5090 Biology Paper 1 - Inheritance

Topical questions | 41 questions

1. Question | 5090 May-June 2023 P1 V1 Q34

34 Some lizards in a population had longer leg bones than others. They were able to climb better than the lizards with shorter legs, so they were able to escape from their predators on the ground. Over time, lizards with shorter legs died out so that all the lizards in the population now have longer legs.

Which process has caused this change within the lizard population?

A extinction

B natural selection

C conservation

D artificial selection

2. Question | 5090 May-June 2023 P1 V1 Q35

35 The genotype for the height of an organism is written as Tt.

Which conclusion may be drawn?

A The allele for height has at least two different genes.

B There are at least two different alleles of the gene for height.

C There are two different genes for height, each having a single allele.

D There is one allele for height with two different forms.

3. Question | 5090 May-June 2023 P1 V2 Q34

34 In a strand of DNA containing 100 nucleotide pairs, 46 nucleotides contain the base A.

How many nucleotides in this DNA strand contain the base T?

A 23 **B** 46 **C** 54 **D** 154

4. Question | 5090 May-June 2023 P1 V2 Q35

35 Two brothers had different blood groups. One was blood group A and the other was blood group B.

What can be concluded about their parents' blood group genotypes?

A Both of the parents must be heterozygous.

B Both of the parents must be homozygous.

C One parent (at least) must be heterozygous.

D One parent (at least) must be homozygous.

5. Question | 5090 Oct-Nov 2023 P1 V1 Q34

34 In a DNA molecule, bonds between pairs of bases hold the strands together.

Which pairs of bases are found in DNA?

1 A-C

2 A-G

3 A-T

4 C-G

5 C-T

6 T-G

A 1, 2, 3, 4, 5 and 6

B 1 and 6 only

C 2 and 5 only

D 3 and 4 only

6. Question | 5090 Oct-Nov 2023 P1 V1 Q35

35 The inheritance of the ABO blood groups in humans is controlled by three alleles (I^A, I^B and I^O), only two of which can be present in one individual.

What are the possible blood groups of children born to a homozygous group A woman and a heterozygous group B man?

A AB and B only

B AB and A only

C A, B and AB only

D A, B, AB and O

7. Question | 5090 Oct-Nov 2023 P1 V2 Q34

34 Which statements are correct?

1 Each chromosome contains one molecule of DNA.

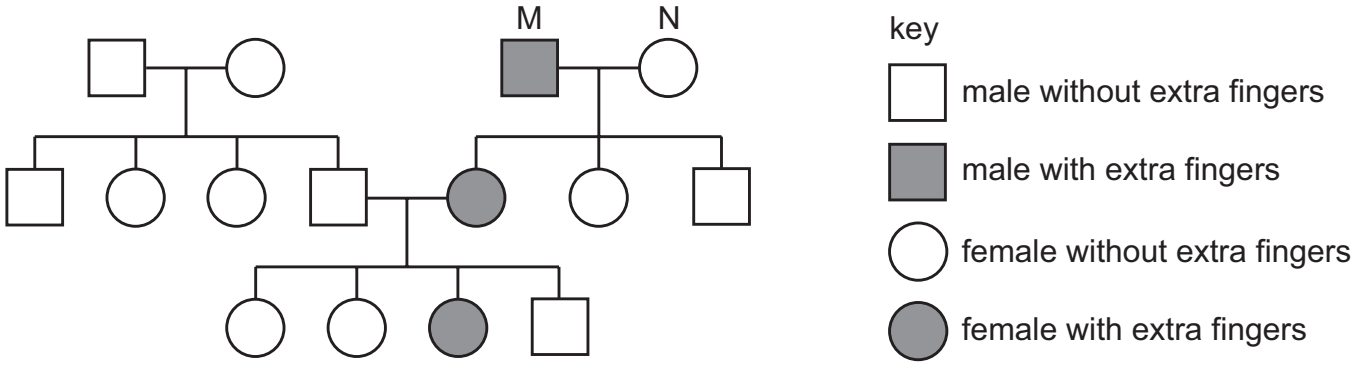
2 A gene is a section of DNA on a chromosome.

3 A gene contains smaller regions called alleles.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

8. Question | 5090 Oct-Nov 2023 P1 V2 Q35

35 The diagram shows the inheritance of the allele, E, for polydactyly (having extra fingers) which is dominant over the allele for no extra fingers, e.



What are the genotypes of persons M and N?

	M	N
A	EE	ee
B	Ee	Ee
C	Ee	ee
D	ee	ee

9. Question | 5090 Specimen 2023 P1 Q33

33 Which human feature shows discontinuous variation?

A blood group

B hair colour

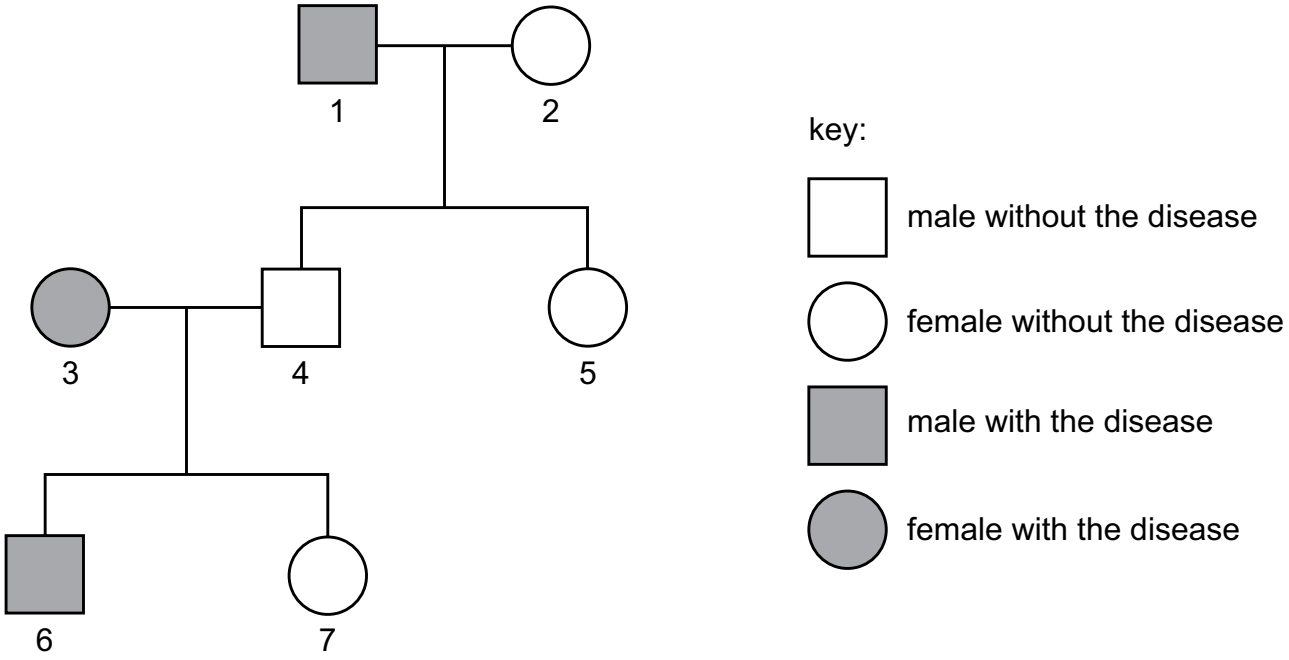
C height

D foot length

34 Which statements about genes and chromosomes are correct?

	A chromosome contains DNA.	A gene is a section of DNA.
A	true	true
B	true	false
C	false	true
D	false	false

35 The diagram shows a family in which some members suffer from a disease caused by a recessive allele.

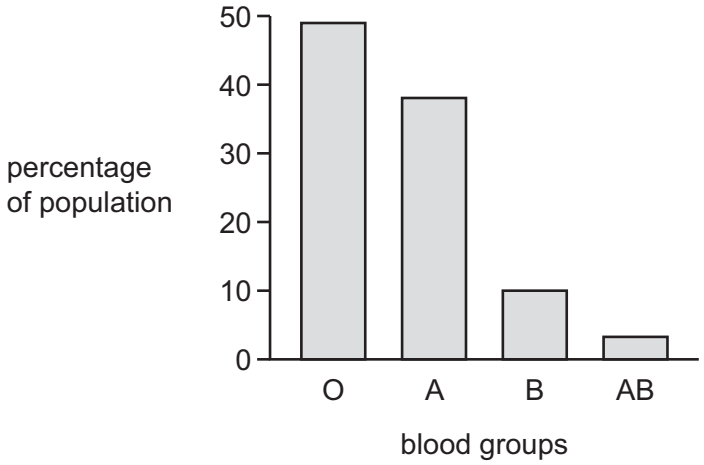


Identify two members of the family who **must** be heterozygous for the gene?

A 5 and 7 **B** 3 and 6 **C** 2 and 5 **D** 1 and 4

12. Question | 5090 May-June 2024 P1 V1 Q33

33 The graph shows the percentage of the population with different ABO blood groups in one region.



How does the graph suggest that variation in ABO blood groups is discontinuous?

A There are intermediates.

B The percentage of the population with each blood group is different.

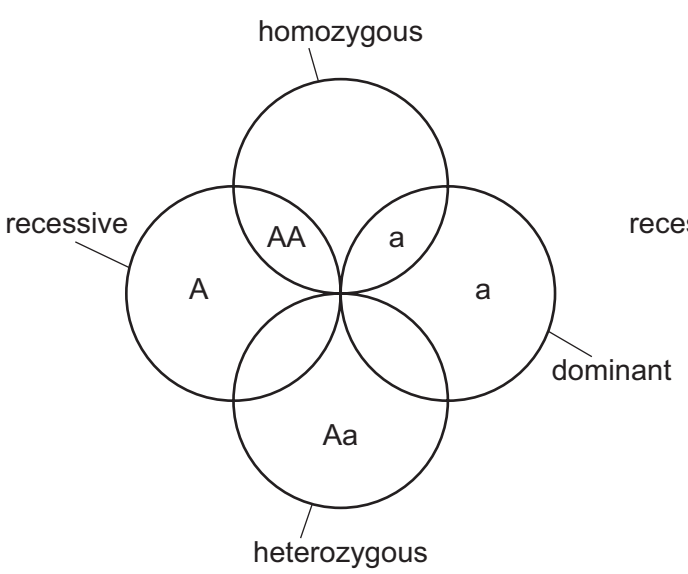
C There is a limited number of phenotypes.

D There is a range of phenotypes between two extremes.

13. Question | 5090 May-June 2024 P1 V1 Q34

34 For a gene with two alleles, A and a, which diagram identifies these alleles and the genotypes they can form?

A



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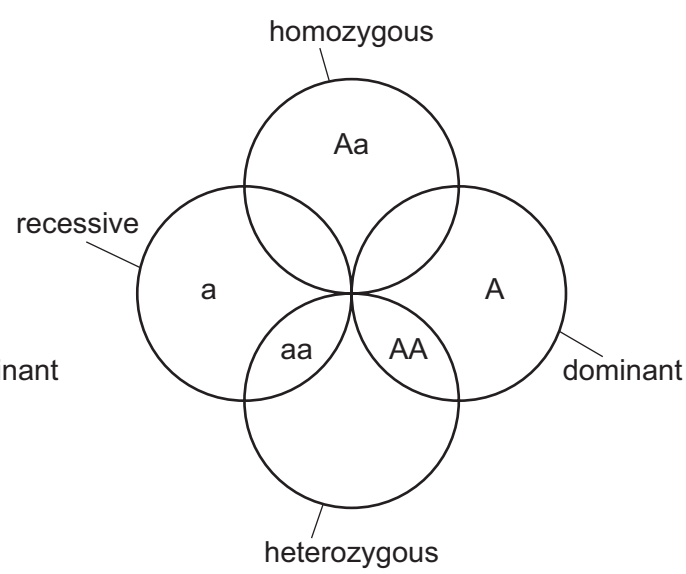

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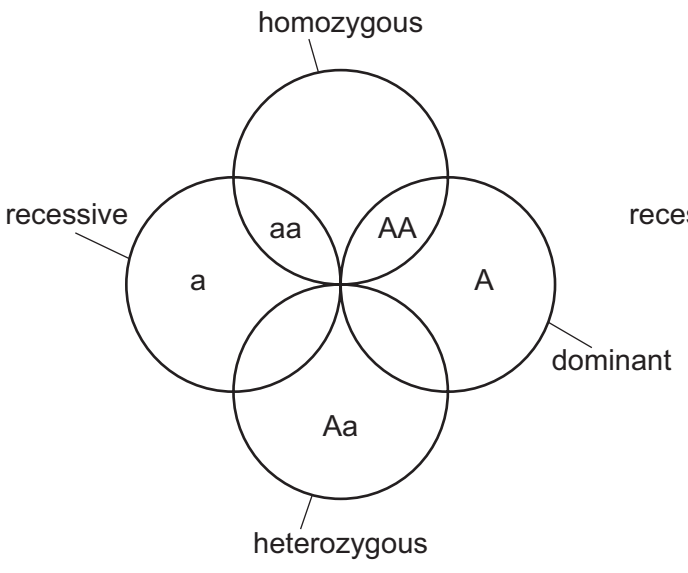

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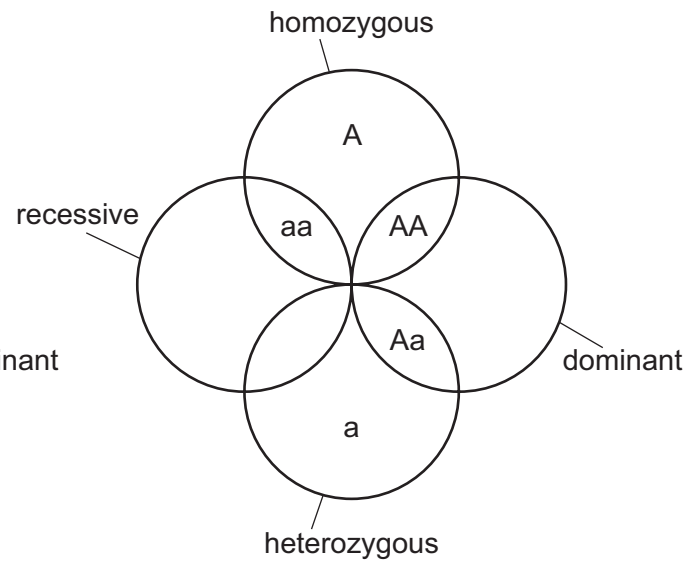


14. Question | 5090 May-June 2024 P1 V1 Q35

35 Over time, a species of bird develops a more pointed beak. The more pointed shape of the beak helps the birds to catch small insects that may be hiding in cracks in the rocks.

What is a reason for the change in the shape of the birds' beaks?

A Birds develop more pointed beaks as they search for insects in cracks in the rocks.

B Individuals with less pointed beaks are better fitted to their environment and more likely to survive.

C Individuals with more pointed beaks are better able to compete for food.

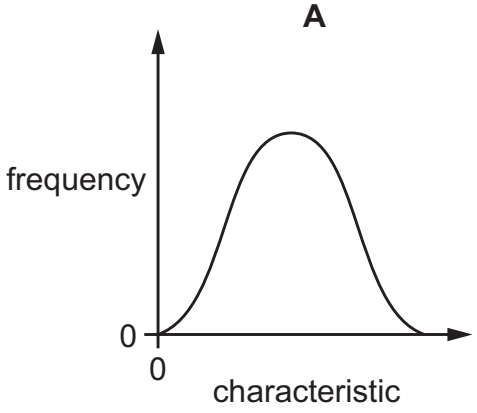
D When reproducing, birds are more likely to seek out mates with less pointed beaks because these are better adapted.

15. Question | 5090 May-June 2024 P1 V2 Q33

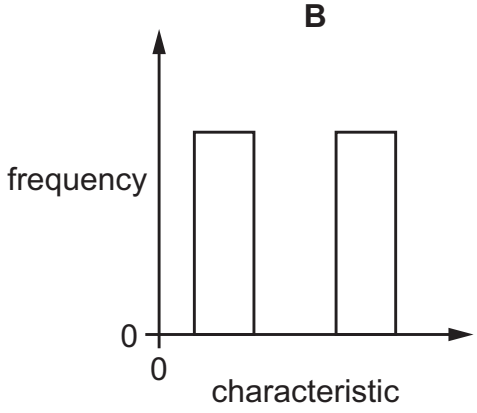
33 Three of the four graphs shown were constructed from data collected about the variation in particular characteristics in a population.

Which graph was **not** constructed from this kind of data?

A



B



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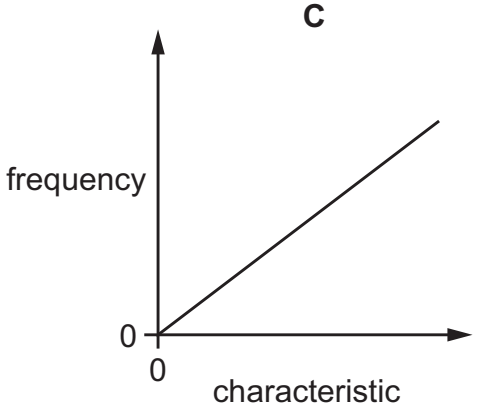
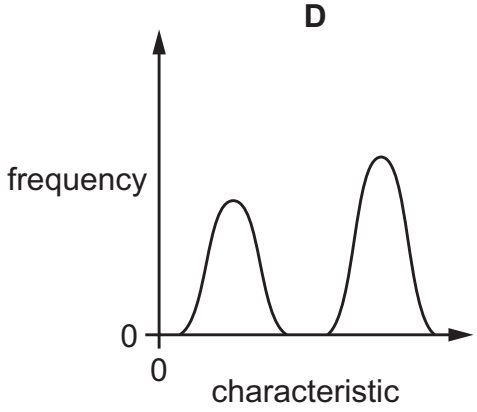


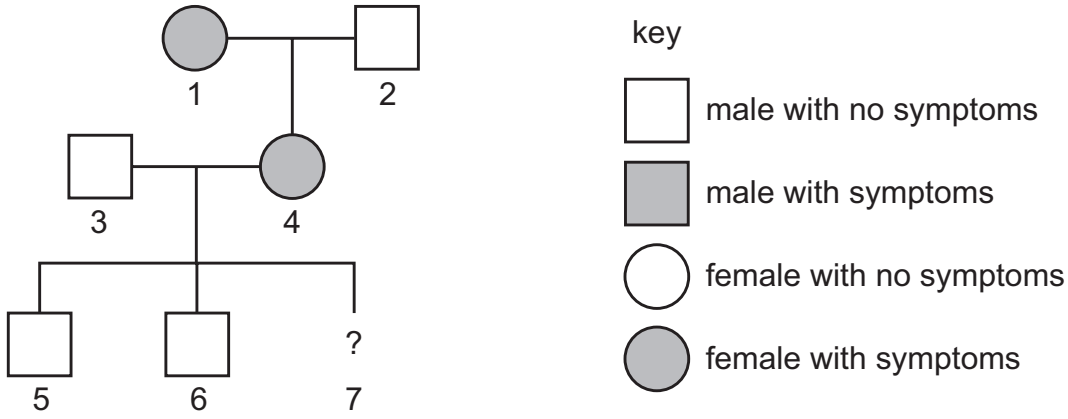
D



16. Question | 5090 May-June 2024 P1 V2 Q34

34 The diagram shows three generations of a family tree in which an inherited condition that affects the nervous system occurs.

This condition is caused by a dominant allele that normally shows its effect in mature adults.



The woman, 4, shows symptoms of this condition while she is pregnant.

What is the chance that the new baby, 7, will be a girl who will also develop the condition later in life?

A 0.00 **B** 0.25 **C** 0.50 **D** 1.00

17. Question | 5090 May-June 2024 P1 V2 Q35

35 Which process involves reproduction between those members of a species that are best fitted to their environment?

A discontinuous variation

B gene mutation

C natural selection

D survival of the fittest

18. Question | 5090 Oct-Nov 2024 P1 V1 Q33

33 What is an example of discontinuous variation in humans?

A body weight

B height

C blood group

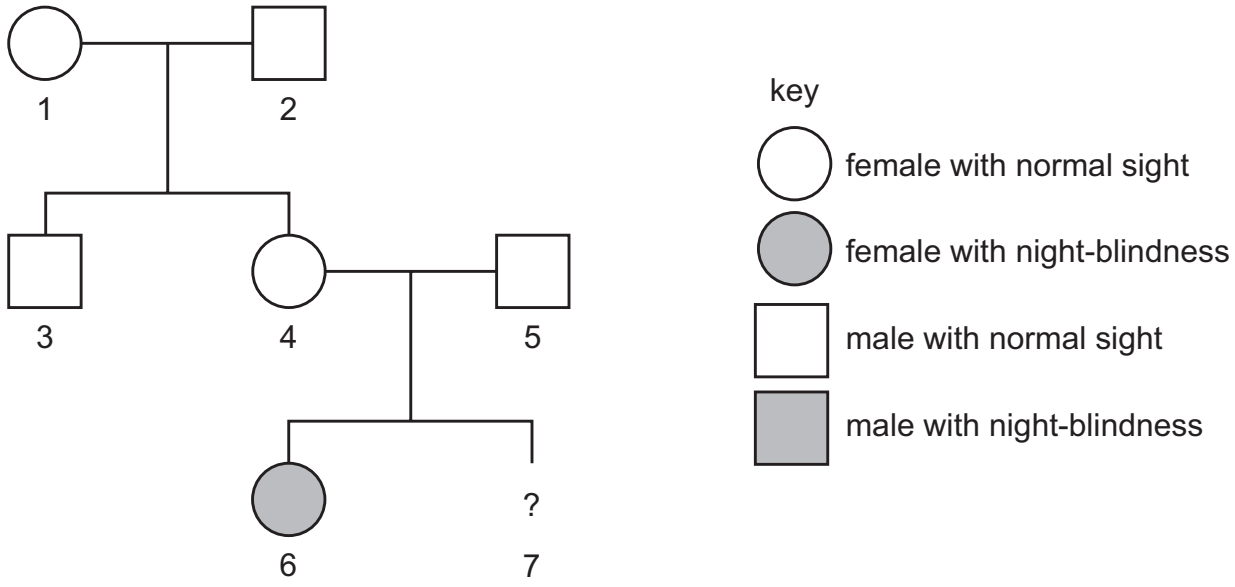
D skin colour

19. Question | 5090 Oct-Nov 2024 P1 V1 Q34

34 Night-blindness is an inherited condition in which people have unusually poor vision when light levels are low.

The diagram shows the inheritance of night-blindness in three generations of a family.

Couple 4 and 5 are expecting their second child, individual 7.



What is the probability that individual 7 will be a male and will also show night-blindness as his phenotype?

A 0.500 **B** 0.300 **C** 0.250 **D** 0.125

20. Question | 5090 Oct-Nov 2024 P1 V1 Q35

35 What is essential for natural selection to occur?

	competition	variation
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key
✓ = yes
✗ = no

21. Question | 5090 Oct-Nov 2024 P1 V2 Q33

33 DNA is divided into sections called

A chromosomes.

B genes.

C nuclei.

D proteins.

22. Question | 5090 Oct-Nov 2024 P1 V2 Q34

34 A man and his wife have three children. The first two are both girls; one has blood group A and one has blood group O.

The children's father has blood group B.

What is the probability that the third child is a boy with blood group B?

A 0.125 **B** 0.25 **C** 0.50 **D** 1.00

23. Question | 5090 Oct-Nov 2024 P1 V2 Q35

35 Which outcomes might farmers want to achieve by using artificial selection?

	increased	decreased
A	fertiliser use	pesticide use
B	growth rate	yield
C	pesticide use	growth rate
D	yield	fertiliser use

24. Question | 5090 May-June 2025 P1 V1 Q36

36 Which row identifies the factors causing continuous and discontinuous variation?

	continuous variation	discontinuous variation
A	both the environment and the genes	both the environment and the genes
B	the environment only	both the environment and the genes
C	the genes only	the environment only
D	both the environment and the genes	the genes only

25. Question | 5090 May-June 2025 P1 V2 Q36

36 Sickle cell anaemia is caused by a recessive allele.

A couple have two children.

One of the children has sickle cell anaemia.

The parents and the other child do **not** have sickle cell anaemia.

The couple are expecting their third child.

What is the probability that this third child will be male with sickle cell anaemia?

A 0% **B** 12.5% **C** 25% **D** 50%

26. Question | 5090 Oct-Nov 2025 P1 V1 Q29

29 Chromosomes, DNA molecules and genes are pieces of inherited material with different sizes.

Which statement describes the relationship between these pieces of inherited material?

A A chromosome is larger than a gene.

B A gene is larger than a chromosome.

C Multiple chromosomes make up a DNA molecule.

D Multiple DNA molecules make up a gene.

27. Question | 5090 Oct-Nov 2025 P1 V1 Q30

30 During the division of a nucleus by meiosis, changes can happen that produce a gamete with an abnormal number of genes or an abnormal number of chromosomes.

Which change can result in a child having Down's syndrome?

A a gamete with one extra chromosome

B a gamete with one less gene

C a gamete with one less chromosome

D a gamete with one extra gene

28. Question | 5090 Oct-Nov 2025 P1 V1 Q31

31 Which row shows possible effects of natural selection?

	natural selection can cause mutations to occur	natural selection can lead to the extinction of a species
A	no	no
B	no	yes
C	yes	no
D	yes	yes

29. Question | 5090 Oct-Nov 2025 P1 V1 Q32

32 All organisms in the same species show variation.

Some features of different types of variation are listed.

1 an example is body mass

2 has a limited number of possible forms with **no** intermediates

3 has any value from a minimum to a maximum

4 is unaffected by the environment

5 is usually caused by genes only

Which statements refer to discontinuous variation?

A 1, 3 and 5 **B** 1 and 3 only **C** 2, 4 and 5 **D** 2 and 4 only

30. Question | 5090 Oct-Nov 2025 P1 V2 Q30

30 Which examples show continuous variation?

1 length of seedlings

2 mass of bananas

3 human skin colour

A 1, 2 and 3 **B** 1 and 3 only **C** 1 only **D** 2 and 3 only

31. Question | 5090 Oct-Nov 2025 P1 V2 Q31

31 A man has six fingers on each hand and six toes on each foot. This genetically inherited condition is caused by a dominant allele. The man's genotype is heterozygous.

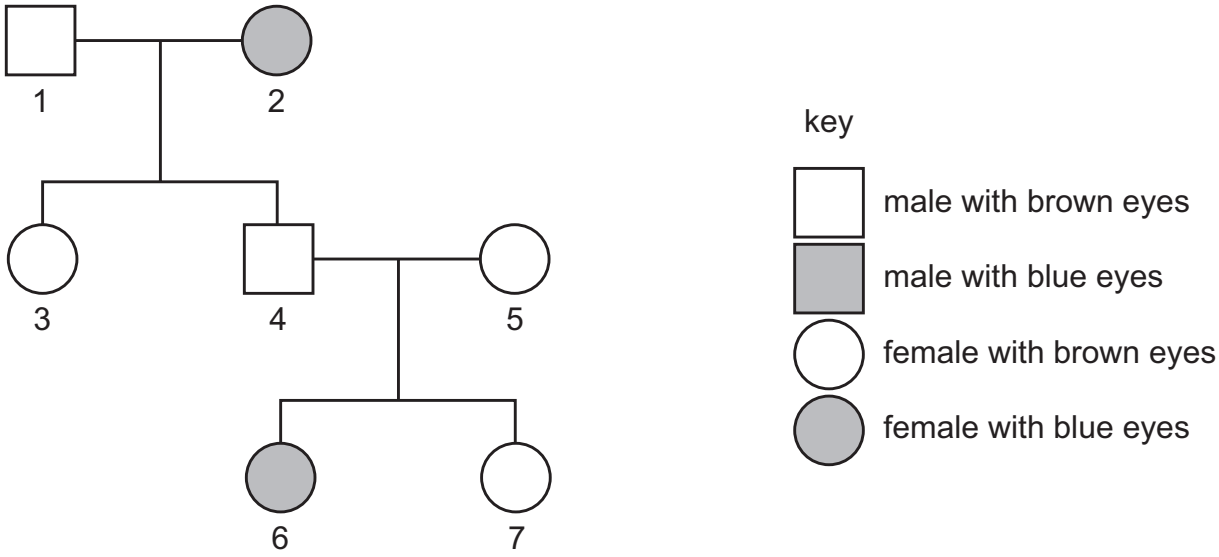
His wife does **not** have the condition.

What is the probability that a child of this couple will be born with the condition?

A 0.00 **B** 0.25 **C** 0.50 **D** 1.00

32. Question | 5090 Oct-Nov 2025 P1 V2 Q32

32 The diagram shows a family tree for the inheritance of eye colour. The allele for brown eyes is dominant and the allele for blue eyes is recessive.

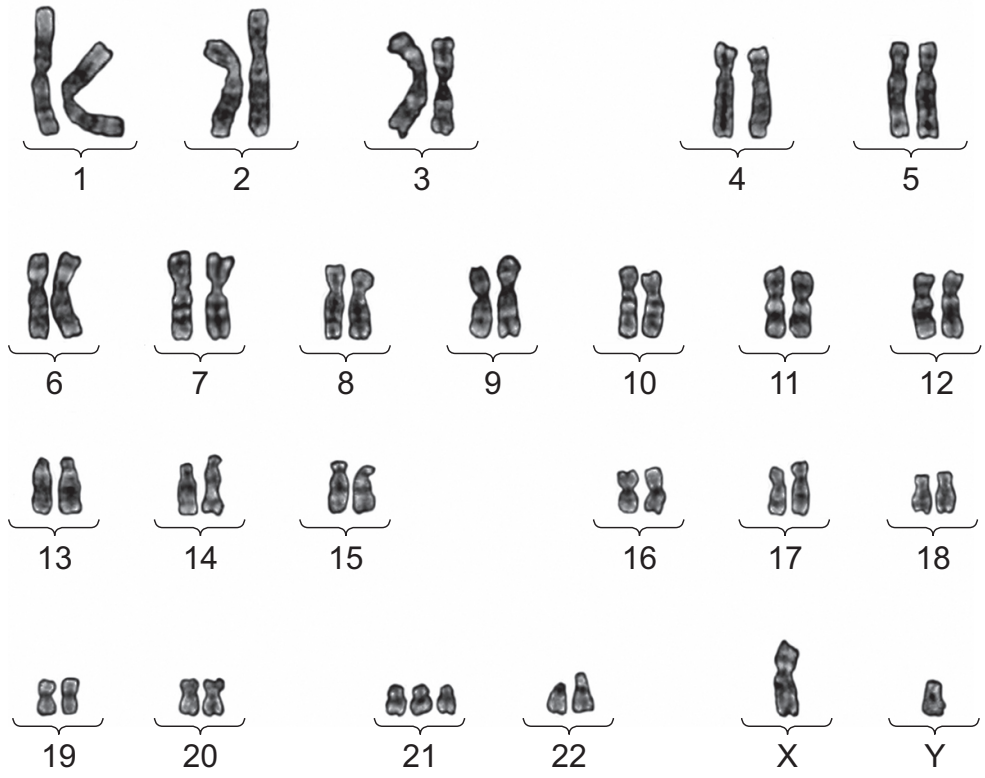


Which people **must** be heterozygous for eye colour?

A 1, 3 and 7 **B** 2 and 6 **C** 3, 4 and 5 **D** 4 and 5 only

33. Question | 5090 Oct-Nov 2025 P1 V2 Q33

33 A karyotype is a photograph showing the chromosomes of an individual.



Which description matches an individual who has this karyotype?

A female without Down's syndrome

B male without Down's syndrome

C female with Down's syndrome

D male with Down's syndrome

34. Question | 5090 Oct-Nov 2025 P1 V2 Q34

34 Three statements about natural selection are listed.

1 An organism with an advantageous inherited feature does **not** always pass this to its offspring.

2 Many organisms in a population die before they interbreed and produce any offspring.

3 Organisms with more advantageous inherited features are more likely to survive and produce offspring.

Which statements are correct?

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

35. Question | 5090 May-June 2026 P1 V1 Q36

36 What is an example of continuous variation?

A ABO blood groups

B body mass

C seed colour in peas

D seed shape in peas

36. Question | 5090 May-June 2026 P1 V1 Q37

37 A strand of DNA has the code CTCAGCA.

What would be the code for the complementary strand?

A AGACTAC

B CTCAGCA

C GAGTCGT

D TCTGATG

37. Question | 5090 May-June 2026 P1 V2 Q32

32 A section of a DNA molecule contains 400 bases, 80 of which are base A.

Which percentage of the bases in this section of DNA are base C?

A 25 **B** 30 **C** 60 **D** 80

38. Question | 5090 May-June 2026 P1 V2 Q33

33 Which statement about recessive alleles is correct?

A They always affect the phenotype.

B They always cause a harmful effect.

C They can only be inherited by males.

D They can only affect the phenotype if two are present.

39. Question | 5090 May-June 2026 P1 V2 Q34

34 A father has blood group A and the mother has blood group B. One of their children has blood group O.

What are the genotypes of the two parents?

A I^AI^A and I^BI^B

B I^AI^A and I^BI^O

C I^AI^O and I^BI^B

D I^AI^O and I^BI^O

40. Question | 5090 May-June 2026 P1 V2 Q35

35 Which statement describes the function of a DNA molecule?

A The copying of a nucleotide in a DNA molecule produces a gene.

B The formation of a nucleotide using a gene manufactures an amino acid.

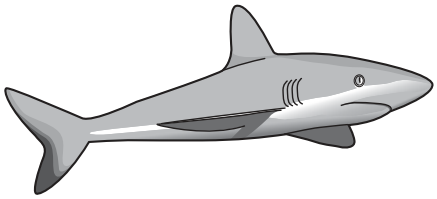
C The order of the bases in a DNA molecule codes for the sequence of amino acids in a protein.

D The repeating chain of four bases in sequence codes for a chromosome.

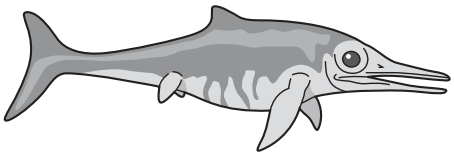
41. Question | 5090 May-June 2026 P1 V2 Q36

36 The diagrams show three different animals.

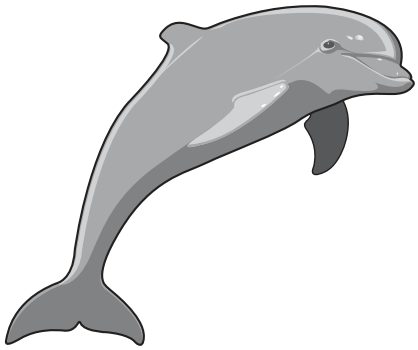
shark
(a fish)



ichthyosaur
(a reptile)



dolphin
(a mammal)



Why do the three animals look alike?

A They all evolved in similar environmental conditions.

B They all belong to the same kingdom.

C They are all vertebrates.

D They are closely related.