

**YEAR 11**

Genetics and Inheritance

Three sections. Draw the Punnett square for every cross in section B, even when you can see the answer: the marks in an exam are for the square.

A. The words you need

- 1 What is a gene? **A section of DNA that codes for a protein**
- 2 What is a chromosome made of? **DNA, coiled up, carrying many genes**
- 3 What is an allele? **A version of a gene**
- 4 What does homozygous mean? **Both alleles for that gene are the same**
- 5 What does heterozygous mean? **The two alleles for that gene are different**
- 6 What is the difference between genotype and phenotype? **The genotype is the alleles present; the phenotype is the characteristic you observe**
- 7 How many chromosomes are in a human body cell? **46, in 23 pairs**
- 8 How many chromosomes are in a human gamete? **23**
- 9 What does it mean for an allele to be dominant? **It shows in the phenotype even when only one copy is present**

B. Crosses

- 10 Two parents are both Bb. Draw a Punnett square and give the ratio of genotypes.
1 BB : 2 Bb : 1 bb
- 11 For those parents, what fraction of children would be expected to be bb? **$\frac{1}{4}$**
- 12 For those parents, what percentage would show the dominant characteristic?
75%
- 13 A BB parent and a bb parent have children. Give the genotype of all of them. **All Bb**
- 14 A Bb parent and a bb parent have children. Give the expected ratio. **1 Bb : 1 bb**

- 15 What percentage of those children would be expected to show the recessive characteristic? **50%**
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- 16 Cystic fibrosis is recessive. Two parents carry one copy each and neither has the condition. What are their genotypes, and what is the chance a child has it?
Both heterozygous, and a 1 in 4 chance
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C. Sex and variation

- 17 Which pair of sex chromosomes does a human female have? **XX**
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- 18 Which pair does a human male have? **XY**
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- 19 Which parent determines the sex of the child, and why? **The father, because he can pass on either an X or a Y**
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- 20 What percentage of children would be expected to be male? **50%**
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- 21 Give one characteristic caused only by genes. **Blood group, or eye colour**
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- 22 Give one characteristic caused only by the environment. **A scar, or a language you speak**
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- 23 Give one characteristic caused by both. **Height, or body mass**
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