

CBSE NCERT Solutions for Class 12 Biology Chapter 1

Back of Chapter Questions

1. Why is reproduction essential for organisms?

Solution:

Reproduction is one of the salient features of all organisms. It is a biological process by which organisms give birth to their offspring. The offspring develop, mature and again produce offspring of their kind. Reproduction is a mode of multiplication and conservation of the pre-existing individuals giving rise to new young ones as the older individuals are prone to deteriorate or face death. It has been a model of conservation of species throughout evolution. The newborn is known as offspring. Genetic material is often transferred from generation to generation, sometimes changing the composition due to crossing over of genetic material and cell division.

2. Which is a better mode of reproduction: sexual or asexual? Why?

Solution:

Sexual reproduction is a better mode of reproduction compared to asexual reproduction. Sexual reproduction involves the fusion of organisms of different sexes, such as the male and female, giving rise to offspring of the same kind with the exchange of genetic material taking place in the chromosomes of the gametes leading to variations. Whereas in asexual reproduction, it does not involve the transfer of genetic material, and hence, there are no variations in the offspring. The survival capacity is better in case of sexual reproduction compared to asexual reproduction as variations help in the survival of the species.

3. Why is the offspring formed by asexual reproduction referred to a clone?

Solution:

The asexual reproduction doesn't involve the fusion of gametes, and hence, there is no exchange of genetic material. The offspring produced will be identical to the parent organisms as well as the other daughter organisms. Since there is no difference between parent and its progeny, morphologically or genetically, the families formed due to asexual reproduction are often referred to as a clone.

4. Offspring formed due to sexual reproduction have better chances of survival. Why? Is this statement always true?

Solution:

The statement that offspring formed due to sexual reproduction have better chances of survival is always true as sexual reproduction is a method of reproduction in which the exchange of genetic material takes place which often leads to variation in the offspring. The variations are a tool using which the further generations evolve to survive.

5. How does the progeny formed from asexual reproduction differ from those formed by sexual reproduction?

Solution:

The progeny formed from asexual reproduction differ from those formed by sexual reproduction since, in case of asexual reproduction, the progeny is identical to the parent organism and is considered as a clone whereas, in case of sexual reproduction, the offspring is similar to their parents as they inherit the genetic material from both the parents, leading to variations.

6. Distinguish between asexual and sexual reproduction. Why is vegetative reproduction also considered as a type of asexual reproduction?

Solution:

| Asexual reproduction | Sexual reproduction |
|---|--|
| It is a mode of reproduction in which the offspring is formed from a single parent and doesn't involve the fusion of gametes. | It is a mode of reproduction in which the fusion of male and female gametes results in the formation of offspring. |
| The progeny is identical to the parent and known as a clone. | The progeny is similar to the parent. |
| Genetic variations cannot be observed. | Genetic variations can be observed. |
| It is observed in prokaryotic and unicellular organisms. | It is observed in multicellular organisms. |

Vegetative propagation is a type of asexual reproduction observed in plants, in which new plant can arise from a part of the parent plant or out of a specialised region. Here the plants reproduce from stem or tubers (potato, mint), leaves (bryophyllum), root (sweet potato, tapioca) or reproductive parts (onion, agave). Vegetative propagation is a natural process but can also be induced artificially. The structures from which the new plants arise are called as vegetative propagules.

7. What is vegetative propagation? Give two suitable examples.

Solution:

It is a type of asexual reproduction observed in plants, in which new plant can arise from a part of the parent plant or out of a specific region. Here the plants reproduce from stem or tubers (potato, mint), leaves (bryophyllum), root (sweet potato, tapioca) or reproductive parts such as bulbs or seeds (onion, agave). Vegetative propagation is a natural process but can also be induced artificially. Artificial vegetative propagation is used by the horticulturists to obtain varieties in the yield as compared to the native plant and further clone it since the genetic material remains unchanged. This method is widely used in plants where sexual

reproduction or seeds are not available, and the process is simpler and cheaper compared to traditional propagation of plants.

8. Define

- (A) Juvenile phase,
- (B) Reproductive phase,
- (C) Senescent phase.

Solution:

(A) Juvenile phase:

Every sexually reproducing organism will have to attain a certain stage of growth and maturity before they can reproduce, and this stage of growth is called juvenile phase.

(B) Reproductive phase:

Sexually reproducing organisms reproduce in this phase.

(C) Senescent phase:

The sexually reproducing organisms begin to grow old and lose their ability to reproduce in this phase.

9. Higher organisms have resorted to sexual reproduction in spite of its complexity. Why?

Solution:

The higher organisms have resorted to reproduce by the sexual method in spite of its complexity since this method brings about variations in the progeny due to exchange and sharing of genetic material and also help them in resistance to diseases.

10. Explain why meiosis and gametogenesis are always interlinked?

Solution:

Meiosis is a process of cell division that takes place in specialised organs during the process of gametogenesis. Gametogenesis is the process of formation of gametes which can be either female or male gamete. The gametes formed are haploid resulting from the meiotic division of a single cell(2n), wherein the half set of chromosomes (n) are given to each of the two daughter cells. This way, both gametogenesis and meiosis are interlinked.

11. Identify each part in a flowering plant and write whether it is haploid (n) or diploid (2n).

- (A) Ovary _____
- (B) Anther _____

- (C) Egg _____
 (D) Pollen _____
 (E) Male gamete _____
 (F) Zygote _____

Solution:

- (A) Ovary - Diploid
 (B) Anther- Diploid
 (C) Egg - Haploid
 (D) Pollen - Haploid
 (E) Male gamete -Haploid
 (F) Zygote - Diploid

12. Define external fertilization. Mention its disadvantages.

Solution:

External fertilisation is the fusion of female and male gametes (syngamy) takes place outside the female body and in the surrounding medium such as water. This method is observed in frogs and bony fish, where a large number of gametes are released to increase the chances of syngamy.

The major disadvantage of this method of fertilisation is that chances of survival of offspring until they reach adulthood is very less.

13. Differentiate between a zoospore and a zygote.

Solution:

| Zoospore | Zygote |
|--|---|
| They are microscopic reproductive structures found in fungi and algae. | A zygote is a specialised cell obtained from the fusion of male and female gametes. |
| They are motile | They are non-motile |
| They are involved in asexual reproduction. | They are involved in sexual reproduction. |

14. Differentiate between gametogenesis from embryogenesis.

Solution:

| Gametogenesis | Embryogenesis |
|---|---|
| It is the process of formation of male and female gametes | It is a process of formation of an embryo from a zygote |
| It is a pre-fertilisation event | It is a post-fertilisation event |
| Meiosis and cell differentiation takes place | Mitotic division of cell takes place |

15. Describe the post-fertilization changes in a flower.

Solution:

A flower is a reproductive region in a plant which takes part in the process of fertilisation. The fertilisation takes place in three steps:

Pre-fertilisation

Fertilisation

Post-fertilisation

During the post-fertilisation process, zygote formation and embryogenesis take place.

Zygote formation:

During the process of fertilisation, the fusion of male and female gametes results in the formation of a diploid fertilised egg called zygote, found in all sexually reproducing organisms. It is either formed on the medium such as water, in case of external fertilisation and inside the female organism, in case of internal fertilisation. The zygote is a precursor to an embryo.

Embryogenesis:

It is the development of the embryo from the zygote. In the case of plants, the zygote is formed inside the ovule of a flower. The ovule develops into seeds while zygote develops into embryo and ovary forms the fruit. The outside protective layer called pericarp develops on the surface of the fruit. The embryo is found inside the seed coat and act as pre-cursor to future plants. Seed dispersal is one of the ways of plant propagation.

16. What is a bisexual flower? Collect five bisexual flowers from your neighborhood and with the help of your teacher find out their common and scientific names.

Solution:

A bisexual flower is a type of flower that has both male and female reproductive parts such as stamen and pistil, respectively. Few of the bisexual flowers with their scientific and common names are

| Common name | Scientific name |
|-------------|-------------------------------|
| Hibiscus | <i>Hibiscus rosa-sinensis</i> |
| Lily | <i>Lilium</i> |
| Rose | <i>Rosa</i> |
| Tomato | <i>Solanum lycopersicum</i> |
| Chilli | <i>Capsicum annum</i> |

17. Examine a few flowers of any cucurbit plant and try to identify the staminate and pistillate flowers. Do you know any other plant that bears unisexual flowers?

Solution:

Cucurbit plants have a unisexual flower. They either have a male or female reproductive part in them, i.e., if the flower possesses only stamen, it is called staminate, and if the flower possesses only pistil, it is called as pistillate. The male and female cucurbits are as given below.



Male cucurbit flower

Female cucurbit flower

In the male cucurbit plant, only stamen is present within the petals whereas, in the case of female cucurbit flower, a bulb-like structure bearing the ovules in the present below the petals is found, which develops into a pumpkin.

Some of the other plants having unisexual flowers are :

Coconut, Watermelon, Papaya, and Corn.

18. Why are the offspring of oviparous animals at a greater risk as compared to offspring of viviparous animals?

Solution:

Oviparous animals are those that lay an egg, which later hatches into young ones and viviparous animals are those that give birth to young ones, wherein the zygote develops into a young one for a certain period of incubation inside the female organism before being delivered outside. Since, in the case of oviparous animals, the egg is laid and has to hatch outside the female organism, they are affected by environmental factors and predators. Hence they are at greater risk than the viviparous animals.

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