Name   TG

Year 11

Knowledge Organisers

Term 3 - 2025

4:1 Production Processes

Production is:
the process of turning raw materials into saleable products and services

Job production
Making products individually
Batch production
Making one type of product then switching to make a different product
Flow production
The production of one product on a continuous assembly line
Automation
Production involving machinery not controlled by a person

Job production

Advantages	Disadvantages
▪ Products are usually high-quality ▪ Products can be made to meet the needs of individual customers ▪ Workers often get more satisfaction	▪ Costs of production will be high ▪ Labour costs may be high because job production often requires skilled labour

Technology is being used more and more in the production of goods and services.

Technological development is making it possible for technology to perform skilled work and reducing the need for human resources

Batch production

Advantages	Disadvantages
▪ The needs of different customers can be met by making batches of different goods ▪ Batches are made to meet specific orders from customers ▪ It may be possible to use specialist machines to automate production	▪ It takes time to switch production from one batch to another - costly ▪ May have to keep stock of raw materials to be able to switch production ▪ Less choice of products for customers ▪ Tasks are repetitive for workers

Flow production

Advantages	Disadvantages
▪ Large amounts can be made ▪ Costs of production for each unit is low ▪ Machinery can be used, helping to recue costs ▪ Technology can be used to change the products slightly to more are available for customers to choose from	▪ Goods are mass-produced so quality may be low ▪ Expensive to set up a production line ▪ Large stocks of materials need to be kept which can be expensive ▪ If production stops at any point then production stops everywhere ▪ Jobs can be repetitive and boring

4:2 Quality of Goods and Services

Quality is:
about a product being fit for purpose and working in a way that it is supposed to

Quality control
A system for inspecting the quality of goods and services
Quality assurance
An approach that involves the whole business focusing on quality
Returns
Goods which customers take back to the shop because of problems
Recalls
The business asks for products to be returned because of faults

Importance of providing quality products

It avoids waste
If goods are not of a good quality they may not be able to be sold and so the producer has wasted money

It avoids recalls
If unsatisfactory products are made and sold they will then have to be recalled and the issue resolved at a cost to the manufacturer

Reputation and sales
Customers will not be happy with poor quality products and may shop elsewhere in the future

Disrupted production
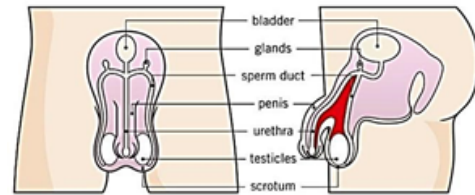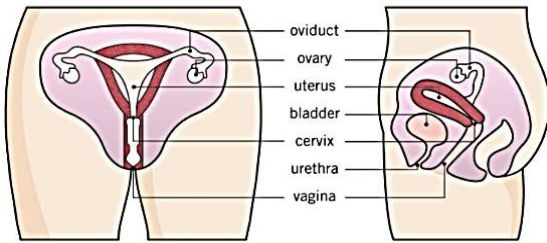Production may be disrupted if quality is poor from the start

4:3 The Sales Process and Customer Service

Businesses are able to use a range of selling methods. E-commerce:

Pros to the business
Can sell worldwide
Open 24/7
Professional look at little cost
Lower operating costs

Cons to the business
Worldwide competition
Problems with delivering and returning goods
Online security issues
Technology advances rapidly

Pros to the customer
Price comparison available
24/7 availability
Wider range of products

Cons to the customer
Lack of personal contact
Problems returning goods
Only image of goods seen
Security
Cannot pay with cash

E-commerce
Bringing together the buyer and seller electronically
Customer service
What a business does to keep customers happy
Face-to-face selling
Usually completed in a shop where there is direct contact between buyer and seller
Telesales
Sales completed over the telephone
After-sales service
Any help and advice given to customers after they have bought a product

Year 11 Child development

(female reproductive system diagram – labels: oviduct, ovary, uterus, bladder, cervix, urethra, vagina)

(male reproductive system diagram – labels: bladder, glands, sperm duct, penis, urethra, testicles, scrotum)

Part	Function
Glands	Produce nutrients for sperm (release semen).
Sperm duct	Tube that carries sperm from the testicles to the penis.
Penis	Carries sperm or urine out of the male's body. It swells with blood and stiffen (erection).
Urethra	Tube that carries urine or sperm out of the body.
Testicles / testes	Where sperm and testosterone are produced.
Scrotum	Skin that contains the testes.

Part	Function
Oviduct	(fallopian tubes) carry an egg to the uterus.
Ovaries	Contains egg cells.
Uterus	(womb) where the baby develops.
Cervix	Ring of muscle at the entrance to the uterus. Keeps the baby in place.
Vagina	Receives sperm during sexual intercourse. Where the male's penis enters the female body.

day 1.

MENSTRUAL CYCLE
- **The cycle is 28 days and is controlled by hormones.**
- **Ovulation occurs on day 14.**
- **A woman does not have periods during pregnancy.**

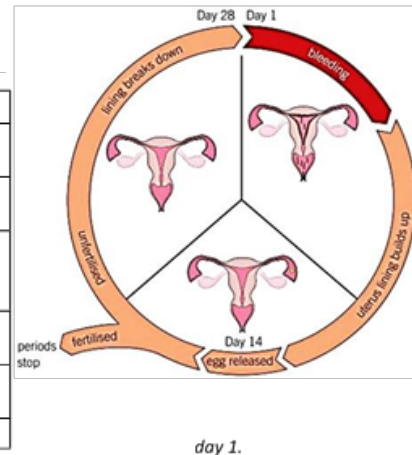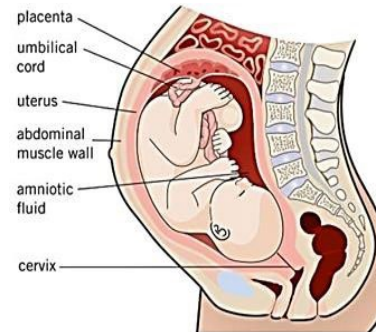| KEYWORD	DEFINITION
Amniotic fluid	Liquid that surrounds and protects the fetus (shock absorber).
Embryo	A ball of cells that forms when the fertilised egg divides.
Fertilisation	Joining of a nucleus from a male and female sex cell.
Fetus	The developing baby during pregnancy (from 8 weeks after fertilisation).
Menstrual cycle/ period	The monthly cycle during which the uterus lining thickens and breaks down.
Menstruation	Loss of the lining of the uterus during the menstrual cycle.
Ovulation	Release of an egg cell during the menstrual cycle.
Placenta	The organ that allows transfer of nutrients and waste products between mother and fetus.
Reproductive system	All the male and female organs involved in reproduction. The organ systems that produce sperm and egg, also where the fetus develops.
Sex hormones	Hormones that are involved in the reproductive system (e.g. testosterone and oestrogen)
Sperm cells	Male sex cell
Umbilical cord	Connects fetus to placenta.

Why do some couples have difficulty getting pregnant?
- Low sperm count / sperm cannot swim properly
- Egg cells are not released monthly / blocked oviduct.

How do sperm cells reach the egg cell?
Sperm swims from vagina, through the cervix, into the uterus. Many will die. If it meets an egg, fertilisation can occur. The embryo is then implanted into the uterus lining.

Where does a baby grow?
The blood of the mother and fetus flow closely inside the placenta. Oxygen and nutrients diffuse from the mother to the fetus. Waste substances (carbon dioxide) diffuse from the fetus to the mother.

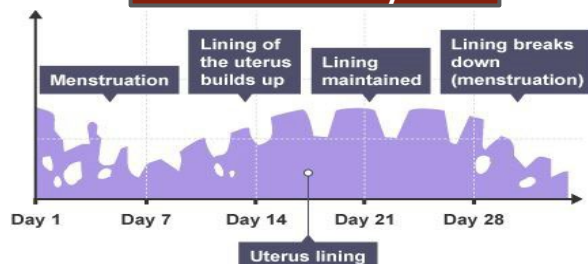(pregnancy diagram – labels: placenta, umbilical cord, uterus, abdominal muscle wall, amniotic fluid, cervix)

5 Preconception health considerations for parents:

- Parental age
- Healthy weight
- Smoking/alcohol/recreational drugs

Mother only:
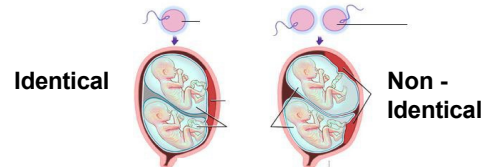- Folic acid
- Up to date immunisations.

The menstrual cycle

Menstruation | Lining of the uterus builds up | Lining maintained | Lining breaks down (menstruation)

Day 1 | Day 7 | Day 14 | Day 21 | Day 28

Uterus lining

The female reproductive system includes a cycle of events called the **menstrual cycle**. It lasts about 28 days, but it can be slightly less or more than this

Twin Pregnancy Types

Identical | Non - Identical

Identical	1 sperm, 1 egg. Egg splits. 1 placenta
Non - Identical	2 sperm, 2 egg. 2 placenta

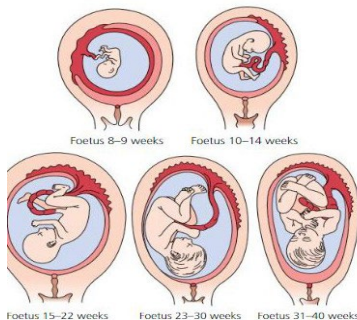| Key Words	Definitions
Ovulation	Mature egg cell (ovum) is released from the ovary
Fertilisation /conception	Sperm penetrates an egg and fuse into one cell.
Implantation	Fertilised egg burrows into lining of uterus
Barrier Method	Contraception methods which prevents live sperm from reaching an egg (ovum).
Hormonal Method	Contraception methods that prevent eggs from being released from the ovaries, thicken cervical mucus to prevent sperm entering the uterus and thins the lining of the uterus to prevent implantation.

Development of a baby

1. **Blastocyst - Fertilisation to implantation**
2. **Embryo - implantation to week 8**
3. **Foetus - Week 8 - birth**

Foetus 8–9 weeks | Foetus 10–14 weeks

Foetus 15–22 weeks | Foetus 23–30 weeks | Foetus 31–40 weeks

| Placenta	Produces hormones, provides nutrients and oxygen, filters waste, separates mother and babies blood
Amniotic Fluid	Protects, maintains temperature, helps muscles development, lubricates to prevent toe/finger webbing.
Umbilical cord	Transfers oxygen, nutrients (to baby) and waste (away from baby)

Umbilical cord

Placenta

Amniotic fluid
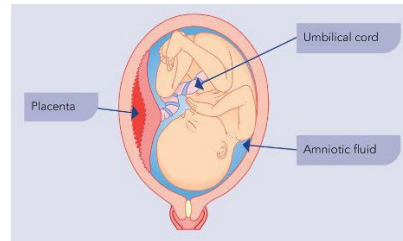
Signs and symptoms of pregnancy

- **Missing Period**
- **Breast changes**
- **Passes urine more frequently**
- **Tiredness**
- **Nausea**
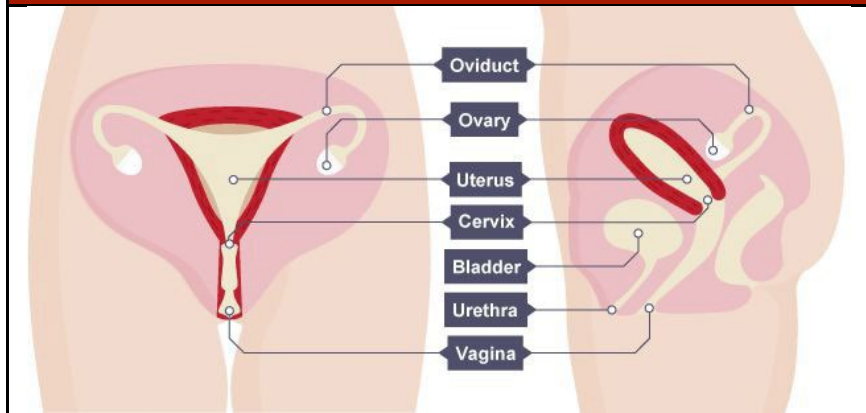
Ovary : Stores eggs /produces the hormones/controls the menstrual cycle

Fallopian tube: Connects ovaries → uterus, lined with cilia that move egg down the tube to meet the sperm

Uterus: where the egg is implanted, where the embryo/foetus grows and develops. Lining is called the endometrium.

Cervix: Strong ring of muscle between the uterus and vagina, keeps the baby in place, dilates during labour to let the baby out.

Vagina: MUSCULAR TUBE Connecting the cervix to the outside the body. Where the penis enters during sex
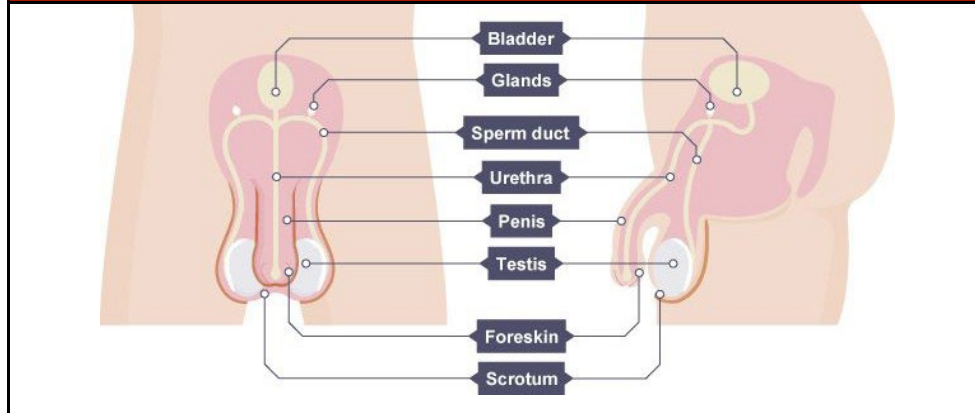
Scrotum & Testes	The scrotum is the bag of skin that contains 2 testes. Testes make millions of sperm. They also produce hormones including testosterone.
Sperm duct system	The sperm duct system consists of the epididymis, which contains/stores sperm, and the vas deferens.
Urethra	Tube inside penis that carries urine and semen (not both at same time).
Penis	Consists of the shaft and tip, which has a small opening. Through this opening sperm and urine leave the body (separately) via the urethra.
Vas deferens	This is a muscular tube which extends upwards from the testicles, transferring sperm that contain semen to the urethra.

	How it works	Pros	Cons
Contraceptive Implant 99% effective	Small plastic rod placed under the skin in upper arm. Releases progestogen lasts for 3 years.	Doesn't interrupt sex Option if you can't use oestrogen-based contraception, Safe to use while you're breastfeeding Fertility will return to normal as soon as it is removed May reduce heavy/painful periods	Temporary side effects; headaches, nausea, breast tenderness, mood swings Periods may be irregular / stop altogether May get acne or your acne might get worse Need a procedure by GP or nurse to have it fitted and removed Doesn't protect against sexually transmitted infections (STIs)
Contraceptive Patch	Hormones released through the skin into the bloodstream to prevent ovulation. Same hormones as the combined pill and works in the same way. Thickens the cervical mucus (prevents sperm entering uterus). Thins the lining of the womb (prevents fertilised egg implanting).	Easy to use, doesn't interrupt sex, don't have to take a pill every day, you only have to remember to change it weekly. Works if you're sick (vomit) or have diarrhoea because the hormones aren't absorbed by the stomach. Can make your periods more regular, lighter and less painful Can help with premenstrual symptoms May reduce the risk of ovarian, womb and bowel cancer, fibroids, ovarian cysts and non-cancerous breast disease	it may be visible, it can cause skin irritation, itching and soreness doesn't protect against STIs, so may need to use condoms too Can get temporary side effects to start with such as; headaches, sickness (nausea), breast tenderness and mood changes. Bleeding between periods (breakthrough bleeding) and spotting (very light, irregular bleeding) is common in the first few cycles of using the patch some medicines can make the patch less effective. You need to remember to change it every week
Emergency contraceptive pill	Taking it is thought to stop or delay the release of an egg (ovulation).	Can be taken up to 3 days after sexual intercourse.	But it can cause: headaches, tummy pain, changes to your next period – it can be earlier, later or more painful than usual, feeling or being sick
Contraceptive pills	**Combined pill** – contains oestrogen and progesterone (progestogen). Stops egg being released, Thickens the cervical mucus (prevents sperm entering uterus). Thins the lining of the womb (prevents fertilised egg implanting). **Progestogen-only** – Thickens the cervical mucus. Thins the lining of the womb	Does not interrupt sex Usually makes bleeds regular, lighter and less painful Reduces risk of cancer of the ovaries, womb and colon Can reduce symptoms of PMS (premenstrual syndrome) Can sometimes reduce acne May protect against pelvic inflammatory disease May reduce the risk of fibroids, ovarian cysts and non-cancerous breast disease	Temporary side effects at first; headaches, nausea, breast tenderness and mood swings. Can increase blood pressure Does not protect against STI's Has been linked to an increased risk of some serious health conditions, such as blood clots and breast cancer
IUD/IUS	Prevents the sperm or egg from surviving in the womb or fallopian tubes. IUS - releases hormones	Protects for 5 or 10 years, depending on the type. Works straight away. Does not interrupt sex. No hormonal side effects, (acne, headaches,	Your periods may become heavier, longer or more painful, though this may improve after a few months. It does not protect against STIs, so you may need to use

	IUD - releases copper which kills the sperm and egg.	breast tenderness). Safe to use if breastfeeding. Not affected by other medicines, fertility returns as soon as the IUD is removed No evidence it affects your weight or increase the risk of cervical cancer, cancer of the uterus or ovarian cancer.	condoms as well. If you get an infection when you have an IUD fitted, it could lead to a pelvic infection if not treated. Most women who stop using an IUD do so because of vaginal bleeding and pain, although these side effects are uncommon.
Contraceptive Injection 99% effective	Contains progestogen which thickens the cervical mucus (prevents sperm entering uterus). Thins the lining of the womb (prevents fertilised egg implanting). Can prevent the release of an egg each month (ovulation)	Lasts for either 8 or 13 weeks Option if you can't use oestrogen-based contraception Don't need to remember to take a pill every day, Does not interrupt sex Safe whilst breastfeeding, Not affected by other medicines May reduce heavy/painful periods, premenstrual symptoms	Periods may become irregular, heavier, shorter, lighter or stop altogether – this can carry on for months after you stop the injections Doesn't protect against sexually transmitted infections (STIs) Can take up to 1 year for periods return to normal/fertility returns May experience side effects like headaches, acne, hair loss, decreased sex drive and mood swings, weight increase
Male condom	'Barrier' method of contraception. Designed to stop sperm meeting an egg, protect both partners from STI's, made from very thin latex (rubber).	Used correctly, they are 98% effective Only used during sex, no advance preparation (other than obtaining them), suitable for unplanned sex. Usually no side effects. Easy to obtain	Can interrupt sex, May split or tear if not used properly. - Some people may be allergic to latex, plastic or spermicides, (you can get latex free condoms)
Female Condom	Female condoms are made from soft, thin synthetic latex or latex. Worn inside the vagina to prevent semen getting to the womb	Can interrupt sex, only used during sex, no advance preparation other than obtaining them. Suitable for unplanned sex, usually no side effects.	May split or tear if not used properly, they are not as widely available as male condoms and can be more expensive.
Diaphragm / cap	Barrier method of contraception, it fits inside your vagina to prevent semen getting to the womb. You need to use it with gel that kills sperm (spermicide)	Only need to use when having sex, sex but can put it in at a convenient time before having sex (use extra spermicide if you have it in for more than 3hrs). no serious health risks or side effects, female in control of contraception.	Only 92-96% effective depending on if using correctly Doesn't provide reliable protection against STIs, can take time to learn how to use it, can cause cystitis (bladder infection), latex and spermicide can irritate some women and their sexual partners.

lammability

Key content
Comparing secondary storage

Capacity The amount of space that is available to store files. Generally measured in GB.
Speed How quickly a computer can read and write data from a storage device.
Portability
How easy a device is to be transported. Some devices may be permanent hardware, others may be easier to transport.
Durability Will the device withstand a certain amount of damage without corrupting files?
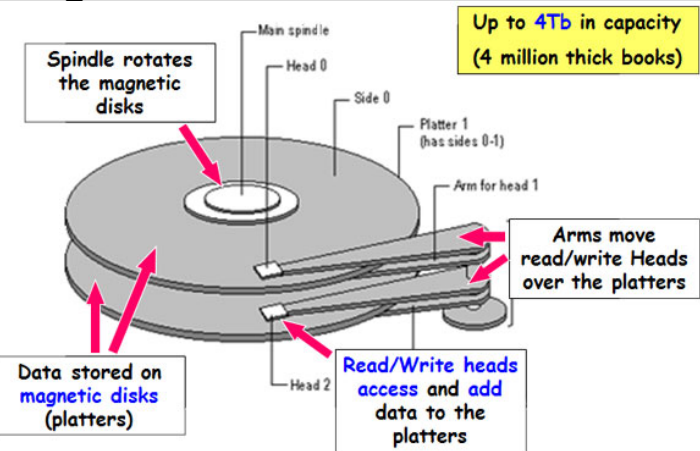**R**eliability The length of time that a device is expected to last for, how long will it retain functionality?
Cost The cost of a device is compared in terms of cost per GB.

Key vocab

Secondary Storage	A non-volatile storage medium which stores files and programs. Examples include the hard drive (HDD) and solid state drives (SSD).
Magnetic Devices	Magnetic disks are read and written to with a moving head inside the disk drive. They often contain moving parts and are susceptible to damage. Magnetic devices can be either internal or portable.
Solid State Devices	SSD has no moving parts. It retains an electronic charge using logic gates. Examples include SD cards and USB memory sticks. Also referred to as flash storage.
Optical Devices	Optical media includes CD, DVD and Blu-Ray disks. Lasers are used to read and write data to a disk. Data is stored on tracks around the disk as a series of pits which represent binary code.
Cloud Storage	Cloud storage refers to saving data in an off-site location maintained by another party. Examples include Dropbox, Google and Microsoft. This relies on having an internet connection to be able to upload and download files from a cloud server.

Diagrams:

Spindle rotates the magnetic disks
Main spindle
Head 0
Side 0
Platter 1 (has sides 0-1)
Arm for head 1
Arms move read/write Heads over the platters
Data stored on magnetic disks (platters)
Read/Write heads access and add data to the platters
Head 2

Up to 4Tb in capacity (4 million thick books)

More info can be found here:
https://youtu.be/qIy_wgo03Oo
https://youtu.be/xfDwcdap5LA

Key vocab

Sequence

Addition example code

```
number1 = int(input("Input the first number :"))
number2 = int(input("Input the second number :"))
answer = number1 + number2
print("The answer is " + str(answer))
```

The code above takes two number inputs and stores them as variables called number1 and number2. It then adds these together and saves them in a variable called answer.

The final line prints the answer out in a sentence.

Iteration

for i in range(0,10):	Repeats any code indented after this line a set number of times, in this case, 10.
while x < 10:	Repeats any code indented after this line until a condition is met, in this case x becoming equal to or greater than 10.
list = ["",""]	Creates a variable and makes it an array – a list which can store many values.

Selection

Selection example code

```
fav_num = int(input("Pick a number between 1 & 10..."))

if(fav_num == 7):
    print("Good guess!")
elif(fav_num < 7):
    print("Too low!")
else:
    print("Too high!")
```

The code above inputs a number. If the number is 7 it will print "Good guess!", if it is less than 7 it will print "Too low!" and for anything else it will print "Too high!".

Method	Description	Method	Description
.length	Outputs the length in characters of the string.	.count(x)	Outputs the number of instances of x in the string.
.substring(x,y)	Outputs the character that are between positions x and y.	.reverse	Outputs the characters of the string but in reverse.
.upper	Outputs the string in upper case.	.split	Splits the string, into a list, usually where there are spaces.
.lower	Outputs the string in lower case.	string[3]	Outputs the character at index 3.
.replace(x,y)	Outputs the string but with all instances of x being replaced with y.	.strip(x)	Outputs the string but with any instances of x removed from the front and end of string.

Key content
Concatenating Strings
This means joining multiple strings together. A plus symbol (+) is used in Python.

greeting = "Hello"
name = "Elizabeth"

```
print(greeting + " " + name)
```

Hello Elizabeth

More info can be found here:
https://youtu.be/wLJ1n47sGRI

Key content

Comparative operators

==	Equal to
!=	Not equal to (or different to)
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to

Arithmetic operators

Operation	Symbol	Example	Output
Addition	+	2 + 10	12
Subtraction	-	9 − 6	3
Multiplication	*	5 * 4	20
Division	/	5 / 2	2.5
Floor Division	//	7 // 2	3
Remainder	%	7 % 3	1

Diagrams
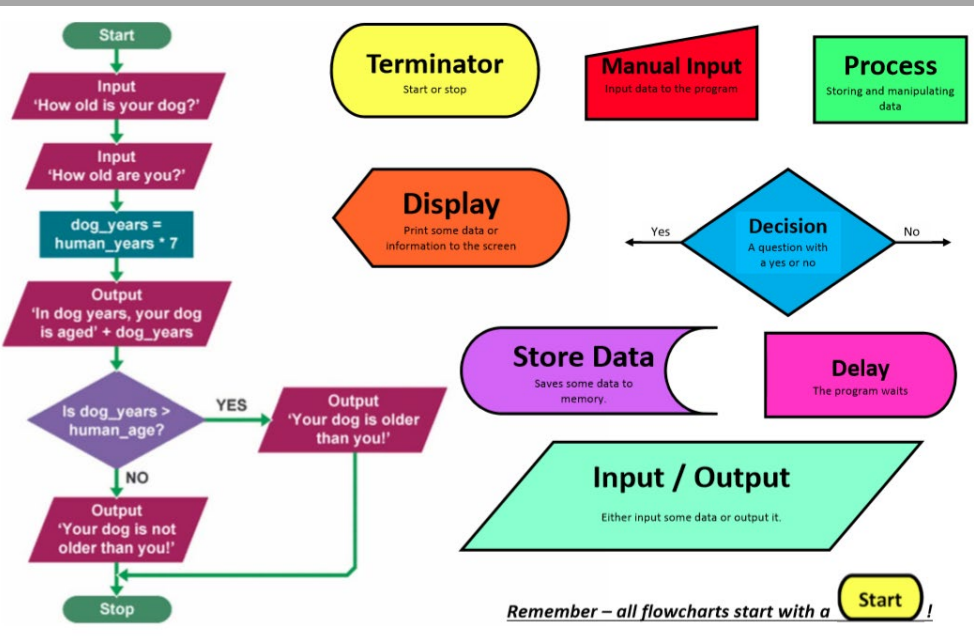
Key vocab

Word	Definition
Abstraction	The process of removing unnecessary details and including only the relevant details. It is a method of computational thinking that focusses on what is important in problem solving
Decomposition	The process of breaking a complex problem down into smaller more manageable parts. Dealing with many different stages of a problem at once is much more difficult than breaking a problem down into a number of smaller problems and solving each, one at time.
Flowchart	A method of representing the sequences of steps in an algorithm in the form of a diagram. Sometimes called a Flow diagram
Structure Diagram	A diagram showing a top-down breakdown of a complex problem
Pseudocode	A text based alternative of representing the sequences of steps in an algorithm. Pseudo-code can be thought of as a simplified form of programming code.
OCR Reference Language	You must be able to read this but you can always use Python in your exams— but be precise
Syntax Error	Syntax errors are errors which break the grammatical rules of the programming language. They stop it from being run/translated
Logic Error	Errors which won't stop the program running. Logic errors are errors which produce unexpected output. E.g Outputting an answer that was multiplied when it should have been taken away

More info can be found here:

https://youtu.be/wLJ1n47sGRI

ENGINEERING YEAR 11 MODULE 3 Systems

KEY WORDS

System Diagram

This is a diagram that breaks down an operation into three main component parts: Input, Process, Output.

Processing device

This device handles information and then turns on or off an output device.
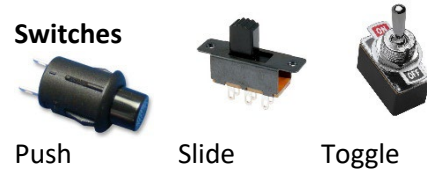
Microcontroller

This is a small computer within a single integrated circuit.

Integrated Circuit

This is a self-contained circuit made from a number of components designed together.

Input Devices

Switches

Push   Slide   Toggle

Light dependant resistor (LDR)

When light hits this

Component its resistance

Changes turning on the circuit.

Thermistor

When heat hits this

Component its resistance

Changes turning on the circuit.

Process Devices

A PIC chip (peripheral interface controller) is a simple controller commonly used in schools.

Microcontroller

Are small computers within a single integrated circuit (counters, timers and decision-making components).
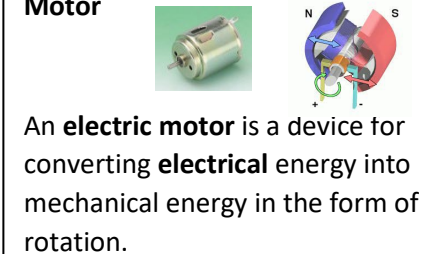
Output Devices

Lamps

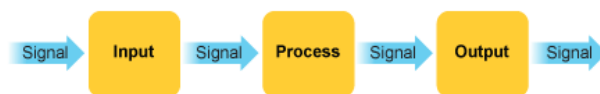Bulb   LED (light emitting diode)

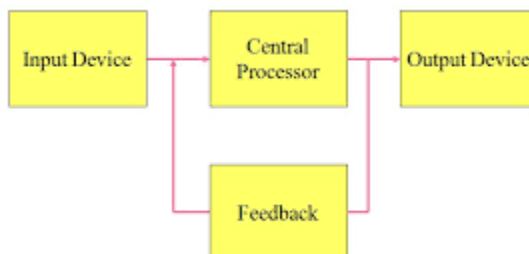### Buzzers and speakers

Motor

An **electric motor** is a device for converting **electrical** energy into mechanical energy in the form of rotation.
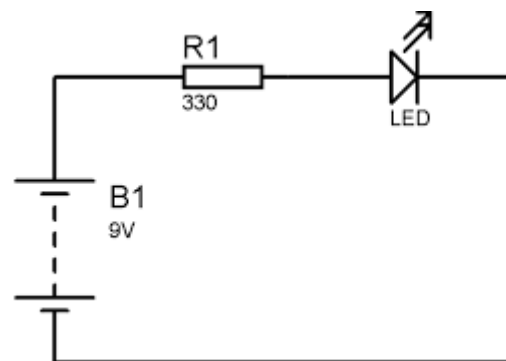
Simple System Diagram

Simple System Diagram with feedback

LED series light circuit

KEY POINTS

- System block diagrams describe what happens in a system.
- System block diagrams always have a minimum of one input, one process and one output.
- Input devices provide information from outside into the system.
- Process devices handle information received and turn outputs on or off.
- Output devices send out information into the environment.

Where food comes from

Where food comes from
Food can be grown, reared or caught.

Plants are grown in an environment where light, food (soil) and water are available to help them grow and photosynthesise.

Food production and processing ensures that food is edible and safe.

Historical changes
Throughout the ages, people have hunted animals and gathered plants for food, relying on what was growing locally and animals that were easy to catch. The discovery of fire meant animals and plants could be cooked to eat and taste better. The industrial revolution in the 19th century led to greater mechanisation of food production allowing for the development of new products and increased volumes of production, as well as jobs outside of the home or even the local area.
Today, other factors that affect food production include:
- domestication of animals and crops;
- preservation methods;
- development of villages and towns;
- changes of land ownership;
- transport and travel;
- war;
- religion and culture;
- famine, drought, flood, disease,
- research and development of food ingredients.

Diets have changed too and the need for cooking in the home has been reduced by the availability of processed foods.

Food provenance
Food provenance is about where food is grown, caught or reared, and how it was produced.
Food certification and assurance schemes guarantee defined standards of food safety or animal welfare. There are many in the UK, including:

Farming systems
Agriculture in the UK can be grouped into the following:

- **Intensive** – a system of production using large amounts of labour and capital relative to land use (high input/high output);
- **Extensive** – a system of production using small amounts of labour and capital in relation to area of land being farmed (low input/lower output);
- **Conventional** – a system that may include the use of artificial and natural pesticides (to control pests, weeds and diseases), artificial fertilisers and organic manures; other techniques used may include concentrated animal feeding/rearing operations, includes both intensive and extensive approaches;
- **Organic** – a system where artificial fertilisers are not allowed to be used, soil fertility is built through crop rotation, and inorganic pesticide use is severely restricted. It is a form of extensive farming;
- **Free-range** – a system where animals, for at least part of the day, can roam freely outdoors. This may be done within a conventional or an organic system;
- **Regenerative farming** – a cropping system and grazing practice that, among other benefits, reverses climate change by rebuilding soil organic matter and restoring degraded soil biodiversity, resulting in both carbon capture and improving the water cycle.

Farming types in the UK
There are seven main types of farming in the UK:
- **aquaculture** – farming fish in fresh or sea water;
- **arable** – growing of crops and cereals;
- **horticulture** – production of flowers, fruit, vegetables or ornamental plants;
- **market gardening** – small scale production of fruit and vegetables;
- **mixed farming** – combination of arable and pastoral;
- **pastoral** – rearing and production of animals, including pigs, chickens, hill farming sheep, beef and dairy cattle;
- **viticulture** – grapes.

For more information, go to: https://bit.ly/398qABo

Farming across the UK
Some parts of the UK have excellent soil for crops, while others are used for cattle, sheep, pigs and poultry.

North West England, Wales and Scotland	Sheep and beef cattle are most suited to the land and colder temperatures.
Northern Ireland	Sheep, cattle, pigs and dairy are the largest commodity sectors.
South West England	Dairy farming is suited to this region due to the quality grass grown.
East of England	Arable crops such as wheat and barley and vegetables are grown.
South East of England and lowlands of Scotland	Grain, potatoes and sugar beet are grown along with vegetables.

Hydroponics
Hydroponic vegetables are grown in a nutrient solution rather than soil. Tomatoes, peppers and lettuce are increasingly grown this way. Growing vegetables hydroponically enables them to be grown in a controlled environment with less chance of disease, faster growth and greater yield.

Genetic modification and biotechnology
Genetic modification of plants and crops can help:
- improve crops resistance to pests, disease or drought;
- extend shelf life;
- improve nutrition and taste;
- produce higher yields;
- animals may be made more resistant to disease, produce less fatty meat, grow faster or be more fertile.

Key terms
Food provenance: Knowing where food was grown, caught or raised and how it was produced.
Genetic modification: The direct manipulation of an organism's genes using biotechnology.
Hydroponics: The process of growing plants in sand, gravel, or liquid, with added nutrients but without soil.
Organic farming: A system of farming and food production. Certification is legally required to grow, process or market organic products.
Photosynthesis: The process by which green plants and some other organisms use sunlight to synthesise nutrients from carbon dioxide and water.
Seasonality: Fruit and vegetables naturally grow in cycles, and ripen during a certain season each year.

Seasonality in the UK
Fruit and vegetables naturally grow in cycles and ripen during a certain season each year. When they are in season they are harvested.
Buying and eating food that is season means that it is fresh, has the best flavour, texture and colour, and has optimum nutritional value. Other benefits include lower cost, supporting local growers, reduced energy needed to grow and transport the ingredients and food.

World food
There are a wide variety of ingredients and foods that are not readily available in the UK, due to the climate. These are imported from other countries.

The availability of these ingredients and foods provides consumers with a wide choice throughout the year.

The variety of ingredients and foods that are now readily available have been introduced to the UK over a long period of time.

Tasks
1. The Red Tractor food assurance scheme requires strict standards of animal welfare. List the main requirements for cows, sheep and pigs.
2. Create a presentation about farming in your local area. Include how it has changed over time.

Crime and punishment Knowledge Organiser. 1 Medieval period, c.1000-c.1500.

Crimes	Policing and trials	Punishment	Key considerations

Saxon period, c.1000 – 1066.
• Crimes against the person, e.g. assault / murder
• Crimes against property, e.g. theft
• Crimes against authority, e.g. treason
• Moral crimes (links to Church / religion), e.g. drunkenness, adultery, etc.
Normans, 1066 - c.1200, continuity and change.
• William generally retained Edward the Confessor's laws
Reason for continuity: stressed continuity and that William was Edward's legitimate successor
• Murdrum law - Saxon community collectively responsible for murder of a Norman: catch murderer or face fine
Reason for change: Normans a tiny minority (7000 among 2m Saxons); deterrent through community pressure; placed responsibility for order on whole community.
• Forest Laws – banned hunting / collection of firewood / grazing of animals in forests; heavy punishments included blinding and execution for repeat offence
Reason for change: to protect William's hunting which he loved
Seen as unfair 'social crime'
• Wergild abolished; replaced by concept of the 'King's Peace'
Reasons for change: crimes were against king so compensation paid direct to the king; raised money
Later Medieval, c.1200 – c.1500, continuity and change.
• Murdrum fine abolished c.1350
Reasons for change: differences between Normans and Saxons faded over time
• Heresy Laws introduced from 1382 to deal with challenges to Church beliefs
Reason for change: increasing challenges to the Church in England (Lollards) and over Europe
• Increased focus on treason
	Policing – community based:
	Saxon period, c.1000 – 1066.
	• Hue and cry – witnesses / whole village expected to chase suspect; fines if failed to do so: no organised police force
	• Tithings – all males over 12 in a group of 10 – responsible for each other's behaviour
	Normans, 1066 - c.1200, continuity
	• No change after Norman Conquest (1066)
	Reason for continuity: system cheap and reasonably effective.
	Later Medieval, c.1200 – c.1500, continuity and change
	• 1285, Parish Constable introduced
	Reason for change: to organise hue and cry and link with county Sheriff for more important crimes / crimes outside village boundaries
	• Parish watch introduced - night-time patrols
	Reason for change: more organised efforts at policing
	• Tithings fade out by the 1400s
	Reason for change: looser feudal ties of peasants after Black Death (1348/50)
	
	Trials - community-based plus religious influence:
	Saxon period, c.1000 – 1066.
	• Local manor courts for most cases; King's Court in London existed for most serious cases
	• Local jury (knew accused); made judgement based on witnesses / evidence and their knowledge of the character of accused / accuser
	• Religious influence:
	  o accused / accuser / witnesses / jurors took oath to ensure honesty
	  o Trial by ordeal (hot / cold water, iron, consecrated bread): where jury could not reach verdict: 'God decides'.
	Normans, 1066 - c.1200, continuity and change
	• Trials essentially as before including trial by ordeal:
	Reason for continuity: court / jury system effective; trial by ordeal due to Normans' deep religious beliefs
	• Addition of trial by combat to 'trial by ordeal'
	Reason for change: linked to traditional warlike Norman customs
	Later Medieval, c.1200 – c.1500, continuity and change.
	• 1166 creation of Assize / Circuit courts where Royal judges tried more serious crimes in circuits of important towns
	• 1190 Coroners appointed to investigate suspicious deaths
	• 1215 abolition by the Pope of Trial by Ordeal
	• 1361, Justices of the Peace – centrally appointed local judges (magistrates)
		Saxon period, c.1000 – 1066.
		• *Early-Saxon Blood Feud - where victim's family took revenge - replaced by following punishments*
		• Wergild – paid to victim's family; amount varied according to importance of victim; types and extent of damage done
		• Fines
		• Corporal punishment - stocks, pillory, whipping, maiming
		• Capital punishment – hanging
		• NOT prison
		Purpose
		• Compensation - Wergild
		• Retribution – severity of punishment matched crime (treason – death; repeat offences maiming, etc.)
		• Deterrent – painful / humiliating public punishment in front of community (linked to cost and lack of policing)
		Normans, 1066 - c.1200, continuity and change.
		• Wergild abolished
		Reason for change: fines paid to the king for breach of 'King's Peace'
		• Increase in crimes punishable by death or mutilation (e.g. Forest Laws)
		Reason for change: Norman harshness and need for deterrent as a small minority
		• Retribution and deterrent overwhelmingly main purposes
		Later Medieval, c.1200 – c.1500, continuity and change.
		• 1305, introduction of 'hung, drawn and quartered' punishment for treason
		Reason for change: retribution / deterrent - hideous punishment to stress enormity of crime
			Saxon period, c.1000 – 1066.
			Society:
			• Agricultural: vast majority lived in small villages.
			• Massive importance of community in policing, trials and public punishment.
			• Growth of towns during Middle Ages reduced effectiveness of community.
			• Importance of Church / religion in all areas of life (and death)
			
			Institutions – government
			• Saxons – slow growth of royal power.
			• Normans, 1066 - . increased harshness of laws and punishments, e.g. brutality (Harrying of the North); Forest Laws; Murdrum Law; castles, etc. Particularly linked to deterrence as Normans a tiny minority of c.7000 among 2m Saxons.
			• Later Middle Ages: Norman / Saxon divisions faded; development of government institutions seen in courts / coroners, etc.
			Institutions – Church / religion
			• Christian religion massively influential in all areas of life and crime, etc.
			• **Society:** profound belief in God; massive wealth and influence of Church; tension between Church and government (Thomas Becket – Church Courts)
			• **Crimes:** Religious influence on moral crimes e.g. drunkenness, adultery, failure to attend church; Heresy – crimes against Church beliefs especially after 1382.
			• **Policing:** Sanctuary linked to concept of mercy. Certain holy places left the criminal immune from arrest: had 40 days to decide whether to stand trial or go into exile.
			• **Trials:** Oaths to 'prove' honesty of accused / witnesses / jury; Trial by Ordeal – 'God decides' until abolished in 1215; development of 'Church Courts' to try clergy:
			  o The so-called 'Benefit of the Clergy' allowed those connected to the Church (or capable of reciting the 'neck verse' to be tried by Church Courts where sentences more lenient and excluded capital punishment.
			• **Punishment:** mercy, especially in relation to crimes committed by the clergy.
			Individuals
			• William the Conqueror – Norman laws, harshness, personal love of hunting.
			Attitudes
			• Importance of religion
			• Development of concept of 'social crime' under Normans. Unfair 'crime', e.g. Forest Laws.
			Science and technology
			• Domination by religion

When writing your support plan you must think about:

1. How to communicate information clearly, sensitively and appropriately to different audiences.
Think about using:

- Sign language
- Makaton
- Simplified language
- Larger size type
- Symbols or pictures
- Audio tapes/dvds
- Text translated into different languages

- Make sure they can hear, see and are comfortable
- Talk clearly and allow the person to lip read if needed
- The environment should be quiet with no distractions
- The plan must be physically accessible to the individual
- Information should be communicated sensitively
- Concentrate fully on the individual

2. How to match care and support provision to individual needs.

   a) Identify the **needs** of the individual including Mobility, Medication and General safety in the home

   b) What does the individual want to achieve?

   c) What support is already in place?

   d) What support is needed to meet the needs and wishes of the individual?

3. How the care plan needs to evolve through a persons life. e.g.

   A child born with a severe physical disability will be dependent on **their parents**, like any other baby

   As they grow older and reach adolescence **parents may need more support to meet their PILES needs**. The child will become bigger and heavier, making them harder to move. They may need a hoist.

   The child becomes an adult at 18, and will move from **child health and social care services into adult services**. They may **leave their parents home** and have a home of their own. If they are living on their own they will need **support from HSC services.**

Getting older

Key vocab

Word	Definition
Support **P**lan	A plan that sets out how a persons care and support needs will be met.
Cleft **F**oot	a rare congenital (meaning your baby was born with it) condition. This causes the affected foot to have missing toes, a V-shaped cleft, and other differences.
Asthma	A common lung condition that causes occasional breathing difficulties.
Visual **I**mpairment	a loss of sight that cannot be corrected using glasses or contact lenses.
Cerebral **P**alsy	the name for a group of lifelong conditions that affect movement and co-ordination. It's caused by a problem with the brain that develops before, during or soon after birth.
Need	something that is essential for good health
Support	Provision to help you if you need care because of illness or disability

More info can be found here:
Health and Social Care text book
NHS.co.uk

MEDIA KNOWLEDGE ORGANISER

CRIME DRAMA

Crime drama is a <u>sub-genre</u> of drama that focuses on crimes, the criminals that commit them and the police that catch them.

There are many formats of Crime drama such as detective, forensic/medical, procedural etc...

The Sweeny features elements of the **action genre**, while *Luther* includes conventions of different genres such as **Thriller**....

Key Conventions of TV Crime Drama:

- Committing and solving of crime
- Medical/ Forensic/ Procedural
- Fictional accounts of real life stories
- Titles of the shows are regularly eponymous e.g. "Luther"
- Main character has conflict with authority or their partner in crime
- Set in the city
- Typical character types inc. villain
- Disequilibrium – discovery of a crime leads to equilibrium – solving of a crime
- Continuing narrative arc over multiple episodes

CONVERGENCE: Luther was initially broadcast on BBC1, then made available to download or stream via iPlayer. It was then available to buy on DVD boxset and then later sold to Netflix.

PUBLIC
-FUNDED BY TV LICENSE

PRIVATE/COMMERCIAL
-FUNDED BY TV & ONLINE ADVERTISING

REGULATION: Luther and The Sweeney were both given a 15 certificate and were broadcast at 9pm – post watershed due to the violence and adult themes which revolve around the serious crime unit settings for the drama.

WATERSHED

There are strict rules about what can be shown on TV before the 9pm watershed.

The watershed means the time when TV programmes which might be unsuitable for children can be broadcast. The watershed begins at 9pm and material unsuitable for children should not, in general, be shown before 9pm or after 5.30am.

Unsuitable material can include everything from sexual content to violence, graphic or distressing imagery and swearing. For example, the most offensive language must not be broadcast before the watershed on TV or, on radio, when children are particularly likely to be listening.

LUTHER uses social media & the BBC website to connect with audiences, provide entertainment through streaming options, clips and information. Social media was specifically used to market and promote new series to audiences.

KEY TERMS

Conventions – what we expect to see in a TV crime drama

Hybrid Genre – some programmes share the conventions of more than one genre e.g. Jonathon Creek

Sub-Genre – programmes that share similar conventions e.g. detective lead shows

Watershed – After 9pm

Prime time – The most popular programmes shown between 7pm8pm

Enigma code – something within the narrative raises questions for TA

Inverted Narrative — The criminal is identified to the audience early on, there is no mystery around who the villain is and the story focuses on how the detective is going to catch the criminal.

Action codes – progress the story quickly e.g showing a character packing a suitcase means they are leaving

Diegetic sound – natural sound that hasn't been added

Non – diegetic sound – soundtrack that is added over the action

High key lighting – bright light used

Low key lighting – dark light used Cliff-hanger – the narrative is left unsolved

Mise-en-Scene —What's in a scene? Props, costumes, settings, composition, lighting etc.

Verisimilitude –The believability or realism of a film or TV show.

MEDIA KNOWLEDGE ORGANISER

- **Luther** is a British crime drama television series starring Idris Elba as the title character DCI John Luther.
- Prior to Luther Elba was well established in the US crime drama The Wire and the US version of The Office.
- Written by Neil Cross.
- The first series comprised six episodes which ran in **May 2010** on **BBC1** in the **9pm timeslot**
- BBC Studios handles the distribution of the series.
- The series has been highly successful receiving numerous awards and critical acclaim for the production, writing and the stars of the show.

STYLE:

50s Noir conventions are borrowed e.g. dark lighting and long overcoat Alice Morgan is pale and wears red lipstick – 'femme fatale' again borrowed from the 50s . This is noted in the opening credit sequence, with its use of reds, blacks and crime-drama genre iconography. Reinforced by enigmatic silhouettes and the whispering, secretive theme tune.

OPENING SCENE MEDIA LANGUAGE:
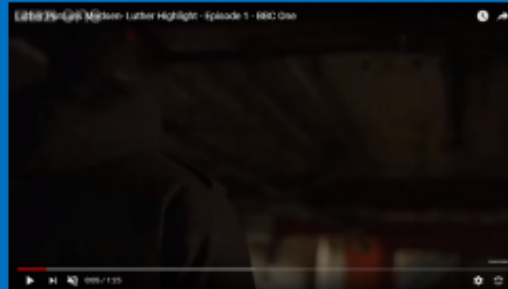
ESTABLISHING SHOT –industrial setting, implies 'gritty'
**TRACKING SHOTS** on Luther pursuing Henry Madsen
LOW ANGLE SHOTS –intimidating, powerful
CROSS-CUTTING: Between scenes at the crime scene and the chase implying they are happening simultaneously, the music is used to convey a sense of urgency –a race against time
Our initial impression is that Luther is the **villain** –dark, hooded figure pursuing the smart businessman. We initially don't see Luther's face creating **enigma**.

MEETING ALICE MORGAN MEDIA LANGUAGE:

SETTING: At Alice's family home , environment creates high level of **verisimilitude**.
BODY LANGUAGE & GESTURE: Creates a sense of vulnerability, she is in distress and represented as the **victim** when we first meet her. She waits for the police to rescue her, a 'damsel in distress'.
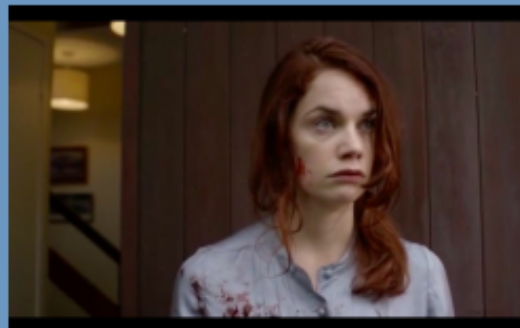
REPRESENTATION & CONTEXT:

ETHNICITY: Luther challenges stereotypical representations of black men in crime drama which is typically negative. This is further reflected in Luther's highly educated, successful mixed race wife. This reflects the diverse, multi-cultural setting of this contemporary drama.

GENDER: Masculinity is represented in a very complex way; Luther is represented as an aggressive, alpha male, yet also vulnerable through his psychological instability. Typical masculine stereotypes are challenged through characters such as Justin who is openly admirable of Luther; and Mark who is gentle and represented as a 'sensitive' contrast to Luther. The representation of femininity **challenges stereotypes** in all lead female characters; Alice subverts expectations as a manipulative, intelligent villain, Rose Teller is a powerful, authority figure, and while Zoe Luther is by far the most typically 'feminine' representation (vulnerable, weak, lead by love), she is also represented as a highly successful humanitarian lawyer. These female representations reflect the contemporary context of the setting.

CRIME & THE POLICE: Crime is represented as dark & sinister and Luther is represented as a vigilante, rule-breaker who will stop at nothing to stop criminals. Rose is the calm, steady influence who encourages him to stay on the right track.

PROPP CHARACTER FUNCTIONS:

HERO: John Luther, troubled but brilliant detective; a rule-breaker who will do anything to bring criminals to justice.
VILLAIN: Alice Morgan, femme fatale, highly intelligent, manipulative and an obsession with Luther.
HELPER: Justin Ripley, faithful side-kick who idolises Luther and is eager to learn. Ripley asks questions that the audience need to follow Luther's thoughts and processes of detection.
DISPATCHER: Rose Teller, Luther's boss, keeps him focused , tough but fair –see's Luthers brilliance and willing to put her job on the line for him.
DONOR: Both Ripley and Benny provide Luther with the means to achieve his goal

Year 11 Music

Key Words

Dynamics
- Forte
- Crescendo
- Mezzo Piano
- Piano
- Sforzando
- Dynamics
- Mezzo Forte
- Diminuendo

Tempo
- Accelerando
- Rubato
- Allegro
- Largo
- Presto
- Moderato
- Andante
- Rallentando

Melody
- Imitation
- Stepwise/ Conjunct
- Scalic
- Repetative
- Chromatic
- Arpeggios
- Disjunct
- Riff
- Ostinato
- Canon
- Sequence

Rhythm & Metre
- Triplet (3 notes in the space of 2)
- 4/4 (common time)
- Simple time
- 3/4
- Compound time
- Syncopated (off beat)
- Polyrhythm (lots of rhythms layered)
- Crotchet/ quaver/ minim etc.
- Straight (on beat)

Texture
- Octaves
- Homophonic
- Polyphonic
- Unison
- Monophonic
- Melody & Accompaniment

Structure
- Minuet & Trio
- Sonata Form (exposition, development, recapitulation)
- Ternary (ABA)
- Binary (AABB)
- Popular/ Strophic form (VCVC)
- Rondo (ABACA)

Harmony
- Pedal
- Drone
- Chord/ broken chord
- Major
- Diatonic
- Minor
- Dissonant
- Raga
- Chromatic
- Cadence
- (Perfect/imperfect/ plagal/interrupted)

Instrumentation
- Synthesizer
- Solo/ Duet/ Trio/ Quartet/ Quintet
- Arco
- Brass
- Woodwind
- Chamber Group
- Percussion
- Orchestra
- String
- Live
- Muted
- Computerised
- Rock band
- Pizzicato

Combined science HT – biology – inheritance
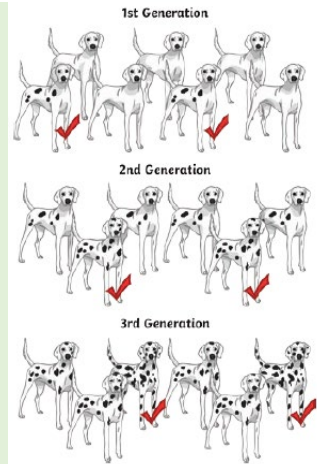
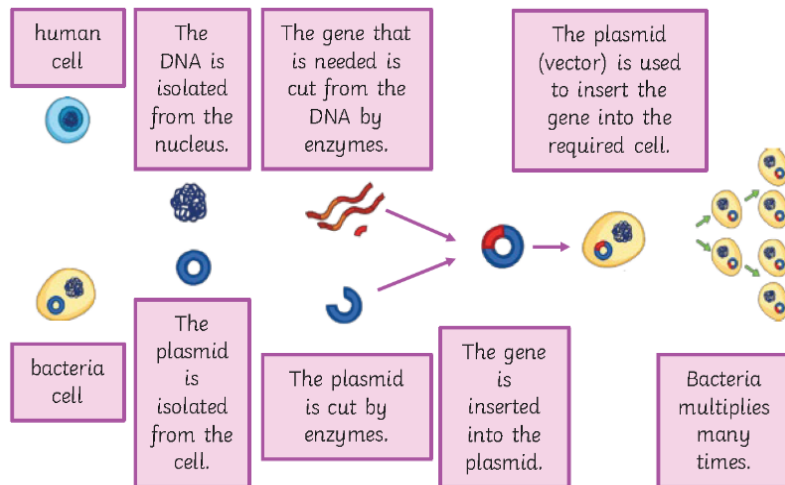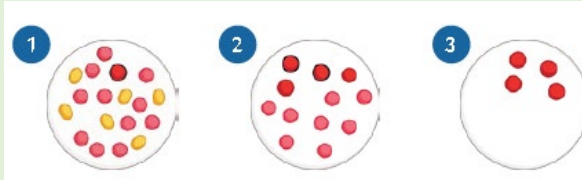## Selective breeding

1.Choose parents who have a desired characteristic.

2. Select the best offspring and breed these to make the next generation.

3. The offspring are bred again and again until a desired result is achieved.

1st Generation
2nd Generation
3rd Generation

Variation:

Variation maybe due to differences in:
- Genes that have been inherited
- Conditions in which they have developed
- A combination of genes and the environment

Genetic engineering

human cell

The DNA is isolated from the nucleus.

The gene that is needed is cut from the DNA by enzymes.

The plasmid (vector) is used to insert the gene into the required cell.

bacteria cell

The plasmid is isolated from the cell.

The plasmid is cut by enzymes.

The gene is inserted into the plasmid.

Bacteria multiplies many times.

Resistant Bacteria

1. There is variation in the bacterial population. One bacterium develops a mutation by chance that means it is resistant to an antibiotic.
2. The antibiotic kills some of the bacteria, the resistant bacterium survives and reproduces.
3. The antibiotic kills the rest of the non-resistant bacteria so the person may start to feel a little better. The resistant bacterium has survived the antibiotic and continues to multiply.

Evolution:

All species of living things have evolved from simple life forms by natural selection.
If a characteristic is advantageous in an environment, then the individual will be better able to compete. This means they will be more likely to survive and reproduce.

Word	Definition
Polydactyly	Having extra fingers or toes. It is caused by a dominant allele
Recessive	An allele that is only expressed if two copies of it are present.
Embryo screening	Genetic tests carried out on an embryo to see whether it carries a faulty allele.
Evolution	A change in the inherited characteristics of a population over time through a process of natural selection
Evolutionary tree	A method used to show how scientists believe organisms are related.
Extinction	The permanent loss of all members of a species.
Fossils	The remains of organisms from millions of years ago which are found in rocks.
Natural selection	The process by which organisms that are better suited to an environment are more likely to survive and reproduce.
Selective breeding	Humans selecting animals or plants, that have a required characteristic, for breeding

The Early Atmosphere

Approximately **4.6 billion years ago** the Earth was formed. Scientists have lots of ideas and **theories** about how the atmosphere was produced and the gases within it, but due to the lack of evidence, they cannot be sure.

One theory suggested that **intense volcanic activity** released gases that made **Earth's early atmosphere** very similar to that of Mars and Venus. These planet's atmospheres mainly consist of carbon dioxide with little oxygen.

Nitrogen gas would have also been released from volcanoes and would have built up in the atmosphere.

Water vapour in Earth's early atmosphere would have **condensed** to create the **seas and oceans**. Carbon dioxide would have dissolved into the water, decreasing the level in the atmosphere.

Percentage of gases in the Atmosphere

The pie chart below shows the abundance of each gas in our atmosphere.

- 78% Nitrogen
- 21% Oxygen
- Other including: 1% Argon
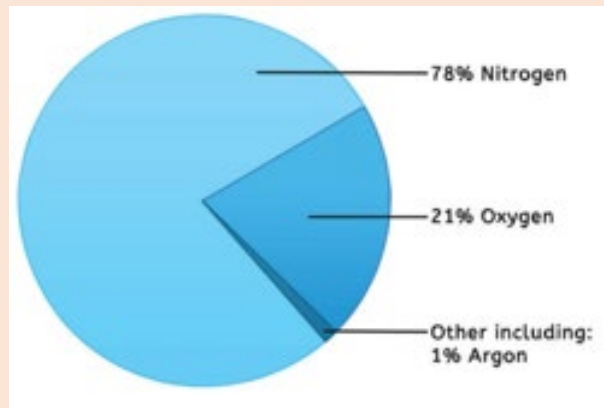
How did oxygen levels increase?

2.7 billion years ago, algae first produced oxygen. Gradually over time, the levels of oxygen in our atmosphere increased as plants evolved. This was followed by animals as the levels of oxygen increased to a level thatwould sustain more complex life.

Oxygen is produced by plants in the process of **photosynthesis**.

How did Carbon dioxide levels decrease?

Carbon dioxide **dissolves** in water. As water vapour condensed and the oceans and seas formed, the carbon dioxide gas dissolved producing **carbonate compounds**. This process reduced the amount of carbon dioxide in the atmosphere. Carbonate compounds were then **precipitated**: limestone is an example of a sedimentary rock; it has the chemical name calcium carbonate.

Combustion

Complete combustion occurs when there is **enough oxygen** for a fuel to burn.

propane + oxygen $\longrightarrow$ carbon dioxide + water

$$C_3H_8 + 5O_2 \longrightarrow 3CO_2 + 4H_2O$$

Incomplete combustion occurs when there **isn't enough oxygen** for a fuel to burn.

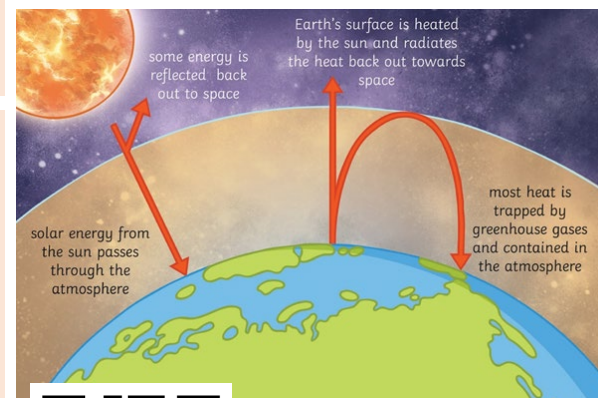ethane + oxygen $\longrightarrow$ carbon monoxide + water

$$2C_2H_6 + 5O_2 \longrightarrow 4CO + 6H_2O$$

Word	Definition
Global warming	the gradual increase in the average surface temperature of the Earth
Climate change	A long term change in weather patterns.
Carbon footprint	is the total amount of **carbon dioxide** andother greenhouse gases emitted over the full life cycle of a product, service or event

Sulphur dioxide

Sulfur dioxide is an **atmospheric pollutant**. It is a gas that is produced from the burning of **fossil fuels**.

sulfur + oxygen $\longrightarrow$ sulfur dioxide

$$S + O_2 \longrightarrow SO_2$$

some energy is reflected back out to space

Earth's surface is heated by the sun and radiates the heat back out towards space

solar energy from the sun passes through the atmosphere

most heat is trapped by greenhouse gases and contained in the atmosphere

Combined science HT – chemistry – chemistry of the atmosphere

Required Practical

Aim: investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface.
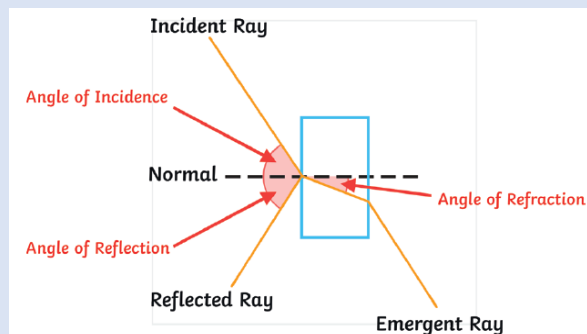
In this investigation, you are finding out which type of surface emits the most infrared radiation:
• dark and matt
• dark and shiny
• light and matt
• light and shiny
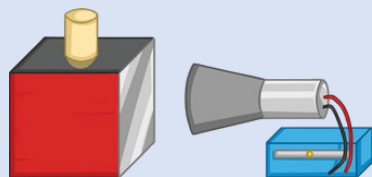
Properties of waves:

Reflection:

The law of reflection states that:
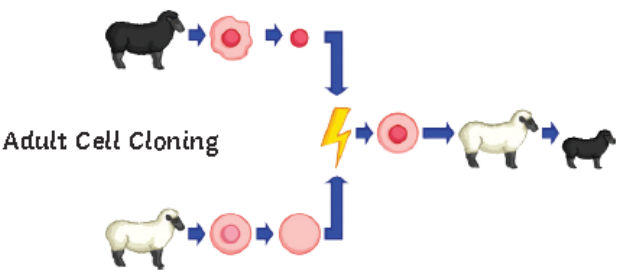
Angle of incidence = angle of reflection

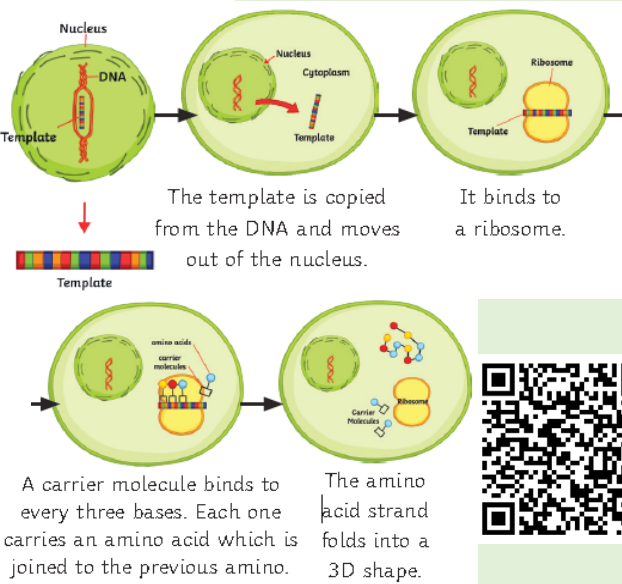| Word	Definition
Compression	is the part of the wave (or Slinky) that is pressed together
Rarefaction	is the part of the wave (or Slinky) that is spread apart.
Oscillations	occurs when a system or object goes back and forth repeatedly between two states or positions.
Frequency	the number of waves that pass a fixed point in unit time
Wave length	the distance between successive crests of a wave

Frequency	Wave	Use	Other Information
Low ↑ ... ↓ High	radio waves	Communication via television and radio, and satellite communications.	Easily transmitted through air and can be reflected to change their direction. Harmless if absorbed by the human body. Are reflected back off the atmosphere and cannot pass through into space.
	microwaves	Communications including satellite communications and cooking food.	When the molecules absorb microwaves, their internal energy increases. This can be harmful when internal body cells become heated by over exposure to microwaves. Can pass through the atmosphere and into space.
	infrared	Short-range communications (remote controls), electrical heaters, cooking food, optical fibres, security systems and thermal imaging cameras.	It can cause burns to skin.
	visible light	Used for lighting, photography and fibre optics.	Frequency range that is detectable by the human eye.
	ultraviolet	Sterilising water and killing bacteria. Detecting forged bank notes.	Causes skin tanning and can lead to burns or skin cancer.
	X-rays	Medical imaging and airport security scanners.	Very little energy is absorbed by body tissues. Instead, it is transmitted through the body.
	gamma rays	Sterilising medical equipment or food and treatment for some cancers.	These waves can lead to gene mutation and cancer.

Combined science HT – physics - waves

Cloning in animals

Adult Cell Cloning

Protein synthesis

Nucleus
DNA
Template

Nucleus
Cytoplasm
Template

Ribosome
Template

The template is copied from the DNA and moves out of the nucleus.

It binds to a ribosome.

amino acids
carrier molecules

Carrier Molecules
Ribosome

A carrier molecule binds to every three bases. Each one carries an amino acid which is joined to the previous amino.

The amino acid strand folds into a 3D shape.

Evolution by Natural selection

Darwin's theory was only gradually accepted because…

- the theory challenged the idea that God made all the animals and plants that live on earth.
- there was insufficient evidence at the time the theory was published to convince many scientists.

the mechanism of inheritance and variation was not known until 50 years after the theory was published.

Flame spectroscopy

Step 1 – A sample is heated in a flame.
Step 2 – Electrons in the metal ions are excited by the thermal energy provided from the flame. As a result, the electrons move into a higher energy level.
Step 3 – When the electrons fall back into a lower energy level, they release energy in the form of light.
Step 4 – The emitted wavelengths of light are analysed instrumentally.
Step 5 – To identify the metal present, its spectrum is compared with reference spectra from known metal ions.

Above is an example of the spectra produced by flame emission spectroscopy. It looks like a colourful array of lines.

**Each metal ion produces a unique emission spectrum**.
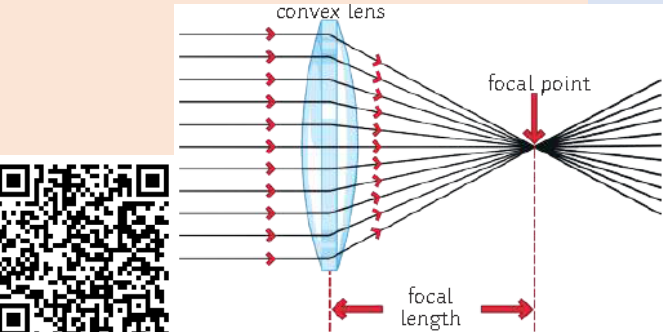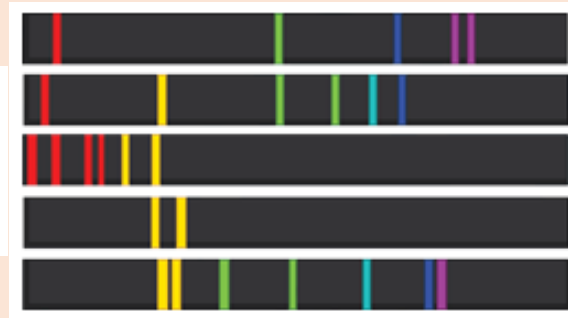
Lenses

convex lens	Lens	concave lens
←——→	Ray Diagram	>——<
	Illustration	
Causes parallel waves to converge at the principal focus.	Action	Causes parallel waves to diverge from the principal focus.
real or virtual	Type of Image	always virtual

An imaginary horizontal line through the middle of the lines is called the axis and this is where the principal focus forms. In a convex lens, the light rays enter the lens parallel to one another and then converge at the principal focus after the lens. In a concave lens, the light rays enter the lens parallel to one another and then diverge. The principal focus is the virtual source of the diverging rays before the lens.

$$\text{power (D)} = \frac{1}{\text{focal length (m)}}$$

D stands for dioptres which is the unit of measurement for lens power.
In a converging lens the power is a positive value.
In a diverging lens the power is a negative value.

convex lens
focal point
focal length

concave lens
principal focus
focal length
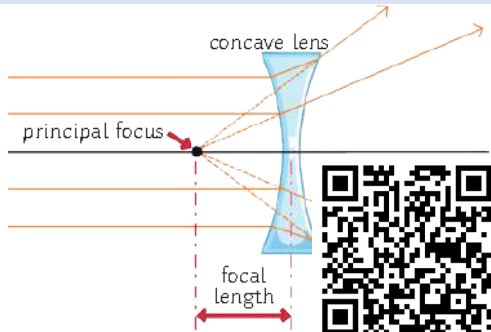
A. Advanced Adjectives: Characteristics		VOCABULARY B. Advanced Verbs		C. Advanced Nouns	
1. belligerent	argumentative	**1. abhor**	hate	**1. alacrity**	speed
2. complacent	lazy	**2. acquiesce**	accept reluctantly	**2. animosity**	hatred
3. ephemeral	fleeting	**3. amass**	gather	**3. antithesis**	opposite
4. endemic	widespread	**4. ameliorate**	make better	**4. avarice**	material greed
5. erroneous	mistaken	**5. antagonise**	wind up	**5. benevolence**	kindness
6. fractious	awkward	**6. augment**	increase	**6. conjecture**	speculation
7. homogenous	same kind/alike	**7. coerce**	force	**7. crescendo**	climax
8. implacable	relentless	**8. delineate**	describe precisely	**8. dichotomy**	opposition
9. incontrovertible	undeniable	**9. deride**	mock	**9. discord**	conflict
10. indolent	lazy	**10. domineer**	intimidate	**10. discrepancy**	inconsistency
11. industrious	hardworking	**11. embolden**	encourage/give courage	**11. enmity**	hatred
12. insolent	disrespectful	**12. empathise**	understand feelings	**12. gravitas**	seriousness
13. invidious	unpleasant/awkward	**13. emulate**	imitate	**13. hybrid**	mixture
14. judicious	wise	**14. endeavour**	try	**14. ignominy**	public shame
15. liminal	in-between	**15. ensnare**	trap	**15. infancy**	early stages

LAST PAGE