

Quick questions:

Name the most suitable material for each of the following:



Kitchen sink



Fence panel



Sports top



School chair



Plug



Dining chair



Exit sign



Door handle



Car body



T-shirt



Flat pack desk



Kitchen work surface



Drinks can

Extension

For each of the products above, explain why you have chosen each material.

Material Identification



Name all materials used to make this lamp.
Hint: the minimum you should name is four.

Material Identification



Name all materials used to make a free-standing hammock.
Hint: the minimum you should name is three.

Questions

Task

For each of the following, think of a product that has all the materials and explain why the materials are used.

1. Natural timber and non-ferrous metal
2. Thermoforming plastic and non-ferrous metal
3. Manufactured board and synthetic fabric
4. Copper and thermosetting plastic
5. Stainless steel and oak
6. Ash and steel
7. Polypropylene and steel
8. MDF and polyester
9. Brass and MDF
10. Plywood and natural timber

Natural Timbers

Natural timbers come from two main categories of trees: hardwoods (deciduous) and softwoods (coniferous).

- Hardwoods are usually tougher, but not always. They lose their leaves in the winter. Examples are oak, ash and mahogany. They are commonly used for high-quality indoor furniture.
- Softwoods grow quicker and are evergreen. Examples include pine, larch and spruce. They are used for cladding, fencing and outdoor furniture.

Thermoforming Plastics

Thermoforming plastics are usually made from crude oil. They can be heated, shaped when heated and reshaped multiple times. They are able to be recycled.

- Acrylic (PMMA) can also be known as Perspex and is used for display signs, machine guards and see-through products such as goggles and motorcycle visors. Acrylic is hard and weather-resistant, although it is quite brittle.
- Polypropylene (pp) is a tough and flexible plastic which is often used for chairs. It can be made transparent, making it good for lab and medical equipment.

Thermosetting Plastics

Thermosetting plastics are resistant to heat but are unable to be recycled. When thermosetting plastics are moulded, they undergo a chemical change so they cannot be remoulded like thermoforming plastics.

- Urea-Formaldehyde (UF) is a good electrical isolator so is used for electrical fittings like plugs.
- Epoxy resin (ER) can be used as glue because it comes as a resin and a hardener which can be mixed together. It is used for printed circuit boards (PCB). It is very durable so can be used for wind tunnel rotor blades.

Manufactured Boards

Manufactured board are timbers that have been processed into sheets by gluing fibres or layers of timber together.

- Plywood – thin layers of veneer glued together at 90 degrees and used in high quality flat pack furniture
- MDF – small fibres of wood glued together and used in furniture. It is normally covered or painted.
- Chipboard – large chips of wood glued together and used in kitchen work surfaces.

Ferrous/Non-Ferrous Metals

Ferrous metals - Ferrous metals contain iron, are magnetic and corrode (rust) when exposed to water.

- Mild steel moulds easily and is used for car bodies.
- Cast iron is heavy durable but brittle.

Non-ferrous metals - Non-ferrous metals do not contain iron aren't magnetic and are often more resistant to corrosion. Aluminium has good strength to weight ratio and is used to make aluminium cans.

- Copper can be formed into wires and is a great electrical conductor.

KS3 Technology Spine Core Materials



Natural Fabrics

Natural fabrics are from plants or animals and are therefore renewable. In general, natural fabrics are absorbent and strong when dry.

- Cotton comes from cotton plants and is used for jeans, t-shirts and soft furnishings. It is comfortable to wear, easy to add colour to and cool in hot weather.
- Wool comes from sheep and is used for jumpers, coats and carpets. It is warm when worn, has good elasticity and is light weight.

Alloys

Alloys are metals that contain two or more metals to make a metal with improved properties, e.g. strength or resistant to corrosion (rust).

Examples of alloys include:

- Brass - a metal that is yellow in colour and a mix of copper and zinc. It is often used for door handles and decorative metal work.
- Stainless steel - a metal that is silvery in colour and is a mix of iron, carbon and chromium. It is resistant to corrosion.

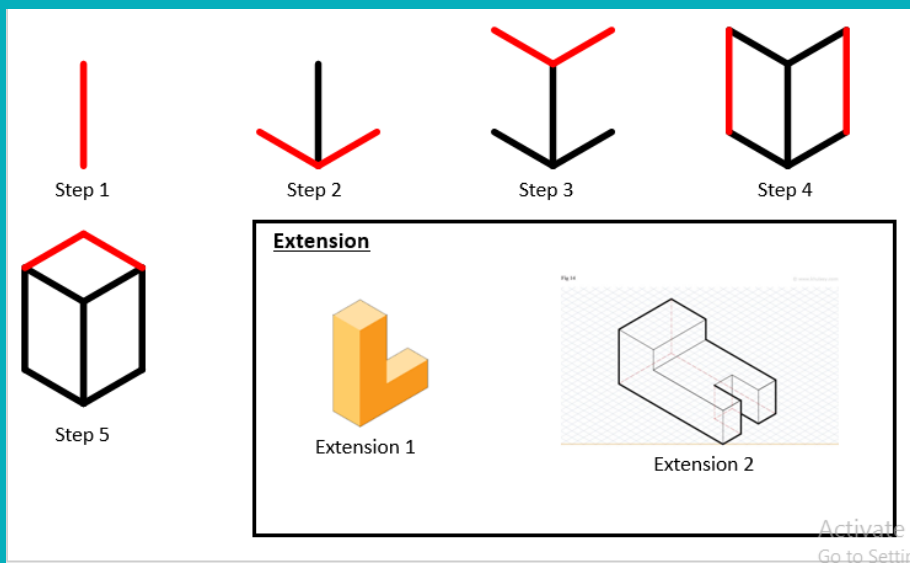
Synthetic Fabrics

Synthetic fabrics are man-made and mainly come from non-renewable fossil fuels, such as crude oil. They can have advantages over natural fabrics, such as water resistance, stretchiness and resistance to fabric-damaging insects.

- Polyester is a man-made fibre that is strong (even when wet) with good stretchiness, and is relatively cheap, although it is not absorbent and melts as it burns. It is used for outdoor wear, bed sheets and cushions.

Isometric Sketching

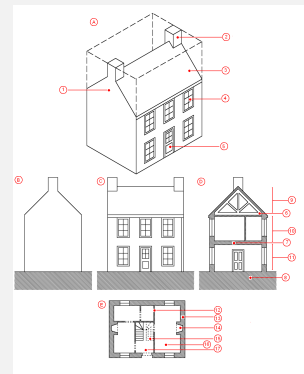
Draw five accurate cubes and then complete the two extension shapes.



Orthographic projection

Example

Use the example to help draw an orthographic projection of the extension tasks in the isometric section.



Modelling

Task

Find a piece of furniture at home and, using only the material of a single cereal box, model the piece of furniture.

Extension

Choose a piece of furniture that has a moving part, e.g. a hinge or a drawer, and include it in your model.

CAD CAM

Task 1

Make a mind map of all the advantages when using CAD/CAM over traditional methods.

Task 2

Make a mind map of all the disadvantages when using CAD/CAM.

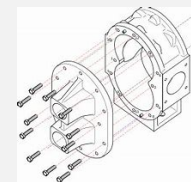
Exploded drawing

Task

All the exploded drawings are drawn in isometric so ensure you are using the correct isometric tools.

Ikea uses exploded drawings to great effect in their flat pack furniture instruction manuals. The instruction manuals can be found online on the Ikea website.

1. Copy an exploded drawing from an Ikea design at any stage of construction. The more parts that are included, the more difficult it will be. An example is provided below



Scale

1. If a model is made half scale, how would that be written as a ratio?
2. If an orthographic projection of a cube is drawn at a scale of 1:3 and the height of the orthographic cube is 100mm, how big will the cube be at full scale?

Freehand

Freehand sketching is drawing without using any equipment and is the quickest way to communicate a design.

- Use 2D and 3D sketches next to each other to help communicate and explain an idea.
- Use annotations to explain your idea in more detail - e.g. materials, how it's made and how it will be used.
- Some colour can help show off key parts of the design, or give a background to the design to give it more visual depth.

3D Modelling

Making a physical model of your design allows you to see how your design interacts with users and spaces. The model can be to a smaller scale or be full scale. A model is often made of inexpensive materials such as paper, card, modelling foam or manufactured board.

A 3D model can allow you to test parts of your design to the specification, to see how well they work and develop the design further.

Computer Aided Design

2D CAD allows you to draw accurately on a 2D surface like a pen and paper. This includes software like Photoshop, Techsoft 2D design and Illustrator. These can often be sent to a 2 axis CAM machine, such as a laser cutter or a printer, to test a design or make a final product.

3D CAD allows you to design your product to scale in 3 dimensions. It allows you to see your product accurately from different angles. A scale or final product can be modelled by a 3 axis CAM machine such as a 3D printer.

Isometric

Isometric is a way of drawing in 3D. There are two ways of drawing in isometric: using isometric dot paper and using isometric tools such as a drawing board, T-square and 30 degree set square. The product is often drawn as if you are looking at it from a 45 degree angle. Isometric is a good way of sketching a design to communicate dimensions and measurements. There are three main rules to drawing in isometric:

- Vertical edges are drawn as vertical lines
- Parallel edges are drawn parallel
- Horizontal edges are drawn at 30 degrees

Exploded Drawings

Exploded drawings allow a designer to show how a product will be put together. You will often find exploded drawings in instruction manuals for flat pack furniture. Exploded drawings are sent to manufacturers for assembly of the product or to help the designer learn how a product will be put together.

Exploded drawings are always in 3D (often isometric), have dotted lines to show how the parts will connect and parts on them are drawn with a line coming away from the previous part.

KS3 Technology Spine Drawing Techniques and Modelling



Orthographic Projections

Orthographic projection is used so a manufacturer can understand a design. It shows 3D products as 2D views: front, end (side) and plan (top down).

- Orthographic is always drawn to scale
- Dimensions are always given
- Dimensions are always in millimetres (mm)

Computer Aided Manufacture

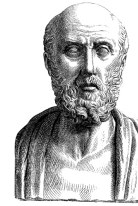
CAM are machines that follow a computer programme. A CAD programme will give XYZ coordinates that a Cam machine follows. If a machine can move in two directions, e.g. left/right and forward/back, it is a 2 axis machine; if it can move in 3 directions, e.g. left/right, forward/back and up/down, it is a 3 axis machine.

- 2 axis machines include printers, laser cutters and embroidery and knitting machines.
- 3 axis machines include 3D printers, CNC milling machines and CNC routers.

Scale

Scale is the size of the product being sketched or modelled. A full scale drawing or model is the exact same size as the final product. Large products are often drawn at smaller scales, such as furniture and cars, and small products will be drawn at larger scale, such as cameras and circuit diagrams.

Scales are written as ratios. For example, a 1:2 scale is half the size, 1:4 means an quarter of the size and 1:1 means it is full size.



Let food be your medicine...

The Effects of a Poor Diet

- Too high a calorie intake vs activity levels = weight gain which can lead to obesity.
- Too low a calorie intake vs activity levels = weight loss which can lead to anorexia.
- Too much fat (particularly saturated fat) can cause cholesterol build-up in arteries, leading to Coronary Heart Disease (CHD), weight gain (obesity).
- Too high a sugar consumption can lead to dental decay, weight gain (obesity), type 2 diabetes.
- Too low a fibre intake = constipation, poor skin, increased risk of bowel cancer.
- Too high salt intake increases blood pressure and increased risk of strokes.

Key Vocabulary

Using the mat and your own research, create definitions for the following words. Explain why these are important for food nutrition.

Nutrients	Protein
Macronutrients	Carbohydrates
Micronutrients	Fats
Diet	Vitamins
Obesity	Minerals
Anorexia	Fibre
Cholesterol	

Questions

1. Name three foods that are a good source of protein.
2. Why should we not drink more than one glass of fruit juice/smoothie a day?
3. Why should we eat five portions of fruit and vegetables a day?
4. If a diet is high in sugar and saturated fat, what effects could this have on health?
5. What dietary recommendation would you make to a teenage girl who is training to compete in cross country running events?

Quick Questions

1. What are the two types of nutrient group?
2. What is the name of the dietary recommendation to eat a balanced diet?
3. Which nutrient would you consume for growth and repair?
4. Which factors affect our nutritional requirements?
5. Why is increased protein required in a teenager's diet?
6. What are the macronutrients in food?
7. What is the required consumption of milk for 2-5 year olds?
8. What are the recommendations of the 'Eatwell Guide'?
9. When can the calorie intake of women be increased by 200Kcal?
10. At what life stage would you need to increase calcium and Vitamin D intake to avoid brittle bones?

Nutrition

- Food and drink supply the substances (**nutrients**) the body requires to function properly, e.g. grow, develop, repair and maintain and be healthy.
- If nutrients are supplied in the correct amounts as part of the **diet**, a healthy lifestyle can be achieved and the risk of food-related diseases/disorders can be reduced.
- Age, gender and physical activity levels affect nutritional requirements.

Nutrients

There are two main types of nutrient:

- **Macronutrients** – needed in large amounts. These include protein, carbohydrates (starch, sugar and dietary fibre) and fats.
- **Micronutrients** – needed in little amounts, these include vitamins (A,D, E, K, B group & C) and minerals (calcium, iron).

Functions of Nutrients

- Protein – growth, repair, maintenance and secondary source energy
 - Carbohydrates – energy
 - Fats – protect, insulate and provide energy
 - Vitamins – healthy skin/tissue, eye, teeth, bones, fights infections, release energy and form blood
 - Minerals – develop bones, teeth and blood cells
- Water is also required to maintain body health, cell formation, get rid of waste and regulate body temperature.

Healthy Eating and a Balanced Diet

To achieve a healthy diet, the Eatwell Guidelines should be followed:

- 1/3 (approximately 39%) of the diet should consist of fruit and vegetables, at least 5 a day.
- 1/3 (approximately 39%) of the diet should consist of starchy carbohydrates, ideally wholegrain.
- 12% protein foods – including two portions of fish, lean meat or vegetarian alternatives. Reduce consumption of processed meat products.
- 8% dairy foods – including low fat or alternatives, e.g. soya milk.
- 1% fat - small amounts of unsaturated fats.
- 6-8 glasses of fluid a day, a maximum of one fruit juice.
- Sugary, fatty and salty foods should be restricted.

KS3 Technology Spine Principles of Food & Nutrition



Portion Size

To maintain a healthy weight, 2,000 Kcal are required by women per day and 2,500 Kcal by men per day. It is recommended that the correct portion sizes are consumed to achieve this:

- Protein – palm-sized
- Carbohydrates – fist-sized
- Fats, e.g. butter/mayonnaise – tip of thumb
- Fruit 1 medium piece; 1 heaped tablespoon (tbsp.) dried fruit; 3 heaped tbsp. vegetables; 150ml or 1 small glass of fruit juice/smoothie.

Children Dietary Needs

- 2-5yr olds: small meals regularly; 300ml milk; protein, including two portions of fish, pulse/legume vegetables.
- 5-12yr olds: increased energy and nutrients needed due to growing quickly and increased activity; carbohydrate and some fat for energy required; calcium and Vitamin D for bone and teeth development.
- Teenagers: growth spurts and muscle development = increased protein; increased iron and Vitamin C due to periods and prevention of anaemia; calcium and Vitamin D for growth and increased bone density. **Stress can affect eating habits, causing anorexia or obesity.**

Adults

- Men = taller/ larger, more lean muscle
- Women = replace lost iron
- Calcium and Vitamin D decrease risk of developing bone disease with age and in menopause for women
- Pregnancy = increase in calorie intake in later stages by 200Kcal, increase in folic acid to decrease chances of birth defects, e.g. Spina Bifida.

The Elderly

- Muscle converted to fat therefore reduced energy need.
- Reduced saturated fat to lower risk of heart disease.
- Smell and taste changes therefore food taste changes.
- Calcium and Vitamin D prevent bones being brittle.
- Vitamin B12 = healthy brain activity, avoiding memory loss.
- Fibre = prevents constipation.
- Vitamin A = good eye health.

Product Analysis

Task 1

a) Do a product analysis on the following products using ACCESS FM.



b) Complete a target market profile on both products above.

Task 2

Choose a product you own and complete a Target Market Profile.

Questionnaires

A designer has been asked to design a chair for a school. The designer has written a questionnaire with four questions on it:

1. What is the age range of the student using the chairs?
2. What is the student's favourite colour?
3. Will the chairs need to be stored and, if they do, how?
4. Is wood a good material to use?

Which questions are good questions and which need improving? Explain your answer.

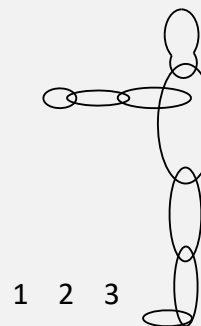
Write a five-question questionnaire for a designer who is designing a kettle for use in a retirement home.

Anthropometrics

Task

Make a anthropometric chart on yourself. You will need to measure the foot length, ankle to knee, knee to hip, hip to shoulder, shoulder to elbow, elbow to wrist, hand length and shoulder to head. Remember to make all measurement in mm.

Divide each measurement on the chart by 6 to make it 1:6 scale. A step-by-step of how to draw each part is opposite. First, draw a line the length of the 1:6 scale of the body part, then add the shape and make holes ready for a split pin.



Design brief and specification

Task 1

A good design brief will always include the following:

- What kind of product is needed and why
- How the product will be used
- Who the product will be used by

Write a design brief for the following problems:

1. When a hiker gets tired and want to rest, there is often no bench or places to sit nearby; the ground/environment may be difficult to sit down on, due to it being uncomfortable or wet.
2. Families normally have lots of shoes - the average is four pairs of shoes per person. Most families have between 3-5 people and limited room to store shoes, so they are often left in piles or are generally messy, causing a tripping hazard in the hallway.
3. In refugee camps, shelter is often an issue as weather is usually hot and shade is at a premium. Permanent buildings are not allowed and temporary structures, such as tents, are overcrowded.

Task 2

Write a five-point specification for each of the problems listed above.

Market Research

Market research is designed to help a designer to understand who they are designing for. This can include looking at what is already on the market and what people are buying, as well as questionnaires and interviews.

- An interview is meeting a person face-to-face and asking advice on a design, product or problem.
- A questionnaire is a set of written questions that you can get many people to answer. You can analyse the results when all are completed.

Mood boards

Mood boards are a series of images that somehow relate to your brief or design problem. The images inspire creativity and narrow down what a successful product will look like. A good mood board should have:

- Varied images which include photos, illustrations, other products, both similar and dissimilar.
- A clear theme (something visual that links the images).

Target Market

A target market is a the group of people who are most likely to buy your product. Products are not for everyone and everything is designed for a group of people in mind. Things to think about your target market profile include:

- Age – what is the age range, e.g. 20-30?
- Gender
- Hobbies and interests
- Job and amount of disposable income
- Views and beliefs

Product Analysis

Product analysis lets you know what is on the market and how products are made. A good product analysis will look at every aspect of a product, from its environmental and social impacts to how well it works.

- Using ICT to analyse a product lets you look at its form, cost, the materials and its environmental impact. You can also use reviews to see what other people think.
- Having the product in your hand allows you to test the ergonomics of the product and how well it functions. You should also disassemble the product to see how it works.

Design Brief

All design starts with a design brief. The design brief sets out what problem the design is going to solve. A good design brief will include:

- What kind of product is needed and why
- How the product will be used
- Who the product will be used by

A good way to set out your ideas is a spider diagram. This allows a designer to analyse the problem and start to decide what research will need to be done.

KS3 Technology Spine Research



Design Specification

A design specification is a list of conditions that the product will need to meet to be successful. The design specification should take into account the brief needs and the research carried out.

- Each point should be specific and testable, e.g. the stool should be 600mm tall as most work benches are 800mm tall. This allows for a comfortable height and enough room for people's legs.
- Categories to think about while writing a brief are aesthetics, cost, customer, environment, size, safety, function and materials/manufacture (ACCESS FM).

Anthropometric Data

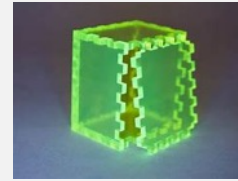
Anthropometrics is the study of human dimensions. To design something for a human, a designer must know the measurements of the parts of the body that are relative to their product. E.g. the design of a stool needs to be big enough for lots of different sized people to use it, but not too big that it is uncomfortable for most people. In order to make a usable stool, a designer will need a range of sizes from different people for their foot to inner knee height (height of the stool) and length of the inner knee to the start of the back (size of the seat).

Ergonomics

Ergonomics is all about designing a product to be comfortable and easy to use. This means that the product will not cause health problems over time. An example of good ergonomic design could be a video game controller as this can be used for long periods of time and not cause discomfort. A controller which has a bad ergonomic design will cause problems with finger and wrist joints over time. Designers can use anthropometric data to help with the ergonomics of the product.

Stock Forms

1) For each image below, name the stock materials used in its construction.



2) Link the sock form to the correct image.

Dowel

Moulding

Filament

Granules

Rod

U-shaped bar



Quick questions

1. What is the image below describing?



2. Name a temporary fixing that can be used with metal, plastic or timber.
3. What is sometimes known as a plastic weld?
4. Which fixing uses heat or electrical current?
5. What is a permanent fixing?
6. Name a permanent fixing that requires a drying time.
7. Name five products that use screws in their construction.
8. What type of movable fixing is suitable for a heavy door?
9. What hinge is best used in a kitchen cabinet?
10. What is a disadvantage of using a permanent fixing?

Timber Stock Form

Timber comes in many stock forms. The most common are:

- Planks – natural woods that are rectangular in shape
- Strips – natural woods that are rectangular in shape but not as wide or thick as planks
- Mouldings – either natural wood or manufactured board that are cut with different cross sections, used for picture frames and skirting boards
- Dowels – natural woods that are circular cylinders of wood, like a rod
- Sheets – large flat sheets (these are manufactured boards)

Metal Stock Form

Metals come in many stock forms. The most common are:

- Sheets – large flat surfaces that come in different standard thicknesses
- Bar – a rectangular length of metal that is thicker than a standard sheet
- Rod – circular cylinders of metal
- Tube – a hollow circular cylinder of metal
- Angle – a 90 degree L-shaped length of metal
- U-shaped – a right angled U-shaped length of metal
- Wire – thin rods of metal that are malleable

Plastic Stock Forms

Plastics come in many stock forms. The most common are:

- Sheets, tubes and rods (see metals)
- Foams – a spongy form that can be compressed easily
- Films – a thin continuous sheet that comes in rolls
- Granules – small beads of plastic that are melted in plastic forming processes
- Filaments – a wire of plastic of the standard thickness that feeds into 3D printers

Knock Down Fixings

Knock down fixings: a term for fittings/joints that can be put together and taken apart easily with only simple tools (screw driver and hammer), making them good for flat pack furniture:

- Block joints are used for simple joints, allowing you to put screws in at 90 degrees to each other, creating a stronger joint. Pronged nut is a nut that pulls itself into the wood and leaves a nearly flush surface, and a bolt can be screwed in from the other side.

Timber Fixing

Permanent – a fixing that cannot be undone.

- PVA glue – soaks into the wood then dries and becomes stronger than the wood around it.

Temporary fixing – a fixing that can be removed.

- Screws come in many types but all have a thread that pulls the screw into the wood and holds the joint together.
- Nails provide a weak joint as they only hold the wood in place through the friction of the nail.

Metal Fixings

Permanent – a fixing that cannot be undone.

- Welding: there are different types of welding but all heat up the metal with either a flame or electricity. The join is permanent as welding melts the metal into a single piece.
- Rivets are like a nail with two heads and can be hammered on both sides. Pop rivets are a modern version of a rivet.

Temporary fixing – a fixing that can be removed.

- Nuts and bolts are used to join thin materials like sheets or bars together that may need to be undone.

Plastic Fixings

Permanent – a fixing that cannot be undone.

- Solvent cement and glue that bonds two plastics together by chemically melting the two surfaces together. This is sometimes called a plastic weld.

Temporary fixing – a fixing that can be removed.

- Nuts and bolts are used to join thin materials like sheets or bars together that may need to be undone.

KS3 Technology Spine Standard Components, Fixings and Stock Forms



Hinges

Hinges are moveable joints which are often found in doors and boxes. They are normally made out of steel or brass. The part that moves is called the knuckle.

- Butt hinges are the most common, used in doors
- T-hinges are used for heavy objects like gates as they can support a larger weight
- Flush hinges are easy to fit and are usually used only for lightweight jobs

Questions

1. Identify three symptoms of food poisoning.
2. List three steps to take before you start practical work to ensure good hygiene.
3. When is it most important to wash your hands?
4. How are bacteria spread?
5. Explain why raw meat should be stored at the bottom of the fridge.
6. Explain why good personal hygiene reduces chances of food poisoning from food preparation.
7. State how you would use a food probe to check the temperature of food.



Quick Questions

1. What is the danger zone?
2. What is a high risk food?
3. Which coloured chopping board would you use to prepare vegetables?
4. Why is it important to use hot soapy water when washing up?
5. Identify two high-risk foods.
6. What temperature should meat, e.g. chicken and burgers, be cooked to?
7. Identify the conditions needed for bacteria growth?
8. Why do you need to keep raw and cooked foods apart?
9. Why is food safety important?
10. Why should a red chopping board and knife be washed quickly after cutting a chicken breast before using the area to prepare a salad?

Personal Hygiene

To reduce the risk of food poisoning, during food preparation, good personal hygiene is important:

- Wash hands in hot soapy water.
- Always tie long hair up.
- Always wear a clean apron.
- Jewellery should be removed.
- Always wash your hands thoroughly after handling raw meat.

Washing Up

To wash up safely and hygienically you must use:

- Hot water – **to kill bacteria and remove greasy residue on equipment.**
- Washing up liquid – **to help remove grease from equipment.**
- Scourer – **to remove any burnt on or stuck food from the equipment.**
- Dish Cloth – **to wipe down dirty work surfaces; this can be used damp to wipe down draining boards.**
- Tea towel – **to dry up clean equipment that has been placed upside down on the draining board.**
- Washing up brush – **to help clean dirty equipment.**

Food Storage

Foods need to be kept in the fridge (0-5°C) to help slow bacteria growth. These include foods with a "use by" date, cooked foods and ready-to eat foods, such as desserts and cooked meats.

Freezing (-19 to -25°C) stops bacteria growth but does not kill bacteria.

Dried and low risk foods can be stored in a cool dry place.

Food Poisoning

Bacteria are the main cause of food poisoning. The symptoms of food poisoning include **diarrhoea, stomach cramps, sickness and fever**. Food that is **contaminated** with bacteria often **doesn't look, taste or smell any different**, so it is hard to know they are there. Bacteria like **conditions where they can multiply quickly – these include a food, neutral pH, moisture, warmth and time**. When working with food, it is really easy to pass bacteria from raw food to work surfaces, equipment and your hands. Bacteria are then easily transferred onto other food – this is called **cross-contamination**.



KS3 Spine

Principles of Food Safety

Using a Food Probe

The temperature at the thickest part of the food, normally the middle, should be taken as food cooks from the outside in:

- Wipe the end with an anti-bacterial wipe.
- Turn on (temperature should read room temp. around 21°C).
- Place the end of the probe in the middle of the food as soon as possible and record the temperature. The meat should be cooked to a temperature of at least 75°C for 2 minutes.
- Turn off and clean the end of the probe.

Temperature Control

Bacteria grow more rapidly in foods at the right temperature. This is the '**danger zone**' (5-63°C). Foods should always be kept either below 5°C or above 63°C. Key temperatures to remember:

- Fridge should be 0-5°C.
- Freezer should be -19 to -25°C.
- Meat should be cooked above 75°C for 2 minutes.

High-risk foods

High-risk foods are moist and high in protein, allowing bacteria to grow quickly. They have a short shelf life, which means you can't keep them for long as the bacteria will multiply to dangerous levels. High-risk foods include:

- **Cooked meat and fish**
- **Gravy, stock, sauces and soup**
- **Shellfish**
- **Dairy products such as milk and cream**
- **Cooked rice.**

Chopping Boards

Use separate chopping boards for red meat, poultry, fish and vegetables to prevent cross-contamination of bacteria.

- **Red – raw meat**
- **Yellow – cooked meat**
- **Blue – raw fish**
- **Green – fruit and salad**
- **Brown – vegetables**
- **White – dairy and bakery**