EXERCISE-9.1 PAGE: 143

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?

Solution:

Trait B appears to own arisen earlier because it is gift in larger fraction of the population. Since agamogenesis maintain the attribute within the population and make the relation with identical traits as gift in the oldsters.

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

Solution:

Variations facilitate in header up with the changes within the surroundings. Thus variations promote the survival of the species.

EXERCISE-9.2 PAGE: 147

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

Solution:

According to law of dominance, an attribute is painted by 2 contrastive factors of a factor during a heterozygous individual; the allele/factor that may specific itself in heterozygous individual is named as dominant trait. The opposite issue whose impact is cloaked by presence of dominant factor, is named recessive issue. Once Johann Mendel crossed one tall and one short leguminous plant, all the off springs (F1 generation) were tall. Once he self-crossed the F1 generation, among them 3/4th of the progenies were tall whereas 1/4th were short. So he ended that though the F1 relation had each tall and short traits, solely tall plants were discovered within the F1 generation, this implies that tallness may be a dominant attribute.

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

Solution:

Law of independent assortment tells regarding segregation and distribution of things governing 2 totally different traits. Consequently, genes for the 2 traits gift on separate chromosomes are inheritable severally of every alternative. Throughout hybridization by plant scientist, it had been determined that once 2 pairs of attributes were considered; every trait expressed freelance of the opposite. For example Cross between a plant manufacturing spherical and yellow seeds (RR and YY) crossing with a plant producing wrinkled inexperienced seeds (rr and yy).

F1 offspring produces spherical and yellow seeds (R and r, and Y and y) during which spherical and yellow are dominant traits. F2 offspring were just like their folks and made spherical yellow seeds, whereas a number of them made wrinkled inexperienced seeds. However, some plants of the F2 offspring even showed new mixtures, like round-green seeds and wrinkled- yellow seeds. The cross quantitative relation of 9:3:3:1led to the Law of freelance Assortment that says regarding independent inheritance of traits.

3. 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?

Solution:

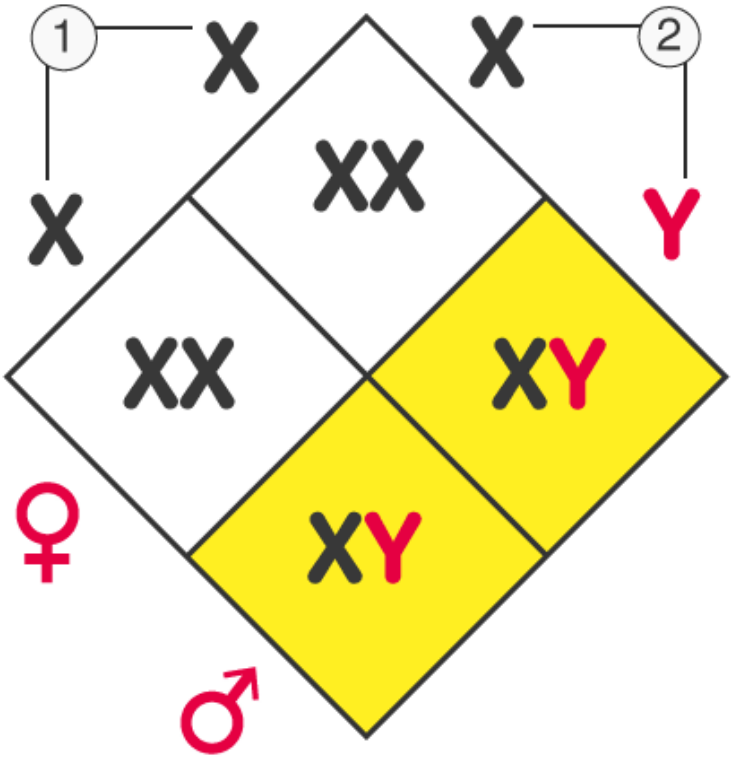
Given information is not enough to tell us which characteristics are dominant –blood group A or O. Blood type A is always dominant in the type of ABO blood and blood type O is always recessive. Here, father's group of blood may be genotypically AA (homozygous) or AO (heterozygous), where as that of mother can be OA or OO.

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

Solution:

Sex of child in humans is set by the sort of male haploid sex cell that fuses with the feminine egg. Throughout meiosis, all the gametes created by females contain solely the X chromosome (A + X), whereas males manufacture 2 varieties of gametes, 1/2 gametes with X- and 1/2 with Y-chromosome (A + X and A + Y). Fertilization of egg (A + X) with sperm cell carrying A+X chromosomes ends up in female descendant (AA + XX). Fertilization of egg (A+ X) with sperm cell carrying A+Y chromosomes ends up in teenager (AA + XY).

SEX DETERMINATION - BOY OR GIRL



1 Female gametes | 2 Male gametes

EXERCISE-9.3 PAGE: 150

1. What are the different ways in which individuals with a particular trait may increase in a population?

Solution:

An individual attribute could increase in a population within the following 2 ways:-

(a) **Natural selection:** if an attribute is useful to a population, it'll increase naturally.

As an example – inexperienced colorize beetles is favorable because it helps them in camouflage against the predators.

(b) **Genetic drift:** if a population faces AN accident such majority of its members get killed, the remaining members can pass away their traits to the following generations. This may result in a rise of the attribute within the population.

2. Why are traits acquired during the life-time of an individual not inherited?

Solution:

The non-inheritable traits don't effect on the genetic makeup of an individual; thus they're not transferred to or familial by the longer term generations.

3. Why are the small numbers of surviving tigers a cause of worry from the point of view of genetics?

Solution:

As the tiger population is decreasing sharply, the genetic pool of the tigers is additionally decreasing. This results in a limitation on the variations which will be introduced within the genetic makeup of the tigers. This might need serious implications. For example, if a un-wellness spreads within the tiger population, it would swipe the whole population while not going any survivors. This might even cause their extinction.

EXERCISE-9.4 PAGE: 151

1. What factors could lead to the rise of a new species?

Solution:

Factors that would cause the increase of a brand new species are as follows:
(a) Natural activity.
(b) Method of genetic drift.
(c) Mutation.
(d) Geographical isolation.
(e) Environmental factors on the isolated populations.
(f) Generative isolation for a protracted time.
(g) Quantum of genetic variant transmissible from one generation to the following generation.

2. Will geographical isolation be a major factor in the speciation of a self-pollinating plant species? Why or why not?

Solution:

In a pollination of plant species, geographical isolation can't be a serious think about evolution, as a result of no new attribute will become a component of the genetic makeup in a very pollination plant species. However, there are some possibilities of some environmental changes which could result in some variations.

3. Will geographical isolation be a major factor in the speciation of an organism that reproduces asexually? Why or why not?

Solution:

In the case of the asexually reproducing organism, geographical isolation can't be serious. Consider evolution as a result of meiosis which doesn't happen throughout reproduction. Also, reproduction includes single parent. Therefore there are terribly rare possibilities of variation and while not variation there can't be evolution.

EXERCISE-9.5 PAGE: 156

1. Give an example of characteristics being used to determine how close two species are in evolutionary terms.

Solution:

Let us take the instance of humans and apes. Each of them have similar body style. Hair and exocrine gland glands are gift in each the animals. Hence, these 2 animals are closely connected in organic process term. Currently take some common characters between a fish and a person. Rachis, brain box and jaws are gift in each of them. However fish and man look entirely different from one another. Hence, they're not closely connected in organic process term; rather are like distant relatives.

2. Can the wing of a butterfly and the wing of a bat be considered homologous organs? Why or why not?

Solution:

Homologous organs perform completely different functions and have different look however share common basic structural structure. The origin wings of a butterfly are composed of polysaccharide membrane, whereas wings of a bat are composed of bony skeleton. Hence, these aren't homologous organs rather analogous organs.

3. What are fossils? What do they tell us about the process of evolution?

Solution:

Fossils are called the preserved remains of animals or plants or other organisms from the distant past. These fossils tell us about a lot of extinct animals and also give insights into how evolution might have occurred. Fossils can be used to build an organism's evolutionary history. The pattern of fossil distribution gives us an idea of the time in history when various species were formed or become extinct. Fossil also helps trace some animal's evolutionary history.

EXERCISE-9.6 PAGE: 158

1. Why are human beings who look so different from each other in terms of size, color and looks said to belong to the same species?

Solution:

While human beings vary widely in size, color and appearance, their genetic makeup is similar. The variations in size, color and appearance are the result of these characteristics different levels of expression. However, human beings have the same organization at the genetic level. Therefore they all belong to the same species.

2. In evolutionary terms, can we say which among bacteria, spiders, fish and chimpanzees have a 'better' body design? Why or why not?

Solution:

No, we can't say there's a better body design as these organisms evolved to survive in the environment according to their needs. If a chimpanzee has strong limbs capable of multiple actions, the bacteria can survive in extreme conditions where it is impossible for other organisms. Therefore there is no better design of the body.

EXERCISES PAGE: 159

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
Solution:
Correct answer – (c)
TtWW might be the genetic makeup of the tall parent. Since half the progenies are short, this implies that the parent plant also will have a collection of short genes; all progenies bore violet flowers, which suggests that violet color is dominant over white.

2. An example of homologous organs is
(a) Our arm and a dog's fore-leg.
(b) Our teeth and an elephant's tusks.
(c) Potato and runners of grass.
(d) All of the above.
Solution:
Correct answer – (d)
Homologous organs have the same origin as each of the above organs, but different functions. Homologous organs can be defined as the organs of various animals having similar basic structure but different functions. For example, a whale's flippers, a frog's forelimbs, and man have the same basic structures but perform different functions, which is why they are called homologous organs.

3. In evolutionary terms, we have more in common with
(a) A Chinese school-boy.
(b) A chimpanzee.
(c) A spider.
(d) A bacterium.
Solution:
Correct answer – (b)
Humans and chimpanzees are connected since they belong to the identical order, Primates and same family, Hominidae. However, a school going boy is himself a person that belongs to homo. This suggests that the characteristics of a college are specifically a dead ringer for people at large.
Hence, in organic process terms, we have a tendency to be specifically almost like a college boy than to a Pan troglodytes.

4. A study found that children with light-colored eyes are likely to have parents with light-colored eyes. On this basis, can we say anything about whether the light eye color trait is dominant or recessive? Why or why not?
Solution:
For considering an attribute as dominant or recessive, we'd like knowledge of a minimum of 3 generations. This knowledge is regarding solely 2 generations. The fogeys may be homozygous for the attribute resulting in presence of same trait in youngsters. This doesn't support that the given attribute is dominant.

5. How are the areas of study – evolution and classification – interlinked?

Solution:
Classification and evolution are extremely interlinked fields of study. Classification is influenced by evolution. The fashionable system of classification is additionally known as biological process classification; which implies it's supported biological process relationships. Hence, evolution and classification are closely connected.

6. Explain the terms analogous and homologous organs with examples.
Solution:
Homologous organs are those organs that have the identical basic structural style and origin however have completely different functions. For example: The forelimbs of humans and also the wings of birds look completely different outwardly however their complex body part is comparable.

Analogous organs are those organs that have the various basic structural style and origin however have similar functions. For example: The wings of birds and insects.

7. Outline a project which aims to find the dominant coat color in dogs.
Solution:
Dogs have a spread of genes that govern coat color. There are a minimum of eleven known sequence series (A, B, C, D, E, F, G, M, P, S, T) that influence coat change dog. A dog inherits one sequence from every of its oldsters. The factor gets expressed within the constitution. As an example, within the B series, a dog is genetically black or brown. Allow us to assume that one parent is homozygous black (BB), whereas the opposite parent is homozygous brown (bb).

bb	BB		
		B	B
	b	Bb	Bb
	b	Bb	Bb

In this case, all the off springs are going to be heterozygous (Bb).
Since black (B) is dominant, all the off springs are going to be black. However, they're going to have each B and b alleles. If such heterozygous pups are crossed, they're going to manufacture twenty five homozygous black (BB), fiftieth heterozygous black (Bb), and twenty five homozygous brown (bb) off springs.

	B	b
B	BB	Bb
b	Bb	Bb

8. Explain the importance of fossils in deciding evolutionary relationships.
Solution:
Fossil give evidence about
(a) The organisms that lived way back like the fundamental quantity throughout that they lived, their structure etc.
(b) Biological process development of species i.e., line of their development.

(c) Connecting links between 2 teams. As an example,
feathers gift in some dinosaurs implies that birds are terribly closely associated with reptiles.
(d) That organisms evolved earlier and which later.
(e) Development of complicated body styles from the straightforward body designs.

9. What evidence do we have for the origin of life from inanimate matter?

Solution:

The evidence of the origin of the inanimate matter in life was provided by Stanley L. Miller and Harold C. Urey's associate degree experiment conducted in 1953. They assembled an environment in experiment that contained molecules such as ammonia, alkane series and element sulfide over water, but no chemical element. It was just like the atmosphere on earth that thought it would exist. This was kept at a temperature slightly below 100 ° C and the mixture of gasses to simulate lightning was felt by sparks. At the end of the week, fifteenth of the alkane series carbon has been regenerated into easy carbon compounds as well as amino acids that form super molecule molecules and support basic life. It was inferred from this that life arose again on earth.

10. Explain how sexual reproduction gives rise to more viable variations than asexual reproduction. How does this affect the evolution of those organisms that reproduce sexually?

Solution:

Sexual reproduction causes a lot of viable variations because of the subsequent reasons:
(a) Error in repetition of desoxy ribonucleic acid, that don't seem to be extremely vital.
(b) Random segregation of paternal and maternal body at the time of sex cell formation.
(c) Exchange of genetic material between homologous chromosomes throughout formation of gametes.
(d) Accumulation of variations occurred because of reproduction over generation after generation and choice naturally created wide diversity.
(e) In case of agamogenesis, solely the terribly tiny changes because of inaccuracies in desoxy ribonucleic acid copying pass away the relative. Thus, off springs of agamogenesis are a lot of or less genetically just like their folks. So, it will be ended that evolution in sexually reproducing organisms proceed at a quicker pace than in asexually reproducing organisms.

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

Solution:

The inheritance of equal parent chromosomes ensures equal genetic contribution within the relative of male and female folk. There are 23 pairs of chromosomes. There is no pairing of all human chromosomes. The primary twenty-two trials are called autosomes out of those twenty-three pairs, and the remaining one pair is also thought to be sex chromosomes drawn as X and Y. Females have an ideal trial of 2 X sex chromosomes and males have an inappropriate trial of 1 X and 1 Y chromosome.

During the replication process, the male germ cell (haploid) fuses with the feminine gamete (haploid) resulting in the formation of the diploid fertilized ovum as the fertilization method takes place. Within the relative, the fertilized ovum receives the associated degree of equal contribution from the oldsters of genetic material. Comparatively twenty-three pairs of chromosomes, the parent contributes twenty-two autosomes and one X or sex chromosome, whereas the feminine parent contributes twenty two autosomes and one chromosome.

12. Only variations that confer an advantage to an individual organism will survive in a population. Do you agree with this statement? Why or why not?

Solution:

We agree with the statement that solely variations that confer a plus to a private organism can survive during a population. All the variations don't have associate equal likelihood of extant within the setting within which they notice themselves. The possibilities of extant rely upon the character of variations. Totally different individual would have different reasonably benefits. Bacterium which will face up to heat will survive higher during a wave.

Choice of variants by environmental factors forms the idea for revolutionary method.