Key Stage 3 Computing and ICT.

All knowledge organisers are hosted in the ICT and Computing department website which can be accessed directly via the link http://exmouthcollege.moodle.webanywhere.co.uk/

Year 8

Effective digital working practices Knowledge Organiser
Data representation Knowledge Organiser
Block structured programming Knowledge Organiser
Software Knowledge Organiser
Hardware Knowledge Organiser
Boolean logic Knowledge Organizer
Text based programming Knowledge Organiser
Computational thinking Knowledge Organiser
Spreadsheets Knowledge Organiser
Networks and website design Knowledge Organiser
Computer Graphics Knowledge Organiser

Year 8 Autumn 1

Unit 1 Number

Topic/Skill	Definition/Tips	Example
1. Integer	A **whole number** that can be positive, negative or zero.	$-3, 0, 92$
2. Decimal	A number with a **decimal point** in it. Can be positive or negative.	$3.7, 0.94, -24.07$
3. Negative Number	A number that is **less than zero**. Can be decimals.	$-8, -2.5$
4. Addition	To find the **total**, or **sum**, of two or more numbers. 'add', 'plus', 'sum'	$3 + 2 + 7 = 12$
5. Subtraction	To find the **difference** between two numbers. To find out how many are left when some are taken away. 'minus', 'take away', 'subtract'	$10 - 3 = 7$
6. Multiplication	Can be thought of as **repeated addition**. 'multiply', 'times', 'product'	$3 \times 6 = 6 + 6 + 6 = 18$
7. Division	Splitting into equal parts or groups. The process of calculating the **number of times one number is contained within another one**. 'divide', 'share'	$20 \div 4 = 5$ $\frac{20}{4} = 5$
8. Remainder	The amount '**left over**' after dividing one integer by another.	The remainder of $20 \div 6$ is 2, because 6 divides into 20 exactly 3 times, with 2 left over.
9. Multiple	The result of multiplying a number by an integer. The **times tables** of a number.	The first five multiples of 7 are: $7, 14, 21, 28, 35$
10. Factor	A number that **divides exactly** into another number without a remainder. It is useful to write factors in pairs	The factors of 18 are: $1, 2, 3, 6, 9, 18$ The factor pairs of 18 are: $1, 18$ $2, 9$ $3, 6$
11. Prime Number	A number with **exactly two factors**. A number that can only be divided by itself and one. The number **1 is not prime**, as it only has one factor, not two.	The first ten prime numbers are: $2, 3, 5, 7, 11, 13, 17, 19, 23, 29$

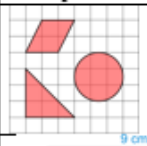
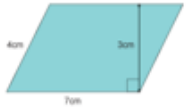
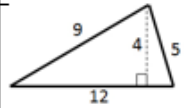
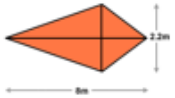
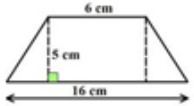
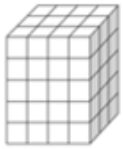
12. Prime Factor	A factor which is a prime number.	The prime factors of 18 are: 2, 3
13. Product of Prime Factors	Finding out which **prime numbers multiply** together to make the **original** number. Use a **prime factor tree.** Also known as 'prime factorisation'.	
14. Square Number	The number you get when you **multiply a number by itself**.	**1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225…** $9^2 = 9 \times 9 = 81$
15. Square Root	The **number you multiply by itself** to get another number. The reverse process of squaring a number.	$\sqrt{36} = 6$ because $6 \times 6 = 36$
16. Solutions to $x^2 = ...$	**Equations** involving **squares** have **two solutions**, one **positive** and one **negative**.	Solve $x^2 = 25$ $x = 5$ *or* $x = -5$ This can also be written as $x = \pm 5$
17. Cube Number	The number you get when you **multiply a number by itself and itself again**.	1, 8, 27, 64, 125… $2^3 = 2 \times 2 \times 2 = 8$
18. Cube Root	The **number you multiply by itself and itself again** to get another number. The reverse process of cubing a number.	$\sqrt[3]{125} = 5$ because $5 \times 5 \times 5 = 125$
19. Powers of…	The powers of a number are that **number raised to various powers**.	The powers of 3 are: $3^1 = 3$ $3^2 = 9$ $3^3 = 27$ $3^4 = 81$ etc.

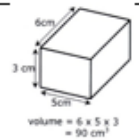
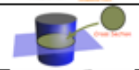
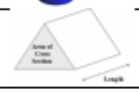
Try these

1 Work out
   a 14.7 + 2.63 − 1.5
   b 37.3 × 20
   c Find the cost of 3 shirts costing £8.99 each.
2 The temperature in a freezer should be −12°C.
   a During a power cut, the temperature in Bill's freezer went up by 15°C. What was the new temperature?
   b The temperature in Ahad's new freezer is 20°C. When he switched on the freezer, the temperature fell by 2°C per hour.
   How many hours did it take for the freezer to reach the correct temperature?
5 a Between which two whole numbers does $\sqrt{57}$ lie?
   b Between which two whole numbers does $\sqrt[3]{100}$ lie?
6 Bill changes his torch battery every 55 days. Asfa changes her supertorch battery every 30 days. One morning they both put new batteries in their torches. Use prime factors to find when they would next both change their batteries together, assuming they used their torches at the same rate.
9 Work out the difference between 6^3 and 14^2

Year 8 Autumn 1

Unit 2 Area and Volume

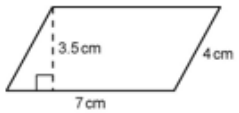
Topic/Skill	Definition/Tips	Example
1. Area	The amount of **space inside** a shape. Units include: mm^2, cm^2, m^2	
2. Area of a Rectangle	**Length x Width**	 $A = 36cm^2$
3. Area of a Parallelogram	**Base x Perpendicular Height** Not the slant height.	 $A = 21cm^2$
4. Area of a Triangle	**Base x Height ÷ 2**	 $A = 24cm^2$
5. Area of a Kite	Split in to **two triangles** and use the method above.	 $A = 8.8m^2$
6. Area of a Trapezium	$\frac{(a+b)}{2} \times h$ "Half the sum of the parallel side, times the height between them. That is how you calculate the area of a trapezium"	 $A = 55cm^2$
7. Compound Shape	A shape made up of a **combination of other known shapes** put together.	
8. Volume	Volume is a measure of the amount of space inside a solid shape. Units: mm^3, cm^3, m^3 etc.	

9. Volume of a Cube/Cuboid	$V = Length \times Width \times Height$ $V = L \times W \times H$ You can also use the Volume of a Prism formula for a cube/cuboid.	
10. Prism	A prism is a 3D shape whose **cross section is the same** throughout.	
11. Cross Section	The **cross section** is the **shape** that **continues** all the way **through the prism**.	
12. Volume of a Prism	$V = Area\ of\ Cross\ Section \times Length$ $V = A \times L$	

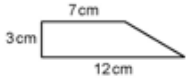
Try these

1 Find the area of
a the triangle

b the parallelogram

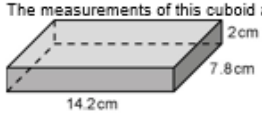


2 The measurements of this polygon are given in cm.



a Write the name of the shape.
c Work out its area using the formula for this shape.

3 The measurements of this cuboid are given in cm.

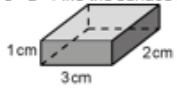


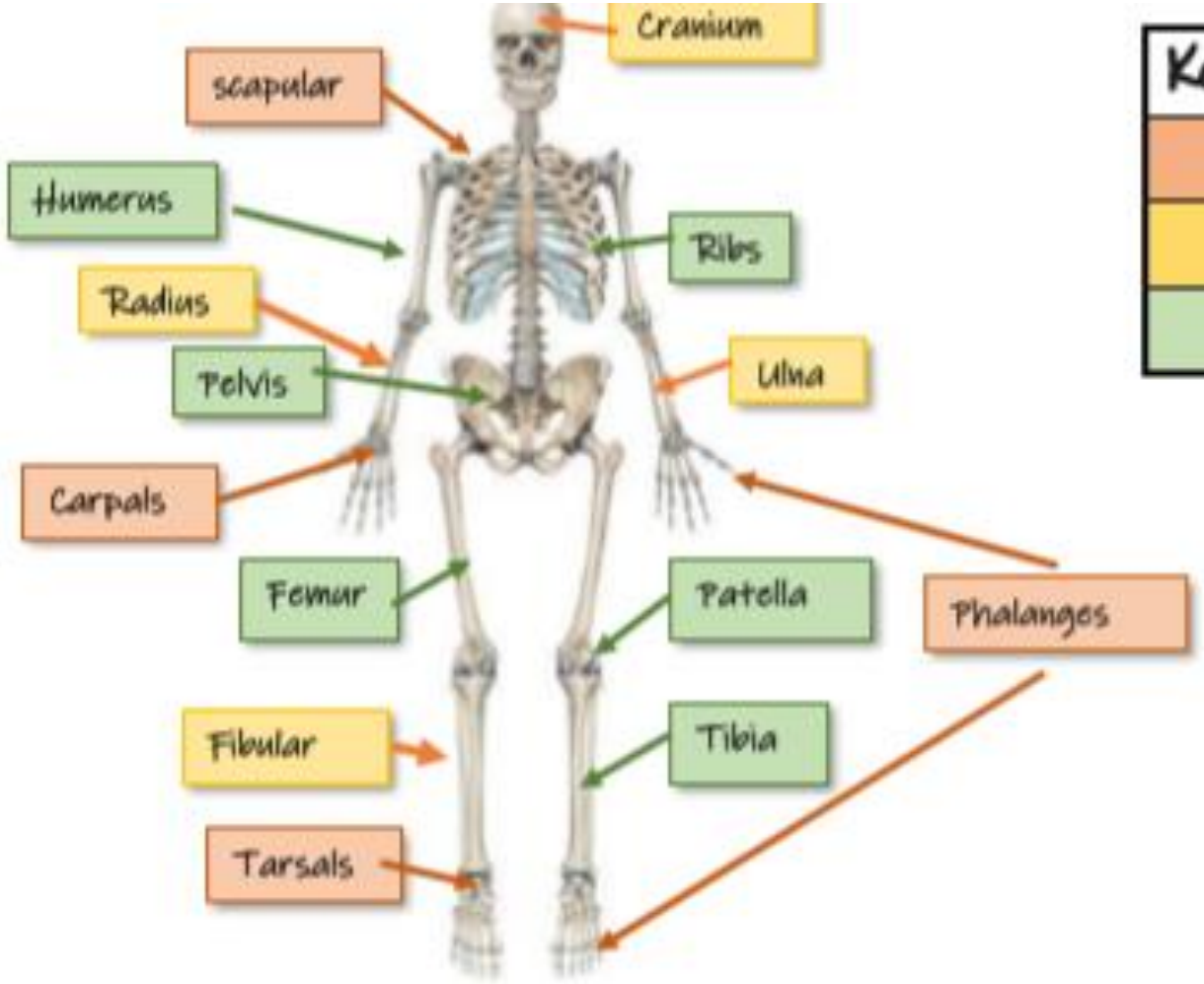
Find the volume of this shape. Make sure to include the units in your answer.

4 Complete the missing measurements.
a 3 m = ... cm
b 8500 m*l* = ... litres
c 4 tonnes = ... kg
d 2.4 litres = ... cm^3

5 The volume of a cube is 64 cm^3. Find the length of its edge.

8 a Find the surface area of the cuboid





Key	
	Advanced
	Secure
	Developing

		Examples
Long Bones	Femur, tibia, fibular, radius, ulnar, phalanges	Generates large, gross movements e.g. Running in netball
Short Bones	Carpals and tarsals	Generates small, fine movements putting in golf at the wrist.
Flat bones	Pelvis, cranium, scapular	Protect vital organs e.g. the cranium protects the brain when heading a football.
Agonist	When the muscle contacts and shortens	During flexion at the elbow the bicep contacts
Antagonist	When the muscle relaxes and contacts	During flexion at the elbow the triceps relax
HIIT	- Alternating between periods of short intense anaerobic exercise with less intense recovery periods	Sprinters Improves speed
Fartlek training	Swedish for 'speed play'. Periods of fast work with intermittent periods of slower work. Often used in running, i.e. sprint, jog, walk, jog, sprint, etc.	Games players that shift between aerobic and anaerobic energy systems. Improves cardio- vascular fitness & muscular endurance
Circuit training	A series of exercise stations (5-7) whereby periods of work are mixed with periods of rest.	Any games player that would like to improve any component of fitness or skills.
Continuous training	Involves working for a sustained period of time without rest.	Long distance runners Improves cardio- vascular fitness
Weight Training	The use of weights or resistance to cause adaptation to the muscles	Rugby players, weight lifters Improves strength, power and muscular endurance.
FIT	Frequency – how often you train	Training twice a week
	Intensity– how hard you train	Speed, level, intensity or weight
	Time – the length of the training session	Training for 45mins per session to 50mins
Aerobic	Respiration that takes place with oxygen	Long duration/low-moderate intensity e.g. Long-distance runner
Anaerobic	Respiration that takes place in the absence of oxygen.	Shot duration/high intensity e.g. a sprinter (100-400m)

Long term-effects of exercise

- Improves the cardiovascular system
- Lower resting HR (continuous training)
- Decreases fat stores
- Improves components of fitness e.g. flexibility, strength, muscular endurance.

Language for learning Physical Education

Year 7 (A01)

Movement Analysis
- **Muscles**
  - Position and location on the body
- **Types of actions/movements**
  - Definitions: Flexion, extension, abduction, adduction, Planta flexion & dorsi-flexion.
  - Linked to practical examples

Fitness & Training
- **Components of fitness**
  - Definitions: Muscular endurance, cardiovascular endurance, agility, reaction time, flexibility and coordination.
  - Linked to sporting examples

Cardio-respiratory
- **Short-term effects of exercise**
  - Linked to components of an effective warm-up.

Year 8 (A02)

Movement Analysis
- **Bones / Types of bones**
  - Position and location on the body
- **Antagonistic pairs**
  - Agonist and antagonist
- **Types of actions/movements**
  - Linked to practical examples (preparation, execution & follow through)

Fitness & Training
- **Components of fitness**
  - Relative of importance to a sports performer.
- **Methods of training / FITT**
  - Linked to component of fitness and specificity of a performer

Cardio-respiratory
- **Types of respiration**
  - Definitions: Aerobic (with O2) Anaerobic (without O2)
  - Link to practical examples
- **long-term effects of exercise**

Year 9 (A03)

Movement Analysis
- **Muscles & bones working together**
  - Actions and movements
  - Analysis linked to practical examples
- **Types of Muscle contractions**
  - Analysis- Isometric, isotonic: eccentric & concentric

Fitness & Training
- **Components of fitness**
  - Analysis & Evaluation
- **Methods of training / SPORT**
  - Comparing sports performers
  - Advantages and disadvantages

Cardio-respiratory
- **Types of respiration**
  - Calculations
  - Analysis to practical examples/ components of fitness
- **Short/ long-term effects of exercise**
  - Evaluate benefits to a performer

Year 8– PE / Language for Learning– HT1

Knowledge Organiser
8B Classification and Adaptation

KPI 1: Describe the factors effecting the abundance and distribution of organisms

Adaptation

- An animal must be able to find food, breed and navigate its way around its habitat if it is to survive.
- Every animal has evolved gradually over millions of years to become well suited, or adapted, to its habitat.
- These adaptations are specific to the environment of the animal and are essential for survival.
- Here are some examples:

Snow Leopard

- Big paws to evenly spread weight and help with walking through snow
- Thick fur for insulation

Siamang Gibbon

- Long arms and fingers for swinging through trees and gripping branches
- Forward facing eyes for judging distances

Bactrian Camel

- Fat stored in humps to convert to water
- Wide feet to even spread weight and prevent sinking into the sand

Humboldt Penguin

- Streamlined bodies to help with swimming
- Serrated beaks to help with catching and swallowing slippery fish

Key Terms	Definitions
Adaptation	Something which helps an organism to survive in their environment, e.g, humps for storing water
Habitat	The environment that an organism lives in
Competition	When animals or plants compete for limited resources
Intraspecific competition	Competition between individuals of the same species
Interspecific competition	Competition between individuals of different species

Competition

- Animals and plants have to compete for the limited resources available to them
- The animals that are best adapted will win and survive
- There are two types of competition
  - Interspecific – between individuals of different species
  - Intraspecific – between individuals of the same species

Competition in animals

- Animals compete for:

Food

Water

Space

Mates

Knowledge Organiser
8B Classification and Adaptation

KPI 1: Describe the factors effecting the abundance and distribution of organisms

Competition in plants

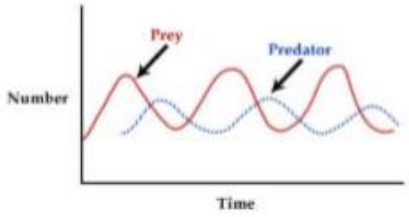
- Plants compete for:

Nutrients Water

Space Sunlight

Predator-prey relationships

- Numbers of predators and prey are interdependent on each other
- If the numbers of prey drop then the numbers of predators will also drop after a while



Key Terms	Definitions
Interdependent species	If the number of one species changes it will affect the numbers of the other species
Variation	Differences between living organisms of the same species
Continuous variation	Differences that can take any value, e.g. height
Discontinuous variation	Differences that can only take set values, e.g. blood groups
Inherited variation	Variation in an individual that is caused by genetics
Environmental variation	Variation in an individual that is caused by the environment

KPI 2: Explain how characteristics can be inherited by individuals

Causes of variation

- The differences between living things of the same species is known as variation.
- Variation can be caused by differences in genes (inherited variation) e.g. eye colour, or differences in the environment e.g. language.
- Some variation is caused by a mixture of both genes and environment (e.g. weight and height).

Types of variation

- Continuous variation is variation that can take any value (e.g. height or weight)
- Continuous variation should always be shown on a line graph
- Discontinuous variation is variation that can only take set values (e.g. shoe size or blood group)
- Discontinuous variation should always be shown on a bar chart

Exmouth Community College
Academy Trust

Knowledge Organiser: 8I Heat Transfers

Section 1: Key Words

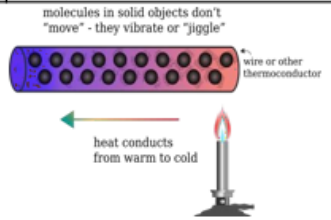
Thermal conductor	A material that will let heat flow through it
Thermal insulator	A material that will not let met flow through it
Conduction	The movement of heat (or electricity) through a substance. Heat is conducted due to particles vibrating and hitting each other
Convection	The transfer of heat through a liquid or gas (fluid) Convection occurs when particles with a lot of heat energy in a liquid or gas move and take the place of particles with less heat energy
Radiation	Heat can be transferred by infrared radiation, this is an electromagnetic wave and doesn't use particles
Temperature	Temperature is a measure of how hot something is
Heat	Heat is a measure of the thermal energy contained in an object
Thermal energy	Energy that is due to particles moving and results in an object having a temperature. It is transferred as heat

Section 2: Transferring Thermal Energy

	Temperature change	Direction of energy flow
Object hotter than surroundings	Temperature of object decrease until it is the same as the surroundings	Energy flows out of the object to the surroundings
Object colder than surroundings	Temperature of object increases until it is the same as the surroundings	Energy flows into the object to the surroundings
Object the same temperature of the surrounds	The object's temperature stays the same	The is no net flow of energy

Section 3: Conduction

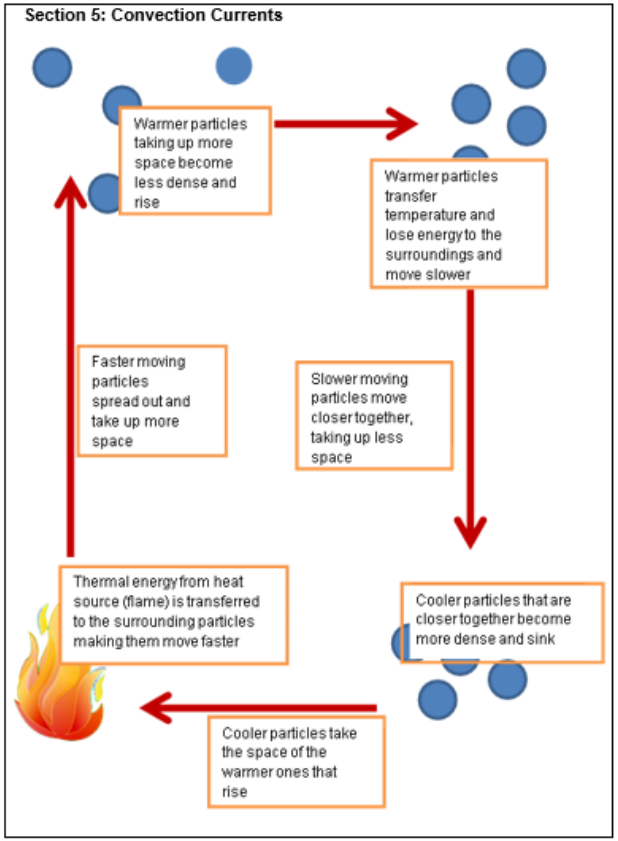
State of matter	Solids
Description	Heat moves from the hotter part of the object to the colder part
Explanation	Particles in the metal are packed closely together. As they are heated the particles gain kinetic energy and vibrate more. The particles that are vibrating collide with other particles and start to make them vibrate. This passes the kinetic energy from the heated particles to the cooler particles causing them to heat up too.



Section 4: Convection

State of matter	Liquids and Gases
Description	Particles with lots of heat energy in a liquid or gas move and take the place of particles with a lot of energy. Heat energy is transferred from hot places to cooler places by convection
Explanation	Liquids and gases expand when they are heated. This happens because the particles in the liquid or gas moves faster when they are heated. This causes the particles to take up more space as the gaps between particles gets bigger. The liquid or gas in hot areas is less dense than the liquid or gas in the cold areas, so it rises into the cold areas. The denser cold liquid or gas falls into the warm areas. In this way, convection currents form that transfer heat from one place to another

Section 5: Convection Currents



Section 6: Radiation

State of matter	n/a
Description	A type of electromagnetic radiation called infrared radiation.
Explanation	Infrared radiation involves waves instead of particles. As such it can travel through a vacuum e.g. space. The hotter an object is, the more infrared radiation it emits.

Section 7: Reflection and absorption of heat by radiation

colour	finish	ability to emit thermal radiation	ability to absorb thermal radiation
dark	dull or matt	good	good
light	shiny	poor	poor

Light, shiny surfaces are also good reflectors of infrared radiation

Section 8: Comparing conduction, convection and radiation

	Conduction	Convection	Radiation
Particles	Y	Y	N
Solids	Y	N	Y
Liquids	N	Y	Y
Gases	N	Y	Y
Particles move far part	N	Y	n/a
Particles vibrate on the spot	Y	N	n/a
Particles rise and fall to transfer energy	N	Y	n/a
Particles hit each other to transfer energy	Y	N	n/a

Section 9: Types of thermal insulation

Appliance/feature	Description
Boiler	This has a large surface area to allow for large amounts of heat energy to be transferred to its surrounding through convection
Radiator	This is specially designed to have a heating element at the bottom. Convection currents heat all the water in it
Double Glazing	Windows and doors with 2 planes of glass with air trapped between them (or a vacuum between them). Air is a poor conductor and there is no convection because the air is trapped and cannot for convection currents
Loft Insulation	A thick layer of the loft floor. It works because it's a poor conduction and traps air, stopping convection
Floor Insulation	An insulation layer under the floor. Prevents heat loss because it is a poor conductor
Draught excluders	Brushes and seals on doors. Prevents warm air escaping from the home
Cavity wall insulation	Insulation place in the cavity of the walls. It works because it traps air which is a poor conductor. However, energy could still be lost due to convection so a insulating material is injected into the gap to create pockets of air and prevent convection currents forming

Year 8– Science / Heat Transfers– HT1

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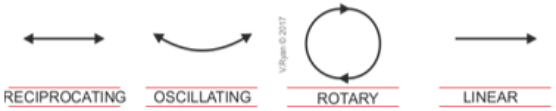
Year 8 Cardboard Automata Knowledge Organiser

Types of Motion

There are four types of motion: LINEAR, ROTARY, OSCILLATING and RECIPROCATING



Mechanisms

A mechanism (noun) is a **tool** to control movement to fulfil a **purpose**.

Mechanisms have certain things in common:

- They involve some kind of **motion**.
- They involve some kind of **force**.
- They must have some kind of **input** to make them work.
- They produce some kind of **output**.

First order (simple) mechanisms are: wedges, levers, wheels, screw threads and inclined planes.

Second order (more complex) mechanisms are: gears, pulleys, linkages, cams

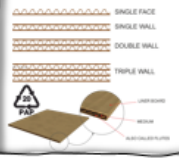
input → Process → output

Cardboard

orrugated card is ***also called corrugated fibreboard*** or ***combined board***. It is manufactured in a ***range of thicknesses***. Corrugated board is **manufactured from** a type of heavy paper called '***containerboard***'.

The flat **outer surface** is called the ***liner board*** and the **triangulated structure** between the liner boards is called ***the medium (sometimes referred to as the flutes)***.

Corrugated cardboard can be ***recycled***.



Context, Brief and Specification

These are all vital to establish at the start of the designing process.

Design context: The context is the general situation where there is a problem such as 'encouraging people to engage with nature'.

The brief is then written to identify the client, some of their needs and possible constraints such as cost, materials, time, safety.

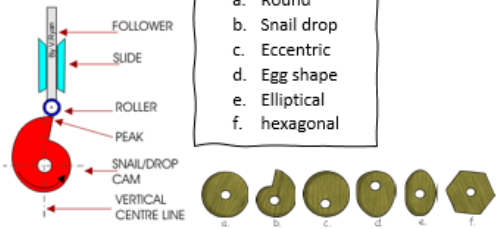
Product Analysis: To **inform** your design you need to **analyse products** that already exist. This helps you see how other designers have solved problems, and perhaps missed better solutions.

ACCESSFM is used for product analysis. Aesthetics, Cost, Client, Environment, Safety, Size, Function and Materials

Design specification: is a list of criteria/standards your product needs to address. It clearly identifies what the client needs and wants from the product and should be detailed enough that a designer could read it and design a suitable product.

CAMS and followers

Cams can be made out of metal, plastic, cardboard, foam sheets or wood. There are different shaped cams. These create different movements.



a. Round
b. Snail drop
c. Eccentric
d. Egg shape
e. Elliptical
f. hexagonal

DWELL: When the **cam** rotates but the follower does not rise or fall.

Sustainable Design

Sustainable design refers to the design process that integrates an environmentally friendly approach and considers nature resources as part of the design. Central to the concept are the 6 R's:

Re-Cycle, Reduce, Rethink,

Reuse, Repair, REFUSE

Other KEYWORDS

Iterative design involves making a model of the design, which is then tested and evaluated. A new improved model is then made, and the process is repeated until you have a suitable idea that meets all the client's needs.

Client: also known as the user, the person or persons who will buy/use the product.

Primary research: first hand, gathered direct from the client.

Secondary research: comes from second hand sources such as the internet.

Year 8– Design & Technology / Cardboard Automata – HT1

Exmouth Community College
Academy Trust

Year 8 Food Preparation and Nutrition Block 1: Knowledge Organizer

Why do we eat food?

The snacks, meals and drinks that you eat make up your **diet**.
Your diet should include a variety of foods to make sure you get all the nutrients you need to stay healthy.
No single food can supply all the nutrients you need.
The **Eatwell Guide** shows how eating different foods can make a **healthy** and **balanced diet**

The body needs food for:
- growth and repair of cells
- energy and warmth
- protection from illnesses and to keep the body working properly.

The materials found in food are called nutrients.
Each nutrient has a function:
Protein is needed for growth and repair of cells.
Fat is needed for warmth and energy.
Carbohydrate is needed for energy.
Vitamins and **minerals** are needed for protection from illness and to keep the body working properly.

Nutrient	Function	Sources
Protein	Growth and repair Secondary source of energy	Meat, fish, milk, eggs, cheese, lentils, soya, nuts, wheat, beans and peas
Carbohydrate Starch & sugar	Energy	Potatoes, pasta rice. Sugar, honey, jam
Fat	Protection and insulation (warmth) Energy	Butter, cheese, oily fish, meat
Vitamin A	Helps the eyes see in dim light Healthy skin and tissue	Liver, eggs, butter, soft spreads, orange and yellow vegetables e.g. carrots & apricots
Vitamin B	Transfer and release of energy Formation of red blood cells	Cereals, meat, fish, eggs, dairy products, pulses, yeast products.
Vitamin C	Healthy skin Helps the body heal faster and helps resist infection Absorption of iron	Fruits and vegetables e.g. oranges, lemons, blackcurrants
Vitamin D	Growth and maintenance of strong bones Absorption of calcium	Made by the body when skin is exposed to sunlight Oily fish & eggs
Iron	Formation of red blood cells which carry oxygen around the body	Red meat, dark green vegetables, eggs, chocolate, dried fruit, wholegrain cereals
Calcium	Healthy bones and teeth Healthy muscles and nerves	Dairy foods (milk, cheese, yoghurt) white bread, canned fish, green leafy vegetables

More facts about carbohydrates

Nutrient		Food source	Main functions
Carbohydrate	Starch	Potatoes Rice Pasta Bread	Starch provides slow-release energy
	Sugar	Sugars and syrups, honey, fruit juice	Sugar provides fast-release energy
	Fibre	Wholegrain cereals Fruit and vegetables	Fibre keeps the digestive system healthy

Why do we need energy?
We need energy for breathing, keeping our organs working, digesting food, and activities such as walking ,running and even sitting down.
The amount of energy we need depends upon our age, gender, activity level, our health and our body size.

What is BMR?
Basal metabolic rate (BMR) is the rate at which a person uses energy when they are resting.
What is energy balance?
If we eat the right amount of food for our energy needs, then our body weight is maintained. Energy in = energy out
If we eat more energy than we need, then we put on weight. Energy in is greater than energy out.

Food Commodities
Primary processing means changing the raw food material into a food that can be either eaten immediately or processed into other types of foo products. During the primary processing of wheat it is usually ground down to make flour by the process of **milling**. Flour can then be used to make bread and pasta.

Year 8– Design & Technology / Food Preparation & Nutrition– HT1

Click on the images to find hidden content!

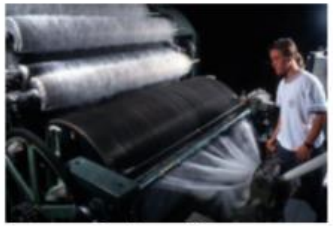
How are Fabrics Made?

Fabrics are made up of different types of fibres. Fibres can come from nature, like cotton from the cotton plant, or wool from sheep and they can also be synthetic (man-made) and be made from chemicals. Fibres often look like hair and they can be processed in different ways to make fabric. How they are processed affects the properties of the fabric, as does the fibre you start with.

There are three main ways to make fabric- Weaving, Knitting and Felting or Bonding.

Woven Fabric

When fibres are collected from nature, they need to be cleaned before they can be turned into fabric, they also are often carded (combed) to remove any debris and help the fibres lay in the same direction. Imagine a sheep's fleece- that needs cleaning and carding before the next stage of the process can begin.

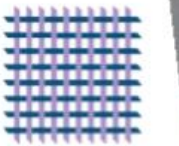


Carding machine

This giant machine spins all the fibres into yarn, ready for weaving.

Once the fibres are clean and ready to use, they are twisted together- this is called spinning. Lots of fibres are spun together making one long strand. The thickness of the strand varies, depending on how you want finished fabric to turn out.

The spun fibres are then woven together on something called a loom. There are lots of different types of weaves and they give a different end result. You might be most familiar one called a plain weave, this is used for fabric that could be made into school shirts, dresses and bedding. If you look very carefully at your school shirt, you might be able to see the different strands woven together. A Twill weave is used to make Denim fabric, which will be used to make Jeans.



Plain weave

Twill weave

Weaving can also be done by hand, this is usually for special fabric, perhaps even using silk.

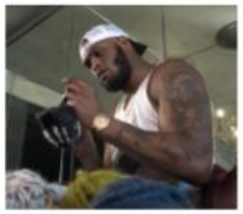
How are Fabrics Made?

Knitted Fabric

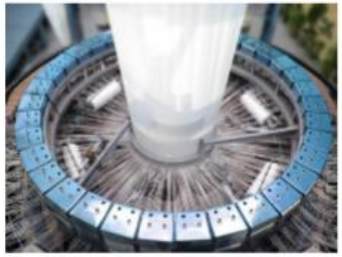
When you think of knitted fabric, you might think of what your grandparents or parents or even you do with knitting needles. Essentially, it is the same process for making knitted fabrics, but on a much larger scale, and using machinery.

Just the same as when making woven fabric, the fibres need cleaning and carding and then spinning before they can be knitted.

After that, the yarn is knitted into either rolls of flat fabric, or sometimes tubes of fabric or even whole garments such as tights or socks.



Heavy weight fighter Maurice Greene started knitting before a fight to calm him down. He's recently moved onto crochet.



This is a type of loom that is making knitted fabric that is in the shape of a tube. This could be used to make the body of a t-shirt, the arms and neck hole would be attached separately.

This is a picture of what knitted fabric would look like if you looked at it very closely. You can see the yarn is looped together. This makes knitted fabric stretchy so it's great for making into things like T-shirts and sportswear.

'Weft' knit

'Warp' knit

So it's not just woolly jumpers that are knitted, but also leggings, swim suits, underwear, socks and any other Textiles items that are stretchy, are likely to be made from knitted fabric.

How are Fabrics Made?

Felted and Bonded Fabric

Felted fabric is made directly from the fibres. No spinning is needed, although the fibres are still washed and carded. Wool is one of the best natural fibres to create felted fabric, because each fibre has a scaly structure that looks a bit like a fir-cone. When the fibres are heated up, the scales open up and then lock together with other fibres when they are agitated (rubbed together).

Wool fibre under a microscope

Felt fabric does not stretch, and can be very warm because of the way it is made. Felt does not fray like woven fabric, or unravel or ladder like knitted fabric but it doesn't drape very well so tends to be used for items like hats, bags and coats.

You may have heard of Needle Felting and Wet Felting. These are both crafts that can be done at home to create a variety of different items. Felting is also done on an industrial scale, and felt can be shaped as it's being made- like into the shape of a hat!

Bonded fabrics are also made directly from fibres, rather than yarn. The fibres are laid out in a random pattern, and then bonded together using heat or glue.

These fabrics tend to be very weak, but they don't stretch or fray. They are used for disposable items like J-cloths, surgical gowns and wet wipes.

Q What would be the best method of making fabric for a school bag? Explain why.

Q Why are fibres 'carded' before being spun into yarn?

Q What is the name for the machine that is used to make yarn into fabric?

Click on the images to find hidden content!

Natural Fibres

Textiles are usually made up of fibres. Fibres can come from all sorts of places like plants, animals, insects and even synthetic (man-made) fibres that come from chemicals. Fibres often look like hairs and can be processed in different ways to make Textiles, also called fabric.

Wool

Wool is a fibre that comes from animals. We mostly get wool from sheep, but you can also get wool from camels, alpacas, llamas, goats and even rabbits! It's possible to make wool from anything that is hairy- you could even make wool fabric from a dog!

Angora rabbit

Before and after shearing!

The wool is sheared from the animal (like having a haircut) and then it's washed, combed and processed to turn it into wool fabric. Wool fabric is warm so it's good for making into things like jumpers, scarves and coats. It's also used to make carpets and insulation to keep your house warm. Wool is absorbent and it can also shrink easily so you have to be careful when you wash it.



Cotton

Cotton Boll

Cotton is a fibre that comes from the cotton plant. The plant grows in warm climates and needs lots of water. After the plant has flowered, it produces a 'boll' which contains the seeds of the plant. In nature, these would be blown around by the wind and the seeds would disperse and grow new plants. Instead, we farm the plants and pick the cotton 'bolls', process them and turn them into cotton fabric.

Cotton feels cool to wear when it's hot, but it can crease easily. It can be quite hard wearing so can be washed easily and can last a long time. Cotton is also absorbent so it's good for making things like towels. Other items made from cotton include bedding, t-shirts, socks and underwear, trousers and school shirts. Cotton is cool to wear so it is used for a lot of clothing.

Field of Cotton plants




Silk

Silk comes from the cocoon of a silk worm. The silk worm (which is actually a caterpillar) spins a cocoon of silk around itself when it is ready to turn into a moth. People farm the silk worms, just like people farm sheep and when they make their cocoons it can take them up to 8 days! The farmers then put them in hot water to release the glue that holds the silk fibres together. Then the silk fibres are processed to turn them into silk fabric.

Silk Worm

Silk Worm Cocoon

As each cocoon is very small, silk fabric is very expensive as it takes so much effort to make just one item – it takes around 1,800 cocoons to make one silk dress! Silk is quite a delicate fabric and can be easily damaged when it's wet (eg washing). Silk is often used for special items like wedding dresses, or special occasion shirts or ties but some people have silk underwear! Silk keeps you cool when it's hot, and also keeps you warm when it's cold. It has a natural 'lustre' or shine.

Linen

Flax plant

Linen comes from a plant called the Flax plant. The stem of the plant is used to make fibres. The plants are cut, then the stems are soaked in water to get rid of the soft parts. That leaves the tough fibres behind which are then processed to turn them into linen fabric.

Linen is great for summer clothes because it's very cool to wear. Linen is hardwearing so lasts for a long time but creases very easily. Apart from summer clothes, it can also be used to make tea towels and table cloths among other things.

Flax plant drying after cutting

Q What type of fibre do you think would make a good T-shirt? Can you give reasons why?

Q Why do you think cotton is a good fibre to make summer socks?

Q What fibre would be good to make a blanket from? Why would it work well?