Solutions

Each answer shows the steps, then the **result**.

2.1

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

2.2

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

2.3

- the transmission of genetic information from generation to generation

2.4

- the **TT** plants are pure-breeding: bred together they can only pass on T, so all offspring are TT
- **Tt** is heterozygous, so it can pass on T or t and its offspring may differ from it

3.1 B

- Bb × Bb gives a **3 : 1** phenotype ratio
- A is a test cross; C is genotypes; D is BB × anything

3.2

(a)

- parents Bb × bb; gametes B, b and b
- offspring **Bb, Bb, bb, bb**

(b)

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

3.3

(a)

- codominant

(b)

- gametes: I^A, I^o and I^B, I^o
- offspring: I^AI^B, I^AI^o, I^BI^o, I^oI^o
- groups **AB : A : B : O = 1 : 1 : 1 : 1**

3.4

(a)

- the gene for the characteristic is on a sex chromosome

(b)

- gametes: X^B, X^b and X^B, Y
- offspring: X^BX^B, X^BX^b, X^BY, X^bY; the sons are X^BY and X^bY
- probability a son is colour blind = **0.5** (1 in 2)

(c)

- males have one X chromosome, so a single recessive allele shows; females need two copies, one on each X