



# How do we use Knowledge Organisers in Biology

## How can you use knowledge organisers at home to help us?

- **Retrieval Practice:** Read over a section of the knowledge organiser, cover it up and then write down everything you can remember. Repeat until you remember everything.
- **Flash Cards:** Using the Knowledge Organisers to help on one side of a piece of paper write a question, on the other side write an answer. Ask someone to test you by asking a question and seeing if you know the answer.
- **Mind Maps:** Turn the information from the knowledge organiser into a mind map. Then reread the mind map and on a piece of paper half the size try and recreate the key phrases of the mind map from memory.
- **Sketch it:** Draw an image to represent each fact; this can be done in isolation or as part of the mind map/flash card.
- **Teach it:** Teach someone the information on your knowledge organiser, let them ask you questions and see if you know the answers.

## How will we use knowledge organisers in Biology?

- **Test:** We will do regular low stakes tests to check your ability to retrieve information from memory.
- **Mark our answers:** Once you have done a low stake test you can mark your work using the knowledge organiser.
- **Improve our work:** Once you have finished a piece of work you may be asked to check your knowledge organiser to see if there is any information on it that you could add into an answer.

Term	Topic/s	Year group
1	Topic 9 & 10: Hormones and Reproduction	11

### Tier 2 'unlocking' language

Reproduction

Hormone

Puberty

Feedback

Regulate

Risk

Target

Control

### Tier 3 subject relevant language

Menstrual

Endocrine

Gland

Organ

Diabetes

FSH

Oestrogen

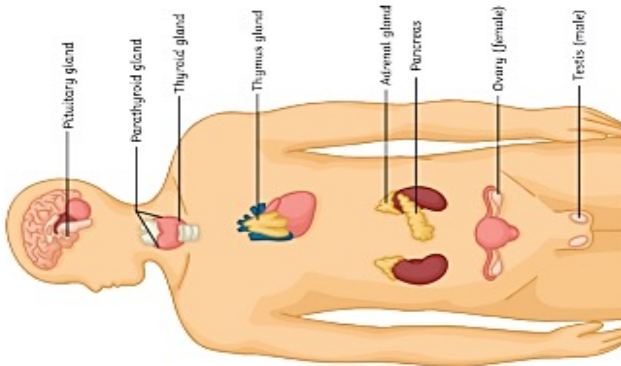
Progesterone



# Knowledge Organiser: Topic 9- Hormones

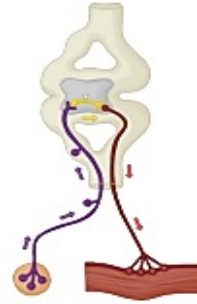
## The Endocrine System

You should be able to identify the major glands of the endocrine system, as shown below.



## Reflexes

A **reflex** is a fast and automatic response to a particular stimulus which may be harmful to the organism. They are quick because there is no conscious thought or process to deliver the response (they are an **involuntary** action). The pathway which carries the information about a reflex action is called a **reflex arc**.



A **reflex arc** begins with the **stimulus** e.g. a bee sting or a hot object on the skin. The stimulus is detected by the **receptor** cells and an electrical **impulse** is transmitted along the **sensory neuron**. The impulse is passed through **relay neurons** in the spinal cord or the **unconscious** areas of the brain. The response is coordinated **automatically** and sent along the **motor neuron** to the **effector** cells.

## Hormones

**Hormones** are **chemical messengers** transported in the **bloodstream** to an **effector** where they can activate a response. They are produced and released from glands around the body which all make up the **endocrine system**. Hormones do a similar job to the neurons of the nervous system but there are some differences.

neurons	hormones
speed	fast
duration	short
target area	specific
	general

The hormones released travel in the blood plasma to their **target cells** and affect only those certain cells. Hormones act on organs or cells where constant adjustments are made to maintain a stable state.

Some examples you should know:

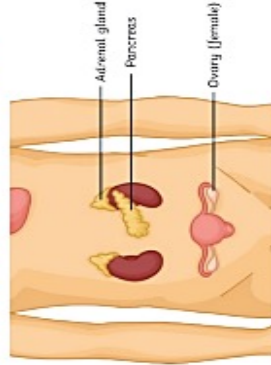
The **pituitary gland** produces a range of hormones including FSH and LH which help to regulate the menstrual cycle. The pituitary gland acts as a **master gland** because many of the hormones it releases control and coordinate the release of other hormones from other glands in the body.

## Diabetes

There are two types of diabetes: type 1 and type 2.

Type 1 diabetes is a disorder affecting the pancreas. In type 1 diabetes, the pancreas does not produce enough insulin to control the blood sugar level and so the levels become higher than normal. Type 1 diabetes is usually treated by injections of insulin.

Type 2 diabetes is a disorder of effector cells which no longer respond to the hormones released from the pancreas. Type 2 diabetes can usually be managed through lifestyle choices such as maintaining a carbohydrate-controlled diet and regular exercise.



The risk of developing type 2 diabetes is higher in people who are obese (have a BMI >30).

## Hormones in Human Reproduction

**Oestrogen** is the main reproductive hormone in females. It is produced in the **ovaries**. During puberty, this hormone increases and it stimulates an egg to be released from an ovary each month. This process is called **ovulation** and happens, on average, every 28 days.

**Testosterone** is the main reproductive hormone in males. It is produced in the **testes**. This hormone stimulates the production of sperm.

Leave blank to allow students to glue.



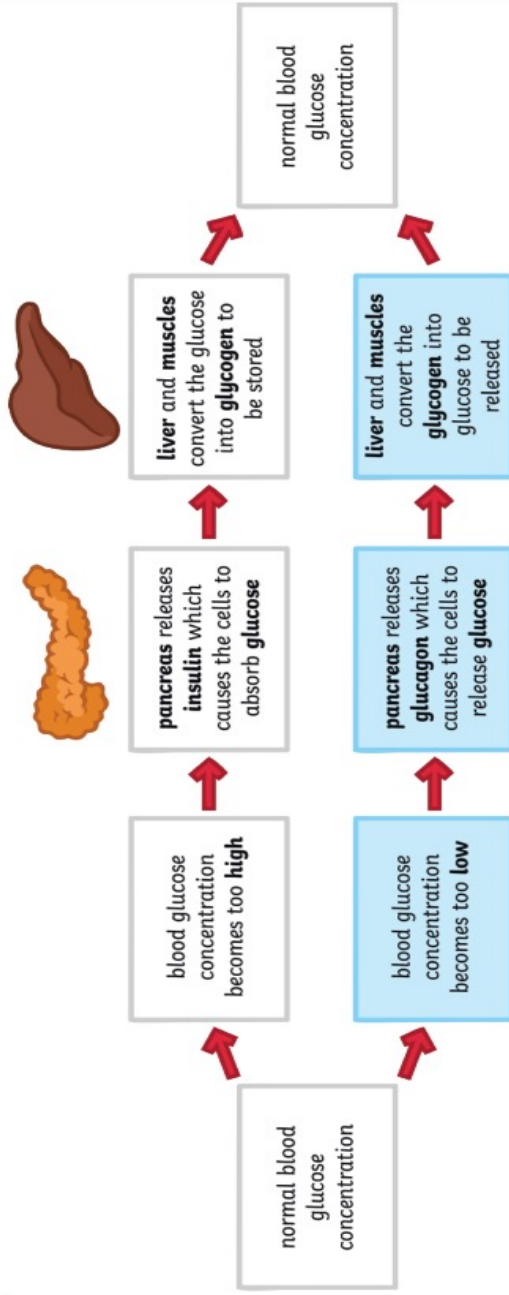
# Knowledge Organiser: Topic 9- Hormones

## Control of Blood Glucose

The pancreas is the organ and gland which monitors and regulates the blood glucose concentration.

(HT only)

If the blood glucose concentration becomes too low, a negative feedback loop is triggered and the pancreas releases another hormone, **glucagon**, which acts on the liver and muscles to cause the stored **glycogen** to be converted back into **glucose** and released into the bloodstream.



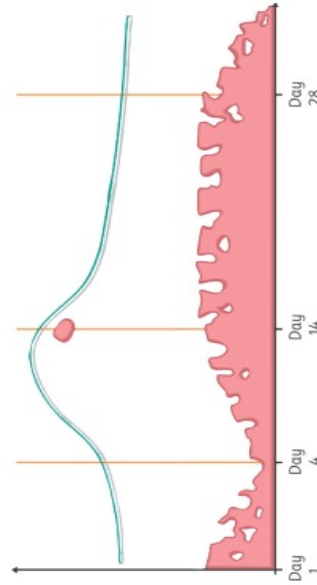
## The Menstrual Cycle

The **menstrual cycle** occurs in females, approximately every **28 days**. It is a cyclical process of the building of the lining of the **uterus** and **ovulation**. If the **egg** become fertilised by a sperm, then **pregnancy** follows. If the egg is not fertilised, then the lining of the uterus is shed away and leaves the body as the **menstruation** (or period).

The whole cycle is controlled by four main reproductive hormones:

- **follicle stimulating hormone (FSH)**
- **oestrogen**
- **luteinising hormone (LH)**
- **progesterone**

Hormone	Where It Is Produced	Response Caused	Interaction with Other Hormones (HT only)
FSH	pituitary gland	An egg to develop in one of the ovaries.	Stimulates the production of oestrogen.
oestrogen	ovaries	The lining of the uterus builds up and thickens.	Stimulates the production of LH. Inhibits the production of FSH.
LH	pituitary gland	Ovulation (at around day 14 of the cycle).	Indirectly stimulates the production of progesterone.
progesterone	ovaries	The uterus lining to maintain.	Inhibits the production of LH.



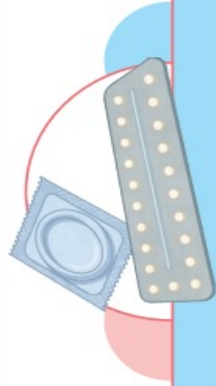
Leave blank to allow students to glue.



# Knowledge Organiser: Topic 9- Hormones

## Contraception

There are many different types of **contraceptive** (or birth control) methods. They are categorised as **hormonal** methods and **non-hormonal** methods.



Method	Hormonal or Non-Hormonal	How It Works	Pros and Cons
oral contraceptives ('the pill')	hormonal	Pill taken which contains hormones to <b>inhibit FSH</b> so that an egg does not mature.	<ul style="list-style-type: none"> <li>😊 Easily self-administered. Short-term effects. Can easily be reversed. Very reliable.</li> <li>😞 May have mild side-effects associated. Could lead to pregnancy if missed. Does not protect from STIs.</li> </ul>
injection, implant or skin patch	hormonal	Contains <b>progesterone</b> which is slowly released to inhibit the release of eggs for months or even years.	<ul style="list-style-type: none"> <li>😊 Administered through routine appointment at GP surgery. Requires little to no aftercare or maintenance. Very reliable.</li> <li>😞 May take some time for effects to be reversed once removed. Does not protect from STIs.</li> </ul>
condoms or diaphragm (female condom)	non-hormonal	Creates a <b>physical barrier</b> to prevent the sperm from reaching the egg.	<ul style="list-style-type: none"> <li>😊 Easy to use. Short-term effects. Very reliable. Provides protection from most STIs.</li> <li>😞 Can fail.</li> </ul>
intrauterine devices (coil)	hormonal	The device is attached to the lining of the uterus and <b>releases hormones or prevents the implantation</b> of an embryo.	<ul style="list-style-type: none"> <li>😊 Requires little to no aftercare or maintenance. Very reliable.</li> <li>😞 May take some time for effects to be reversed once removed. Does not protect from STIs.</li> </ul>
spermicidal agents	non-hormonal	Contains chemicals to <b>kill or immobilise sperm</b> cells.	<ul style="list-style-type: none"> <li>😊 Easy to use. Short-term effects.</li> <li>😞 Does not protect from STIs. Less effective when used as the only method.</li> </ul>
abstaining from intercourse (around the time of ovulation)	non-hormonal	Avoiding sexual intercourse when there is a likelihood of an egg being present in the oviduct.	<ul style="list-style-type: none"> <li>😊 inexpensive</li> <li>😞 Not always reliable.</li> </ul>
surgery	non-hormonal	A surgical procedure carried out in men or women. In males, the vas deferens tubes are sealed or blocked to prevent the passage of sperm from the testes. In females, the fallopian tubes (oviducts) are sealed or blocked to prevent the passage of the egg from the ovaries.	<ul style="list-style-type: none"> <li>😞 Risks associated with surgery (such as infection).</li> <li>😞 Difficult to reverse (if at all possible). Can take several months to be reliable.</li> </ul>

Leave blank to allow students to glue.



# How do we use Knowledge Organisers in Biology

## How can you use knowledge organisers at home to help us?

- **Retrieval Practice:** Read over a section of the knowledge organiser, cover it up and then write down everything you can remember. Repeat until you remember everything.
- **Flash Cards:** Using the Knowledge Organisers to help on one side of a piece of paper write a question, on the other side write an answer. Ask someone to test you by asking a question and seeing if you know the answer.
- **Mind Maps:** Turn the information from the knowledge organiser into a mind map. Then reread the mind map and on a piece of paper half the size try and recreate the key phrases of the mind map from memory.
- **Sketch it:** Draw an image to represent each fact; this can be done in isolation or as part of the mind map/flash card.
- **Teach it:** Teach someone the information on your knowledge organiser, let them ask you questions and see if you know the answers.

## How will we use knowledge organisers in Biology?

- **Test:** We will do regular low stakes tests to check your ability to retrieve information from memory.
- **Mark our answers:** Once you have done a low stake test you can mark your work using the knowledge organiser.
- **Improve our work:** Once you have finished a piece of work you may be asked to check your knowledge organiser to see if there is any information on it that you could add into an answer.

Term	Topic/s	Year group
1	Topic 11: DNA and Genetics	11

### Tier 2 'unlocking' language

Physical

Features

Characteristics

Data

Probability

Version

Inherit

Information

### Tier 3 subject relevant language

Variation

Gene

Genome

Allele

Genotype

Phenotype

Heterozygote

Homozygote



# Knowledge Organiser: Topic 11- DNA and Genetics

**Keywords**

**allele** – An alternative form of a gene.

**asexual reproduction** – The production of offspring from a single parent by mitosis. The offspring are clones of the parent.

**chromosome** – Structures that contain the DNA of an organism and are found in the nucleus.

**cystic fibrosis** – A disorder of cell membranes that is caused by a recessive allele.

**DNA** – A polymer that is made up of two strands that form a double helix.

**dominant** – An allele that is always expressed, even if only one copy is present.

**fertilisation** – The fusion of male and female gametes.

**gamete** – Sperm cell and egg cell in animals; pollen and egg cell in plants.

**gene** – A small section of DNA that codes for a specific protein.

**genome** – The entire genetic material of an organism.

**genotype** – The combination of alleles.

**heterozygous** – A genotype that has two different alleles, one dominant and one recessive.

**homozygous** – A genotype that has two of the same alleles. Either two dominant alleles or two recessive alleles.

**meiosis** – The two-stage process of cell division that reduces the chromosome number of the daughter cells. It makes gametes for sexual reproduction.

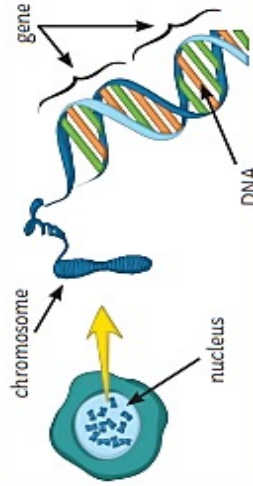
**mutation** – A change in DNA.

**phenotype** – The characteristic expressed because of the combination of alleles.

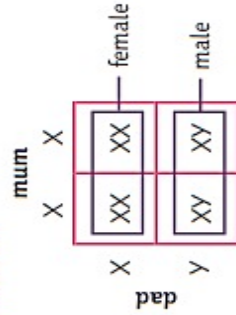
**polydactyly** – Having extra fingers or toes. It is caused by a dominant allele.

**recessive** – An allele that is only expressed if two copies of it are present.

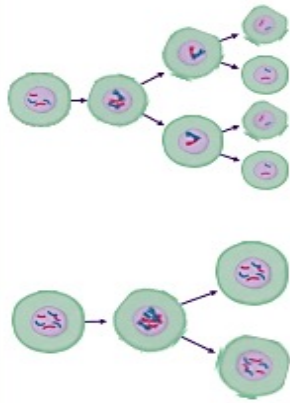
**sexual reproduction** – The production of offspring by combining genetic information from the gametes of two parents. Leads to variation in the offspring.



## Sex Determination

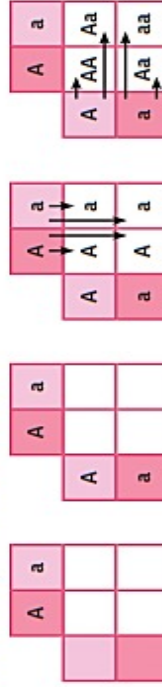


Females carry two X chromosomes.  
Males carry one X and one Y chromosome.



Mitosis	Meiosis
Produces two daughter cells.	Produces four daughter cells.
Daughter cells are genetically identical.	Daughter cells are not genetically identical.
The cell divides once.	The cell divides twice.
The chromosome number of the daughter cells is the same as the parent cells. In humans, this is 46 chromosomes.	The chromosome number is reduced by half. In humans, this is 23 chromosomes.
Used for growth and repair, and asexual reproduction.	Produces gametes for sexual reproduction.

## How to Complete a Punnett Square



**Step 1:** Put the two alleles from one parent into the boxes at the top. This parent is a heterozygote. This means they have one dominant and one recessive allele.

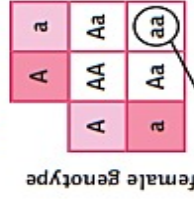
**Step 2:** Put the two alleles from the second parent into the boxes on the left. This parent is also a heterozygote.

**Step 3:** Put the alleles from the first parent underneath them.

**Step 4:** Put the alleles from the second parent to the right of them.

## Probability

There are four possible combinations of gametes that offspring can inherit.



One of these four has the genotype aa – that's  $\frac{1}{4}$ , 25% or 0.25.

The recessive phenotype has a ratio of 1:3 because only one combination will show the phenotype while the other three will not.

Leave blank to allow students to glue.



# How do we use Knowledge Organisers in Biology

## How can you use knowledge organisers at home to help us?

- **Retrieval Practice:** Read over a section of the knowledge organiser, cover it up and then write down everything you can remember. Repeat until you remember everything.
- **Flash Cards:** Using the Knowledge Organisers to help on one side of a piece of paper write a question, on the other side write an answer. Ask someone to test you by asking a question and seeing if you know the answer.
- **Mind Maps:** Turn the information from the knowledge organiser into a mind map. Then reread the mind map and on a piece of paper half the size try and recreate the key phrases of the mind map from memory.
- **Sketch it:** Draw an image to represent each fact; this can be done in isolation or as part of the mind map/flash card.
- **Teach it:** Teach someone the information on your knowledge organiser, let them ask you questions and see if you know the answers.

## How will we use knowledge organisers in Biology?

- **Test:** We will do regular low stakes tests to check your ability to retrieve information from memory.
- **Mark our answers:** Once you have done a low stake test you can mark your work using the knowledge organiser.
- **Improve our work:** Once you have finished a piece of work you may be asked to check your knowledge organiser to see if there is any information on it that you could add into an answer.

Term	Topic/s	Year group
2	Topic 13 & 14: Evolution by Extinction and Genetic technologies	11

### Tier 2 'unlocking' language

Evidence

Selective

Offspring

Preserve

Remains

Engineer

Ethics

Debate

### Tier 3 subject relevant language

Fossilization

Extinction

Evolution

Natural Selection

Asteroid

Breed

Inheritance

Technologies



# Knowledge Organiser: Topic 13- Evolution by Extinction and Topic 14- Genetic Technologies

## Keywords

**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.

**genetic engineering** – The process by which scientists manipulate and change the genotype of an organism.

**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.

**speciation** – The process by which two species evolve from a single original species by natural selection. The two populations have become so different that they can no longer interbreed to produce fertile offspring.

**variation** - Differences in characteristics of individuals in a population.

## Variation

Variation maybe be due to differences in:

- the genes that have been inherited (genetic causes);
- the conditions in which they have developed (environmental causes);
- a combination of genes and the environment.

## Evolution

All species of living things have evolved from simple life forms by natural selection.

- If a variant/characteristic is advantageous in an environment, then the individual will be better able to compete.
- This means they are more likely to survive and reproduce.
- Their offspring will inherit the advantageous allele.



## Fossils

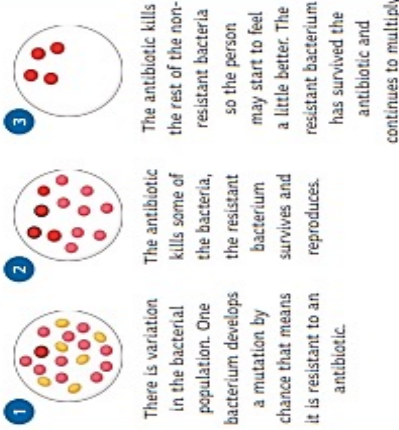
Fossils could be:

- the actual remains of an organism that has not decayed;
- mineralised forms of the harder parts of an organism, such as bones;
- traces of organisms such as footprints or burrows.

Many early life forms were soft-bodied so have left few traces behind.

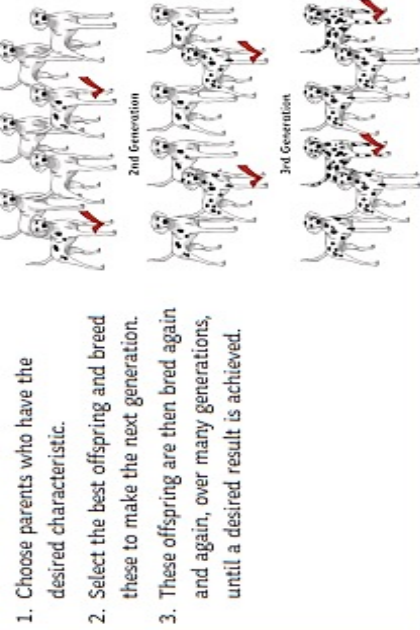
Fossils help us understand how much or little organisms have changed as life developed on earth.

## Resistant Bacteria

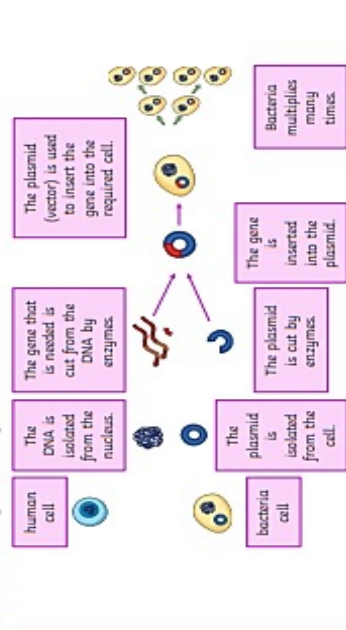


- To reduce the rate at which antibiotic-resistant strains appear:
- Antibiotics should only be used when they are really needed, not for treating non-serious or viral infections.
  - Patients should complete their courses of antibiotics, even if they start to feel better.
  - The agricultural use of antibiotics should be restricted.

## Selective Breeding



## Genetic Engineering



## Classification

Linnaeus classified living things into kingdom, phylum, class, order, family, genus and species.

Organisms are named by the binomial system of genus and species. Due to evidence from chemical analysis, there is now a 'three-domain system' developed by Carl Woese.

Domain	bacteria	archaea	eukaryota
Kingdom	eubacteria	archaeobacteria	protista fungi plantae animalia

Leave blank to allow students to glue.





# How do we use Knowledge Organisers in Biology

## How can you use knowledge organisers at home to help us?

- **Retrieval Practice:** Read over a section of the knowledge organiser, cover it up and then write down everything you can remember. Repeat until you remember everything.
- **Flash Cards:** Using the Knowledge Organisers to help on one side of a piece of paper write a question, on the other side write an answer. Ask someone to test you by asking a question and seeing if you know the answer.
- **Mind Maps:** Turn the information from the knowledge organiser into a mind map. Then reread the mind map and on a piece of paper half the size try and recreate the key phrases of the mind map from memory.
- **Sketch it:** Draw an image to represent each fact; this can be done in isolation or as part of the mind map/flash card.
- **Teach it:** Teach someone the information on your knowledge organiser, let them ask you questions and see if you know the answers.

## How will we use knowledge organisers in Biology?

- **Test:** We will do regular low stakes tests to check your ability to retrieve information from memory.
- **Mark our answers:** Once you have done a low stake test you can mark your work using the knowledge organiser.
- **Improve our work:** Once you have finished a piece of work you may be asked to check your knowledge organiser to see if there is any information on it that you could add into an answer.

Term	Topic/s	Year group
2	Topic 7: Humans and the environment	11

### Tier 2 'unlocking' language

Transfer

Breakdown

Competition

Cycle

Death

Data

Analysis

Global

### Tier 3 subject relevant language

Biodiversity

Decay

Pollution

Decomposers

Extinction

Population

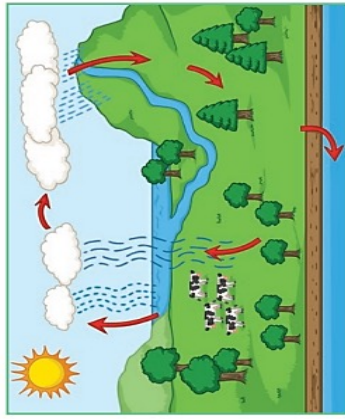
Deforestation

Atmosphere



# Knowledge Organiser: Topic 7- Humans and the environment

## Water Cycle



**Convection** is the movement caused within a fluid as the hotter, less dense material rises and colder, denser material sinks under the influence of gravity. This results in the transfer of heat.

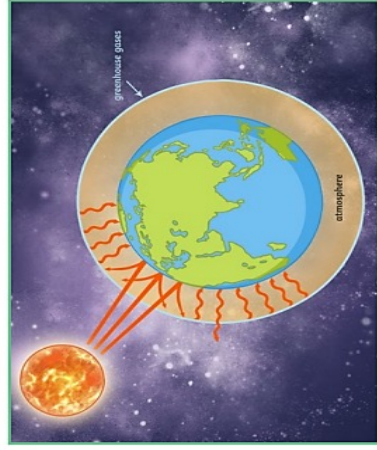
**Evaporation** occurs when heat energy from the surroundings (or a heat source) is transferred to water particles as kinetic energy. The particles begin to move more rapidly and can turn from a liquid into a gas.

**Condensation** occurs when moving particles transfer kinetic energy to the surroundings. The particles begin to move even more slowly and can turn from a gas into a liquid.

**Precipitation** occurs when rain, snow, sleet, or hail falls to (or condenses on) the ground.

**Transpiration** is the process by which water is carried through plants from roots to the stomata on the underside of leaves and it evaporates into the surroundings.

## Global Warming



The **greenhouse effect** is the natural process where some of the Sun's radiation is trapped within the insulating layer of the atmosphere. This maintains a temperature suitable to support life on Earth.

Most of the radiation from the Sun is absorbed by the Earth when it reaches the surface. The rest of the infrared radiation is reflected from the surface and absorbed by the greenhouse gases and clouds in the atmosphere. This is then re-emitted in all directions.

However, due to many contributing factors, the global temperature is gradually increasing. Several gases, called greenhouse gases, trap the heat around the Earth; the most concerning is carbon dioxide. Human activities contribute to the excess amount of carbon dioxide in the atmosphere and so are a cause of global warming.

Global warming leads to the melting of ice caps, rising sea levels, flooding, changes to climate, changes in migration patterns, changes in species distribution and reduction in biodiversity.

## Biodiversity and Waste Management

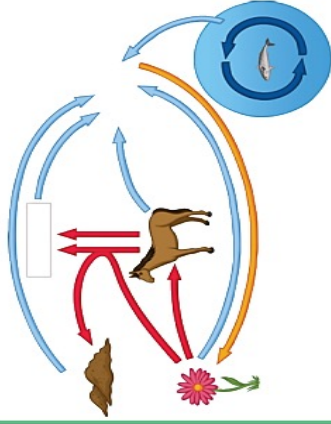
Biodiversity is the variety of living organisms on the earth or in an ecosystem. It is important in helping to maintain stable ecosystems. Organisms are often interdependent, relying on others as food sources, or to create suitable environmental conditions to survive. Human survival is also dependent on this biodiversity.

The global human population has exceeded 7 billion. Human population has increased due to modern medicine and farming methods, reducing famine and death from disease. This means a greater demand for food, resources and water. It also means more waste and emissions are created.



Sewage, toxic chemicals, household waste and gas emissions pollute the water, land and air, killing plants and animals and reducing biodiversity.

## Carbon Cycle



The main focus on the carbon cycle is its transfer to and from the atmosphere. When carbon is in the atmosphere, it combines with oxygen to form carbon dioxide, a greenhouse gas.

Carbon is transferred from the atmosphere when plants absorb carbon dioxide for photosynthesis and when the gas is dissolved into oceans.

Carbon is transferred to the atmosphere through respiration by animals, plants and bacteria and by combustion of fossil fuels (coal, oil and natural gas).

Dead animals and plants are decomposed and their matter is broken down by microbes and fungi. These organisms are collectively called decomposers. When the organisms are broken down, the microbes and fungi release carbon dioxide into the atmosphere through respiration.



Leave blank to allow students to glue.



# How do we use Knowledge Organisers in Biology

## How can you use knowledge organisers at home to help us?

- **Retrieval Practice:** Read over a section of the knowledge organiser, cover it up and then write down everything you can remember. Repeat until you remember everything.
- **Flash Cards:** Using the Knowledge Organisers to help on one side of a piece of paper write a question, on the other side write an answer. Ask someone to test you by asking a question and seeing if you know the answer.
- **Mind Maps:** Turn the information from the knowledge organiser into a mind map. Then reread the mind map and on a piece of paper half the size try and recreate the key phrases of the mind map from memory.
- **Sketch it:** Draw an image to represent each fact; this can be done in isolation or as part of the mind map/flash card.
- **Teach it:** Teach someone the information on your knowledge organiser, let them ask you questions and see if you know the answers.

## How will we use knowledge organisers in Biology?

- **Test:** We will do regular low stakes tests to check your ability to retrieve information from memory.
- **Mark our answers:** Once you have done a low stake test you can mark your work using the knowledge organiser.
- **Improve our work:** Once you have finished a piece of work you may be asked to check your knowledge organiser to see if there is any information on it that you could add into an answer.

Term	Topic/s	Year group
2	Topic 12: Organisms and their Environment	11

### Tier 2 'unlocking' language

Impact

Competition

Cycle

Environment

Relationship

Classify

Distribution

Abundance

### Tier 3 subject relevant language

Pollution

Classification

Biodiversity

Quadrat

Community

Adaptation

Biomass

Interdependence



# Knowledge Organiser: Topic 12: Organisms and their Environment

## Abiotic and Biotic Factors

**Abiotic** factors are the non-living factors of an environment. E.g. moisture, light, temperature, CO<sub>2</sub>, wind, O<sub>2</sub> or pH.

**Biotic** factors are the living factors of an environment. E.g. predators, competition, pathogens, availability of food.

## Adaptations

Adaptations are specific features of an organism which enable them to survive in the conditions of their habitat. Adaptations can be structural, behavioural or functional:

- **Structural adaptations** are features of the organism's body e.g. colour for camouflage.
- **Behavioural adaptations** are how the organism behaves e.g. migration to a warmer climate during colder seasons.
- **Functional adaptations** are the ways the physiological processes work in the organism e.g. lower metabolism during hibernation to preserve energy.

A plant or animal will not physically change to adapt to its environment in its lifetime. Instead, there is natural variation within the species and only organisms whose features are more advantageous in the environment survive. The survivors then go on to reproduce and pass on their features to some of their offspring. The offspring who inherit these advantageous features are better equipped to survive.



Charles Darwin described this process as 'survival of the fittest'.

## Food Chains

The source of all energy in a food chain is the sun's radiation. It is made useful by plants and algae which produce organic compounds through photosynthesis.

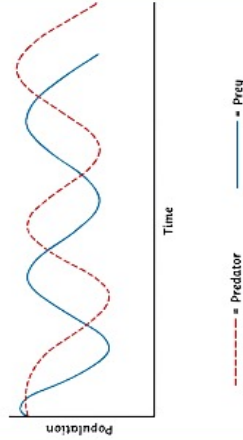


The living organisms use the energy to produce biomass and grow.

When a living organism is consumed, some of the biomass and energy is transferred. Some of the energy is lost.

Remember: the arrow in a food chain indicates the direction of the flow of energy.

Populations of predators and prey increase and decrease in cycles. The size of the predator population depends on the size of the prey population and vice versa. Overall, there is a stable community.



## Competition

Species will compete with one another and also within their own species to survive and to reproduce.

**Mutualism** occurs when both species benefit from a relationship.

**Parasitism** occurs when a parasite only benefits from living on the host.

Animals compete for resources such as food, water and space/shelter. They may also compete within their own species for mates.

Plants compete for resources including light, water, space and minerals. All these resources are needed for photosynthesis so the plant can make its own food. Plants do not need to compete for food.

## Deforestation and Land Use

Humans use land for buildings, quarrying, mining, agriculture and landfill. As the human population increases and we take more land, there is less space for other organisms to live.

Deforestation (to use wood as a fuel/material or to clear space for other uses) destroys habitats where other organisms live.

Peat bogs are produced when decomposition occurs over a very long time. Peat stores a lot of carbon and can be extracted for use by gardeners or as an energy source. Burning peat releases a lot of carbon dioxide into the atmosphere which contributes to the greenhouse effect.

Trees absorb carbon dioxide for photosynthesis, so as they are cut down and removed, less carbon dioxide is taken from the atmosphere. Furthermore, when the trees are burned, they release carbon dioxide back into the atmosphere. The excess carbon dioxide can lead to global warming and the changes to the ecosystem cause reduced biodiversity.

## RPI: Field Techniques Quadrats and Transects

The distribution of an organism is affected by the environment and abiotic factors.

Quadrats can be used to measure the frequency of an organism in a given area e.g. the school field. You could count the individual organisms or estimate the percentage cover. You must collect data from at least two areas to make a comparison. Quadrats should always be placed randomly.

Transects are used to measure the change of distribution across an area e.g. from the edge of a river and moving further from the water's edge. You could either count the number of organisms touching the transect at regular intervals or use a quadrat placed at regular intervals along the transect.

$$\text{mean} = \frac{\text{total number of organisms}}{\text{number of quadrats}}$$



Leave blank to allow students to glue.