

NCERT Solutions for Class 10 Science

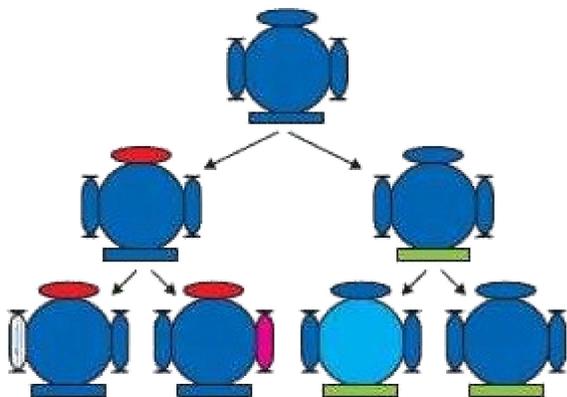
Chapter 8 – Heredity

Intext Questions with Solutions of Class 10 Science Chapter 8 – Heredity

1.

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

Ans: Characteristic B, since it is shared by a larger percentage of the population. It has now infected 60% of the population and probably started earlier. Only 10% of people have developed Trait A yet, since it is very new.



2.

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

Ans: Genetic variants allow a species to better adapt to changes in its environment. Furthermore, it is a crucial force in evolution since it permits the frequency of alleles to rise or decrease via natural selection. These variances will determine whether the species is extinct or continues to exist.

3.

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

Ans: In 1856, Mendel started his genetic experiment on pea plants using a monohybrid cross, which had one character and two alternate features. True-breeding dwarf plants and true-breeding tall plants (TT) were crossed. He was given only tall plants in the first filial generation; no dwarf traits were observed. The F1 progeny were then self-pollinated, producing both tall and dwarf plants. Mendel came to the conclusion that features have two types: one is dominant and the other is recessive. This was based on the monohybrid cross. The dominant trait is an allele that constantly shows itself on the outside, while the recessive trait is hidden when the dominant trait is present in homozygous or heterozygous situations. So, homozygous states are the only ones in which the recessive characteristic manifests. The tall plants in F1 were eventually not true-breeding. They were tall, heterozygous plants (Tt). As a result, the dominant allele suppresses the expression of the recessive allele (t).

4.

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

Ans: Mendel performed dihybrid crossings by crossing two pairs of characteristics that alternately expressed themselves. The prominent qualities were those that emerged in the first generation. Plants of various kinds were created when he employed these F1 offspring to make F2 offspring by self-pollination. There were plants that had both dominant traits, plants that had both recessive features, and plants that had mixed traits. This suggests that characteristics are inherited separately.

5.

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 of the traits – blood group A or O – is dominant? Why or why not?

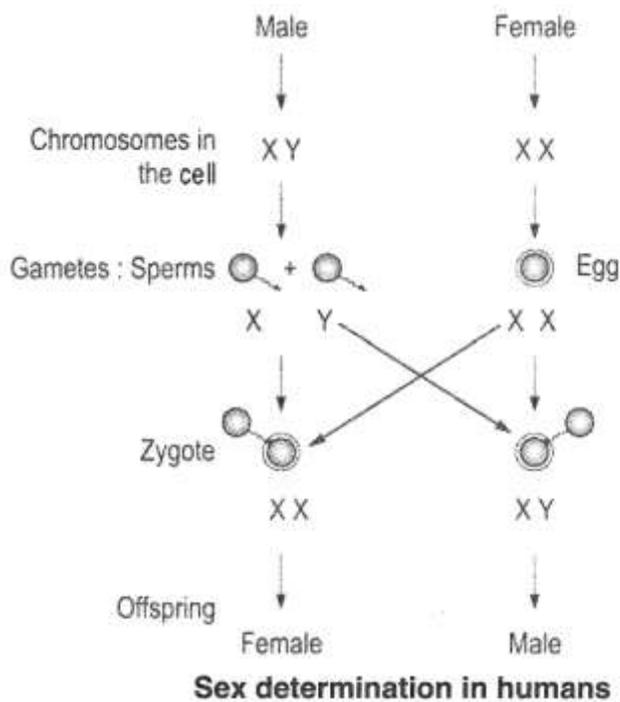
Ans: This information is insufficient. This is due to the fact that every person has two alleles. Only when the alleles are comparable may the recessive characteristic manifest. If blood group O is recessive and blood group A is dominant, then a daughter can only have blood group O if the mother carries both recessive alleles together and the father carries one allele of O and one of A.

6.

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

Ans: In humans, the men determine the child's sex. The XY and XX chromosomes are found in males and females, respectively. Therefore, if:

The mother gives birth to a girl when the X chromosomes of the male and female join. When the female's X and male Y chromosomes unite, the mother gives birth to a boy.



Exercise Questions with Solutions of Class 10 Science Chapter 8 – Heredity

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

Ans: (c) TtWW

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?

Ans: It is impossible to determine if a given trait is dominant or recessive since knowledge of at least three generations is necessary to determine whether an attribute is dominant or recessive.

3.

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

Ans: Dogs possess a specific array of genes that regulate coat color. At least eleven identified sequence series (A, B, C, D, E, F, G, M, P, S, T) affect a dog's coloration. A dog receives one allele from each parent. For instance, in the B series, a dog is genetically either black or brown. One parent is homozygous for black pigmentation (BB), while the other parent is homozygous for brown pigmentation (bb).

	BB	
bb	B	B
	b	Bb
	b	Bb

In this instance, all progeny will be heterozygous (Bb).

Given that black (B) is a dominant trait, all progeny will exhibit the black phenotype. Nonetheless, they will possess both B and b alleles. Crossing these heterozygous pups will yield 25 homozygous black (BB), 50 heterozygous black (Bb), and 25 homozygous brown (bb) offspring.

	B	b
B	BB	Bb
b	Bb	Bb

4.

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

Ans: Couples of chromosomes hold genetic information in most living things. Meiosis is the process that makes gametes in sexually reproducing organisms. During this process, half of the genetic material passes into each gamete. During sexual reproduction, the male and female

gametes come together and reestablish the proper complement. The female contributes fifty percent of the genetic material, while the male contributes the other fifty percent.