

Exercise walk-through

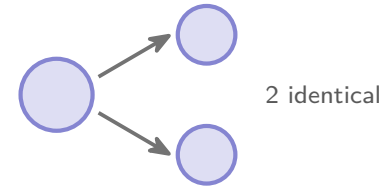
17.4

Monohybrid inheritance

IGCSE Biology

What we will cover

- 1 Chromosomes, genes & DNA
- 2 Sex determination
- 3 Making a protein
- 4 Mitosis vs meiosis
- 5 Inheritance key words
- 6 Monohybrid crosses



mitosis vs meiosis

Sex determination

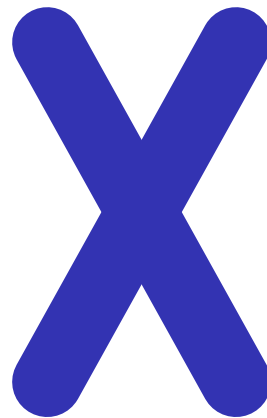
mother **XX** × father **XY**

father		X	Y	
mother	X	XX	XY	1 : 1 girls (XX, purple) boys (XY, blue)
	X	XX	XY	

- The 23rd pair are the **sex chromosomes** : **XX** in a female, **XY** in a male.
- An egg always carries an X. A sperm carries **either** an X or a Y, so the **father's gamete decides the sex**.
- The cross **XX × XY** gives XX, XY, XX, XY – a **50%** chance either way, for every pregnancy.

Check yourself

- 1 What does a gene code for?
- 2 Which gamete decides a baby's sex?
- 3 What does meiosis make?
- 4 What ratio does $Bb \times Bb$ give?



Answers 1. one protein 2. the sperm 3. four different haploid gametes 4. 3:1

Exercises 2.1·2.2

2.1 Define a recessive allele.

[1]

2.2 State the genotype of a heterozygous organism for a gene with alleles B and b.

[1]

Exercises 2.1·2.2

2.1 Define a recessive allele.

[1]

2.1

- a recessive allele is shown in the phenotype **only when no dominant allele is present**
-

2.2 State the genotype of a heterozygous organism for a gene with alleles B and b.

[1]

2.2

- heterozygous for B/b is **Bb**

Exercise 3.1

3.1 Crossing two heterozygous parents ($Bb \times Bb$) gives a phenotype ratio of: [1]

☐

A 1:1

B 3:1

C 1:2:1

D all dominant

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☐

A 1:1

B 3:1

C 1:2:1

D all dominant

3.1 B

- $Bb \times Bb$ gives a **3 : 1** phenotype ratio
- A is a test cross; C is genotypes; D is $BB \times \text{anything}$

Exercise 3.2 (a)

3.2 In rabbits, black fur (B) is dominant to white (b). A heterozygous black rabbit is crossed with a white rabbit.

(a) Complete a Punnett square for this cross.

[3]

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[3]

(a)

- parents $Bb \times bb$; gametes B, b and b
- offspring **Bb, Bb, bb, bb**

Exercise 3.2 (b)

3.2 In rabbits, black fur (B) is dominant to white (b). A heterozygous black rabbit is crossed with a white rabbit.

(b) State the ratio of black to white offspring expected.

[1]

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3.2 In rabbits, black fur (B) is dominant to white (b). A heterozygous black rabbit is crossed with a white rabbit.

(b) State the ratio of black to white offspring expected. [1]

(b)

- ratio **1 : 1** (black : white)