

# EDUCOM ACADEMY

CBSE Class 10 Science

Important Questions

Chapter 9

Heredity and Evolution

2 Marks Questions

1. Why acquired traits are not inherited?

Ans. Acquired traits are those which are developed in the organisms during their life time. These traits are because of non-reproductive tissue, so cannot be passed.

2. How evolution and classification are linked?

Ans. Classification is the arrangement of organisms into groups on the basis of their characteristics. Characteristics are details of appearance or behaviour. Classification based on evolution is considered the most advanced and effective. The classification of organisms/species into groups is a reflection of their common ancestors and hence evolutionary relationship also.

3. What are coacervates?

Ans. First life molecules which are formed due to formation of membrane around amino acids, sugars and nitrogenous bases aggregates are called coacervates. Further development in coacervates leads to origin of life.

4. How do the two factors for a character, present in diploid cells, behave at the time gamete formation?

Ans. Two factors called X and Y, segregate during gamete formation. Hence gamete is either X or Y.

5. Give the pair of contrasting traits of the following characters in plant and mention which one is recessive and which is dominant?

(a) yellow seed

(b) round seed

Ans. (a) Green seed- Dominant

Yellow seed- Recessive

(b) Wrinkled seed – Recessive

Round seed- Dominant

6. Mention two important features of fossils which help in evolution.

Ans. (a) Fossils provide direct evidence of evolution

(b) Fossil records also provide missing links between two groups of organisms, for example-

Archaeopteryx.

7. What do you understand by the term natural selection?

Ans. According to theory of Natural selection, Nature select fittest animal for animal those who not fit, are eliminated by nature itself.

8. Mention the compliment of a sperm and the egg which will determine the birth of female child.

Ans. For girl child, sperm has X chromosome and egg also has X chromosome.

9. What is emasculation? Why is it done?

Ans. Removal of anther to avoid pollination in experimental plant is called Emasculation.

10. What is gene? Where are genes located?

Ans. Segments of DNA are called gene. Genes are located on chromosomes.

11. How many contrasting characters did Mendel see in garden pea? Give any two of them.

Ans. Mendel observed seven contrasting characters in pea plant.

For Ex- flower position- axial and terminal. seed shape- round and wrinkled.

12. What is phenotypic ratio obtained by Mendel by monohybrid cross? Answer with the help of diagram.

Ans. **Attempt answer self.**

13. Why acquired characters are not inherited?

Ans. Acquired traits are those which are developed in the organisms during their life time. They are not inherited to next generations. These traits are because of non-reproductive tissues, so cannot be passed.

14. How is the chromosome number restored in zygote?

Ans. Gametes (male and female) have N number of chromosomes. During fertilization gametes fuse and form zygote. Zygote retains 2N number of chromosomes.

15. What are variations? Give their types.

Ans. Although offspring of the same parents resemble one another as to their parents, yet there are differences among them. These differences are called variations. It is of two types-

(a) Reproductive- Passed from one generation to another.

(b) Non-reproductive- Not passed from one generation to another.

16. Write difference between Autosomes and Allosomes.

Ans. **Attempt answer self.**

17. What will be the sex of the embryo if an egg is fertilized by the sperm having

(a)  $22+x$  and

(b) 22+y composition

Ans. (a) Female

(b) Male.

18. Mention two sources of variation.

Ans. (1) Errors in DNA copying.

(2) Random fertilization.

19. What is monohybrid and dihybrid cross? Give one example of each.

Ans. Monohybrid cross- It is the simplest cross in which inheritance of one character is studied. A cross is made between the pair of plants having one contrasting character such as tall or dwarf.

Dihybrid cross- A cross made between two plants having two pairs of contrasting character is called dihybrid cross. For ex. round and green seed crossed with yellow and wrinkled seed.

20. Why did Mendel choose pea plant for his experimentation?

Ans. Mendel selected garden pea for his experiment for the following reasons-

(a) The life span of this plant is very short so results can be obtained and studied faster.

(b) Garden pea has many characteristics which are in contrast to each other.

(c) Moreover this plant is small, easy to grow and reproduce large number of offsprings.

21. 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. Trait B.

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

Ans. The different ways in which individual with a particular trait may increase are:

(a) Natural selection- Certain variations give survival advantage to individuals in a population in a changed situation resulting in increase of their population.

(b) Genetic drift- Accidents in small population even if they give no survival advantage also lead to increase to certain individual in population.

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

Ans. Any change in non-reproductive tissues cannot be passed on to the DNA of the germ cells. Therefore, the traits acquired during life-time on an individual are not inherited.

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

Ans. It will affect the frequency of selection which is essential for survival. For effective selection, the population must consist of an infinitely large number of individual in population.

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

Ans. Analysis of the organ structure in fossils allows us to make estimates of how far evolutionary relationships go. For example presence of feather in some fossils dinosaurs indicate the birds are closely related to reptiles.

26. Can the wing of a butterfly and the wing of the bat be considered homologous organs?

Ans. No, though the function of wing in both the cases is same but their structural plan and origin is different.

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

Ans. The human beings are different from each other in terms of size, colour but are said to belong to the same species. This is because, despite of great diversity of human forms and features in different human races across the planet, the genetic footprints of all human beings can be traced back to same common ancestry of African roots. All humans are a single species and have originated from Homo sapiens, who were the earliest members of the human species in Africa. As there have been no well set geographical or reproductive isolation among different members of human species, this has led to numerous genetic makeups of traits with slight variation.

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

Ans. In evolutionary terms, we can not say which among bacteria, spiders, fish and chimpanzees have a 'better' body design. The notion of Better body design among different species is not justifiable. Because evolutionary process takes into account the development of most efficient and suitable features in body designs of organisms for survival and adaptation favoring to a particular niche. For example, organisms with Complex and seemingly better body design, may not survive particular situation. Whereas, organisms like bacteria with its primitive body design and simple microbial life form may survive in the most inhospitable and extreme environmental conditions that are extraordinarily hot, cold or acidic. Bacterial microbes can be found everywhere — deep under polar ice, in deserts, around volcanic eruption on earth surface or thermal vents under deep sea or over earth surface, or even in outer space.

29. How are the areas of study- evolution and classification interlinked?

Ans. When we classify organism we look for similarities among organism which allows us to group them. Based on these principles we can work out the evolutionary relationship to the species.

30. Explain the importance of fossils in deciding evolutionary relationship.

Ans. (i) Study of fossils allow us to make estimates of how far back evolutionary relationship go organisms.

(ii) Study of age of fossils allows us to know which organisms evolved earlier and which later.

31. Write the characteristics on the basis of which duck-billed platypus is considered as a link between reptiles and mammals.

Ans. The characteristic resembling reptiles is laying of eggs and the characteristics resembling mammals is presence of mammary glands.

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

Ans. As the population of tigers is decreasing, there is loss of genes from the gene pool and there can't be recombinations and variations, thus no evolution.

33. How one is change adopted to perform different functions? Give one example

Ans. In evolution, one change occurred initially is used to perform other functions. For example, feathers were evolved for warmth, later they were adapted for flight.

34. Why are asexually reproducing organisms capable of showing hereditary features?

Ans. Asexual reproduction tends to preserve the similarities among all the individuals belonging to a give line of descent. Therefore, asexually reproducing organisms are capable of showing hereditary features.

35. If the sperm bearing Y-chromosome fertilizes the egg, the child born will not be entirely like his father. Why is it so?

Ans. It is so because the other sex chromosome, ie the X-chromosome will also have its effects And other autosomes of the egg will also show their characteristics.

36. In evolutionary erms, which among-bacteria, spider, fish and chimpanzee have a "body design? Why or why not?

Ans. Chimpanzee have the better body design as compared to others given. They are better adapted for locomotion, communication and thinking.

37. What is an offspring?

Ans. In sexual reproduction organisms raised are as a result of crossing over and exchange of gene segments and are known as offspring.

38. What are inherited traits? Give one example.

Ans. The characteristics which are transmitted from parents to their offsprings are called inherited traits. E.g. free and attached earlobes.

39. When Mendel crossed a Tall plant with a dwarf plant, no medium height plants were obtained in F generation. Why?

Ans. Because dominant genes express themselves and suppress the effect of recessive genes. So no medium sized plants were obtained.

40. The human hand, cat paw and horse foot when studied in detail show the same structure of bones and point towards a common origin.

i. What do you conclude from this?

ii. What is the term given to such structures?

Ans. (i) We can conclude that these organs had a similar origin.

(ii) They are Homologous organs.

41. How do we know how old a fossil is?

Ans. There are two methods:

(i) Relative method when we dig into the earth, the fossils we find closer to the surface are more recent than the fossils we find in deeper layers.

(ii) By detecting the ratios of different isotopes of the same element in the fossil material.

42. What will be the sex of a baby if sperm carrying X chromosome fertilizes egg in human beings. Why?

Ans. It will be a baby girl because fusion of gametes having X chromosomes leads to homozygous condition producing zygote with XX composition.

43. Feather imprints were preserved along the dinosaur's bones but dinosaurs could not fly. What was the significance of feathers in reptiles and later on for other species?

Ans. It is believed that feathers in dinosaurs might have provided insulation in cold weather but later on became useful for flights in birds.

44. A woman with blonde curly hair married a man with black soft hair. All of their children in first generation had black soft hair but in next generation children had different combinations in the ratio of 9:3:3:1. State the law that governs this Expression

Ans. Law of independent assortment which states that the factors of different pairs of contrasting characters do not influence each other. They are independent of one another in their assortment.



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