

# Edexcel (B) Biology A-level

## 8.2 - Transfer of genetic information

### Flashcards

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Define genotype.



Define genotype.

The genetic constitution of an organism.



Define phenotype.



Define phenotype.

The expression of an organism's genetic constitution, combined with its interaction with the environment.



# What is an allele?



# What is an allele?

Different forms of a particular gene, found at the same locus (position) on a chromosome. A single gene could have many alleles.



# What is meant by a dominant allele?





What is meant by a dominant allele?

An allele whose characteristic will always appear in the phenotype, whether one or two are present.



# What is meant by a recessive allele?



# What is meant by a recessive allele?

An allele whose characteristic only appears in the phenotype if no dominant allele is present, meaning two must be present.



# What is meant by codominant alleles?



What is meant by codominant alleles?

Two dominant alleles that both contribute to the phenotype, either by showing a blend of both characteristics, or the characteristics appearing together.



What is meant by homozygous and heterozygous?



What is meant by homozygous and heterozygous?

Homozygous = both alleles are dominant, or both alleles are recessive.

Heterozygous = one allele is dominant, the other is recessive.



# What is meant by multiple alleles?





What is meant by multiple alleles?

A gene with more than two alleles.



Draw an example of a genetic cross diagram.



Draw an example of a genetic cross diagram.

*Parental phenotypes*

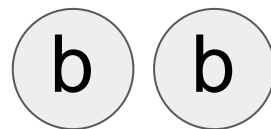
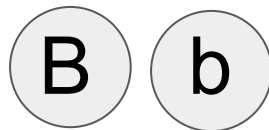
Brown eyes    Blue eyes

*Parental genotypes*

Bb

bb

*Gametes*



*Offspring genotypes*  
(draw a punnet square)

Bb, Bb, bb, bb

*Offspring phenotypes*

2:2 brown eyes:blue eyes



Draw an example of a pedigree diagram.



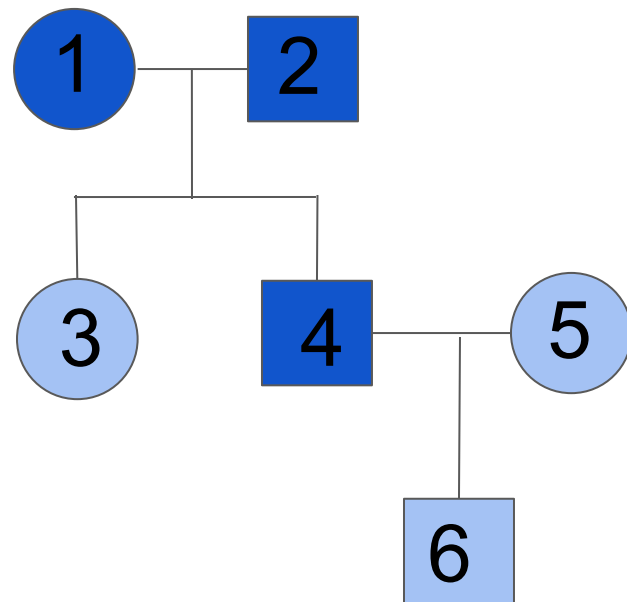
Draw an example of a pedigree diagram.

 Unaffected female

 Unaffected male

 Affected female

 Affected male



# How are non-interacting, unlinked genes inherited?



# How are non-interacting, unlinked genes inherited?

Can be monohybrid or dihybrid.

- Monohybrid = a phenotypic characteristic is controlled by a single gene.
- Dihybrid = two phenotypic characteristics are controlled by two different genes present on two different chromosomes.



# What is meant by autosomal linkage?





## What is meant by autosomal linkage?

Where two or more genes are located on the same (non-sex) chromosome. In this case, only one homologous pair is needed for all four alleles to be present. For genes that aren't linked, two homologous pairs are needed.



Give an example of autosomal linkage.



Give an example of autosomal linkage.

*Drosophila* (fruit flies); colour and wing length are autosomally linked, meaning they are inherited in pairs.



Explain why autosomally linked genes are inherited in pairs, referring to meiosis.



Explain why autosomally linked genes are inherited in pairs, referring to meiosis.

Genes on the same chromosome, particularly those closest together, are unlikely to undergo recombination during meiosis. Therefore they are inherited as if they were the same gene.



What is meant by sex-linkage? Give an example.



What is meant by sex-linkage?

Where an allele is located on one of the sex chromosomes, meaning its expression depends on the sex of the individual e.g. haemophilia.



Why are males more likely to express a recessive sex-linked allele?





Why are males more likely to express a recessive sex-linked allele?

Most sex-linked alleles are located on the X chromosome. Therefore males only get one copy of the allele, so will express this characteristic even if it's recessive. Since females get two alleles, this is less likely.



# What is the chi-squared test?



## What is the chi-squared test?

A statistical test to find out whether the difference between observed and expected data is due to chance or a real effect.



# What are the criteria for the chi-squared test?



## What are the criteria for the chi-squared test?

- Data placed in discrete categories.
- Large sample size.
- Only raw count data allowed i.e. not percentages.
- No data values equal zero.



# How is a chi-squared test performed?



## How is a chi-squared test performed?

The formula results in a number, which is then compared to a critical value (for the corresponding degrees of freedom). If the number is greater than or equal to the critical value, we conclude there is no significant difference and the results occurred due to chance.



How can we use a chi-squared test in relation to the content of this topic?





How can we use a chi-squared test in relation to the content of this topic?

We can compare expected phenotypic ratios with observed ratios to test our understanding of how different genes and alleles are inherited.

