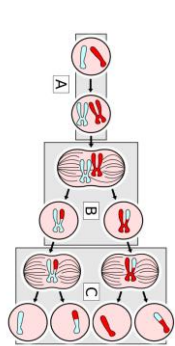


Meiosis halves the number of chromosomes

Gametes are made in reproductive organs (in animals ovaries and testes)

Cells divide by meiosis to form gametes

Copies of the genetic information are made.
The cell divides twice to form four gametes each with single set of chromosomes.
All gametes are genetically different from each other.



Sexual reproduction involves the fusion of male and female gametes.
Asexual reproduction involves only one parent and no fusion of gametes.

Sperm and egg in animals.
Pollen and egg cells in flowering plants.
e.g. cloning of females only in an aphid population.

Produced by meiosis. There is mixing of genetic information which leads to a variety in the offspring.
Only mitosis is involved. There is no mixing of genetic information. This leads to genetically identical clones.

Advantages and disadvantages of sexual and asexual reproduction (Biology only)

Gametes join at fertilisation to restore the number of chromosomes

The new cell divides by mitosis. The number of cells increase. As the embryo develops cells differentiate.

When the protein chain is complete it folds to form a unique shape. This allows proteins to do their job as enzymes, hormones or new structures such as collagen.

Meiosis leads to non-identical cells being formed while mitosis leads to identical cells being formed

Some change the shape and affect the function of proteins e.g. and enzyme active site will change or a structural protein loses its strength

Most do not alter the protein so that its appearance or function is not changed.

(HT) Making new proteins (protein synthesis)
Composed of chains of amino acids. A sequence of 3 bases codes for a particular amino acid.

Reproduction advantages/disadvantages	
Sexual	Asexual
Needs two parents.	Only one parent needed (quicker).
Produces variation in the offspring.	Identical offspring (no variation).
If the environment changes variation gives a survival advantage by natural selection.	Vulnerable to rapidly changing conditions due to lack of variation.
Negative mutations are not always inherited.	Negative mutation can affect all offspring.
Natural selection can be speeded up using selective breeding to increase food production.	Food/medicine production can be extremely quick.

DNA and the genome

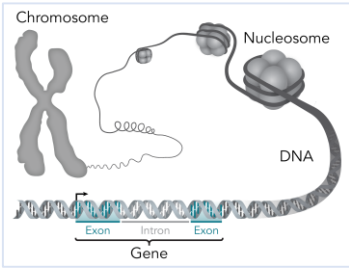
Sexual and asexual reproduction

AQA GCSE INHERITANCE, VARIATION AND EVOLUTION Part 1

Genetic material in the nucleus is composed of a chemical called DNA.



DNA structure
Polymer made up of two strands forming a double helix.
Contained in structures called chromosomes. A gene is a small section of DNA on a chromosome. Each gene codes for a sequence of amino acids to make a specific protein.



The genome is the entire genetic material of an organism.

DNA structure (Biology only)
= Adenine
= Thymine
= Cytosine
= Guanine
Phosphate and sugar back bone

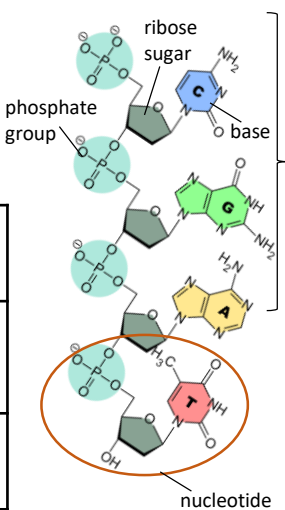
DNA is polymer made from four different nucleotides. Each nucleotide consists of a common sugar, phosphate group and one of 4 different bases A, C, G & T

Mutations occur continuously (HT only)

Protein synthesis (HT only)

In DNA the complementary strands C, A, T, G always link in the same way. C always linked to G on the opposite strand and A to T.

Repeating nucleotide units.



DNA in the nucleus unravels.
Enzymes make a copy of the DNA strand called mRNA.
mRNA moves from the nucleus to ribosome in the cytoplasm.
Ribosomes translate each 3 bases into amino acids according to mRNA template
Ribosomes link amino acids brought by carrier proteins.
A long chain of amino acids form. Their specific order forms a specific protein.

A sequence of 3 bases is the code for a particular amino acid. The order of bases controls the order in which each amino acid is assembled to produce a specific protein.

Some organisms use both methods depending on the circumstances	Malarial parasites	Asexually in the human host but sexually in a mosquito.
	Fungi	Asexually by spores, sexually to give variation.
	Plants	Produce seeds sexually, asexually by runners in strawberry plants, bulbs division in daffodils.

(HT only) Not all parts code for proteins. Non-coding parts can switch genes on and off. Mutations may affect how genes are expressed.

The whole human genome has now been studied.
It is of great importance for future medical developments
Searching for genes linked to different types of disease.
Understanding and treatment of inherited disorders.
Tracing migration patterns from the past.