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1. If a trait A exists in 10% of a population of an asexually reproducing species and trait B exists in 60% of the same population, which trait is likely to have arisen earlier?

Answer:

Trait B likely appeared earlier since it already exists in a larger part of the population and has been passed on more times than trait A.

2. How does the creation of variations in a species promote survival?

Answer:

Genetic variations help species adjust to changes in their surroundings. They play a key role in evolution by letting some individuals survive better and pass on their traits, helping the species continue.

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1. How do Mendel's experiments show that traits may be dominant or recessive?

Answer:

Mendel proved traits can be dominant or recessive by crossing tall (TT) and dwarf (tt) pea plants. All F₁ plants were tall, but in F₂, some were dwarf. This showed tallness is dominant and dwarfness is recessive.

2. How do Mendel's experiments show that traits are inherited independently?

Answer:

Mendel's dihybrid cross showed traits are inherited independently. He crossed plants with different seed shapes and colours and found new combinations like round green and wrinkled yellow, proving independent inheritance.

03. A man with blood group A marries a woman with blood group O, and their daughter has blood group O. Is this information enough to tell you which trait is dominant?

Answer:

No, it's not enough. Blood group A is dominant, and O is recessive, but we can't know the father's genotype (AA or AO) or the mother's (OO) without more data.

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4. How is the sex of the child determined in human beings?

Answer:

The father decides the child's sex. Males have XY chromosomes, and females have XX. If X from the father meets X from the mother, a girl is born; if Y meets X, a boy is born.

EXERCISE

1. A Mendelian experiment consisted of breeding tall pea plants bearing violet flowers with short pea plants bearing white flowers. The progeny all bore violet flowers, but almost half of them were short. This suggests that the genetic make-up of the tall parent can be depicted as –

- (a) TTWW
- (b) TTww
- (c) TtWW
- (d) TtWw

Answer:



(c) TtWW

The tall parent must be **heterozygous (Tt)** for height, as some offspring were short. The violet colour is dominant (WW), so all progeny had violet flowers.

2. A study found that children with light-coloured eyes are likely to have parents with light-coloured eyes. On this basis, can we say anything about whether the light eye colour trait is dominant or recessive? Why or why not?

Answer:

No, we cannot say whether light eye colour is dominant or recessive just from this information. To know that, we must see the eye colour of the children from mixed (light and dark-eyed) parents.

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3. Outline a project which aims to find the dominant coat colour in dogs.

Answer:

We can breed dogs with different coat colours, for example, black and brown. Then we observe the colour of their puppies. If all puppies have one colour, that colour is **dominant**, and the hidden one is **recessive**.

4. How is the equal genetic contribution of male and female parents ensured in the progeny?

Answer:

Both parents give one set of **chromosomes** each — 23 from the father (in sperm) and 23 from the mother (in egg). Together, the child gets **46 chromosomes**, ensuring equal genetic contribution from both.

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