

Sexual and asexual reproduction, and reproduction in plants

How many parents are involved in sexual and in asexual reproduction?

Sexual and asexual reproduction, and reproduction in plants

What is a clone?

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What is a zygote?

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Why do insect-pollinated flowers have large, brightly coloured petals?

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Describe the stigma of a wind-pollinated flower.

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What is pollination?

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What does the pollen tube do?

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After fertilisation, what do the ovule and the ovary become?

An offspring that is genetically identical to its parent, produced by asexual reproduction.

Sexual reproduction involves two parents. Asexual reproduction involves one parent.

To attract insects to the flower.

The cell produced when a male gamete fuses with a female gamete in fertilisation.

The transfer of pollen grains from an anther to a stigma.

Large and feathery, hanging outside the flower, to catch pollen from the air.

The ovule becomes a seed and the ovary becomes a fruit.

It grows down the style into the ovule and carries the male gamete nucleus to the egg cell.

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What food reserves does a seed store?

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Why does a seedling use food reserves?

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Which three conditions do seeds need to germinate?

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In the germination practical, why is the water boiled and covered with oil?

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What is a runner?

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How is a cutting used to reproduce a plant?

Human reproduction

What is the function of the prostate gland?

Human reproduction

Why are the testes in the scrotum?

To get energy and materials for growth until its leaves can photosynthesise.

Starch and oil (fat), broken down by enzymes during germination.

Boiling removes dissolved oxygen and the oil layer stops more oxygen entering, so the seeds have no oxygen.

Water, oxygen and a suitable temperature.

A piece of stem is cut off and planted in moist compost. It grows roots and becomes a new, genetically identical plant.

A stem that grows sideways along the ground and forms new plantlets, a natural method of asexual reproduction, e.g. in strawberry.

It holds them outside the body where it is slightly cooler, which is better for sperm production.

It adds fluid to sperm to form semen. The fluid lets the sperm swim and contains nutrients.

Human reproduction

What are the functions of the ovary and the oviduct?

Human reproduction

What does oestrogen do in the menstrual cycle?

Human reproduction

What does progesterone do in the menstrual cycle?

Human reproduction

Why does menstruation start?

Human reproduction **Biology only**

What does FSH do?

Human reproduction **Biology only**

What causes ovulation?

Human reproduction **Biology only**

Which hormones inhibit FSH?

Human reproduction

How do nutrients get from mother to embryo?

It repairs and builds up the lining of the uterus.

The ovary makes eggs and hormones. The oviduct carries the egg to the uterus and is where fertilisation usually happens.

Progesterone falls, so the uterus lining is no longer maintained and breaks down.

It maintains the lining of the uterus.

A surge of LH from the pituitary gland, triggered by high oestrogen, around day 14.

It is released by the pituitary gland. It causes an egg to mature and stimulates the ovaries to make oestrogen.

They diffuse from the mother's blood into the embryo's blood across the placenta.

Oestrogen and progesterone. Progesterone also inhibits LH.

Human reproduction

Why does the placenta have villi?

Human reproduction

How does amniotic fluid protect the embryo?

Human reproduction

Name two effects of testosterone at puberty.

Human reproduction

Name two effects of oestrogen at puberty.

Human reproduction

Where are oestrogen and testosterone made?

DNA, genes and protein synthesis

What is the genome?

DNA, genes and protein synthesis

What is a gene?

DNA, genes and protein synthesis

Where are genes located in a cell?

It absorbs shocks and cushions the embryo against knocks.

They give a large surface area, so substances diffuse faster.

Any two from: breasts develop, hips widen, pubic and underarm hair grow, the menstrual cycle begins.

Any two from: facial hair grows, voice deepens, muscles develop, shoulders broaden, sperm production starts.

The entire DNA of an organism.

Oestrogen is made by the ovaries.
Testosterone is made by the testes.

On chromosomes, which are found in the nucleus.

A section of a molecule of DNA that codes for a specific protein.

DNA, genes and protein synthesis **Biology only**

Describe the structure of DNA.

DNA, genes and protein synthesis **Biology only**

Which bases pair together in DNA?

DNA, genes and protein synthesis **Biology only**

How does RNA differ from DNA?

DNA, genes and protein synthesis **Biology only**

What happens in transcription?

DNA, genes and protein synthesis **Biology only**

What happens in translation?

DNA, genes and protein synthesis **Biology only**

Codon or anticodon: which is on mRNA and which is on tRNA?

Inheritance

What is an allele?

Inheritance

Dominant allele

Adenine (A) with thymine (T), and cytosine (C) with guanine (G).

Two strands coiled to form a double helix, linked by paired bases: A with T, and C with G.

A copy of a gene is made as a strand of mRNA, in the nucleus.

RNA is single stranded and contains uracil (U) instead of thymine (T).

A codon is three bases on mRNA. An anticodon is three complementary bases on tRNA.

At a ribosome, tRNA brings amino acids in the order set by the mRNA codons, making a polypeptide.

An allele that is expressed in the phenotype even when only one copy is present.

A different version (alternative form) of the same gene.

Inheritance

Recessive allele

Inheritance

Homozygous or heterozygous: TT, Tt, tt?

Inheritance

Genotype versus phenotype

Inheritance **Biology only**

What is codominance?

Inheritance **Biology only**

Two roan cattle (RW × RW) are crossed. What is the phenotype ratio?

Inheritance

What is polygenic inheritance?

Inheritance

Tt × Tt: what are the offspring genotypes and phenotypes?

Inheritance

Two unaffected parents have an affected child. What does this show?

TT and tt are homozygous (two identical alleles). Tt is heterozygous (two different alleles).

An allele that is only expressed in the phenotype when two copies are present.

Both alleles are expressed in the phenotype of a heterozygous organism, for example roan cattle or blood group AB.

Genotype is the alleles an organism has. Phenotype is the characteristic that is expressed.

A feature controlled by several genes working together, such as height. Most features are polygenic.

1 red : 2 roan : 1 white. The heterozygote has its own phenotype, so it is not 3 : 1.

The characteristic is recessive and both parents are carriers (heterozygous).

1 TT : 2 Tt : 1 tt, giving 3 tall : 1 short.

Inheritance

What is the probability of a recessive child from two carrier parents?

Inheritance

Which sex chromosomes do females and males have?

Inheritance

Why is there a 50% chance of a boy or a girl?

Cell division, variation and evolution

What does mitosis produce?

Cell division, variation and evolution

When does mitosis occur?

Cell division, variation and evolution

What does meiosis produce?

Cell division, variation and evolution

How does random fertilisation cause variation?

Cell division, variation and evolution

Diploid and haploid numbers of chromosomes in humans

Females are XX. Males are XY.

1 in 4 (0.25 or 25%). A 3 : 1 ratio means 1 in 4, not 1 in 3.

Two cells with identical sets of chromosomes, genetically identical to the parent cell.

All eggs carry X. Half of the sperm carry X and half carry Y, so the sperm decides the sex.

Four genetically different haploid gametes, each with half the number of chromosomes.

During growth, repair, cloning and asexual reproduction.

Diploid is 46. Haploid is 23.

Gametes are genetically different and any sperm can fuse with any egg, so offspring have different combinations of alleles.

Cell division, variation and evolution

What causes variation within a species?

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Give an example of environmental variation.

Cell division, variation and evolution

What is a mutation?

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How can a mutation change the phenotype?

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What effect do most mutations have on the phenotype?

Cell division, variation and evolution **Biology only**

What increases the rate of mutation?

Cell division, variation and evolution

Outline Darwin's theory of natural selection.

Cell division, variation and evolution

What does evolution mean?

A scar, or body mass affected by diet, or plant height affected by light.

Genetic differences, environmental differences, or a combination of both.

It changes the DNA base sequence, so the amino acid sequence of the protein changes, altering its shape and function.

A rare, random change in genetic material that can be inherited.

Ionising radiation (gamma rays, X-rays, UV rays) and chemical mutagens such as chemicals in tobacco.

Most have no effect, some have a small effect and rarely one has a significant effect.

A change in the inherited characteristics of a population over many generations.

Variation exists; the better adapted survive and reproduce; they pass on their alleles; the proportion with those alleles rises over generations.

Cell division, variation and evolution

**How does antibiotic resistance
increase in bacteria?**

Cell division, variation and evolution

**Why are infections with resistant
bacteria difficult to control?**

The antibiotic no longer kills the bacteria, so the infection persists and can spread.

A mutation gives resistance. The antibiotic kills non-resistant bacteria, the resistant ones survive, reproduce and pass on the allele.