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Question 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 ?

Answer:

As species are asexually reproducing, there would be only very minor differences generated due to small inaccuracies in DNA copying, so trait B, which exists in 60% of the same population may get inherited earlier while trait A, which exists in 10% of the population may be originated late due to variations. Thus, trait B have arisen earlier since it is present in 60% of the same population.

Question 2:

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

Answer:

Natural selection selects the individuals having useful variations which ensure their survival in the prevailing conditions of environment. Variant individuals that can withstand or cope with prevailing environment will survive better and will increase in number through differential reproduction.

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Question 1:

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

Answer:

Mendel took pea plants with contrasting characteristics – tall plant and dwarf (short) plant. On cross pollination, he got all tall plants in F1 generation. Then by self pollination of F1 tall plants, he produced second generation (F2) consisting of tall and short plants in the ratio of 3 : 1. Then he concluded that, 'T' (tall) trait is dominant while 't' trait for shortness is recessive.

Question 2:

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

Answer:

In a dihybrid cross made by Mendel, it was observed that when two pairs of traits or characters were considered; each trait expressed independent of the other. Thus, Mendel was able to propose the Law of Independent Assortment which says about independent inheritance of traits.

Question 3:

A man with blood group A marries a woman with blood 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 ?

Answer:

No. This information is not sufficient to determine which of the traits − blood group A or O − is dominant. This is because we do not know about the blood group of all the progeny. Blood group A can be genotypically AA or AO. Hence, the information is incomplete to draw any such conclusion.

Question 4:

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

Answer:

The females carry two X-chromosomes. Females produce one type of gametes (eggs) with same type of chromosomes (22 + X). Males have one X and one Y-chromosome. Among the male gametes, half of the sperms carry X-chromosome (22 X) and half
carry Y-chromosome (22 + Y). Thus, female is homogametic and male is heterogametic. When a sperm carrying X- chromosome fertilises an egg, the zygote develops into female (XX condition). When sperm carrying Y-chromosome fertilises

an egg, the zygote develops into a male (XY condition). Thus, sex is determined at the time of fertilisation.

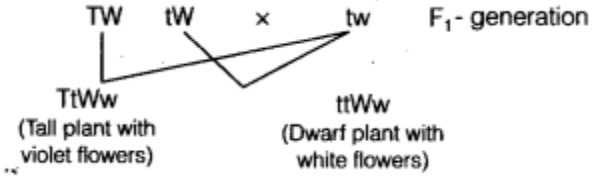
Chapter End Questions

Question 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 makeup of the tall parents can be depicted as
(a) TTWW
(b) TTww
(c) TtWW
(d) TtWw

Answer:

(c) Parent with genotype TtWW produce two types of gametes TW and tW, while the other with genotype ttww produce only one type of gamete W.



Question 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:

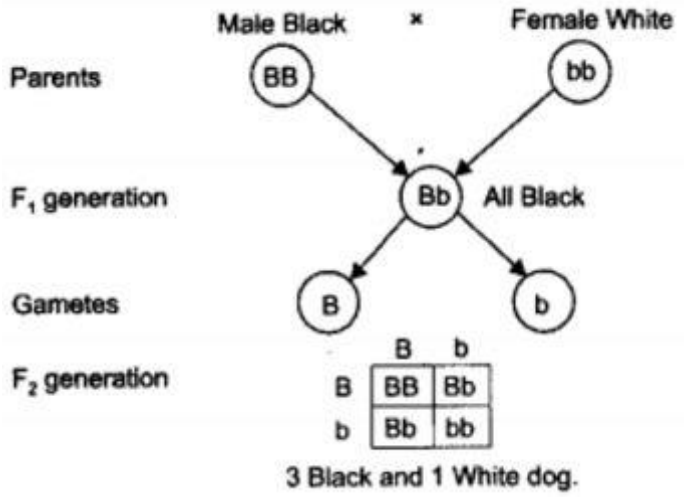
We can say that light eye colour trait is dominant because only dominant traits are expressed in the first generation.

Question 3:

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

Answer:

A homozygous black (RB) male dog and a homozygous white (bb) female dog is taken and given to mate and produce offspring in F1 generation. If black colour is dominant out of every 4 dogs, 3 will be black and if white colour is dominant 3 out of 4 dogs will be white.



Question 4:

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

Answer:

Genetically organisms are of types

(i) **Haploid :** They have single set of chromosomes, where each chromosome is represented singly. As the chromosomes are the bearer of genes so haploids have single set of genes. A single gene determines the expression of character.

(ii) **Diploid :** 'They have two sets Of homologous chromosomes, where the chromosome occur in pair, one maternal contributed by the mother through her ovum and the second Of the pair is contributed by the male parent through his sperm. The resultant cell zygote produces by the fusion of male and female gametes have two sets of chromosomes – each set contributed' by each parent. In diploids a character is controlled by two genes/factors. Both the father and mother contribute practically equal amount of genetic material to the child. It means that each trait can be influenced by both paternal and maternal DNA.