a specification.

A	**Aesthetics**
C	**Consumer**
C	**Cost**
E	**Environment**
S	**Size**
S	**Safety**
F	**Function**
M	**Materials/manufacture**

Topic 2: Task analysis, Design inspiration

Designers generate ideas with a variety of methods including:

- Making ideas boards
- Finding out about current trends
- Disassembling products
- Creating mood boards
- Talking to consumers
- Adapting existing products

Design Brief

Design and make a mini monster soft toy to be sold at an event, attraction or service in your local community, for a specific target market.

Task Analysis

Aesthetics

Components

Cost

Customer

Environment

Safety

Size

Function

Materials

Visual inspiration

Year 8 Textiles Technology Knowledge Organiser

Topic 3: Selecting materials and modern materials

Think about these criteria when selecting materials:

In reality, you won't often find a material with al the properties you want. You will have to compromise e.g. choose a material that doesn't have all the aesthetic properties you want but is available and affordable.

Properties when selecting materials

Function	Aesthetics	Cost	Availability	Manufacture

Think about the properties when selecting materials:

Density— the weight of the material.	**Colour**— Most natural fibres are off white. Manufactured fibres are almost colourless but dye pigments can be added.	**Elasticity**— The amount a fibre can be stretched and still return its original length.	**Resilience**— How well fibres return to their original shape after being bent. This is also called crease resistance.
Absorbency— How well a fibre can soak up moisture	**Flammability**— How easily a fibre will burn	**Tenacity**— The amount of force needed to break a fibre. High tenacity means good durability.	

New materials have been created with new properties

e.g. TENCEL is a relatively environmentally-friendly modern fabric which has the following combination of properties:

Feels similar to silk, breathes like cotton, cheap, machine washable and holds dye well.

Smart materials change their **properties** in response to **changes** in their environment e.g. they change shape or colour in response to response to changes in the t**emperature** or **light**.

Topic 4: Textiles techniques and patterns

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	Fabric is bunched together and tied with string before it is dyed.
Batik	Wax is drawn on to the fabric with a special tool. The fabric is dipped in dye and the wax resists the dye.
Stencilling	Painting fabric dye through the holes of a stencil.
Applique	Cutting shapes out from fabric and sewing them onto a background fabric.
Fabric pens	Used to draw on fabric.
Block printing	An old fashioned way method of decorating fabric. Shapes are stamped onto fabric, e.g. potato printing.

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

CAD– Computer aided design

Use CAD programs to create designs on-screen e.g. designing patterns for embroidery or stencils.

CAM—computer aided manufacture

Designs are sent from the computer to a machine such as the laser cutter which can then cut out the templates or patterns.

Year 8 Textiles Technology Knowledge Organiser

Topic 5: Tools and equipment, health & safety

Marking & measuring	Measuring tape for accuracy and tailor's chalk to transfer markings that can be removed later.
Cutting	Dress-makers scissors to cut fabric. Embroidery scissors for more delicate cutting. Pinking shears to cut with a zigzag edge. Craft knives to cut stencils Seam rippers or un-pickers to unpick seams
Sewing	Pins to hold the fabric together before stitching Needles for hand stitching e.g. embroidery, attaching beads to fabric or tacking. Use a needle that is the right size for the thick-
Pressing	Dry irons use heat and pressure to press creases out of fabric and flatten seams. Steam irons are more effective—they use water and steam as

Health & Safety

Think about health and safety when making a product. It is an important part of planning a product.

- Carry out a risk assessment.
- Evaluate risks involved.
- Take precautions to minimise accidents.
- Know how to switch off or isolate machines in an emergency.

Topic 6: keywords, terms and definitions

Keyword	Definition
Specification	A list of requirements for a product that is decided at the design stage.
Modifying	To change something slightly to improve it.
Block printing	Block printing is the process of printing patterns by means of engraved or raised design added to the block and using ink.
Screen printing	A printing technique where mesh is used to transfer ink on to a material except in areas made impermeable to the ink by a blocking stencil.
Impermeable	Not allowing liquid to pass through the material.
CAD	Computer aided design—Using computers to design a product.
CAM	Computer aided design—Using a computer to control the machine making the product.
Sustainability	The ability to maintain or support a process over time.
The 6Rs of Sustainability	Stands for Recycle, re-use, reduce, refuse, rethink, repair when considering the environmental impact of a design or product.
Aesthetics	The look, feel, structure of a product or material.
Tolerance	The amount of acceptable variation from the specified measurement from which you can cut out pattern pieces, add components sew seams.
Iterative design process	A design process in which a single prototype is made, repeatedly tested and improved until all problems with it have been fixed.

Year 8 Food Technology Knowledge Organiser

Topic 1: Nutrition

To be healthy, you need to make sure the food you eat contains all the nutrients your body needs to work properly.

Different foods contain different nutrients.

1. There are **five** nutrients that are vital to **health—proteins, fats, carbohydrates, vitamins** and **minerals.**
2. These nutrients can be split into **two** groups—**macronutrients** and **micronutrients.**

Macronutrients

Macro means **large**—we need macronutrients in large amounts.

- Carbohydrates (for energy)
- Protein (for growth)
- Fats (for energy)

Micronutrients

Micro means **small**—we need micronutrients in much smaller amounts.

- Vitamins including vitamin A (good for vision, especially when it's dark)
- Vitamin C (to help your body fight disease)

Minerals

You need to eat minerals to stay healthy.

- Iron—needed to make red blood cells (found in red meat and green vegetables)
- Calcium—needed for strong bones (found in foods such as cheese, milk, green vegetables.

You also need plenty of water and fibre.

Topic 2: Modern Ingredients

Scientific developments mean **new ingredients** with **new properties**.

This means designers can create food products that **were not possible** before.

Research into new ingredients is often focused on **particular needs** e.g. low fat alternatives or vegan alternatives.

This is because research is often funded by **manufacturers**. They want ingredients to be developed which they will find useful in their products

Examples include **GM Foods** and Modified Starches

1. **Genetically modified (GM) foods**
2. **Modified starches**
3. **Functional foods**
4. **Nutraceuticals**
5. **Novel foods**

Year 8 Food Technology Knowledge Organiser

Topic 3: Additives and processing ingredients

An **additive** is something that's added to a food product to improve its properties from **improving taste** to extending its **shelf life**.

Seasoning food makes it taste better.

Herbs and spices are **natural seasonings**. They improve the taste e.g. basil makes tomato –flavoured pasta sauces more tasty.. Using dried herbs and spices gives a slightly different flavour to using fresh ones.

Preservatives preserve food—makes it last longer

Vinegar is used to pickle foods like onions and eggs. **Salt** is used to cure meat e.g. ham and bacon. **Sugar** in jam preserves the fruit in it.

Colourings can be used to make food look nicer

e.g. The peas used to make mushy peas lose some of their colour when they have been cooked long enough to go mushy so timed mushy peas often contain food colourings to make them look greener.

Processing can make food taste better and last longer

Processing means we change the food by mashing, cooking, combining ingredients, adding preservatives or adding colourings.

There are four main food processing techniques:

1. **Mechanical**—e.g. harvesting, cleaning
2. **Heat**—e.g pasteurisation
3. **Chemical**—e.g. salting or pickling
4. **Irradiation**—exposing food to radiation that will kill bacteria and extend the shelf life of the food

Topic 4: Planning a meal

Meals should be **nutritionally balanced** and should contain a **mixture** of vegetables, carbohydrates and protein.

When making a meal for someone, you should find out if they have any **special dietary requirements**.

A good meal should provide food with a **variety** of **colour, texture** and **flavour** as colourful foods look **more appealing** than brown or white foods.

Different flavours that go well together should be combined in a dish e.g spicy curry with a mild yoghurt dip.

Different textures make food more appealing e.g. a meal of mince, mashed potato and mushy peas might not be that appealing because all the food is sloppy.

Adapt and invent your own recipes to suit your needs

1. If a recipe uses ingredients that are expensive or out of season, you can leave them out or **swap** them for something that is in season or **cheaper**.

2. Adapt recipes to match the **dietary requirements** of who you are feeding. E.g if someone is on a low fat diet, you could cook with less oil or use reduced fat ingredients.

3. Adapt recipes to match your personal tastes. If you dislike a particular ingredient, don't add it. If you love a particular ingredient, you could try **adding** it to the recipe.

Year 8 Food Technology Knowledge Organiser

Topic 5: Cooking methods

Boiling

1. Boiling means cooking food in boiling liquid, usually water. You can tell water is boiling by the large , fast moving bubbles.
2. Vegetables, rice and pasta are often boiled.
3. Boiling makes the texture softer, is quick and simple, and no fat is added so it is healthy.
4. Vegetables can lose some vitamins and minerals during boiling so try and boil vegetables for the shortest time possible.

Simmering and poaching

1. Similar to boiling but the only difference is the temperature. It is more gentle than boiling. The liquid is heated to a lower temperature and the bubbles in the liquid are smaller.
2. Fewer nutrients are lost when food is simmered and not boiled.
3. Soups and stews are usually simmered.
4. Poaching means cooking food very gently in hot liquid that has not reached a simmer.
5. Poaching is used to cook delicate foods like eggs and fish. If foods like this were boiled, they would break apart.

Steaming

1. Steaming cooks food with steam from boiling water and helps to preserve its colour, texture and vitamins. You can steam foods such as fish, vegetables and rice.

Stewing and braising

This is when foods are cooked slowly in its own juices or in a stock, often to cook tough meat, such as cheap cuts of meat. The slow and gentle cooking in the liquid makes the meat tender and the liquid becomes a sauce for the food. Braising is like stewing but the food is usually fried to brown it first.

Topic 6: keywords, terms and definitions

Keyword	Definition
Boiling	Cooking food in a boiling liquid. The bubbles are large.
Simmering	Cooking food at a lower temperature than boiling. The bubbles are smaller.
Poaching	Cooking food very gently in hot liquid that has not reached a simmer.
Steaming	Cooking food with steam from boiling water.
Stewing	Food cooked slowly in own juices or in a stock.
Braising	Food is usually fried to brown it first before stewing.
Aesthetics	The look, taste, feel and smell of a product.
Consumer	The user of the product.
Macronutrients	Nutrients the body needs in large amounts.
Micronutrients	Nutrients that the body needs in very small amounts.
Seasonal	Foo that is only available at certain times of the year.
Seasoning	Ingredients added to food to flavour it.