AQA GCSE Biology Paper 2 Revision

Inheritance, Variation and Evolution

Revision Session

Content you will **NOT** be assessed on

6.1.1 Reproduction

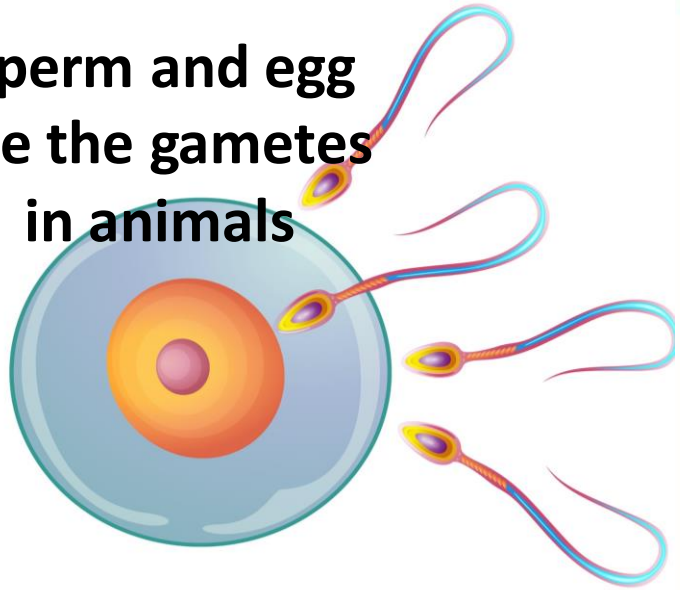
Sexual Reproduction

Sexual reproduction involves the joining (fusion) of male and female **gametes**.

The gametes are formed through meiosis. This is a type of cell division that leads to the formation of **non identical cells**.

There is **mixing of genetic information** which leads to **variation** in the offspring.

Sperm and egg are the gametes in animals



Pollen and egg are the gametes in flowering plants

CS/F CS/H SS/F SS/H

6.1.1 Reproduction

Asexual Reproduction

- Asexual reproduction involves only one parent and **no fusion** of **gametes**.
- There is no mixing of genetic information.
- This leads to genetically identical offspring (**clones**).
- Only **mitosis** is involved. This is a type of cell division that leads to identical cells being formed

Both can reproduce asexually

CS/F CS/H SS/F SS/H

Exam Practice

1. All the offspring produced are genetically identical. What name is given to genetically identical organisms? (1 mark)

Clone

2. A gardener wanted to produce a new variety of onion. Explain why sexual reproduction could produce a new variety of onion. (3 marks)

Fertilisation occurs **Leading to mixing of genetic information** **As gametes are produced by meiosis**

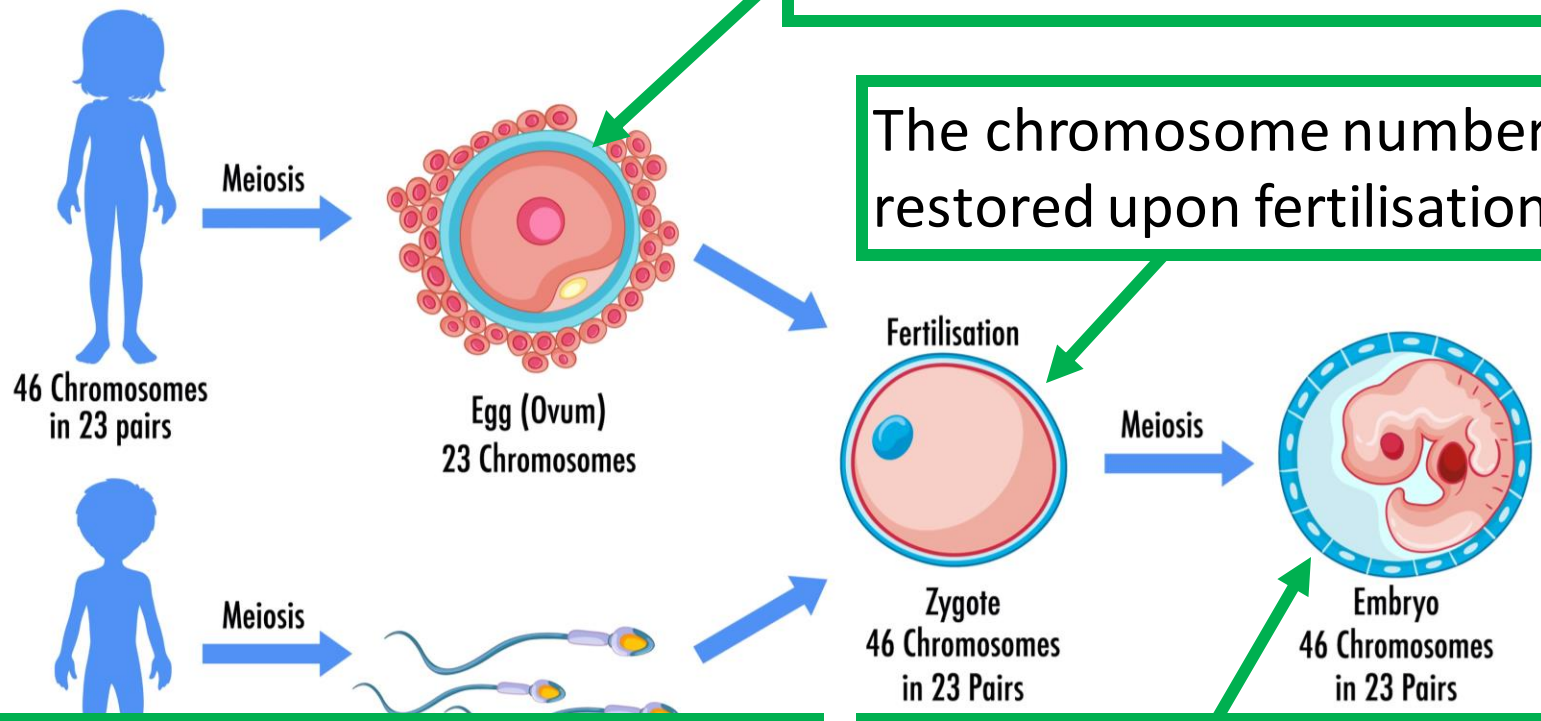
3. Give two advantages to living things of reproducing sexually rather than asexually. (2 marks)

Causes variations

Which reduces the chance of the whole population being wiped out by a disease

6.1.2 Meiosis

Gametes contain half the number of chromosomes.



The chromosome number is restored upon fertilisation.

Cells in reproductive organs divide by meiosis to make gametes.

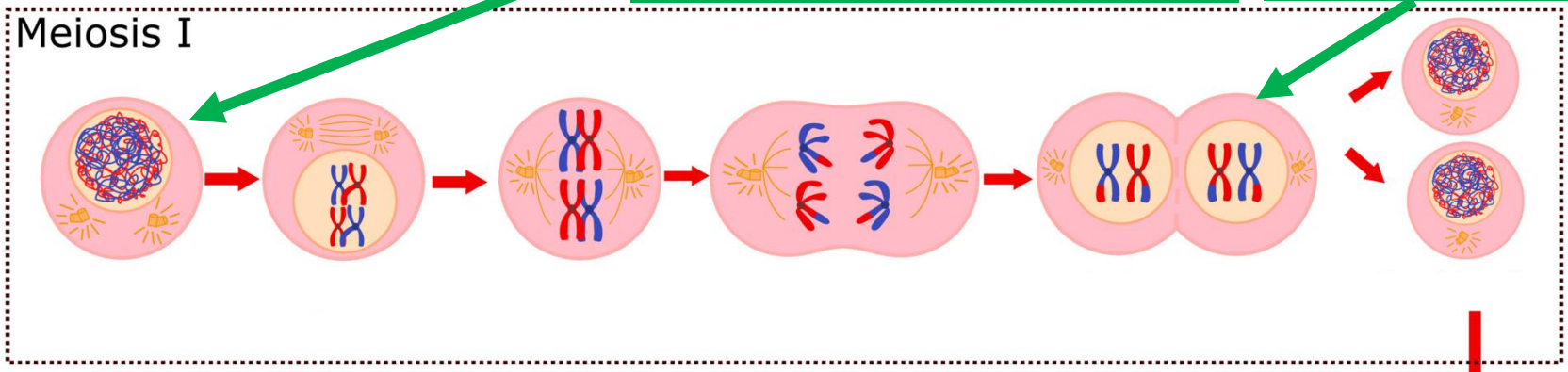
The cells divide by mitosis. As the embryo develops cells differentiate.

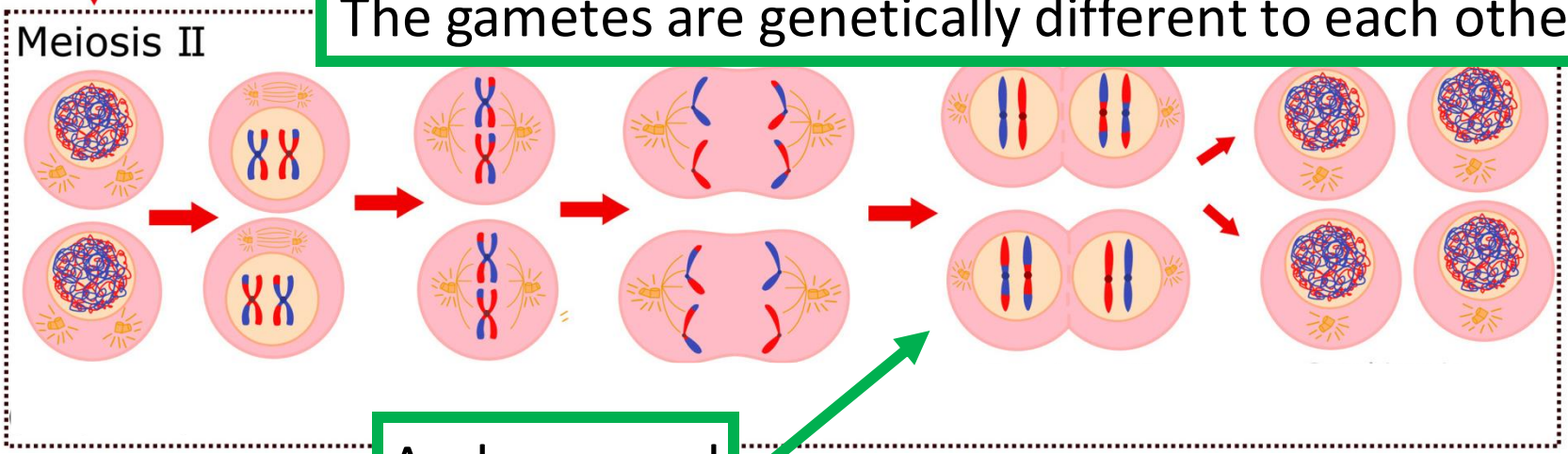
CS/F CS/H SS/F SS/H

6.1.2 Meiosis

During meiosis genetic information is copied.

Cell divides once





The gametes are genetically different to each other.

And a second time.

CS/F CS/H SS/F SS/H

6.1.3 Sexual & Asexual Reproduction

Think
Pair
Share

What are the advantages and disadvantages of **sexual reproduction**?

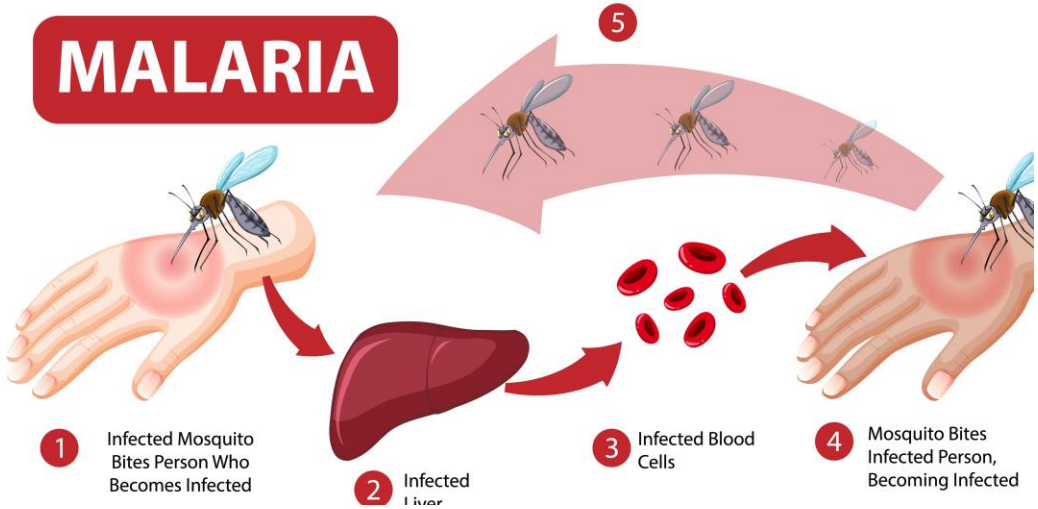
Advantages of Sexual Reproduction	Disadvantages of Sexual Reproduction

6.1.3 Sexual & Asexual Reproduction

Think Pair Share

Which organisms can reproduce sexually and sexually?

Organism	When it Reproduces Asexually	When it Reproduces Sexually
Malarial Parasites	In the human host	In the mosquito



CS/F CS/H SS/F SS/H

6.1.3 Sexual & Asexual Reproduction

Think
Pair
Share

Which organisms can reproduce sexually and sexually?

Organism	When it Reproduces Asexually	When it Reproduces Sexually
Fungi	When it produces spores.	They produce sex cells which fuse. The offspring will have variation.

6.1.3 Sexual & Asexual Reproduction

Think
Pair
Share

Which organisms can reproduce sexually and sexually?

Organism	When it Reproduces Asexually	When it Reproduces Sexually
Plants	Strawberry plants make runners, in daffodils bulbs divide.	When they produce flowers which are pollinated.

CS/F CS/H SS/F SS/H

6.1.4 DNA and the Genome

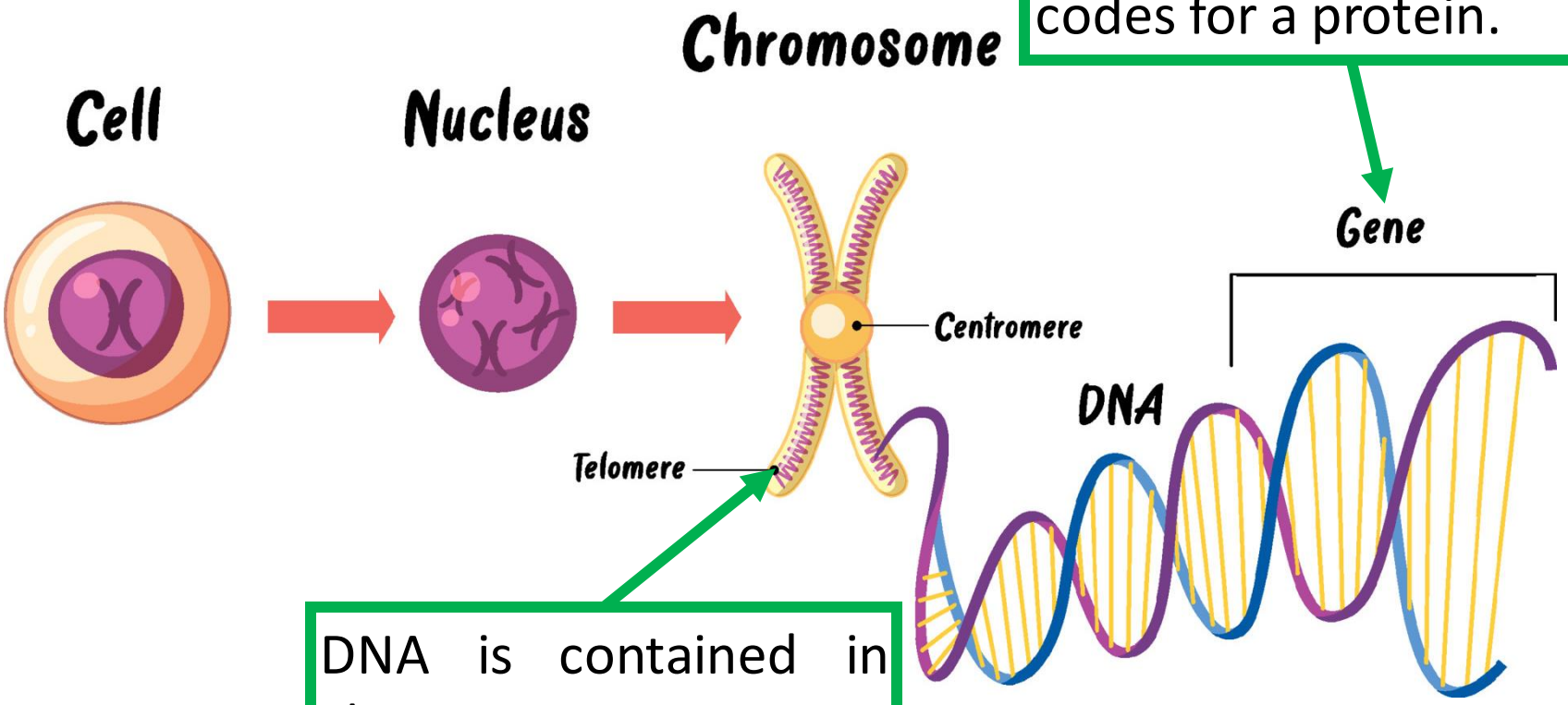
The genetic material found in the nucleus is made up of a chemical called DNA

DNA is a polymer made up of two strands forming a double helix.

CS/F CS/H SS/F SS/H

6.1.4 DNA and the Genome

A gene is a small section of DNA that codes for a protein.

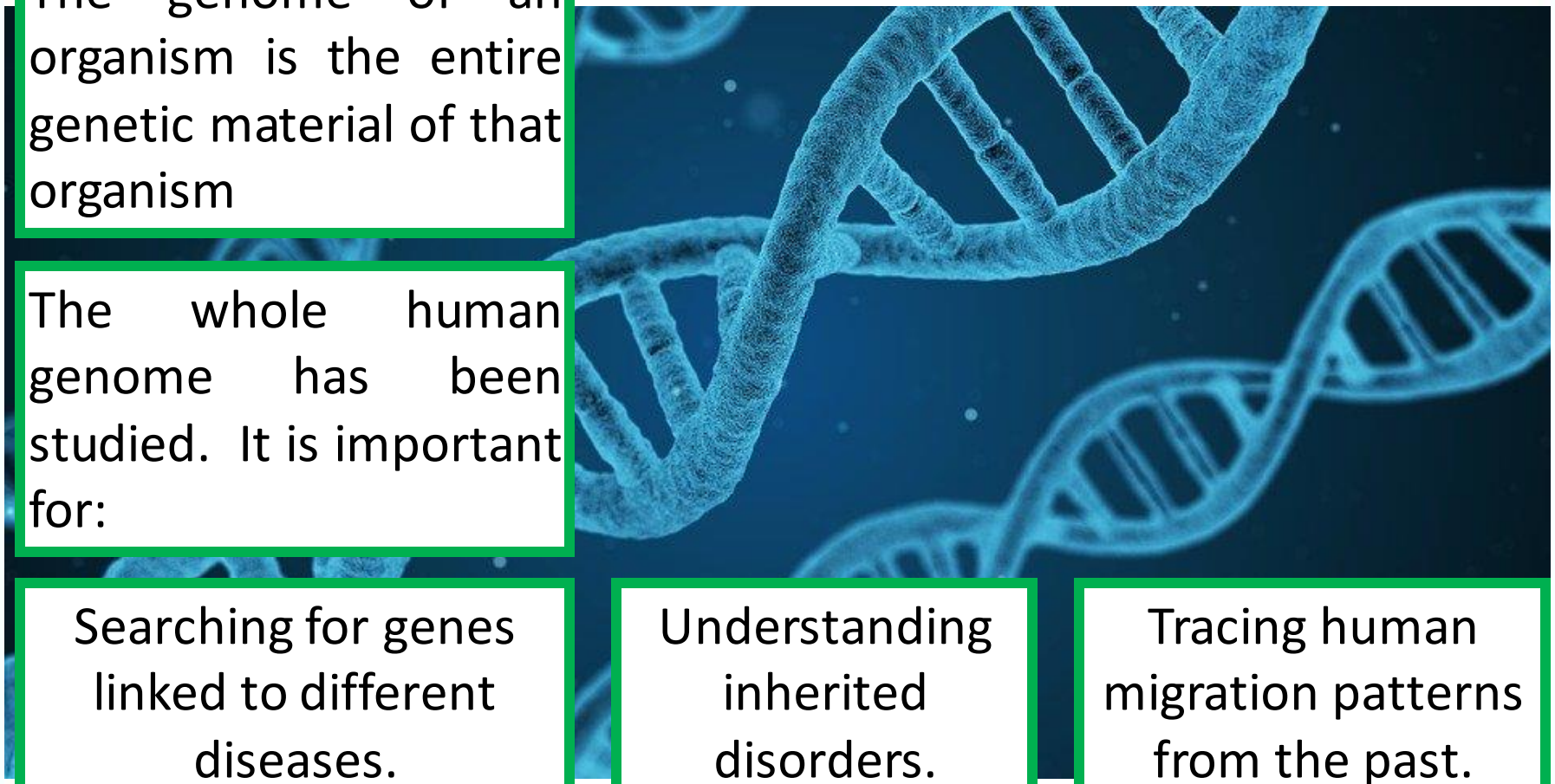


DNA is contained in chromosomes

CS/F CS/H SS/F SS/H

6.1.4 DNA and the Genome

The genome of an organism is the entire genetic material of that organism



The whole human genome has been studied. It is important for:

- Searching for genes linked to different diseases.
- Understanding inherited disorders.
- Tracing human migration patterns from the past.

6.1.5 DNA Structure

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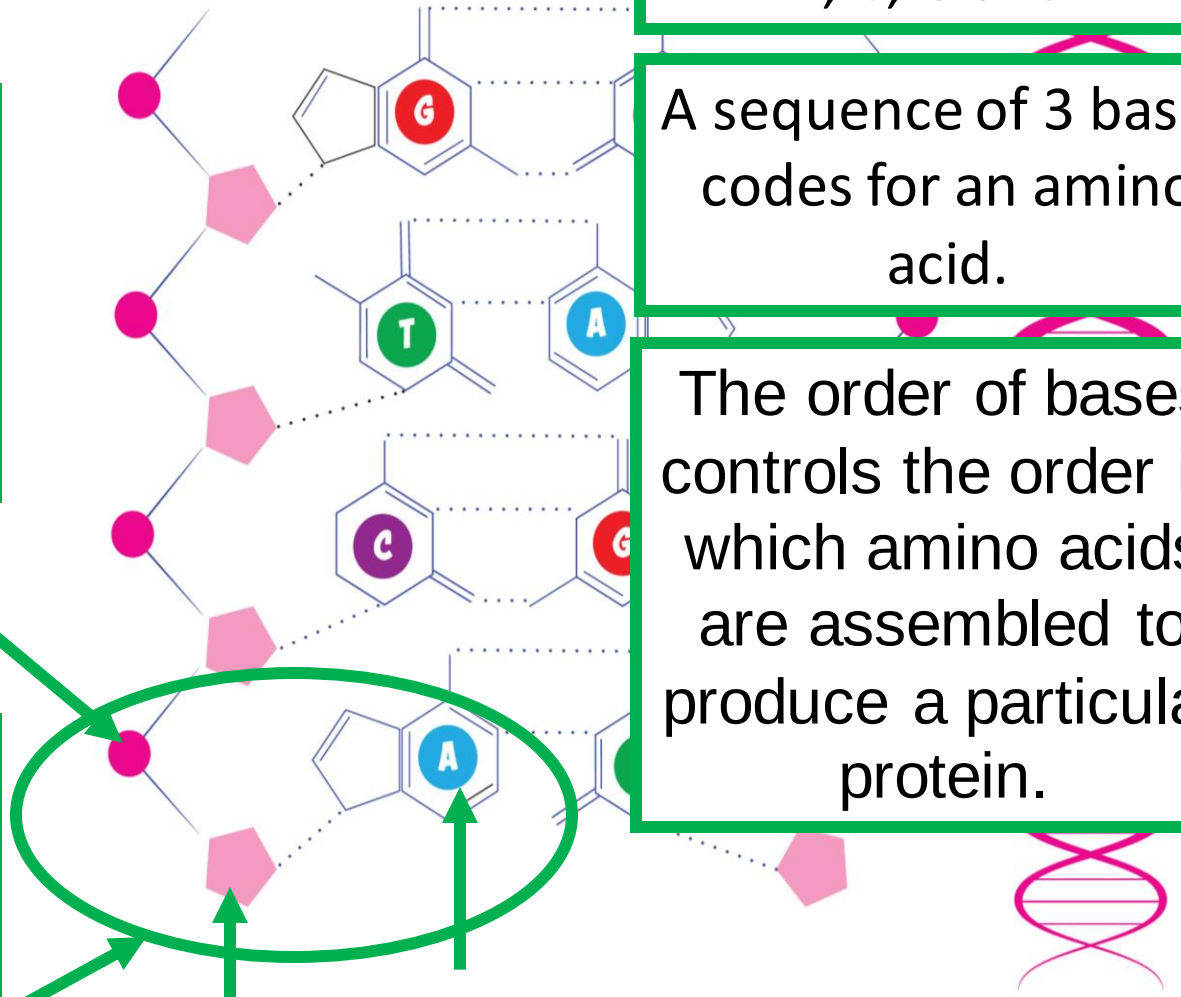
DNA contains 4 bases, A, C, G ant T.

A sequence of 3 bases codes for an amino acid.

The order of bases controls the order in which amino acids are assembled to produce a particular protein.

DNA is a polymer made from four different nucleotides.



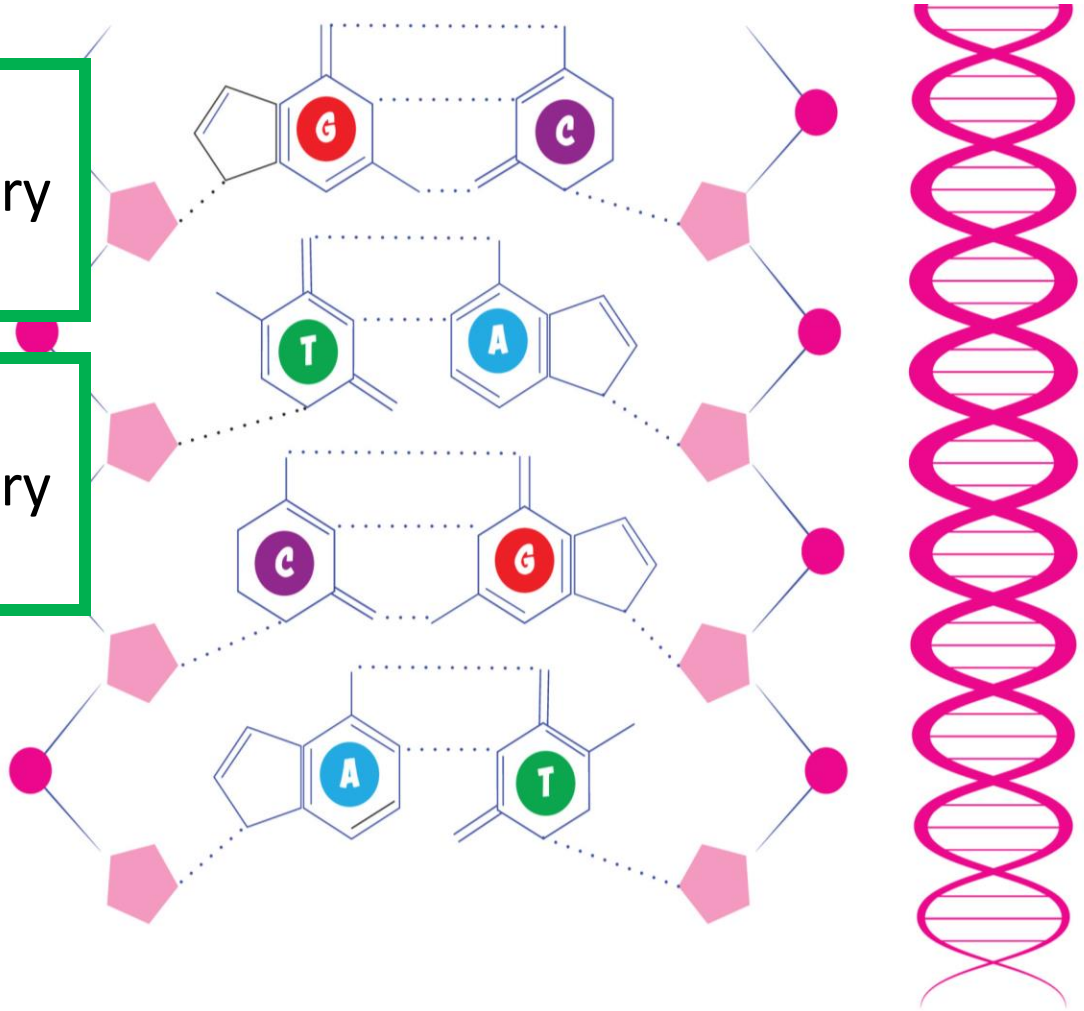
A nucleotide is made up of a common sugar, a phosphate group and one of four different bases

CS/F CS/H SS/F SS/H

6.1.5 DNA Structure

C is always complimentary linked to G.

T is always complimentary linked to A.



CS/F CS/H SS/F SS/H

6.1.5 DNA Structure

Key Term	Definition
Protein Synthesis	
Ribosome	
Mutation	

CS/F CS/H SS/F SS/H

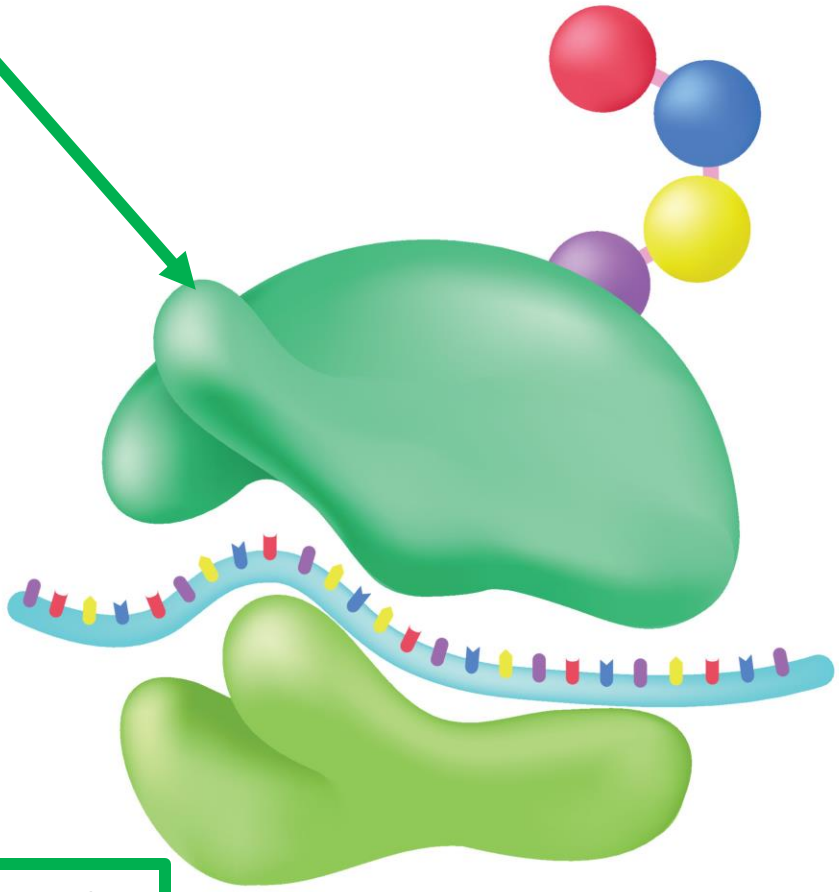
6.1.5 DNA Structure

Proteins are synthesised on ribosomes, according to a template.

Carrier molecules bring specific amino acids to add to the growing protein chain in the correct order.

When the protein chain is complete it folds up to form a unique shape.

This unique shape enables the proteins to do their job as enzymes, hormones or forming structures in the body such as collagen.



CS/F CS/H SS/F SS/H

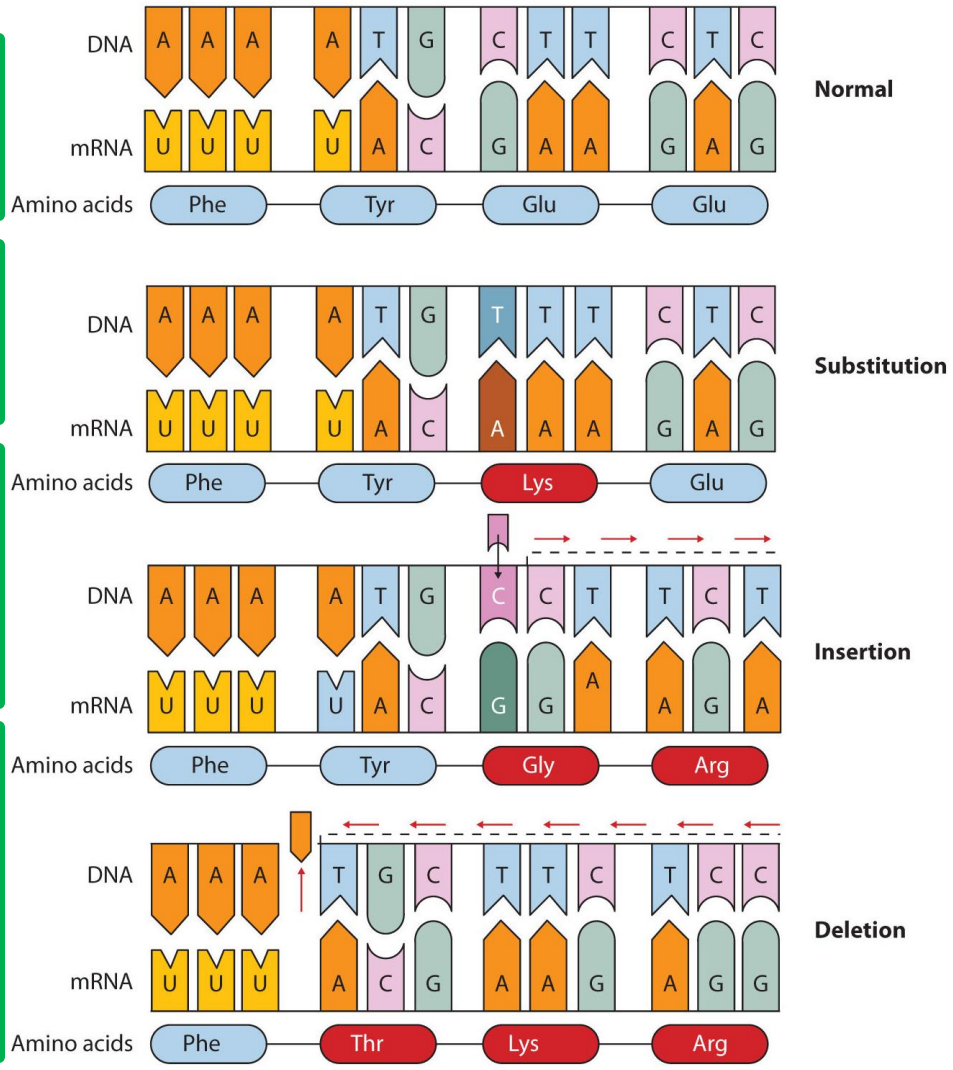
6.1.5 DNA Structure

Mutations occur continuously.

Most do not alter the protein

Most mutations do not cause a change in phenotype.

Some parts of DNA are non coding and so a mutation in these parts would not cause a change.



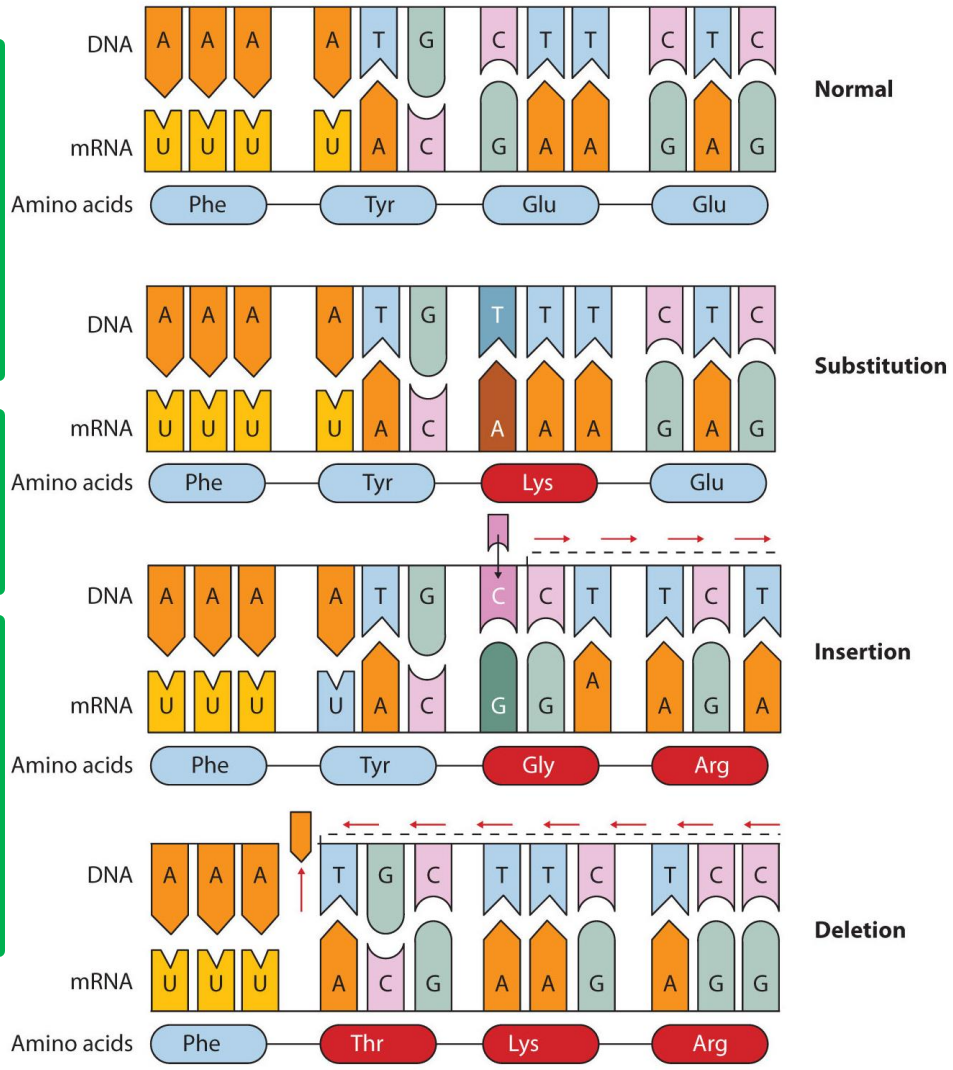
CS/F CS/H SS/F SS/H

6.1.5 DNA Structure

A change in DNA structure may result in a change in the protein synthesised by a gene.

A few mutations code for an altered protein shape.

An enzyme may no longer fit the substrate binding site or a structural protein may lose its strength.



CS/F CS/H SS/F SS/H

Exam Practice

Describe the structure of a nucleotide.

Phosphate

Attached to a sugar

Base attached to sugar

Bases are A, C, G and T

(4)

Exam Practice

The length of a DNA double helix increases by 0.34 nm for every pair of nucleotides.

The total number of nucleotides in a human body cell is 1.2×10^{10}.

Calculate the total length of double helix in a human body cell.

Give your answer in metres. Use information from the diagram.

0.34 x $1.2x10^{10}$

4 080 000 000nm

4 080 000 000/1,000,000,000

4.08m

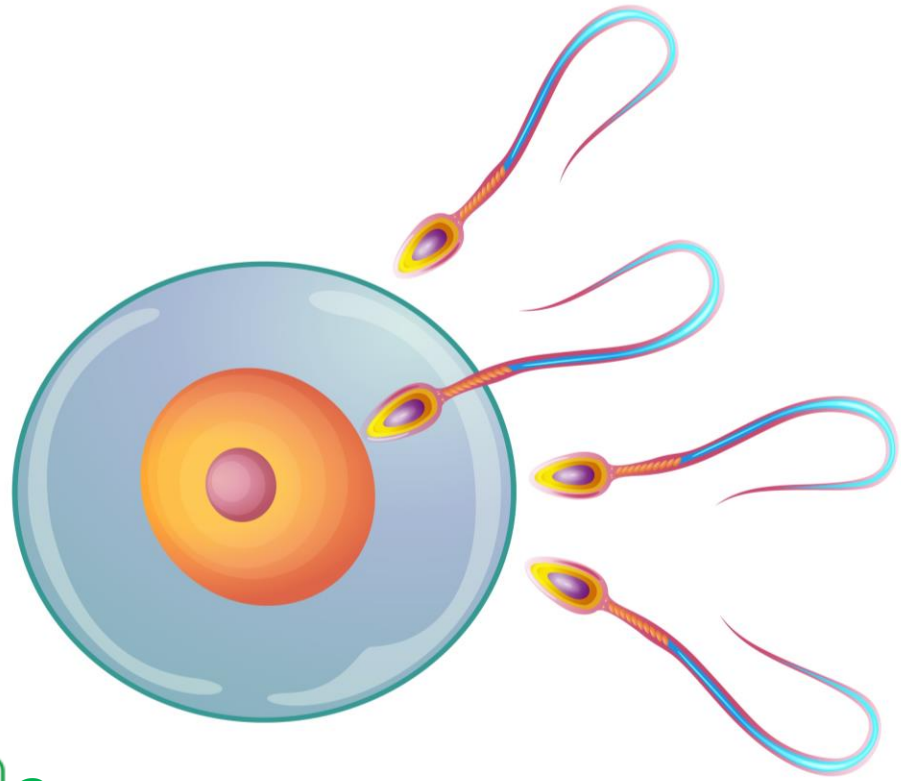
Divide by 2 = 2.04m

Total length = _____ m

(5)

6.1.6 Genetic Inheritance

Key Term	Definition
Gamete	Male and female sex cells. They are formed by meiosis and contain a half set of chromosomes.



CS/F CS/H SS/F SS/H

6.1.6 Genetic Inheritance

Key Term	Definition
Chromosome	
Gene	
Allele	

CS/F CS/H SS/F SS/H

6.1.6 Genetic Inheritance

Key Term	Definition
Dominant Allele	
Recessive Allele	

CS/F CS/H SS/F SS/H

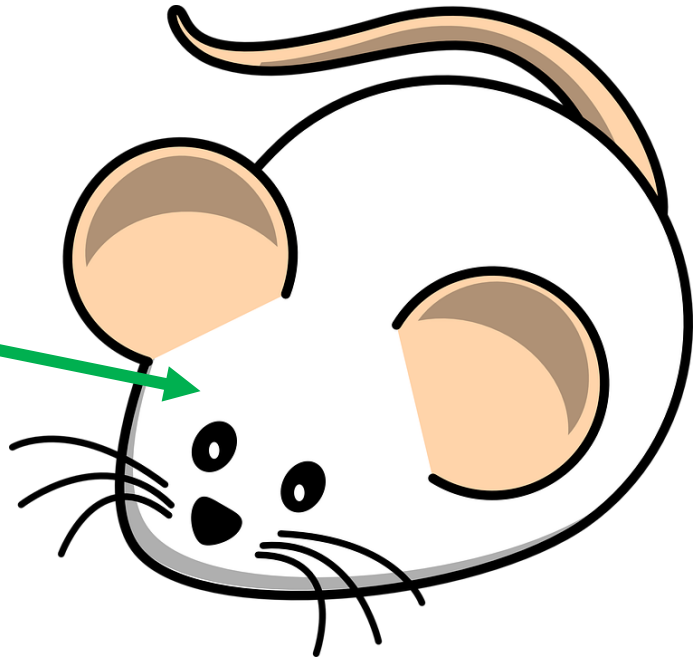
6.1.6 Genetic Inheritance

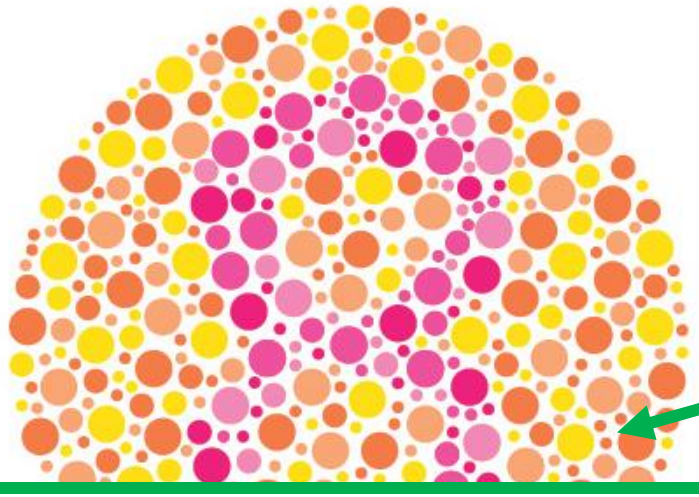
Key Term	Definition
Homozygous	
Heterozygous	
Genotype	
Phenotype	

6.1.6 Genetic Inheritance

Some characteristics are controlled by a single gene.

Fur colour in mice.





Colour blindness

Most characteristics are a result of multiple genes interacting, rather than a single gene.

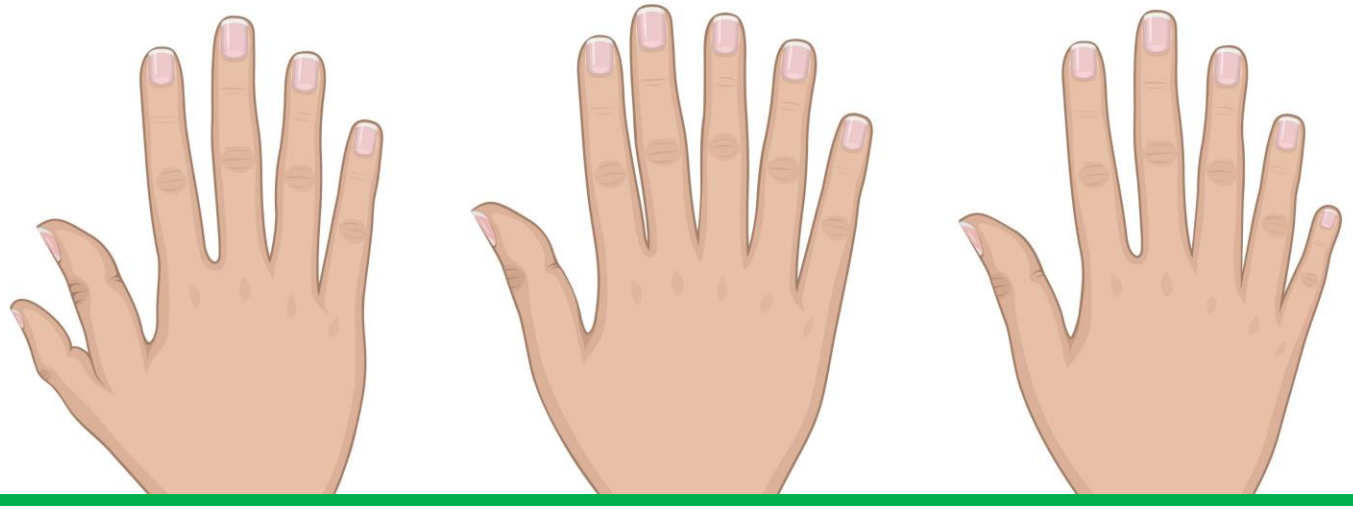
CS/F CS/H SS/F SS/H

6.1.7 Inherited Disorders

Think
Pair
Share

What is polydactyly? What causes it?

Types of Polydactyly



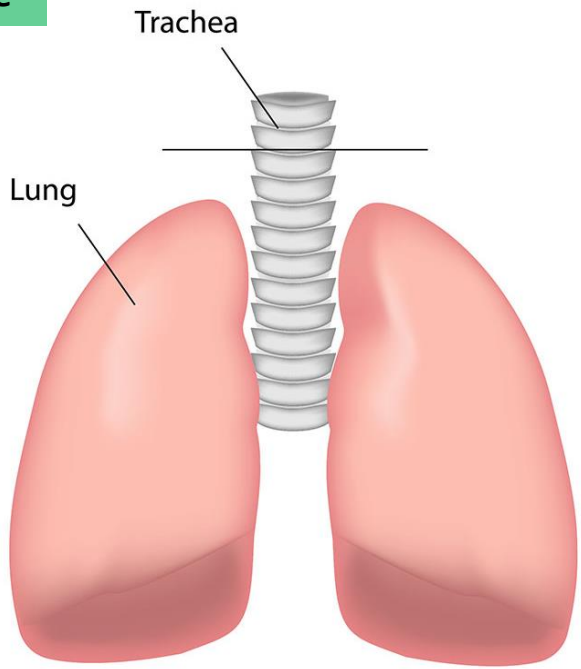
Polydactyly is a disorder in which an organism has extra fingers or toes. It is caused by a **dominant allele**.

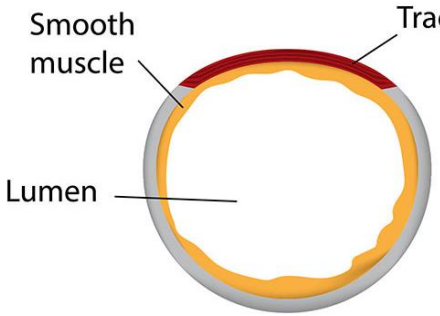
CS/F CS/H SS/F SS/H

6.1.7 Inherited Disorders

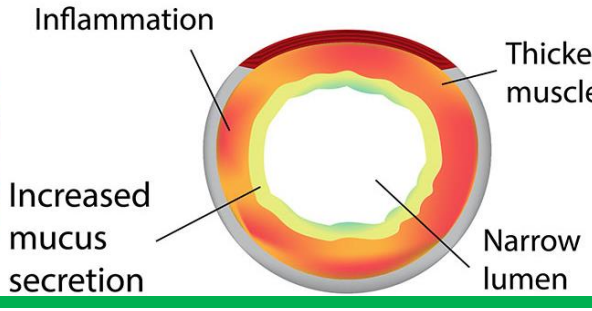
Think
Pair
Share

What is cystic fibrosis? What causes it?





Healthy



Cystic Fibrosis

Cystic Fibrosis is a disorder of cell membranes. It is caused by a **recessive allele**.

CS/F CS/H SS/F SS/H

6.1.7 Inherited Disorders

Question

A mother has a genotype of **Dd** for polydactyly while a father has a genotype for polydactyly of **dd**. Calculate the percentage chance of their child having polydactyly (4 marks)

Step 1:
Draw your Punnett Square diagram and add the genotype of the mother and father

Step 2:
Complete the cross of the different alleles

Step 3:
Identify the phenotype that you have been asked to find in the question

Step 4:
Calculate the chance of that phenotype occurring

Father \ Mother	D	d
d	d D	d d
d	d D	d d

dD: Polydactyly
2 in 4 chance
50%

CS/F CS/H SS/F SS/H

6.1.7 Inherited Disorders

Practice

Both a mother and a father has a genotype of **Dd**. Calculate the percentage chance of their child not having polydactyly (4 marks)

Step 1:
Draw your Punnett Square diagram and add the genotype of the mother and father

Step 2:
Complete the cross of the different alleles

Step 3:
Identify the phenotype that you have been asked to find in the question

Step 4:
Calculate the chance of that phenotype occurring

Father \ Mother	D	d
D	DD	Dd
d	dD	dd

dd: No Polydactyly
1 in 4 chance
25%

CS/F CS/H SS/F SS/H

6.1.7 Inherited Disorders

Practice

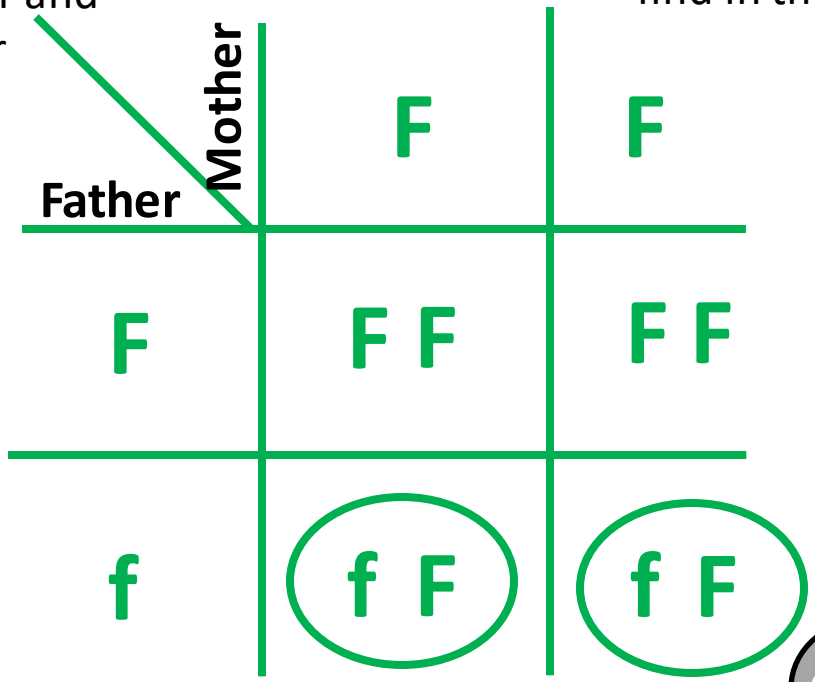
A mother has a genotype of **FF** and a father has a genotype of **Ff**. Calculate the percentage chance of their child being a carrier of cystic fibrosis (4 marks)

Step 1:
Draw your Punnett Square diagram and add the genotype of the mother and father

Step 2:
Complete the cross of the different alleles

Step 3:
Identify the phenotype that you have been asked to find in the question

Step 4:
Calculate the chance of that phenotype occurring



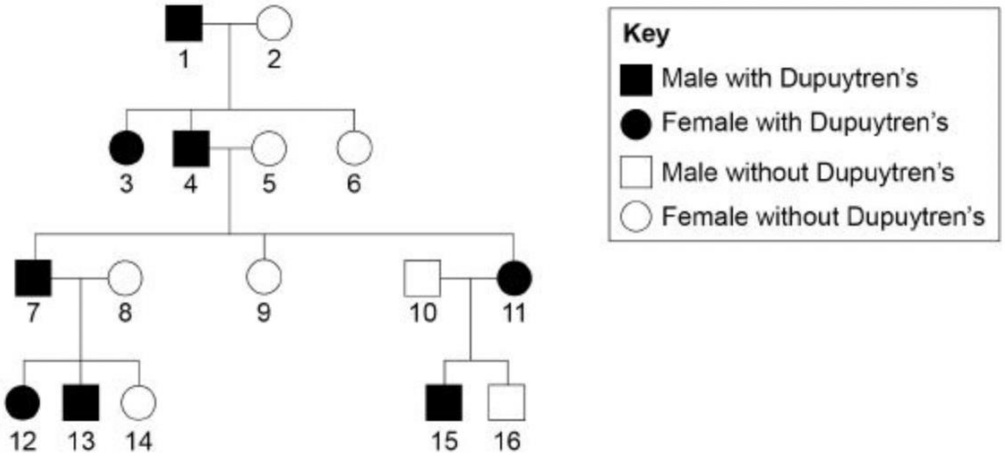
fF: Carrier
2 in 4 chance
50%

CS/F CS/H SS/F SS/H

Exam Practice

Dupuytren's is a disorder that affects the hands.

The diagram below shows the inheritance of Dupuytren's in one family.



Dupuytren's is caused by a dominant allele in this family.

D = dominant allele

d = recessive allele

Give the genotype of person **1**.

Explain your answer.

Genotype Dd

They have a child who does not have the disorder

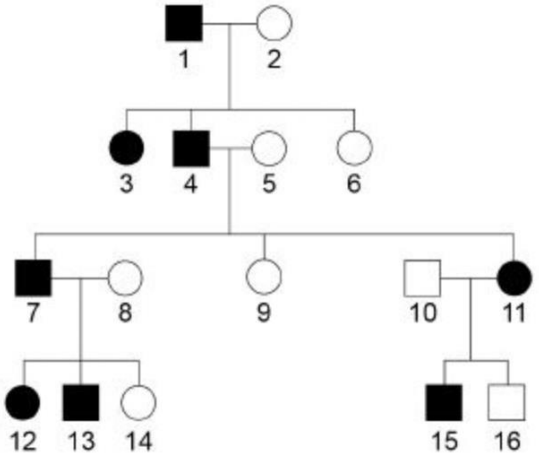
(2)

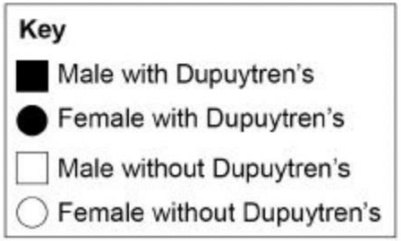
Exam Practice

Dupuytren's is a disorder that affects the hands.

The diagram below shows the inheritance of Dupuytren's in one family.

	D	d
d	Dd	dd
d	Dd	dd





Dupuytren's is caused by a dominant allele in this family.

D = dominant allele

d = recessive allele

Person **7** and person **8** in the diagram above are expecting a fourth child.

What is the probability of the child having Dupuytren's?

You should:

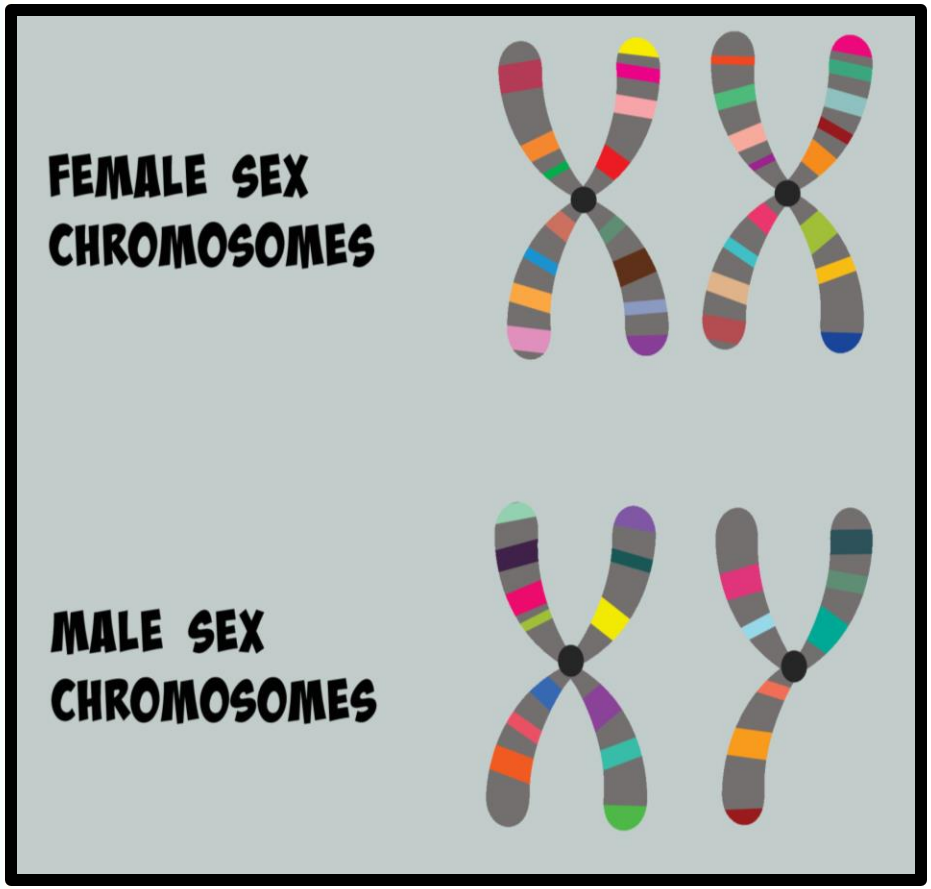
- draw a Punnett square diagram
- identify which offspring have Dupuytren's

50%

6.1.8 Sex Determination

Think
Pair
Share

How is sex determined?



Ordinary human body cells contain 23 pairs of chromosomes.

22 pairs of control characteristics only, but one of the pairs carries the genes that determine sex.

The **female** sex chromosomes are **XX**.

The **male** sex chromosomes are **XY**.

CS/F CS/H SS/F SS/H

6.1.8 Sex Determination

Think
Pair
Share

How can we model the inheritance of sex?

Step 1:
Draw your Punnett Square diagram and add the sex chromosomes of the mother and father

Step 2:
Complete the cross of the different chromosomes.

Step 3:
Identify the male and female sex chromosomes.

Step 4:
Calculate the chance of the offspring being male and female

Father \ Mother	X	X
X	XX	XX
Y	XY	XY

XX: Female 50%

XY: Male 50%

CS/F CS/H SS/F SS/H

6.2.1 Variation

Think
Pair
Share

What is variation?

Variation is the differences in characteristics of individuals in a population.

These differences can be due to:

The genes that they have inherited.

The conditions in which they have developed.

A combination of genes and the environment.

CS/F CS/H SS/F SS/H

6.2.1 Variation

Think
Pair
Share

How does variation occur?

Variants arise from mutations which happen continuously.

Most mutations have no effect on phenotype, but very rarely they can lead to a new phenotype.

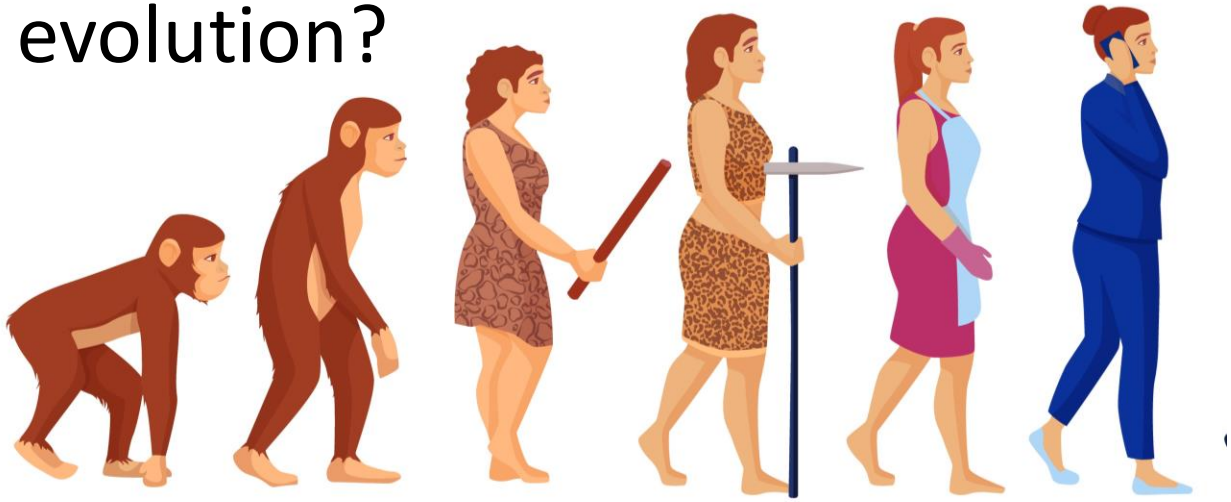
If the new phenotype is suited to an environmental change it can lead to a relatively quick change in the species.

CS/F CS/H SS/F SS/H

6.2.2 Evolution

Think
Pair
Share

What is evolution?



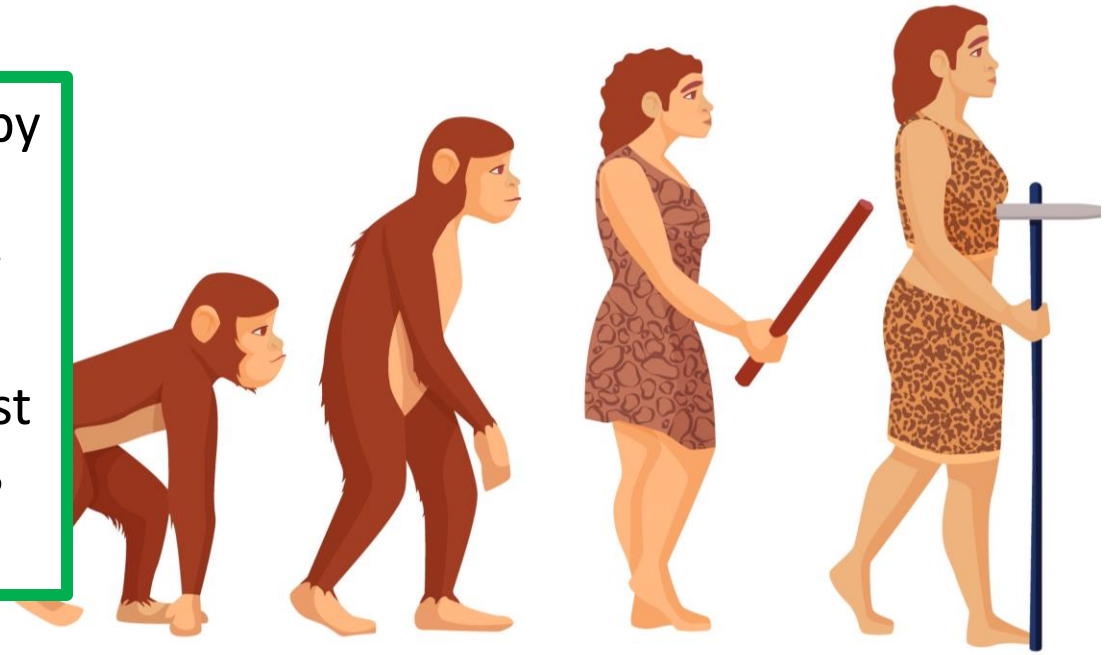
Key Term	Definition
Evolution	

6.2.2 Evolution

Think
Pair
Share

What is evolution?

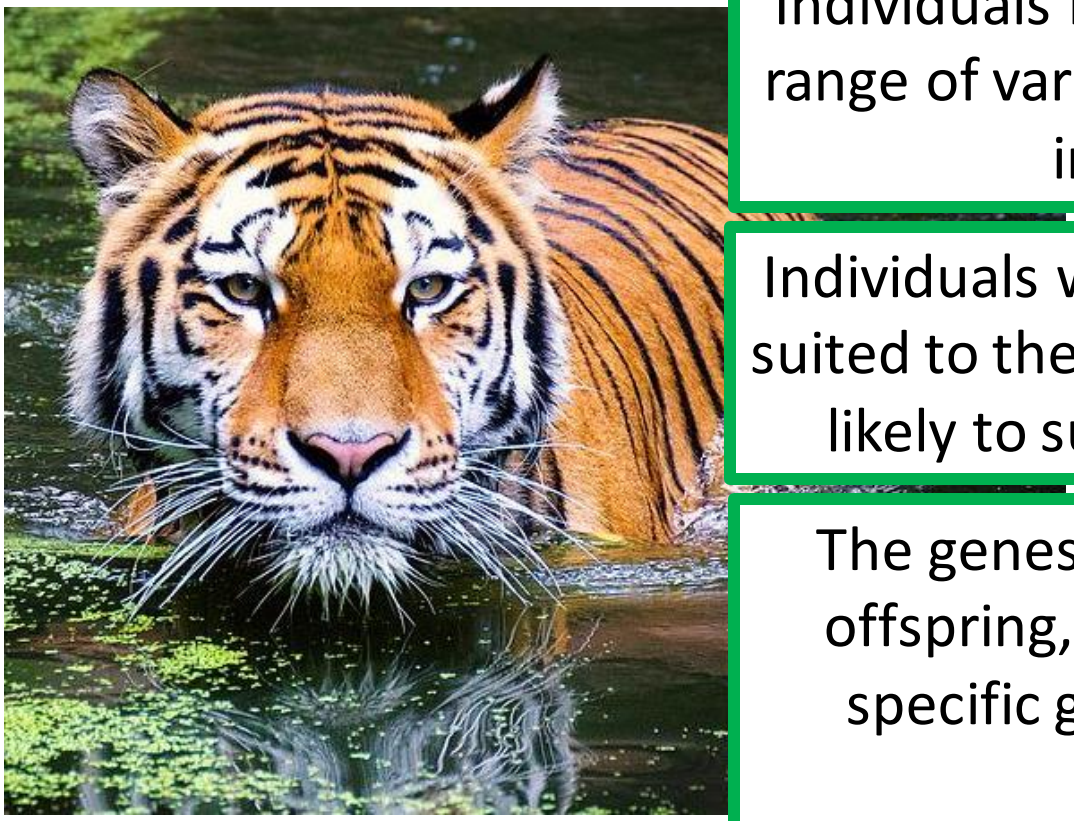
The theory of evolution by natural selection states that all species of living this have evolved from simple life forms that first developed more than 3 billion years ago.



6.2.2 Evolution

Think
Pair
Share

How does evolution occur?



Individuals in a species show a wide range of variation due to differences in their genes.

Individuals with characteristics most suited to their environment are more likely to survive and reproduce.

The genes are passed on to their offspring, which results in these specific genes becoming more common.

CS/F CS/H SS/F SS/H

6.2.2 Evolution

Think
Pair
Share

How does evolution occur?

If two populations become so different in phenotype that they can no longer interbreed to produce fertile offspring they have formed two new species.

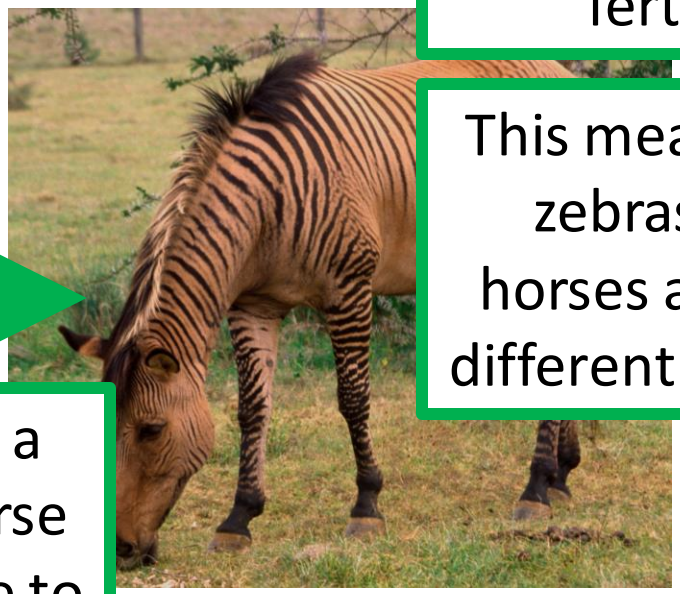
CS/F CS/H SS/F SS/H

6.2.2 Evolution

Think
Pair
Share

How does evolution occur?

For example a zebra and horse can reproduce to make a zorse.



The zorse is not fertile.

This means that zebras and horses are two different species.

CS/F CS/H SS/F SS/H

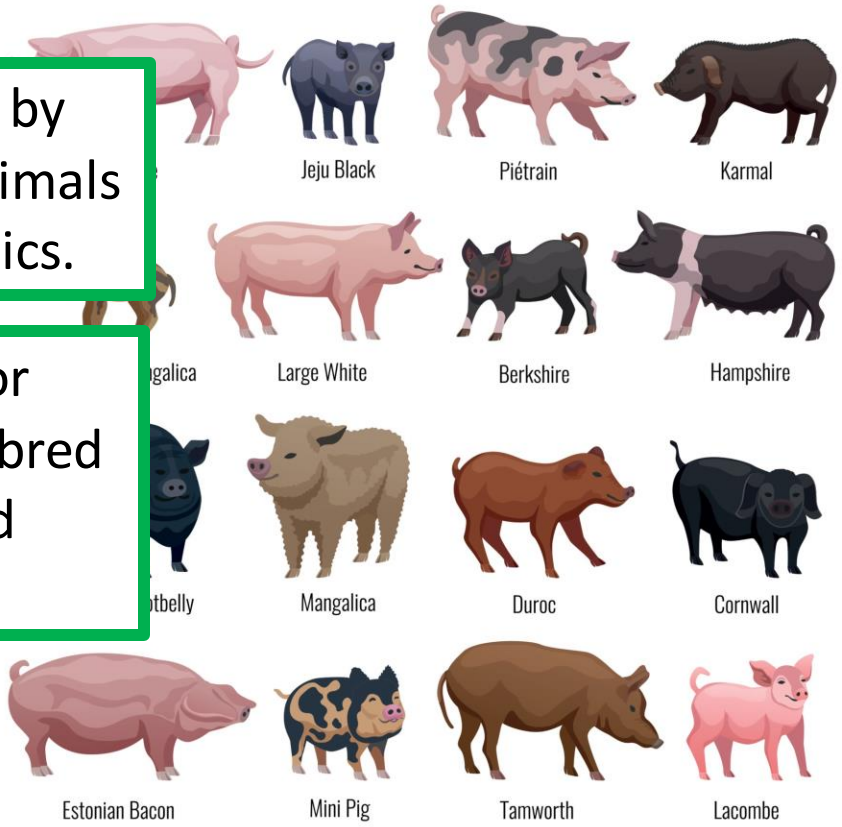
6.2.3 Selective Breeding

Think
Pair
Share

What is selective breeding?

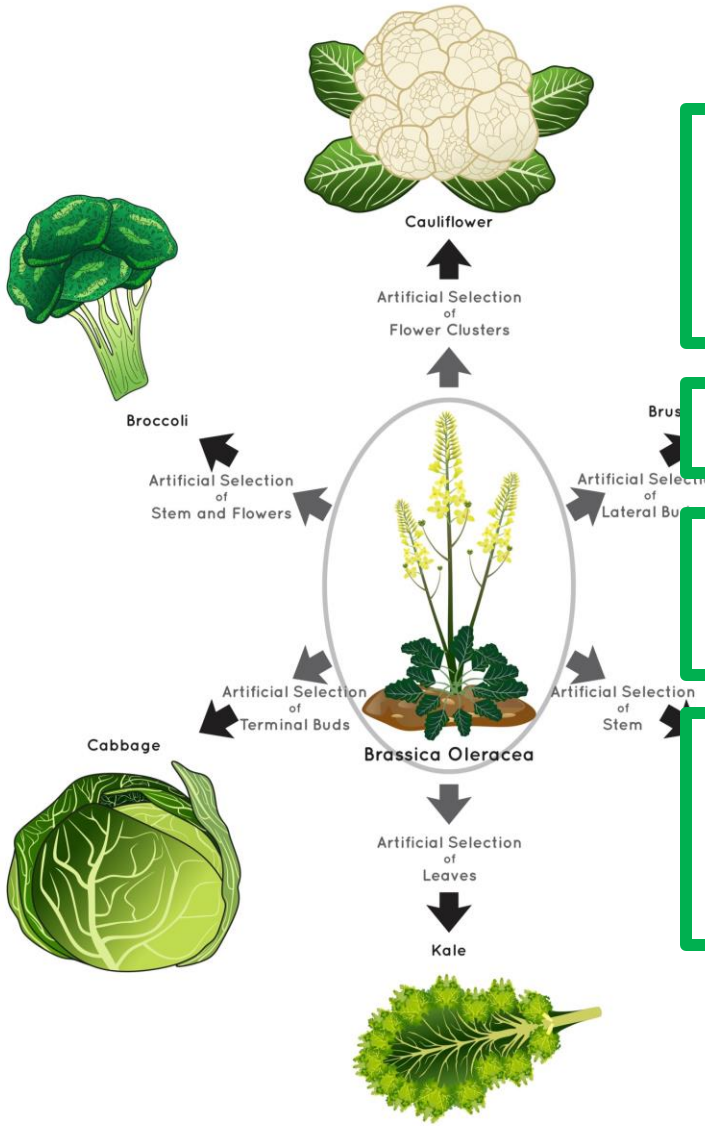
Selective breeding is the process by which humans breed plants and animals for particular genetic characteristics.

Humans have been doing this for thousands of years since they first bred food crops from wild plants and domesticated animals.



CS/F CS/H SS/F SS/H

6.2.3 Selective Breeding



Selective breeding involves choosing parents with the desired characteristic from a mixed population.

The parents are bred together.

The offspring with the desired characteristic are then bred together.

This continues over many generations until all the offspring show the desired characteristic.

CS/F CS/H SS/F SS/H

6.2.3 Selective Breeding

Think
Pair
Share

What are the advantages and disadvantages of selective breeding?

Benefits of Selective Breeding.	Risks of Selective Breeding

CS/F CS/H SS/F SS/H

6.2.4 Genetic Engineering

Think
Pair
Share

What is genetic engineering?

Genetic engineering is a process which involves modifying the genome of an organism by introducing a gene from another organism to give a desired characteristic.

Plant crops have been genetically engineered to be resistant to diseases or to produce bigger better fruits.

CS/F CS/H SS/F SS/H

6.2.4 Genetic Engineering

Think
Pair
Share

What is genetic engineering?

Bacterial cells have been genetically engineered to make useful substances such as human insulin to treat diabetes.

CS/F CS/H SS/F SS/H

6.2.4 Genetic Engineering

Think
Pair
Share

What are GM crops?

Crops that have had their genes modified in this way are called genetically modified crops.

This could include crops that are resistant to insects or to herbicides.

GM crops also generally have increased yields.

CS/F CS/H SS/F SS/H

6.2.4 Genetic Engineering

Think
Pair
Share

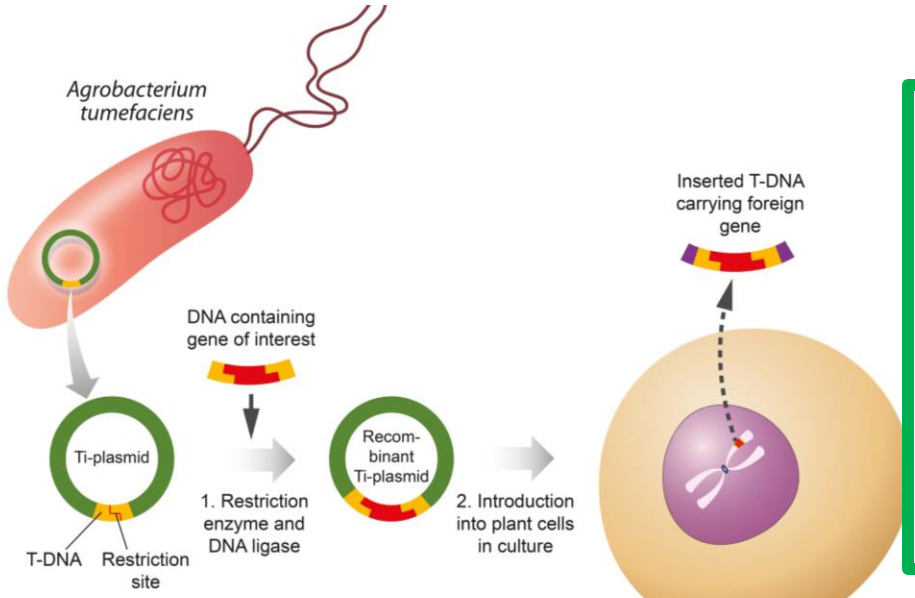
What are the benefits and risks of genetic engineering?

Benefits of Genetic Engineering	Risks of Genetic Engineering

6.2.4 Genetic Engineering

Think
Pair
Share

What happens during genetic engineering?



In genetic engineering, genes from the chromosomes of humans and other organisms can be 'cut out' and transferred to cells of other organisms.

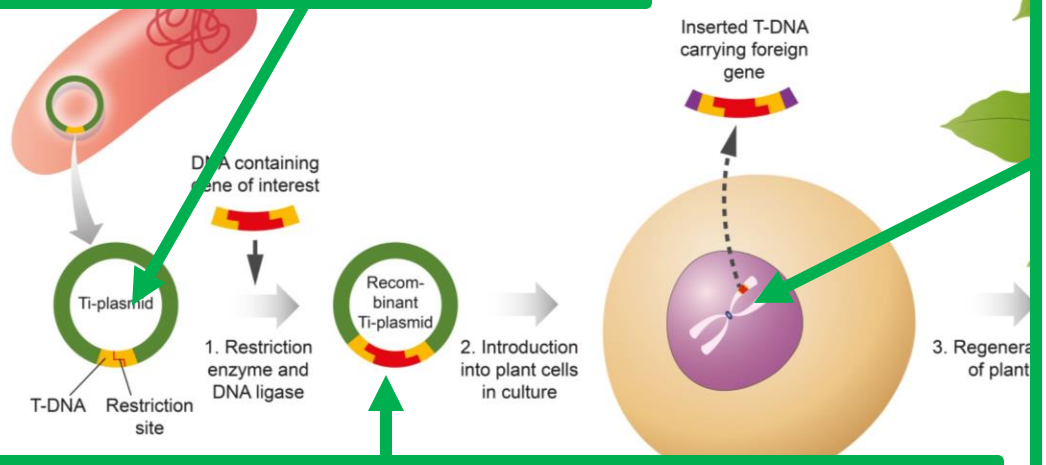
CS/F CS/H SS/F SS/H

6.2.4 Genetic Engineering

Think
Pair
Share

What happens during genetic engineering?

Enzymes are used to isolate the required gene



This gene is inserted into a vector, usually a bacterial plasmid or a virus.

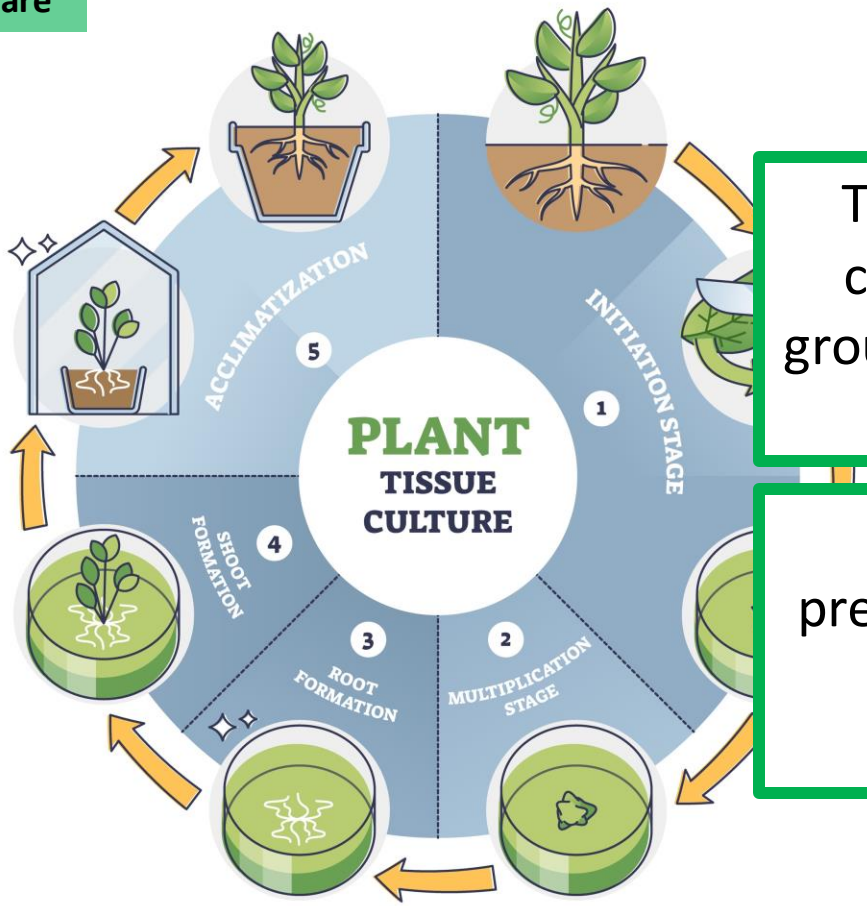
The vector is used to insert the gene into the required cells genes are transferred to the cells of animals, plants or microorganisms at an early stage in their development so that they develop with desired characteristics.

CS/F CS/H SS/F SS/H

6.2.5 Cloning

Think
Pair
Share

What are tissue cultures?



Tissue cultures are a method of cloning in which we use a small group of cells from part of a plant to grow identical new plants.

This method is important for preserving rare plant species and is used commercially in plant nurseries.

CS/F CS/H SS/F SS/H

6.2.5 Cloning

Think
Pair
Share

What are cuttings?

Cuttings is an older, but simple method to make new plants from a parent plant.

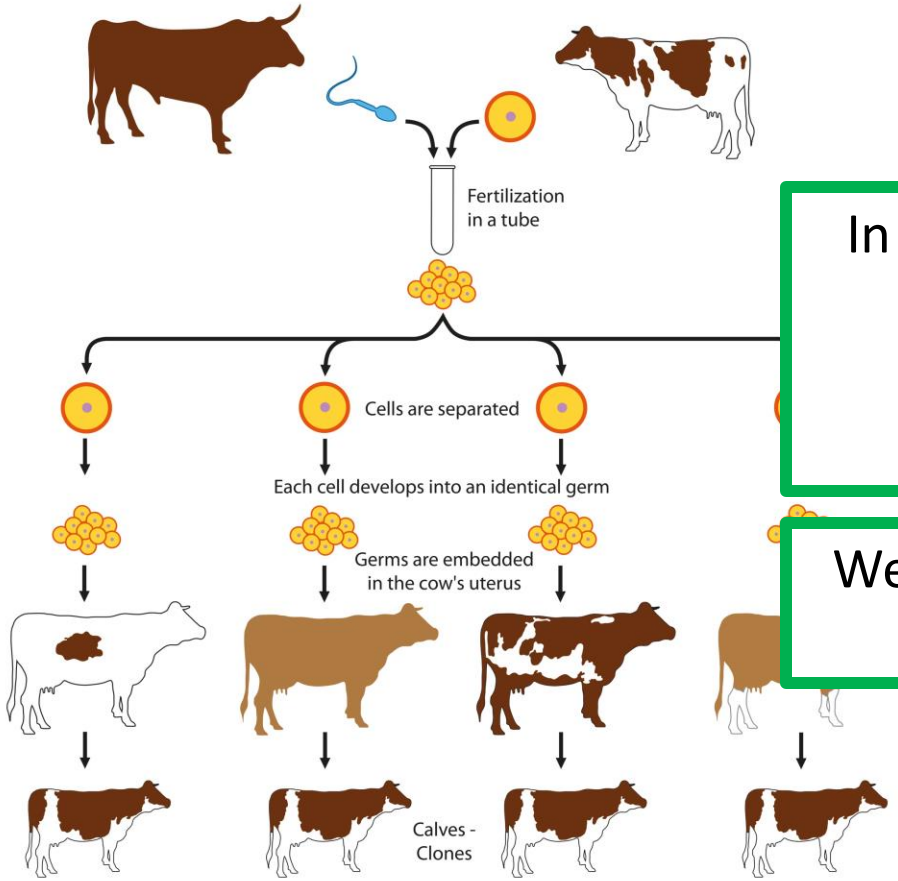
It involves taking a cutting from one plant, dipping the cutting end in rooting powder and replanting this in a pot.

CS/F CS/H SS/F SS/H

6.2.5 Cloning

Think
Pair
Share

What are embryo transplants?



In this method of cloning we split apart cells from a developing embryo before they become specialised.

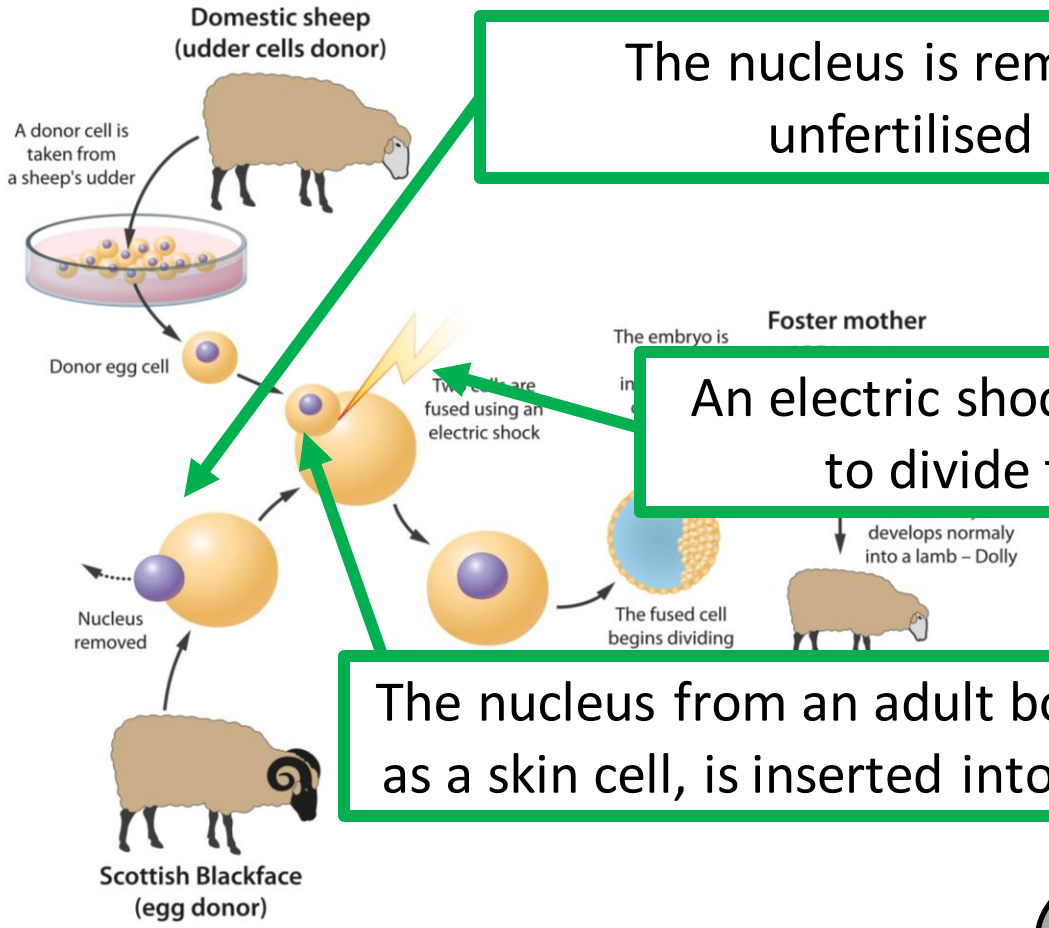
We then transplant these identical embryos into host mothers.

CS/F CS/H SS/F SS/H

6.2.5 Cloning

Think
Pair
Share

What happens during adult cell cloning?



The nucleus is removed from an unfertilised egg cell.

An electric shock stimulates the egg cell to divide to form an embryo.

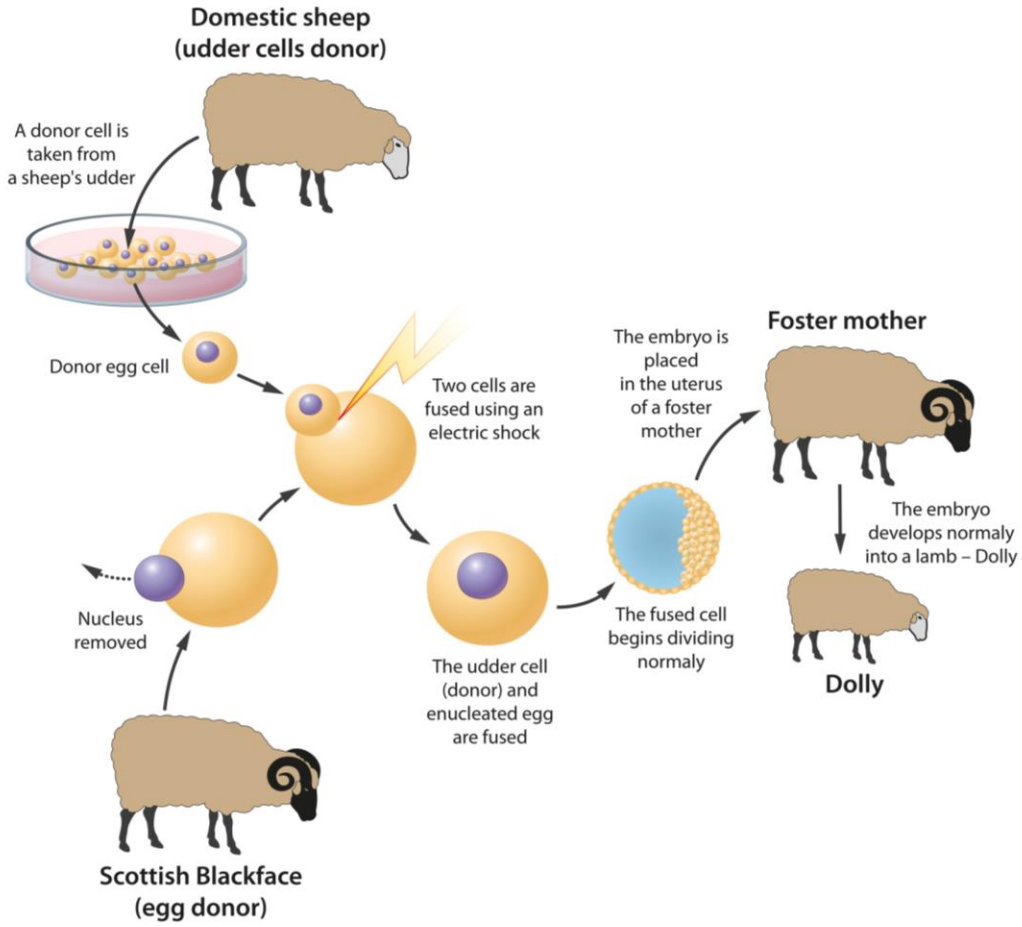
The nucleus from an adult body cell, such as a skin cell, is inserted into the egg cell.

CS/F CS/H SS/F SS/H

6.2.5 Cloning

Think
Pair
Share

What happens during adult cell cloning?



These embryo cells contain the same genetic information as the adult skin cell.

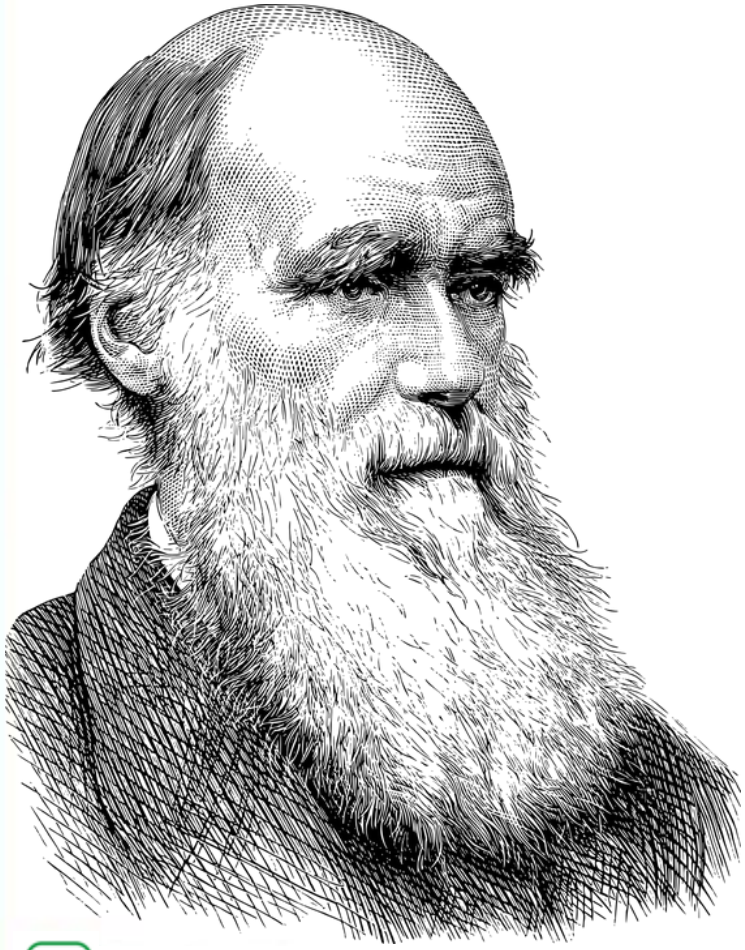
When the embryo has developed into a ball of cells it is inserted into the womb of an adult female to continue its development.

CS/F CS/H SS/F SS/H

6.3.1 Theory of Evolution

Think
Pair
Share

Who is Charles Darwin?



Charles Darwin is a scientist who travelled around the world on an expedition collecting evidence and making observations.

He proposed the theory of evolution by natural selection.

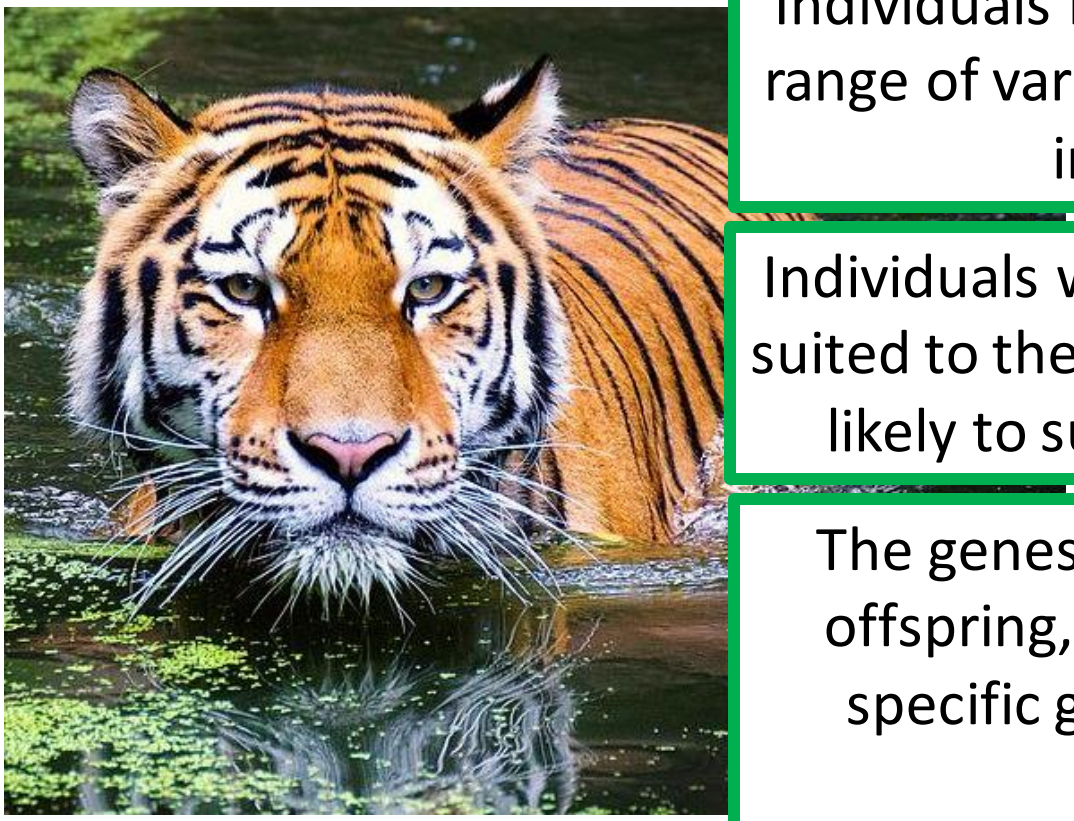
He published his ideas on the Origin of Species in 1859. His ideas caused a lot of controversy.

CS/F CS/H SS/F SS/H

6.3.1 Theory of Evolution

Think
Pair
Share

What is the theory of evolution by natural selection?



Individuals in a species show a wide range of variation due to differences in their genes.

Individuals with characteristics most suited to their environment are more likely to survive and reproduce.

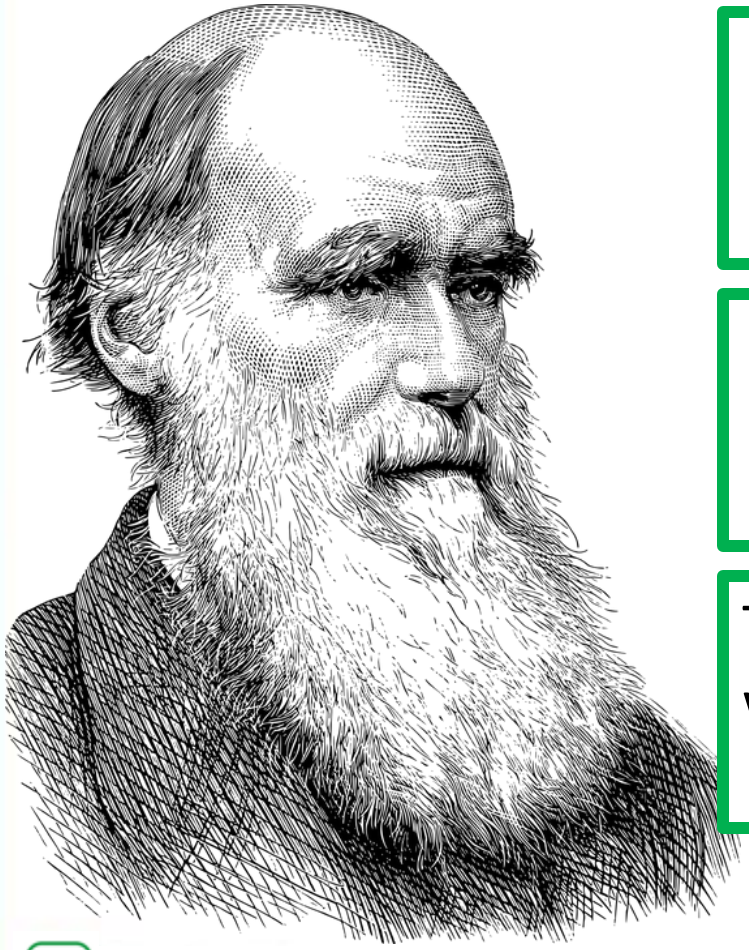
The genes are passed on to their offspring, which results in these specific genes becoming more common.

CS/F CS/H SS/F SS/H

6.3.1 Theory of Evolution

Think
Pair
Share

Why was the theory of evolution only gradually accepted?



The theory challenged the idea that God made all the animals and plants that live on Earth.

There was a lack of evidence at the time the theory was published to convince many scientists.

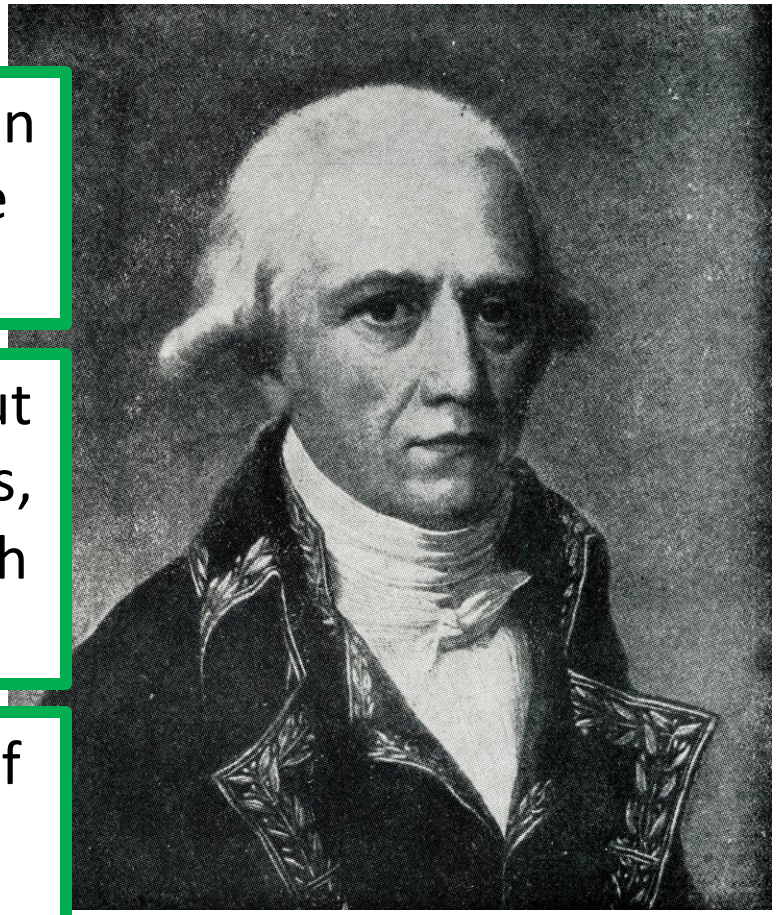
The mechanism of inheritance (genes) was not known until 50 years after the theory was published.

CS/F CS/H SS/F SS/H

6.3.1 Theory of Evolution

Think
Pair
Share

Who was Jean-Baptiste Lamarck?



Lamarck suggested that changes in an organisms during its lifetime can be inherited.

For example, if a giraffe stretched out its neck from reaching high up leaves, then its offspring would be born with the longer neck as well.

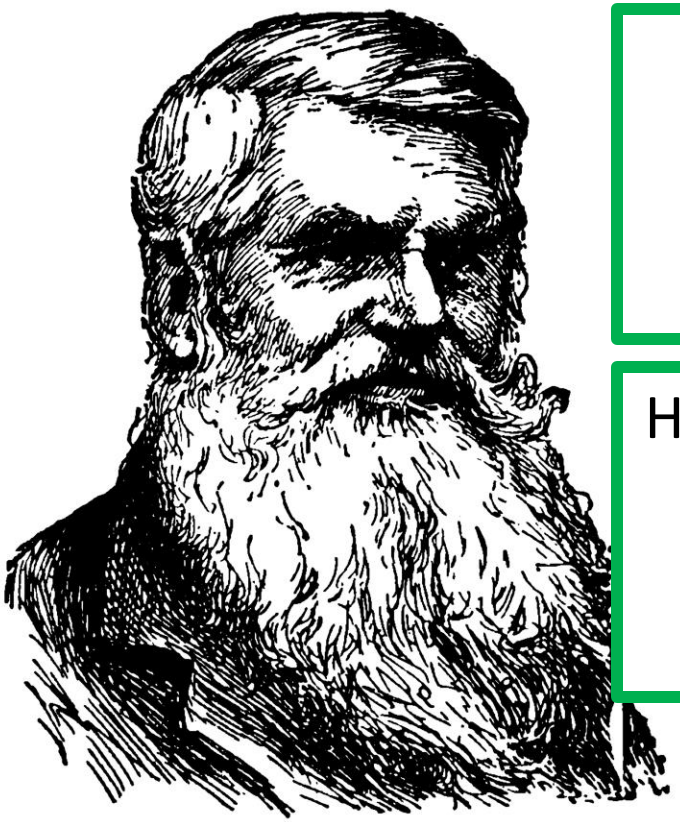
We know that in the vast majority of cases that this type of inheritance doesn't occur.

CS/F CS/H SS/F SS/H

6.3.2 Speciation

Think
Pair
Share

Who was Alfred Wallace?



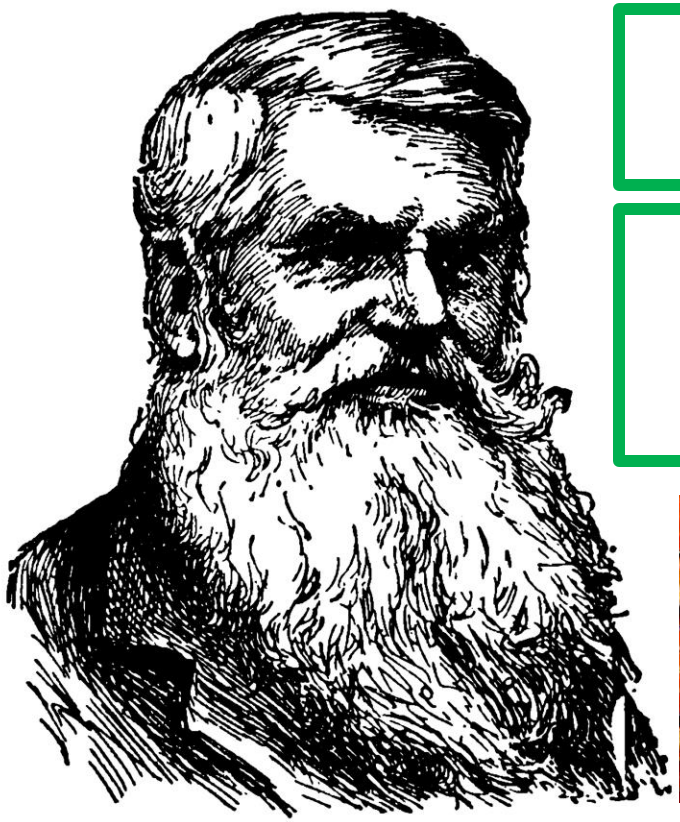
Alfred Wallace was a scientist who independently of Darwin proposed the theory of evolution by natural selection.

He published some joint writings with Darwin in 1858 which prompted Darwin to publish On the Origin of Species the following year.

6.3.2 Speciation

Think
Pair
Share

Who was Alfred Wallace?



He worked worldwide gathering evidence for evolutionary theory.

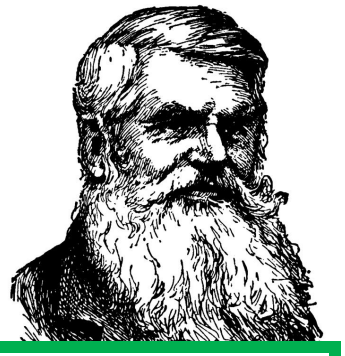
He is best known for his work on warning colouration in animals and the theory of speciation.

CS/F CS/H SS/F SS/H

6.3.2 Speciation

Think
Pair
Share

What is the theory of speciation?



Two ancestral populations were separate or isolated from each other.

There is genetic variation within each population.

Each population is under different environmental conditions.

Natural selection occurs and the better adapted organisms survive to reproduce.

The favourable genes/alleles are passed on to offspring.

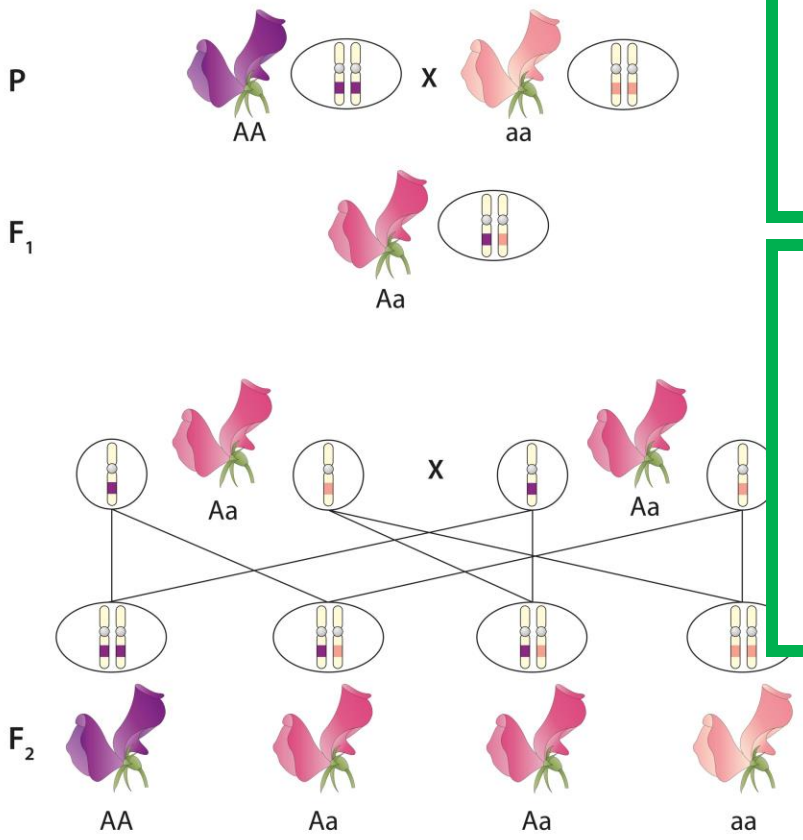
Eventually the two types cannot successfully reproduce to make fertile offspring and so two they are now two different species.

CS/F CS/H SS/F SS/H

6.3.3 Understanding of Genetics

Think
Pair
Share

How has our understanding of genetics changes over time?



In the mid 19th Century Gregor Mendel carried out breeding experiments on plants.

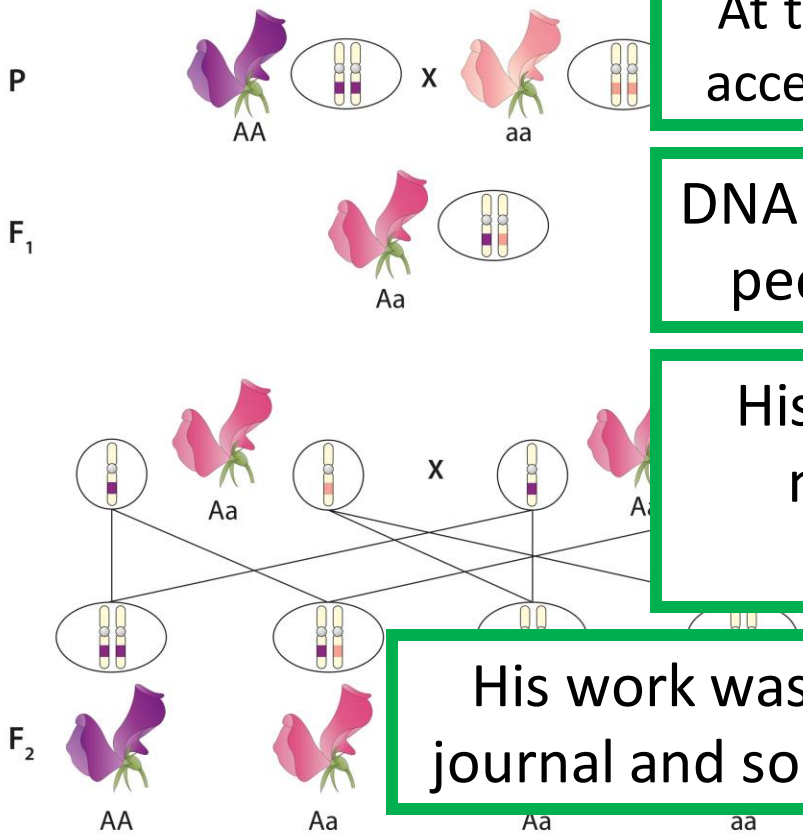
One of his observations was that the inheritance of each characteristic is determined by 'units' that are passed on to descendants unchanged.

CS/F CS/H SS/F SS/H

6.3.3 Understanding of Genetics

Think
Pair
Share

How has our understanding of genetics changes over time?



At the time Mendel's ideas were not accepted for lots of different reasons.

DNA was not known at the time and people had pre-conceived ideas.

His mathematical approach was new, and he was not part of academic establishments.

His work was also published in an obscure journal and so scientists didn't read his work.

CS/F CS/H SS/F SS/H

6.3.3 Understanding of Genetics

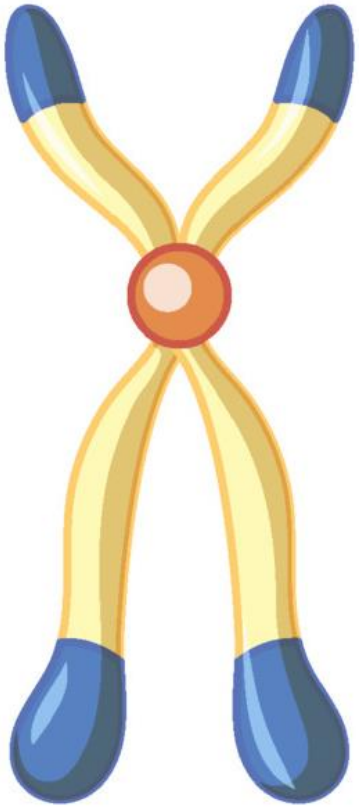
Think
Pair
Share

How has our understanding of genetics changes over time?

By the late 19th Century, the behaviour of chromosomes during cell division was observed.

By the early 20th Century, it was observed that chromosomes and Mendel's units behaved in similar ways.

This led to the idea that the "units", now called genes, were located on chromosomes.



CS/F CS/H SS/F SS/H

6.3.3 Understanding of Genetics

Think
Pair
Share

How has our understanding of genetics changes over time?

By the late 20th Century, the structure of DNA was determined, and the mechanism of gene function was worked out.

6.3.4 Evidence for Evolution

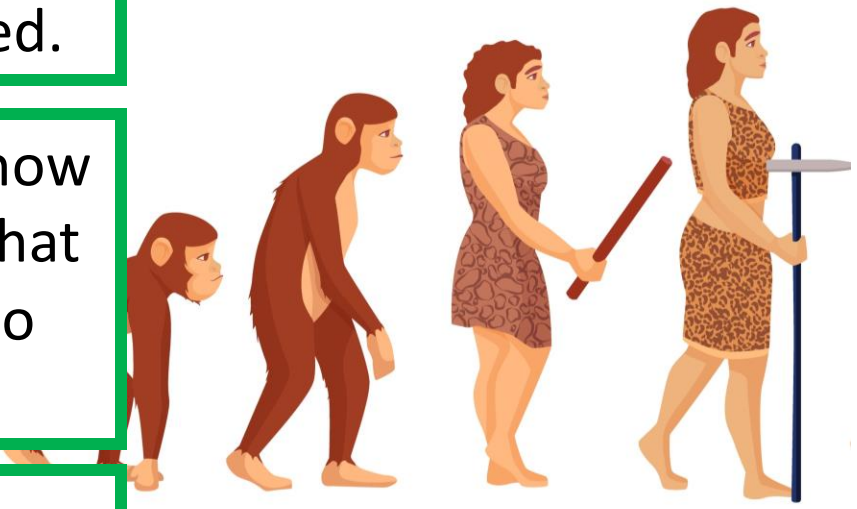
Think
Pair
Share

What evidence do we have for evolution?

The theory of evolution by natural selection is now widely accepted.

Evidence for Darwin's theory is now available as it has been shown that characteristics are passed on to offspring in genes.

There is further evidence in the fossil record and the knowledge of how resistance to antibiotics evolves in bacteria.

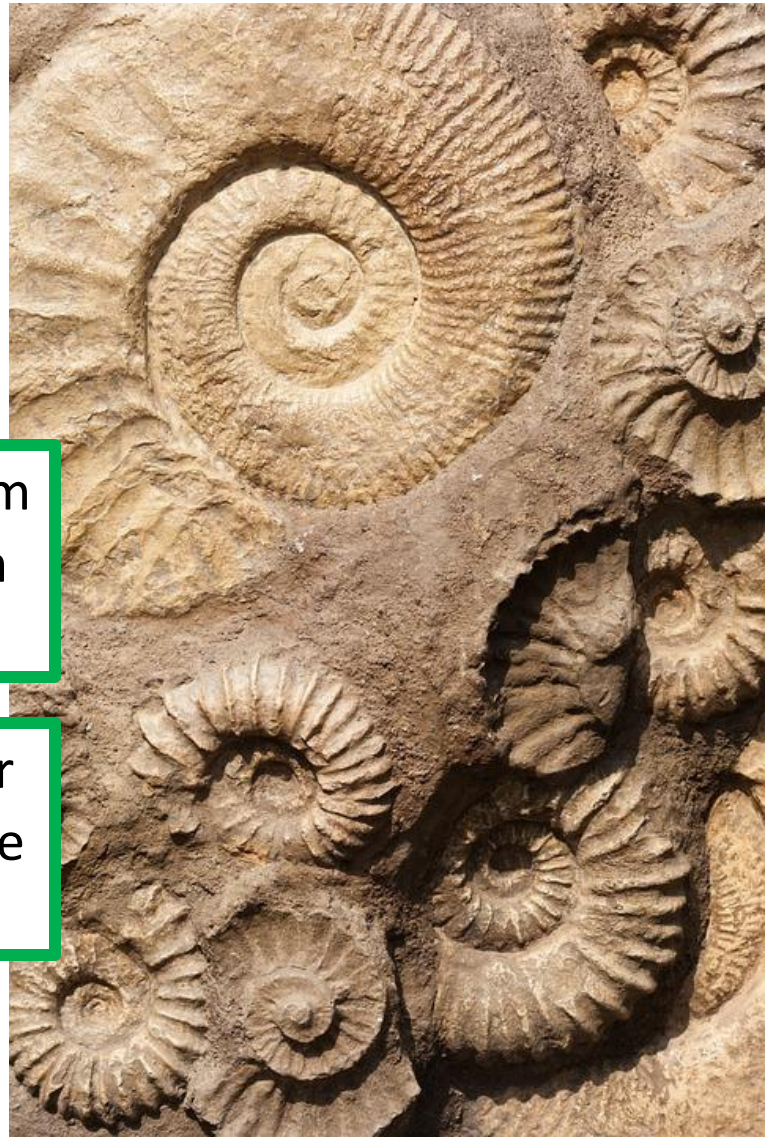


CS/F CS/H SS/F SS/H

6.3.5 Fossils

Think
Pair
Share

What are fossils?



Fossils are the remains of organisms from millions of years ago which are found in rocks.

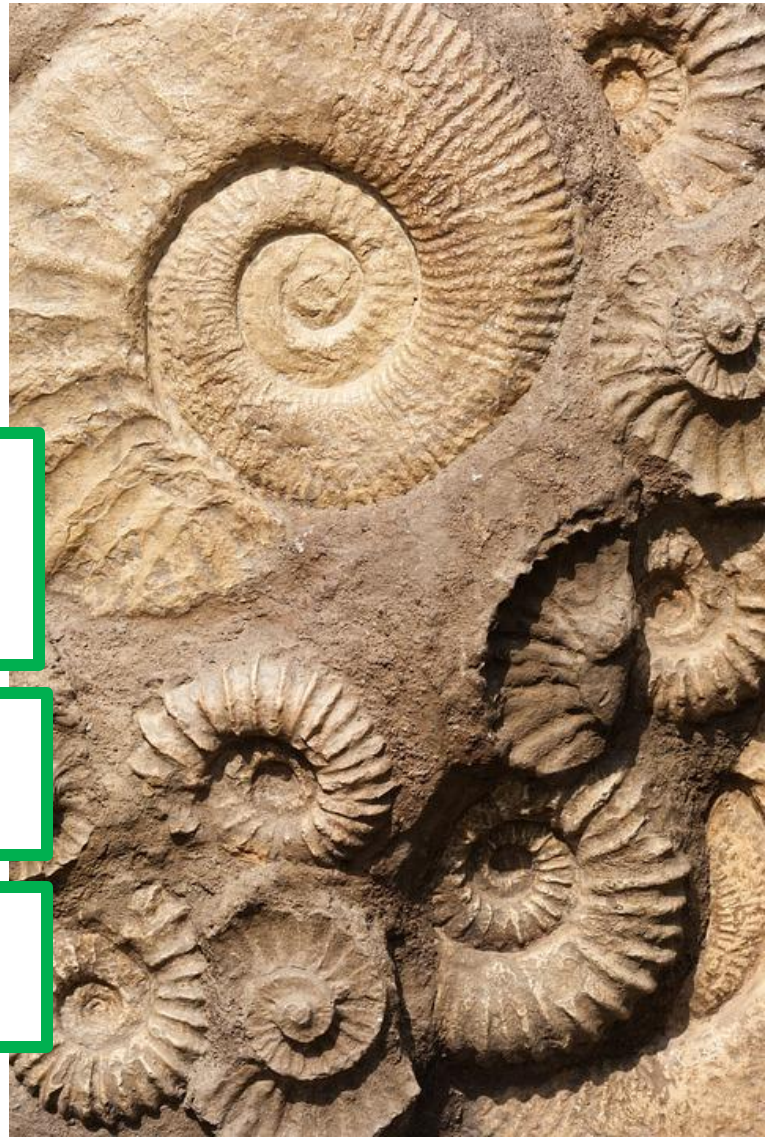
We can use fossils to learn how much or how little organisms have changed as life on Earth developed.

CS/F CS/H SS/F SS/H

6.3.5 Fossils

Think
Pair
Share

What are fossils?



Many of Earth's early organisms were soft bodies which means they have left few traces behind.

What traces did remain have been destroyed by geological activity.

This means we cant be certain how life began on Earth.

CS/F CS/H SS/F SS/H

6.3.5 Fossils

Think
Pair
Share

How do fossils form?

From parts of organisms that have not decayed because one or more of the conditions needed for decay are absent.

CS/F CS/H SS/F SS/H

6.3.5 Fossils

Think
Pair
Share

How do fossils form?

When parts of the organism are replaced by minerals as they decay.

CS/F CS/H SS/F SS/H

6.3.5 Fossils

Think
Pair
Share

How do fossils form?

As preserved traces or organisms, such as footprints, burrows and rootlet traces.

For example this was made by pouring plaster into a cavity within ash found in Pompei.

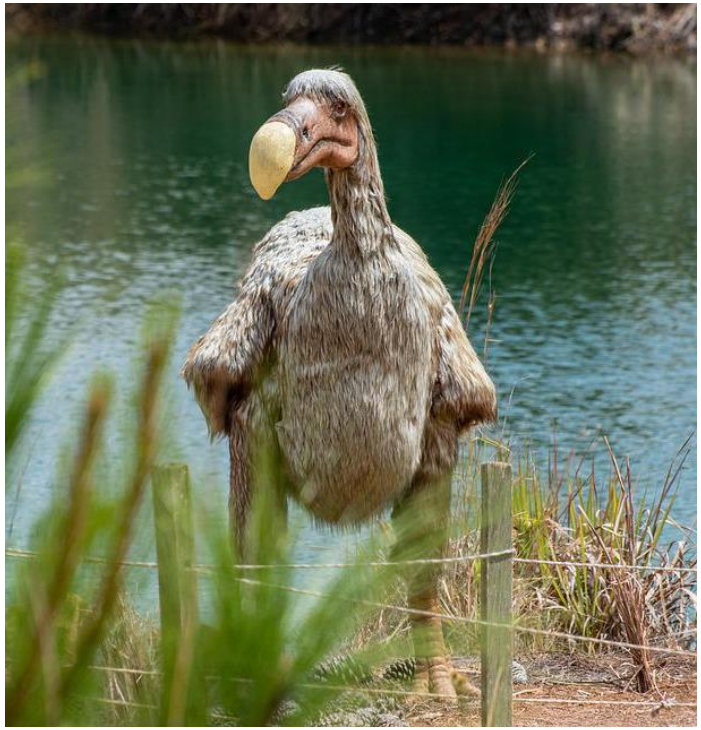
The soft tissue of the person had decayed over time within the ash leaving this space.

CS/F CS/H SS/F SS/H

6.3.6 Extinction

Think
Pair
Share

What is extinction?



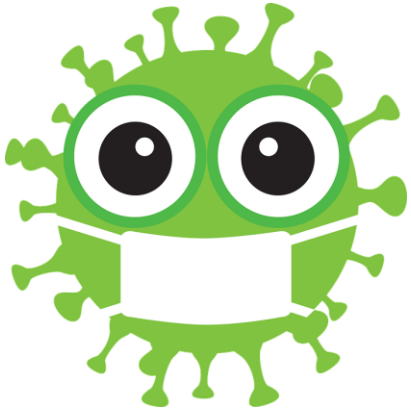
Key Term	Definition
Extinction	

6.3.6 Extinction

Think
Pair
Share

What are the causes of extinction?

Factor Which May Contribute Towards Extinction	Explanation
New Diseases	With the arrival of a new disease the animal will have no immunity to it. If the pathogen is deadly there can be a rapid decrease in the animals' numbers.



CS/F CS/H SS/F SS/H

6.3.6 Extinction

Think
Pair
Share

What are the causes of extinction?

Factor Which May Contribute Towards Extinction	Explanation
New Predators	With the arrival of a new predator animals that it prays upon will have their decrease as there are more animals now hunting them. They will also be unaware that the new predator could eat them. The animals that already preyed upon the new predator's food will not have less to eat and so their numbers could decrease rapidly also.

6.3.6 Extinction

Think
Pair
Share

What are the causes of extinction?

Factor Which May Contribute Towards Extinction	Explanation
New More Successful Competitors	Organisms competing with these new competitors will have less resources available as there is more competition, this will cause their numbers to decrease

CS/F CS/H SS/F SS/H

6.3.6 Extinction

Think
Pair
Share

What are the causes of extinction?

Factor Which May Contribute Towards Extinction	Explanation
Climate Change	The change in climate can lead to changes within the habitat. This means that organisms adapted to the habitat can be under new pressures and stresses as they are no longer as well adapted.

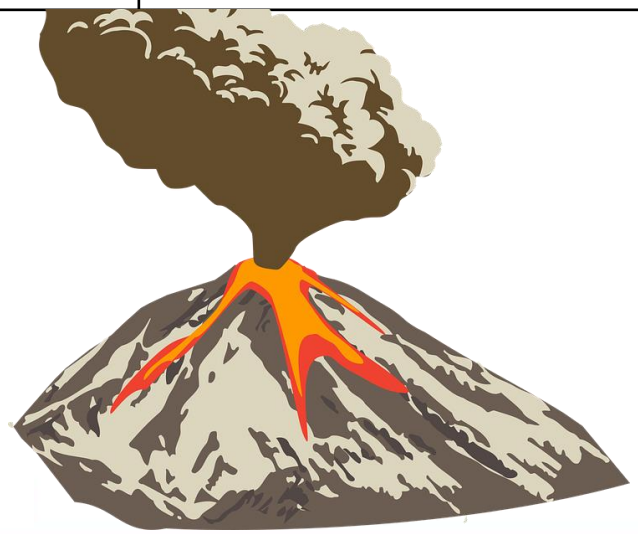
CS/F CS/H SS/F SS/H

6.3.6 Extinction

Think
Pair
Share

What are the causes of extinction?

Factor Which May Contribute Towards Extinction	Explanation
Volcanic Eruptions	There is mass destruction of the habitats in the surrounding area leading to death of animals and plants.



CS/F CS/H SS/F SS/H

6.3.6 Extinction

Think
Pair
Share

What are the causes of extinction?

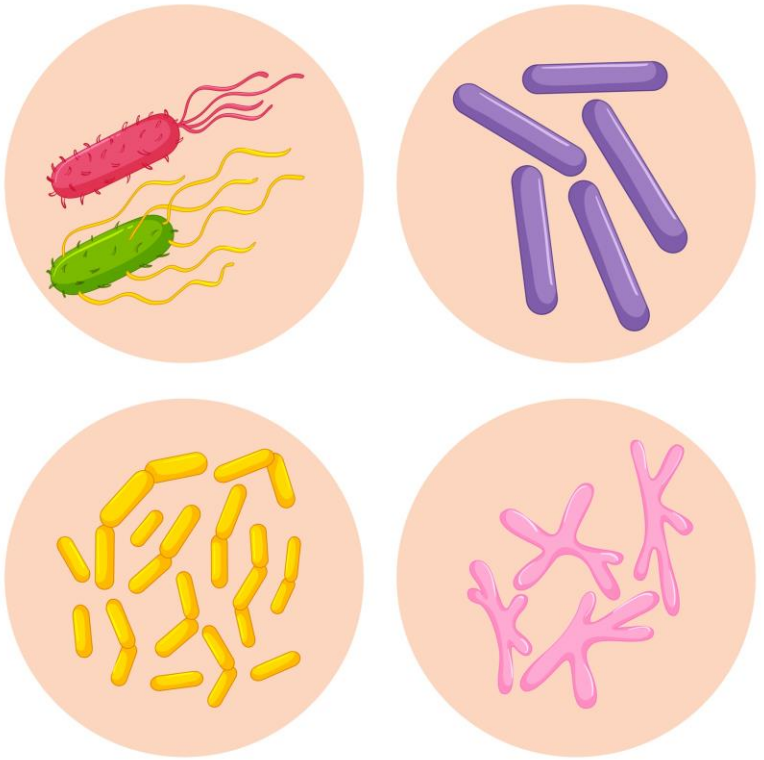
Factor Which May Contribute Towards Extinction	Explanation
Collision With an Asteroid	The force of an asteroid colling with Earth could destroy habitats and kills plants and animals.

CS/F CS/H SS/F SS/H

6.3.7 Resistant Bacteria

Think
Pair
Share

Why do bacteria evolve rapidly?



Bacteria evolve rapidly because they reproduce at a fast rate.

Mutations of bacterial pathogens make new strains.

Some strains might be resistant to antibiotics and so are not killed.

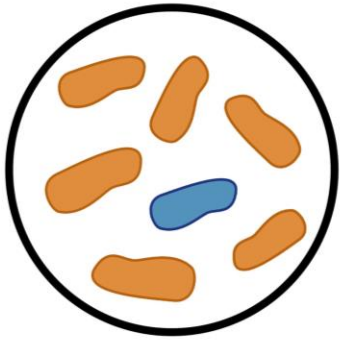
They spread because we don't have effective treatments.

CS/F CS/H SS/F SS/H

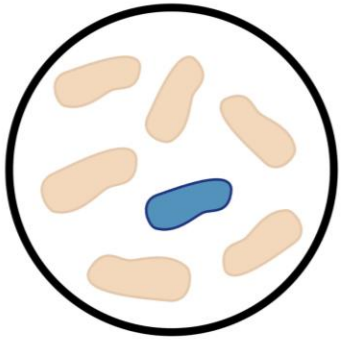
6.3.7 Resistant Bacteria

Think
Pair
Share

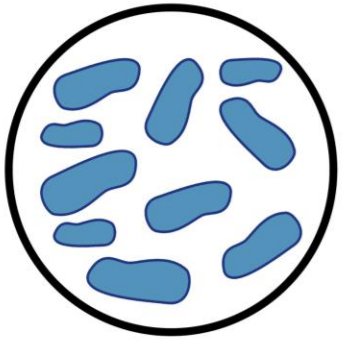
How does antibiotic resistance occur?



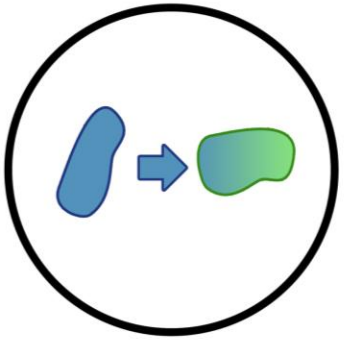
Lots of germs and some are drug resistant



Antibiotics kill the bacteria causing the illnes as well as the good bacteria protecting the body from infection



The drug resistant bacteria is now able to grow and take over



Some bacteria give their drug resistance to other bacteria

- Normal bacterium
- Resistant bacterium
- Dead bacterium

CS/F CS/H SS/F SS/H

6.3.7 Resistant Bacteria

Think
Pair
Share

How can we reduce the rate of development of antibiotic resistant strains?

Doctors should not prescribe antibiotics inappropriately, such as treating non-serious or viral infections.

Patients should complete their course of antibiotics so all bacteria are killed and non survive to mutate.

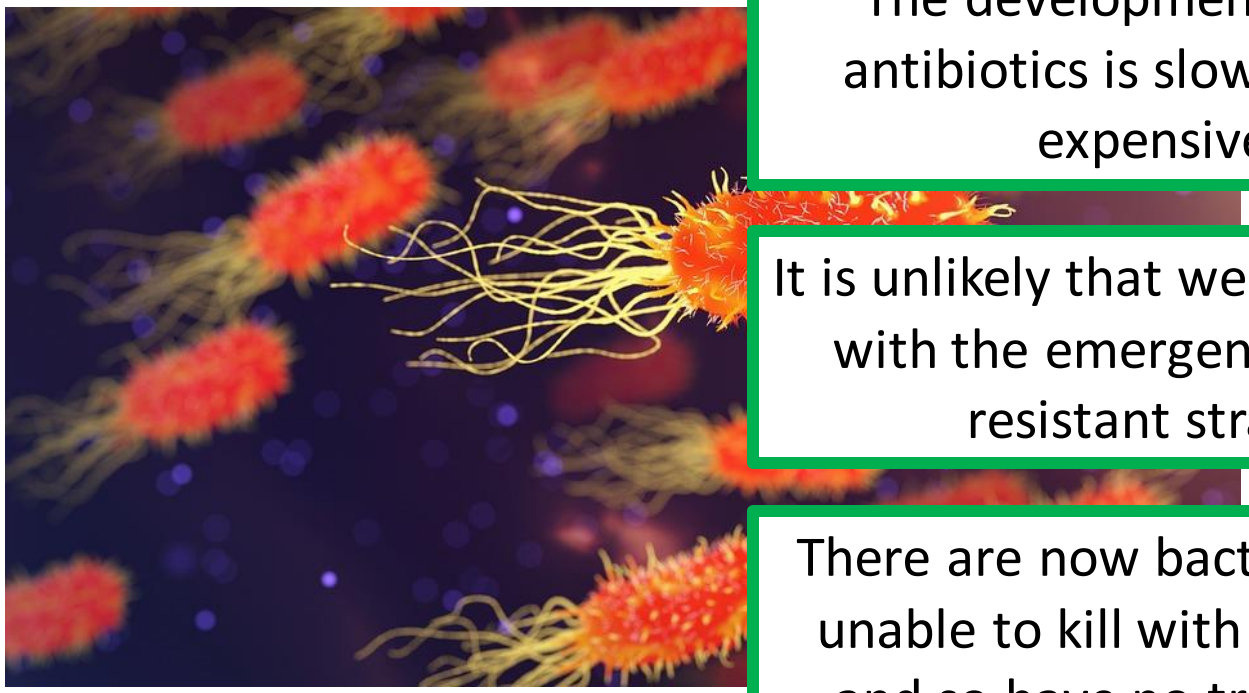
The agricultural use of antibiotics should be restricted.

CS/F CS/H SS/F SS/H

6.3.7 Resistant Bacteria

Think
Pair
Share

Why is the development of antibiotic resistant drugs a concern?



The development of new antibiotics is slow and very expensive.

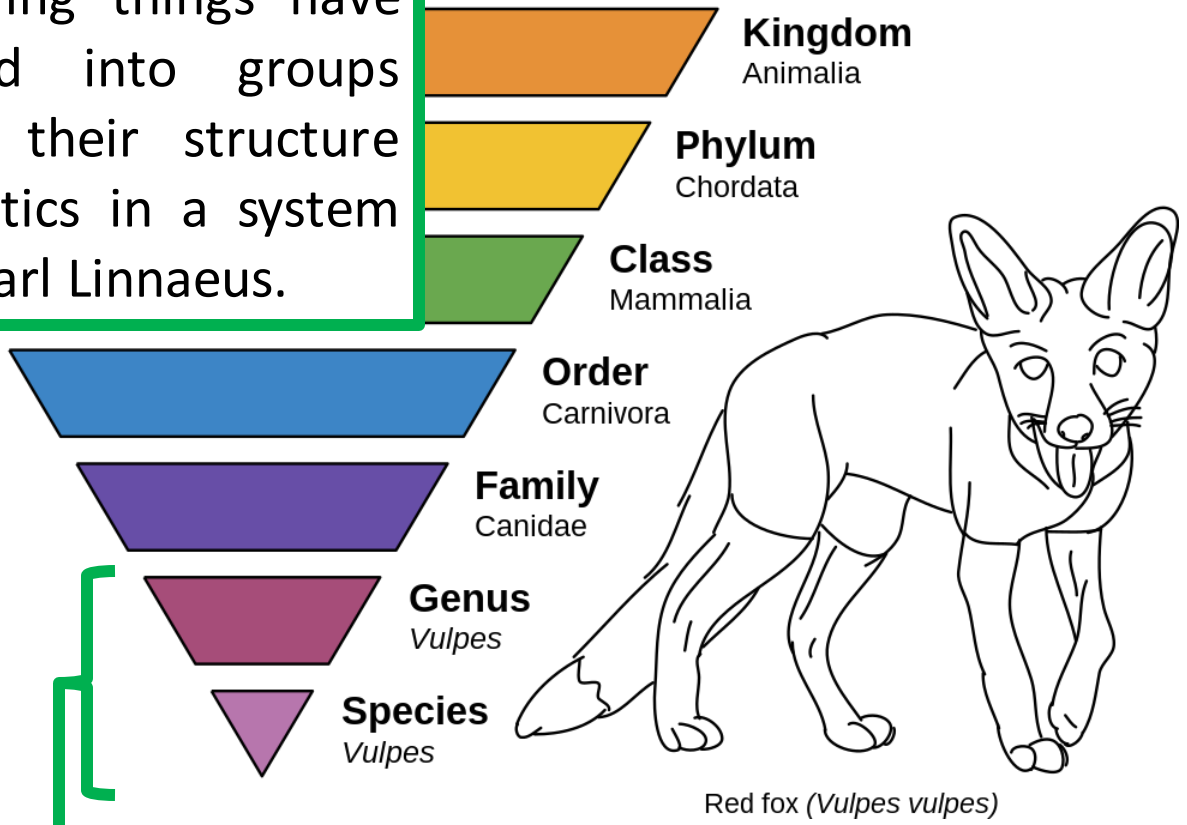
It is unlikely that we can keep up with the emergence of new resistant strains.

There are now bacteria we are unable to kill with antibiotics and so have no treatments.

CS/F CS/H SS/F SS/H

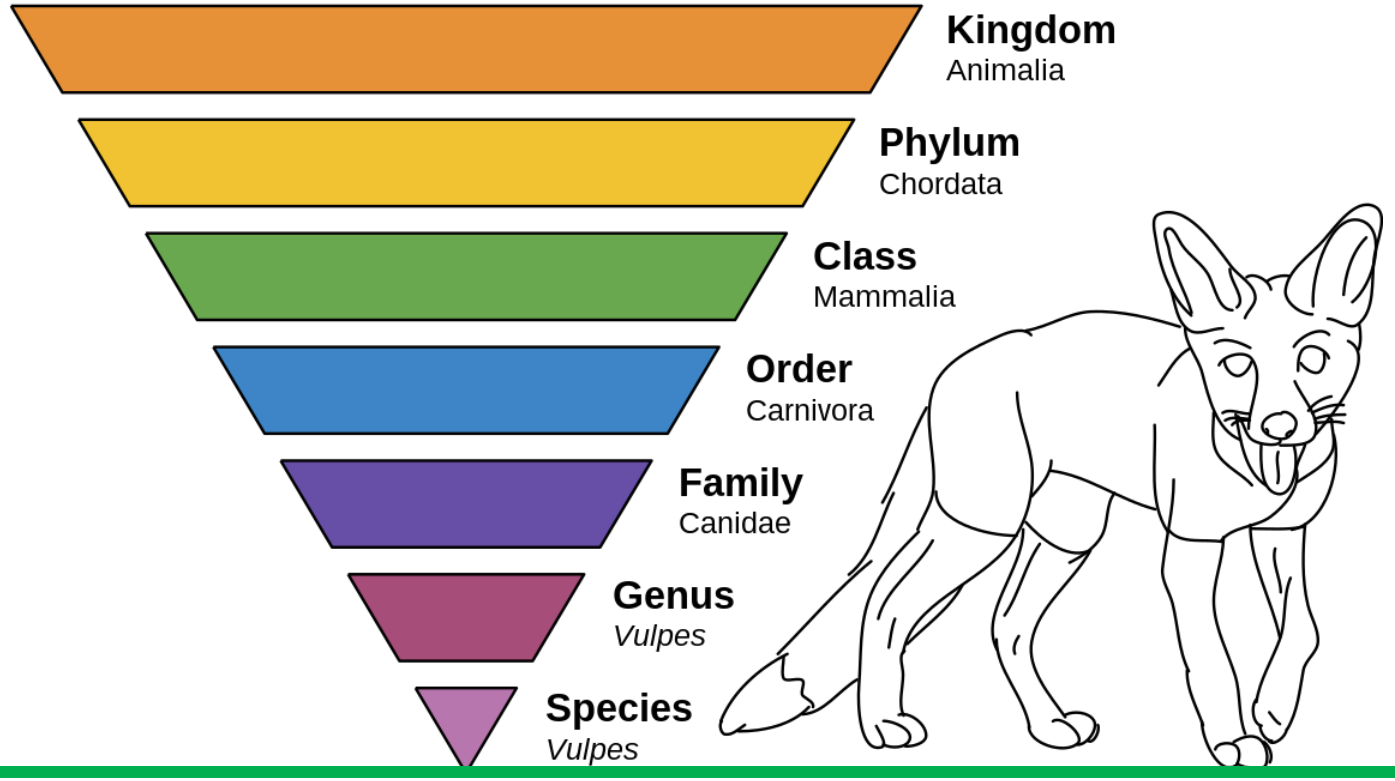
4.6.4 Classification

Traditionally living things have been classified into groups depending on their structure and characteristics in a system developed by Carl Linnaeus.



Organisms are named by the binomial system of genus and species.

4.6.4 Classification

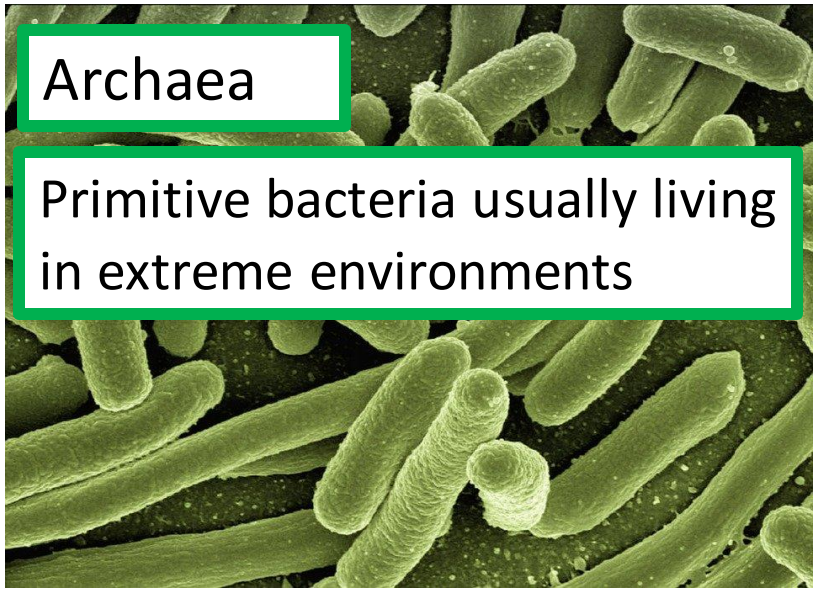


As evidence of internal structures became more developed due to improvements in microscopes, and the understanding of biochemical processes progressed, new models of classification were proposed.

CS/F CS/H SS/F SS/H

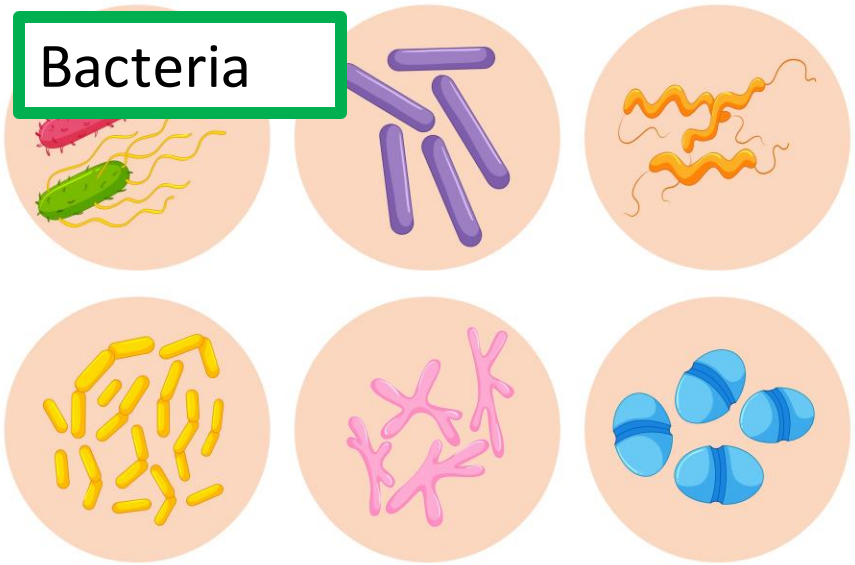
4.6.4 Classification

Due to evidence available from chemical analysis there is now a 'three-domain system' developed by Carl Woese. In this system organisms are divided into:



Archaea

Primitive bacteria usually living in extreme environments



Bacteria

Eukaryotes

Including protists, fungi, plants and animals.

CS/F CS/H SS/F SS/H