

Reproduction and meiosis

Triple only

**Give two advantages of asexual reproduction.**

Reproduction and meiosis

Triple only

**What is the main disadvantage of asexual reproduction?**

Reproduction and meiosis

Triple only

**What is the main advantage of sexual reproduction?**

Reproduction and meiosis

Triple only

**What is a disadvantage of sexual reproduction?**

Reproduction and meiosis

**What is the role of meiotic cell division?**

Reproduction and meiosis

**How many daughter cells does meiosis produce, and how many chromosomes does each have?**

Reproduction and meiosis

**How many chromosomes are in a human body cell and a human gamete?**

Reproduction and meiosis

**Are the gametes made by meiosis identical to each other?**

No variation in the population, so all individuals are affected in the same way by a disease or environmental change.

No need to find a mate, and a rapid reproductive cycle.

The requirement to find a mate.

Variation in the population, so some individuals are likely to survive a change or a disease.

Four daughter cells, each with half the number of chromosomes of the parent cell.

To produce genetically different haploid gametes.

No. They are genetically different.

46 in a body cell and 23 in a gamete.

DNA and the genome

**DNA is a polymer made up of what units?**

DNA and the genome

**What are the parts of a nucleotide?**

DNA and the genome

**What shape is a DNA molecule?**

DNA and the genome

**What joins the two strands of DNA together?**

DNA and the genome

**Which bases pair together in DNA?**

DNA and the genome

**Define the genome.**

DNA and the genome

**Define a gene.**

DNA and the genome

**Why is detergent used when extracting DNA from fruit?**

A sugar and a phosphate group, with one of four different bases attached to the sugar.

Nucleotides.

Complementary base pairs joined by weak hydrogen bonds.

Two strands coiled to form a double helix.

The entire DNA of an organism.

A with T, and C with G.

It breaks down the cell membranes to release the DNA.

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

DNA and the genome

**Why is ice-cold ethanol added when extracting DNA?**

DNA and the genome

**Why is the mashed fruit mixture filtered?**

Protein synthesis and gene variants

Triple only

Higher tier

**What decides the order of amino acids in a protein?**

Protein synthesis and gene variants

Triple only

Higher tier

**How does a protein get its specific shape?**

Protein synthesis and gene variants

Triple only

Higher tier

**Name the two stages of protein synthesis.**

Protein synthesis and gene variants

Triple only

Higher tier

**What does RNA polymerase bind to?**

Protein synthesis and gene variants

Triple only

Higher tier

**What does RNA polymerase produce?**

Protein synthesis and gene variants

Triple only

Higher tier

**What is a codon?**

To remove solid pieces of cell, leaving the DNA in the filtrate.

DNA is not soluble in it, so it comes out of solution as white, stringy strands.

The chain of amino acids folds. The way it folds depends on the order of amino acids.

The order of bases in a section of DNA.

Non-coding DNA located in front of a gene.

Transcription and translation.

A triplet of bases in mRNA that codes for a specific amino acid.

A complementary mRNA strand from the coding DNA of the gene.

Protein synthesis and gene variants

Triple only

Higher tier

**What is the role of tRNA?**

Protein synthesis and gene variants

Triple only

Higher tier

**What happens to amino acids at the ribosome?**

Protein synthesis and gene variants

Triple only

Higher tier

**How can a variant in non-coding DNA affect phenotype?**

Protein synthesis and gene variants

Triple only

Higher tier

**How can a variant in coding DNA affect phenotype?**

Inheritance

Triple only

**Who was Gregor Mendel and what did he do?**

Inheritance

Triple only

**Why was inheritance difficult to understand before Mendel's work was explained?**

Inheritance

**Why do individuals have different inherited characteristics?**

Inheritance

**Define a chromosome.**

They are linked together to form a polypeptide.

It transfers amino acids to the ribosome.

It can alter the sequence of amino acids, and so the activity of the protein produced.

It can change the binding of RNA polymerase, altering the quantity of protein produced.

Genes, chromosomes and DNA were not known, so there was no mechanism to explain it.

A monk who bred pea plants and counted offspring over generations, discovering the basis of genetics.

A long molecule of DNA in the nucleus that carries many genes.

Because they inherit different combinations of alleles.

Inheritance

**Define an allele.**

Inheritance

**Dominant allele or recessive allele:  
which is expressed when only one  
copy is present?**

Inheritance

**Homozygous or heterozygous: which  
has two different alleles of a gene?**

Inheritance

**What is the difference between  
genotype and phenotype?**

Inheritance

**What are a gamete and a zygote?**

Inheritance

**What ratio of phenotypes is expected  
from  $Tt \times Tt$  (T dominant)?**

Inheritance

**Two parents without a characteristic  
have a child with it. What does this  
show?**

Inheritance

**Which sex chromosomes do human  
males and females have?**

The dominant allele.

A different version of the same gene.

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

Heterozygous. Homozygous means two identical alleles.

3 showing the dominant characteristic : 1 showing the recessive.

A gamete is a sex cell with half the chromosomes. A zygote is the cell formed when two gametes fuse.

Males XY, females XX.

The characteristic is recessive and both parents are carriers.

Inheritance

**What is the probability of a baby being male or female?**

Inheritance

**How can the outcome of a cross be expressed?**

Inheritance

**Two carriers (Ff) have a child. What is the probability that it is ff?**

Inheritance **Triple only**

**What is codominance?**

Inheritance **Triple only**

**What are multiple alleles? Give the ABO alleles.**

Inheritance **Triple only**

**Which genotypes give blood group A?**

Inheritance **Triple only** **Higher tier**

**Why are sex-linked disorders more common in males?**

Inheritance **Triple only** **Higher tier**

**A carrier mother has children with an unaffected father. What is the chance a son has the disorder?**

As a ratio, a probability or a percentage.

50% (a 1 : 1 ratio). The sperm decides, as it carries an X or a Y.

Both alleles are expressed in the phenotype of a heterozygous organism, such as  $I^A$  and  $I^B$  giving blood group AB.

$\frac{1}{4}$ , 0.25 or 25%.

$I^A I^A$  or  $I^A I^O$ .

More than two alleles of a gene. The ABO alleles are  $I^A$ ,  $I^B$  and  $I^O$ .

50%. No daughters are affected, but half are carriers.

Males have only one X, so one recessive allele on it causes the disorder. Females need two copies.

Variation, mutations and the Human Genome Project

**Do most features depend on one gene or many?**

Variation, mutations and the Human Genome Project

**What is genetic variation?**

Variation, mutations and the Human Genome Project

**What is environmental variation?**

Variation, mutations and the Human Genome Project

**Continuous or discontinuous variation: which has distinct categories?**

Variation, mutations and the Human Genome Project

**How do you calculate an arithmetic mean?**

Variation, mutations and the Human Genome Project

**What was the Human Genome Project?**

Variation, mutations and the Human Genome Project

**Give two medical applications of the Human Genome Project.**

Variation, mutations and the Human Genome Project

**How does extensive genetic variation in a population arise?**

Different characteristics as a result of mutation and sexual reproduction.

Most phenotypic features are the result of multiple genes rather than single gene inheritance.

Discontinuous. Continuous variation gives a range of values, such as height.

Different characteristics caused by an organism's environment (acquired characteristics).

A project that mapped the human genome, identifying the sequence of bases in human DNA.

Add all the values and divide by the number of values.

Through mutations.

Finding genes linked to inherited disorders for testing and risk prediction, and developing treatments matched to genes.

**What effects do mutations have on the phenotype?**

Most have no effect, some have a small effect, and rarely a single mutation significantly affects the phenotype.