SmartKalike

CBSE Class 10 · Science

Heredity

10 most probable questions for Boards 2027

Q1. 1 mark · Multiple choice

Which chromosome combination is found in a human male?

(A) 44 + XX

(B) 44 + XY

(C) 22 + XY

(D) 22 + XX

Answer

(B) 44 + XY — in human beings, the sex of the child depends on whether the paternal chromosome is X (for girls) or Y (for boys).

Q2. 2 marks · Short answer

Why does a child have the basic features of a human being but not look exactly like their parents?

Answer

Both the father and the mother contribute practically equal amounts of genetic material to the child. This means that each trait can be influenced by both paternal and maternal DNA. A child bears all the basic features of a human being. However, it does not look exactly like its parents, and human populations show a great deal of variation.

Q3. 3 marks · Medium answer

Describe how you would use a class survey of free and attached earlobes to calculate the percentage of students with each type.

Answer

1. Observe each student's earlobes and prepare a list classifying each as free or attached. Count the students in each category.
2. Divide the number with each earlobe type by the total number of students, then multiply by 100. This gives the percentage with free earlobes and the percentage with attached earlobes.

Q4. 4 marks · Long answer

Design an investigation to compare students' earlobe types with those of their parents. State what information you would record and how the observations could help suggest a possible inheritance rule.

Answer

1. Survey group — X: Observe and classify each participating student's earlobes as free or attached; Y: Ask about and classify the earlobes of that student's mother and father in the same way.
2. Record — X: Note the student's identity and earlobe type; Y: Record the mother's and father's

identities and earlobe types against the same student, keeping each family's observations together.
3. Comparison — X: Compare each student's earlobe type with the mother's; Y: Compare the same student's earlobe type with the father's, noting whether the types match or differ.
4. Possible rule — X: Look for repeated patterns between students and their parents; Y: Use consistent similarities and differences to suggest a possible rule for inheritance, while recognising that survey observations alone do not establish a definite rule.

Q5. 5 marks · Long answer

A pure pea plant with round, yellow seeds (RRYY) is crossed with a pure plant with wrinkled, green seeds (rryy). Give the F1 genotype and appearance, show the gametes formed when the F1 plants are self-pollinated, and state the expected F2 phenotypic ratio. What does the result show about inheritance of the two traits?

Answer

Crossing pure pea plants with contrasting seed traits demonstrates the inheritance of two characteristics.

1. The cross RRYY × rryy produces F_1 plants with genotype RrYy; all are round and yellow because roundness and yellow colour are dominant traits.
2. Each F_1 plant forms four types of gametes: RY, Ry, rY and ry, as the factors for seed shape and colour separate independently.
3. Self-pollination, RrYy × RrYy, gives F_2 plants in the expected phenotypic ratio 9 round yellow : 3 round green : 3 wrinkled yellow : 1 wrinkled green.
4. The F_2 generation includes parental combinations and new combinations, namely round green and wrinkled yellow.

Therefore, seed shape and seed colour are inherited independently, producing new combinations in offspring.

Q6. 1 mark · Multiple choice

Which statement about gene sets in sexual reproduction is correct?
(A) Each parent contributes two gene sets, and each germ-cell carries two.
(B) Each parent contributes one gene set, and each germ-cell carries one.
(C) Only the male parent contributes a gene set.
(D) Germ-cells carry no genes.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/science/heredity

Q7. 2 marks · Short answer

How can small inaccuracies in DNA copying produce variation during asexual reproduction, and how does sexual reproduction increase diversity?

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/science/heredity

Q8. 3 marks · Medium answer

Using observations of free and attached earlobes in students and their parents, explain how a possible rule for inheritance of earlobe types could be proposed.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/science/heredity

Q9. 5 marks · Long answer

Explain the difference between dominant and recessive traits. Using tallness and seed shape as examples, describe how dominant traits are expressed and how recombination of factors for two traits can produce new combinations in F2 offspring.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/science/heredity

Q10. 1 mark · Very short answer

What name is given to each separate piece of DNA on which genes are present?

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