Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

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

2.1

- **discontinuous**
- distinct **groups** / no intermediates

2.2

- a random change in the **base sequence** of DNA

2.3

- **histogram**

2.4

- body mass is affected by the **environment**
- e.g. **diet** / exercise differs between the twins

2.5

any two: **light** intensity; **water**; **minerals** / nitrate in soil; temperature

2.6

- most leaves in the **middle** classes, fewer at both extremes / bell-shaped (normal)

3.1

D

3.2

B

3.3

(a) **11 to 12 cm**

(b) $10 + 5 + 2 =$ **17**

(c)

- **continuous**
- a **range** of values / bars touch / no distinct groups

(d)

- alleles inherited from the parent plants set the **potential** length
- **light**, water or minerals during growth affect whether it is reached

3.4

(a)

- the base sequence codes for the order of **amino acids**
- a changed sequence gives a **different amino acid** sequence
- so the protein folds into a different **shape** / works differently

(b) **discontinuous**

(c) mutation is the only source of **new alleles**

(d) avoid **smoking** / tobacco smoke; limit exposure to **X-rays** / ionising radiation

(e) skin cells are **not gametes** / only mutations in gametes are inherited