OCR (B) Biology GCSE

Topic B1.2: How is genetic information inherited?

Flashcards

What are gametes?

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Reproductive cells (e.g. egg and sperm cells) that contain a single copy of each chromosome

Describe sexual reproduction in terms of chromosome number

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- Two gametes with a single copy of each chromosome fuse
- Resulting embryo has two chromosomes for each gene and two copies of each allele

Define homozygous

Define homozygous

Having two identical alleles of a gene

e.g. FF or ff

Define heterozygous

Define heterozygous

Having two different alleles of a gene

e.g. Ff

What is a dominant allele?

What is a dominant allele?

Describes an allele that is always expressed

Represented with a capital letter e.g. F

What is a recessive allele?

What is a recessive allele?

An allele that is only expressed in the absence of a dominant allele

Represented with a small letter e.g. f

A female who is homozygous recessive for cystic fibrosis (ff) has a child with a heterozygous male (Ff). Draw a punnett square to illustrate this single gene inheritance.

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		Female genotype	
		f	f
Male genotype	F	Ff	Ff
	f	ff	ff

PKU is a recessive condition. Two heterozygous parents have offspring. Predict the proportion of offspring that will have PKU.

PKU is a recessive condition. Two heterozygous parents have offspring. Using a punnett square, predict the proportion of offspring that will have PKU.

75% chance of normal phenotype

25% chance of PKU phenotype

		Female genotype	
		P	p
Male genotype	P	PP	Pp
	p	Pp	pp

What is the problem with single gene crosses?

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Most characteristics are controlled by multiple alleles rather than just one

What are sex chromosomes?

What are sex chromosomes?

A pair of chromosomes that determines sex:

- Males have an X and a Y chromosome
- Females have two X chromosomes

Why does the inheritance of a Y chromosome mean that an embryo develops into a male?

Why does the inheritance of a Y chromosome mean that an embryo develops into a male?

Testes development in an embryo is stimulated by a gene present on the Y chromosome

A couple have a child. Using a punnett square, determine the probability of having offspring that is female.

A couple have a child. Using a punnett square, determine the probability of having offspring that is female.

50% chance of female (XX)

		Female genotype	
		X	X
Male genotype	X	XX	XX
	Y	XY	XY

Other than using a punnett square, how else can single gene inheritance be represented?

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Using a family tree

Outline how the work of Mendel helped scientists to develop their understanding of genetics (biology only)

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- Mendel studied the inheritance of different phenotypes of pea plants
- He established a correlation between parent and offspring phenotypes
- He noted that inheritance was determined by ‘units’ passed on to descendants
- Using gene crosses, he devised the terms ‘dominant’ and ‘recessive’

What is genome sequencing?
(biology only/higher)

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Finding out the order of nucleotides in the DNA of an organism, enabling the function and interaction of genes to be assessed

Why is genome sequencing important? (biology only/higher)

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- Allows the comparison of genomes of healthy individuals with patients who have a disease
- Potential disease-causing alleles are identified
- Individuals can then undergo genetic testing for these alleles