IGCSE BIOLOGY • EXERCISE SHEET

17.4 Monohybrid inheritance

Name: _____ Class: _____ Date: _____ **Total: 7 marks**

Objective

Build the skills to answer exam questions on **monohybrid inheritance** 单基因遗传—the key terms, **Punnett squares** 庞纳特方格, and ratios.

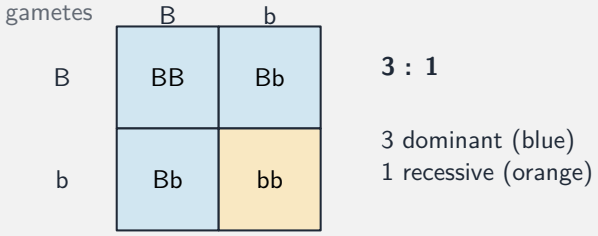
You must be able to:

- use genotype/phenotype, dominant/recessive, homo-/heterozygous
- complete a Punnett square and predict ratios
- interpret a test cross / pedigree

1 Worked examples

A monohybrid cross

Bb × **Bb** (both parents)

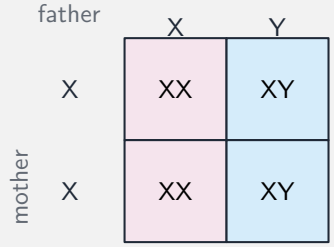


3 : 1

3 dominant (blue)
1 recessive (orange)

Bb × Bb → BB, Bb, Bb, bb → a 3:1 ratio of dominant to recessive

mother **XX** × father **XY**



1 : 1

girls (XX, purple)
boys (XY, blue)

A Punnett square also predicts sex determination

- **dominant** shows with one copy (capital); **recessive** needs two copies (lower-case).
- **homozygous** = two same alleles; **heterozygous** = two different.

2 Practice

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]

3 Exam-style questions

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

- **A** 1:1
- **B** 3:1
- **C** 1:2:1
- **D** all dominant

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]

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

4 Go further

You are now ready for the real exam questions on this subtopic. Open the **17.4 Monohybrid inheritance** past-paper sheet in the Library, or try these in **Practice mode**:

- 0610/21 N25 —Q27 (monohybrid inheritance)
- 0610/21 N25 —Q29 (genetic cross)

Solutions

2.1 an allele shown in the phenotype only when no dominant allele is present.

2.2 Bb.

3.1 B. Bb × Bb gives a 3:1 ratio.

3.2 (a) parents Bb × bb; gametes B,b and b,b; offspring Bb, Bb, bb, bb.
(b) 1:1 (black : white).