

# CIE Biology GCSE

## 17 - Inheritance

### Flashcards

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# What is inheritance?



# What is inheritance?

Transmitting genetic information from one generation to the next



# What is a chromosome?



# What is a chromosome?

Tightly packaged DNA around histone proteins in a thread-like structure that carries information in the form of genes



# What is a gene?



# What is a gene?

A section of DNA that codes for a specific protein



# What is an allele?





# What is an allele?

## Different versions of the same gene



# How is sex determined by genes?



## How is sex determined by genes?

- One of the 23 pairs of chromosomes determines sex
- The pair can either be XX for a female or XY for a male



Describe how genes determine the order  
of amino acids in a protein  
(Higher/Supplement)



Describe how genes determine the order of amino acids in a protein (**Higher/Supplement**)

The sequence of bases in a gene relates directly to the amino acids added during protein synthesis



# How does DNA control cell function? (Higher/Supplement)



# How does DNA control cell function? (Higher/Supplement)

DNA codes for proteins which can be enzymes, antibodies and receptors (for example)



# Explain protein synthesis (Higher/Supplement)





## Explain protein synthesis (Higher/Supplement)

- A copy of the gene is made using mRNA and taken into the cytoplasm to a ribosome
- The ribosome assembles amino acids into proteins based on the sequence of bases in the mRNA molecule



Compare the genes found in all the body  
cells  
(Higher/Supplement)



## Compare the genes found in all the body cells (Higher/Supplement)

- All body cells contain the same genes
- However genes can be 'turned on or off' dependant on the proteins the cell needs to make



# What is a haploid nucleus (Higher/Supplement)



What is a haploid nucleus (Higher/Supplement)

A nucleus with one set of unpaired chromosomes



# What is a diploid nucleus (Higher/Supplement)



What is a diploid nucleus (Higher/Supplement)

A nucleus with two sets of chromosomes where there is a pair of each type of chromosome



How many pairs of chromosomes does a  
human diploid cell have  
**(Higher/Supplement)**





How many pairs of chromosomes does a human diploid cell have (Higher/Supplement)

23 pairs



# What is mitosis?



# What is mitosis?

A type of nuclear division that produces two genetically identical daughter cells



# State 4 uses of mitosis



## State 4 uses of mitosis

- Growth
- Replacing worn out cells
- Repairing tissues
- Asexual reproduction



When does the duplication of  
chromosomes happen in relation to  
mitosis?  
(Higher/Supplement)



When does the duplication of chromosomes happen in relation to mitosis? (Higher/Supplement)

The duplication of the chromosomes happens before mitosis



# How is chromosome number maintained during mitosis?

## (Higher/Supplement)





## How is chromosome number maintained during mitosis? (Higher/Supplement)

- The chromosome number doubles prior to mitosis
- During mitosis, each of the copies are separated, giving each daughter cell the original amount (23 pairs)



# What are stem cells? (Higher/Supplement)



What are stem cells? (Higher/Supplement)

Cells that do not lose the ability to differentiate and so can differentiate into many different types of cells



# What is meiosis?



# What is meiosis?

A type of nuclear division that produces four daughter cells that are not genetically identical



# What is meiosis?

## (Higher/Supplement)



## What is meiosis? (Higher/Supplement)

A type of reduction division which halves the chromosome number, producing four genetically different daughter cells



What type of cell does meiosis produce?





What type of cell does meiosis produce?

Sex cells (gametes)



# How does meiosis produce genetically different daughter cells? (Higher/Supplement)



How does meiosis produce genetically different daughter cells? (Higher/Supplement)

Meiosis combines maternal and paternal chromosomes in different ways



# What is the genotype?



# What is the genotype?

## The genes present for a trait



# What is the phenotype?



# What is the phenotype?

## The visible characteristic



What is meant when an organism is homozygous?





What is meant when an organism is homozygous?

When an organism has two copies of the same allele (two recessive or two dominant)



What is meant when an organism is heterozygous?



What is meant when an organism is heterozygous?

When an organism has two different versions of the same gene (one dominant and one recessive)



What is the term used to describe the type of breeding carried out when two homozygous individuals breed?



What is the term used to describe the type of breeding carried out when two homozygous individuals breed?

Pure-breeding



# What is a dominant allele?



# What is a dominant allele?

A version of a gene where only one copy is needed for it to be expressed



# What is a recessive allele?





# What is a recessive allele?

A version of a gene where two copies are needed for it to be expressed

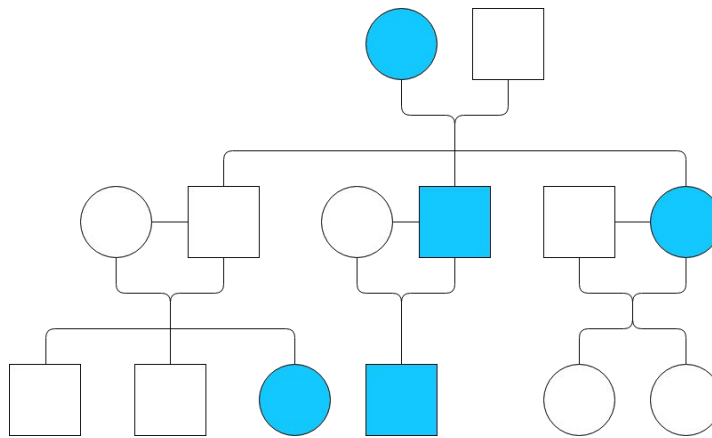


# What do family pedigrees show?



# What do family pedigrees show?

## The inheritance of an allele over generations



Draw a Punnett square for a cross between a homozygous recessive blue eyed female (bb) with a heterozygous brown eyed male (Bb)



Draw a Punnett square for a cross between a homozygous recessive blue eyed female (bb) with a heterozygous brown eyed male (Bb)

	B	b
b	Bb	bb
b	Bb	bb

50% brown eyes	Bb
50% blue eyes	bb



Draw a Punnett square for a cross between a homozygous dominant red flower (RR) with a homozygous recessive white flower (rr)



Draw a Punnett square for a cross between a homozygous dominant red flower (RR) with a homozygous recessive white flower (rr)

	R	R
r	Rr	Rr
r	Rr	Rr

100% Red flowers	Rr
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Draw a Punnett square for a cross between two heterozygous cystic fibrosis carriers (Ff)





Draw a Punnett square for a cross between two heterozygous cystic fibrosis carriers (Ff)

	F	f
F	FF	Ff
f	Ff	ff

25% healthy	FF
50% carriers	Ff
25% have CF	ff



# What is a test cross?



## What is a test cross?

- A method used to identify an unknown genotype
- It is done by breeding the unknown organism with a homozygous recessive organism



# What is codominance? (Higher/Supplement)



What is codominance? (Higher/Supplement)

When two alleles affect the phenotype



# What is a sex-linked characteristic? (Higher/Supplement)



# What is a sex-linked characteristic?

## (Higher/Supplement)

- A characteristic where the gene responsible for its located on a sex chromosome
- This makes it more common in one sex than another



Give one example of a sex-linked  
characteristic?  
(Higher/Supplement)





Give one example of a sex-linked characteristic?  
(Higher/Supplement)

Colour blindness



Draw a Punnett square for a cross  
between a female with blood type A and  
a male with blood type AB  
(Higher/Supplement)



Draw a Punnett square for a cross between a female with blood type A and a male with blood type AB  
 (Higher/Supplement)

	$I^A$	$I^B$
$I^A$	$I^A I^A$	$I^A I^B$
$I^A$	$I^A I^A$	$I^A I^B$

50% Blood type A	$I^A I^A$
50% Blood type AB	$I^A I^B$

