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Solution 1

Sexual Reproduction

Solution 2

Free Earlobes.

Solution 3

Gametes.

Solution 4

B.

Solution 5

Genes.

Solution 6

Tt.

Solution 7

Sex Chromosomes.

Solution 8

Sperm.

Solution 9

False.

Solution 10

Baby boy

Solution 11

XY.

Solution 12

Gregor Mendel

Solution 13

Pea plants.

Solution 14

Black hair.

Solution 15

A, B, AB and O.

Solution 16

(a) Lizard (*Agama agama*)

(b) Turtle (*Chrysema Picta*)

Solution 17

(a) Pairs.

(b) Recessive; Dominant.

(c) Free; attached.

d) 23; 46.

(e) Four.

(f) Sex; Female; male.

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Solution 18

(a) Tall - Tt will have tall plants because of the presence of T which is dominant gene and t is recessive gene.

(b) Dwarf plants: It is dwarf due to the presence of both the recessive genes.

(c) Tall plants: These plants are tall due to the presence of both the dominant genes.

Solution 19

Equal chance of having blood group O or blood group B.

Solution 20

(a) Gregor Mendel

(b) Snails: This indicates that sex is not determined genetically in some animals.

Solution 21

The characteristics or traits in animals and plants are controlled by genes. For example the transmission of color of hair from the parents to the child. If a mother has black hair and the father has blonde hair and the child has black hair then the transmission of genes for hair colour from the mother and father to the child is as follows: Mother's cell contains two genes HH for black hair. Both the genes HH are dominant genes, so the mother has black hair. Father's cell contains two genes (hh) for blonde hair. The two genes hh are recessive genes, so the father has blonde hair. Now, during the process of reproduction, the mother transmits one of the dominant genes H for black hair to the child and the father transmits one of his recessive genes h for blonde hair to the child. Due to this, the child has the genes Hh for her hair. Now the gene H for black hair is the dominant gene but the gene h for blonde hair is the recessive gene. The dominant gene H for black hair shows its effect due to which the child has black hair.

Solution 22

- (a) The advantage of variation to a species is that it increases the chances of its survival in a changing environment.
- (b) The chromosomes which determine the sex of a person are called sex chromosomes. There are two types of sex chromosomes - X and Y chromosomes.

Solution 23

The sex of a child depends on what happens at fertilisation:

- (a) If a sperm carrying X chromosome fertilises an ovum (or egg) which carries X chromosome, then the child born will be a girl. This is because the child will have XX combination of sex chromosomes.
- (b) If a sperm carrying Y chromosome fertilises an ovum (or egg) which carries X chromosome, then the child born will be a boy. This is because the child will have XY combination of sex chromosomes.

Solution 24

- (a) Tall plant.
- (b) Dwarf plant.
- (c) Female.
- (d) Male.

Solution 25

- (a) In the F_1 generation, all plants produced will be tall and in F_2 generation three tall plants and one dwarf plant will be produced.
- (b) It is an example of monohybrid cross.

Solution 26

It is a monohybrid cross. Example - when two hybrids tall Pea plants cross bred with each other, they will produce three tall plants and one dwarf plant in F_2 generation.

Solution 27

- (a) tt.
- (b) TT.
- (c) (i) tt
- (ii) TT.

Solution 28

- (a) (i) 23.
- (ii) 46.
- (b) Three tall plants and one dwarf plant.

Solution 29

- (a) 46.
- (b) 23.
- (c) 23.
- (d) 46.
- (e) 46.

Solution 30

- (a) Genes.
- (b) Chromosomes.

Solution 31

No, because mother has a pair of X chromosomes. All new born babies will inherit an X chromosome from mother whether they are baby boys or baby girls.

Solution 32

(a) Green seed: Yellow is dominant: Green is recessive.

(b) Wrinkled seed: round is dominant: wrinkled is recessive.

Solution 33

(a) The transmission of characters from parents to the offspring's is called heredity. The units of heredity are genes.

(b) According to Mendel's first law of inheritance: The characteristics (or traits) of an organism are determined by internal 'factors' which occur in pairs. Only one of a pair of such factors can be present in a single gamete.

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Solution 34

(a) Mendel choose pea plants for studying inheritance because pea plants had a number of clear cut differences which were easy to tell apart. Another reason for choosing pea plants are they were self pollinating and many generations can be produced in a short time span.

(b) According to Mendel's second law of inheritance: In the inheritance of more than one pair of traits in a cross simultaneously, the factors responsible for each pair of traits are distributed independently to the gametes.

Solution 35

(a) The differences in the characters among the individual of a species is called variation.

(b) Human height and free ear lobe are the traits which show variation in humans.

(c) Due to the creation of variations, a species can adjust to the changing environment around it. And this promotes the survival of the species in the changing environment. Example: The accumulation of 'heat resistant' variation (or trait) in some bacteria will ensure its survival even when the temperature in its environment rises too much due to a heat wave or some other reasons. On the other hand, the bacteria which did not have this variation to withstand heat would not survive under these circumstances and die.

Solution 36

(a) Genes are the units of heredity which transfer characteristic from parents to their offspring's during reproduction. Genes are located on the chromosomes.

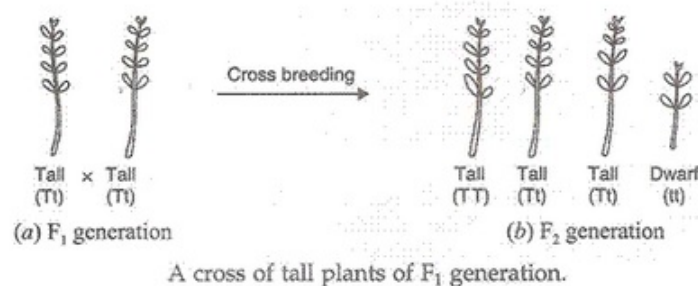
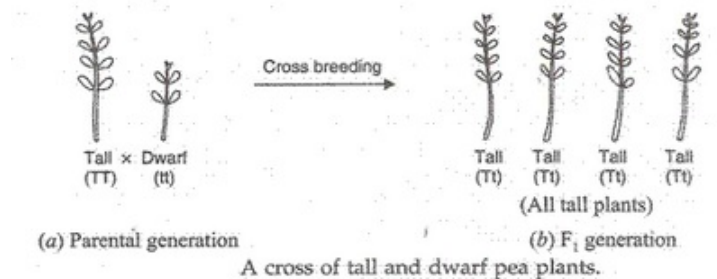
(b) The gene which decides the appearance of an organism even in the presence of an alternative gene is known as dominant gene. The gene which can decide the appearance of an organism only in the presence of another identical gene is called a recessive gene. The dominant gene is represented by a capital letter and the corresponding recessive gene is represented by the corresponding small letter. For example, in pea plants, the dominant gene for tallness is T and the recessive gene for dwarfness is t.

(c) There is a pair of genes for each characteristic of an organism, one is dominant gene and the other is recessive gene. Each parent passes only one of the two genes of the pair for each characteristic to its progeny through gametes. Thus, the male gamete and the female gamete carry one gene for each characteristic from the gene pairs of the parents. When a male gamete fuses with a female gamete during fertilisation they make a new cell called zygote which grows and develops to form a new organism having characteristics from both the parents which it has inherited through genes.

Solution 37

(a) Mendel first crossed pure bred tall pea plants with pure bred dwarf pea plants and found that only tall pea plants were produced in the first generation. No dwarf pea plants were obtained in F1

generation. Mendel concluded that the first generation showed the traits of only one of the parent plants; tallness. The trait of other parent plant, dwarfness, did not show up in the progeny of first generation. Mendel then crossed the tall pea plants of the first generation (F_1 Generation) and found that tall plants and dwarf plants were obtained in the second generation (or F_2 generation) in the ratio of 3:1. Mendel noted that the dwarf trait of the parent pea plant which had seemingly disappeared in the first generation progeny reappeared in the second generation. In this way, Mendel's experiments with tall and dwarf pea plants showed that the traits may be dominant and recessive.



(b) When Mendel crossed pure-bred tall pea plants with pure-bred dwarf pea plants, he found that only tall pea plants were produced in the F_1 generation. When Mendel further crossed the tall pea plants of the F_1 generation, he found that the tall plants and dwarf plants were obtained in the ratio 3:1 in the F_2 generation. Mendel noted that all the pea plants produced in the F_2 generation were either tall or dwarf. There were no plants with intermediate height (or medium height) in-between the tall and dwarf plants. In this way, Mendel's experiment showed that the traits (like tallness and dwarfness) are inherited independently. This is because if the traits of tallness and dwarfness had blended (or mixed up), then medium sized pea plants would have been produced.

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