



NCERT SOLUTIONS

REPRODUCTION IN ORGANISMS

BIOLOGY CLASS 12

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Q1. Why is reproduction essential for organisms?

Answer: Reproduction is a fundamental feature of all living organisms. It is a biological process by which living organisms produce offspring similar to them. Reproduction ensures the continuity of various species on the Earth. In the absence of reproduction, the species will not be able to exist for a long time and may soon get extinct.

Q2. Which is a better mode of reproduction sexual or asexual? Why?

Answer: Sexual reproduction is a better mode of reproduction because:

- It allows the formation of new variants by the combination of the DNA from two different individuals, typically one of each sex.
- It involves the fusion of the male and the female gamete to produce variants, which are not identical to their parents as well as among themselves.
- These variations allow the individual to adapt to constantly changing and challenging environments. Also, it leads to the evolution of better suited organisms which ensures greater survival of a species.
- On the contrary, asexual reproduction allows very little or no variation at all. As a result, the individuals produced are exact copies of their parents and exactly similar to each other as well.

Q3. Why is the offspring formed by asexual reproduction referred to as clone?

Answer: A clone is a group of morphologically and genetically identical individuals. In the process of asexual reproduction, only one parent is involved and there is no fusion of the male and the female gamete. As a result, the offspring produced are morphologically and genetically similar to their parents and are thus called clones.

Q4. Offsprings formed due to sexual reproduction have better chances of survival. Why? Is this statement always true?

Answer: The offsprings obtained from sexual reproduction have better chances of survival because the genetic material of such organisms are formed from both the parents. Daughter organisms/offsprings show variation that leads to the evolution of species.

This statement is always true. The offspring produced due to sexual reproduction adapt better to the changing environmental conditions. Genetic recombination, interaction, etc. during sexual reproduction provide vigour and vitality to the offspring. For example, some individuals who do not move from one place to another and are well settled in their environment. Also, asexual reproduction is a fast and a quick mode of reproduction which does not consume much time and energy as compared to sexual reproduction.

Q5. How does the progeny formed from asexual reproduction differ from those formed by sexual reproduction?

Answer: Production of offspring by a single parent without the formation and fusion of gametes is called asexual reproduction. It involves only mitotic cell division that gives rise to the daughter cells which are genetically identical to the parent cell.

Sexual reproduction is the production of offspring by two parents, male and female. It involves meiotic cell divisions producing haploid nuclei which on fusion produce offspring that are genetically different from their parents.

Q6. Distinguish between asexual and sexual reproduction. Why is vegetative reproduction also considered as a type of asexual reproduction?

Answer:

Sexual reproduction	Asexual reproduction
It involves the fusion of the male and female gamete.	It does not involves the fusion of the male and the female gamete
It requires two (usually) different individuals.	It requires only one individual.
The individuals produced are not identical to their parents and show variations from each other and also, from their parents.	The individuals produced are identical to the parent and are hence called clones.
Most animals reproduce sexually. Both sexual and asexual modes of reproduction are found in plants.	Asexual modes of reproduction are common in organisms having simple organizations such as algae and fungi.
It is a slow process.	It is a fast process.

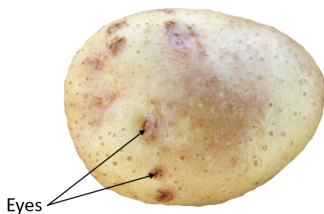
In plants asexual reproduction is called vegetative reproduction because vegetative plant parts like rhizome, runner, sucker, tuber, bulb all are capable of producing off springs These parts give rise to daughter individuals without the involvement of two parents.

Q7. What is vegetative propagation? Give two suitable examples.

Answer: Vegetative propagation is the formation of new plants from vegetative units. In plants, the units of vegetative propagation are runner, rhizome, sucker, tuber, offset, bulb, etc. These are capable of producing new offspring. These structures are called vegetative propagules.

Examples of vegetative reproduction are:

1. Eyes (buds) of potato:



2. Rhizomes of ginger:



Q8. Define

- (a) Juvenile phase
- (b) Reproductive phase
- (c) Senescent phase.

Answer:

(a) **Juvenile phase:** All organisms have to reach a certain stage of growth and maturity in their life before they can reproduce sexually. That period of growth is called the juvenile phase. However, this phase is known as vegetative phase in plants. This phase is of different durations in different organisms.

(b) **Reproductive phase:** It is the period when an individual organism reproduces sexually. During this phase, the organisms produce offspring. In higher plants, this phase can be easily seen when they come to flower but in animals, the juvenile phase is followed by morphological and physiological changes prior to active reproductive behaviour. The reproductive phase is also of variable period in different organisms like some plants, flower throughout the year while others show seasonal flowering.

(c) **Senescent phase:** During this phase of life span, there is progressive deterioration in the body (like slowing of metabolism, etc.). Old age ultimately leads to death.

Q9. Higher organisms have resorted to sexual reproduction in spite of its complexity. Why?

Answer: Although sexual reproduction involves more time and energy, higher organisms have resorted to sexual reproduction in spite of its complexity. This is because this mode of reproduction helps introduce new variations in progenies through the combination of the DNA from two (usually) different individuals. These variations allow the individual to cope with various environmental conditions and thus, make the organism better suited for the environment. Variations also lead to the evolution of better organisms and therefore, provide better chances of survival. On the other hand, asexual reproduction does not provide genetic differences in the individuals produced.

Q10. Explain why meiosis and gametogenesis are always interlinked?

Answer: Meiosis is a process of reductional division in which the amount of genetic material is reduced. Gametogenesis is the process of the formation of gametes. Gametes produced by organisms are haploids (containing only one set of chromosomes), while the body of an organism is diploid. Therefore, for producing haploid gametes (gametogenesis), the germ cells of an organism undergo meiosis. During the process, the meiocytes of an organism undergo two successive nuclear and cell divisions with a single cycle of DNA replication to form the haploid gametes.

Q11. 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 _____

Answer:

- (a) Diploid (2n)
- (b) Diploid (2n)
- (c) Haploid (n)
- (d) Haploid (n)
- (e) Haploid (n)
- (f) Diploid (2n)

Q12. Define external fertilization. Mention its disadvantages.

Answer: When fusion of the gametes takes place outside the body of the organisms, it is called external fertilization or external syngamy. An external medium like water is required for this form of fertilization. This form is found in many aquatic animals like fishes, amphibians, and the majority of algae.

In this, parents release eggs and sperm in the surrounding water, then fertilization and development of offspring occur externally. Disadvantages of external fertilization:

- occurs only in aquatic mediums.
- A chance factor is involved, requiring synchronous release of gametes nearby and absence of turbulence of water.
- There is no protection for young ones. They are vulnerable to a number of predators.

Q13. Differentiate between a zoospore and a zygote.

Answer: The zoospore is flagellated, motile, haploid or diploid spore formed inside a zoosporangium. It is the result of asexual reproduction.

The zygote is always diploid and formed by the fusion of gametes. It is usually non- flagellated and non-motile or motile. It is the net result of sexual reproduction.

Q14. Differentiate between gametogenesis from embryogenesis.

Answer: Differences between gametogenesis and embryogenesis are as follows

Gametogenesis	Embryogenesis
It is the process of the formation of haploid male and female gametes.	It is the process of the development of the embryo from the zygote.
Gametes are the haploid cells.	Embryo is a diploid cell.
Both mitotic & meiotic cell division take place.	Only mitotic division occurs

Q15. Describe the post-fertilization changes in a flower.

Answer: Fertilization is the process of the fusion of the male and the female gamete to form a diploid zygote. After fertilization, the zygote divides several times to form an embryo. The fertilized ovule forms a seed. The seed contains an embryo, enclosed in a protective covering, called the seed coat. As the seed grows further, other floral parts wither and fall off. This leads to the growth of the ovary, which enlarges and ripens to become a fruit with a thick wall called the pericarp.

Q16. 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.

Answer: A flower that contains both the male and female reproductive structure (stamen and pistil) is called a bisexual flower. Examples of plants bearing bisexual flowers are:

- Brassica (sarson) – Brassica campestris
- China rose (shoe flower) – Hibiscus rosa-sinensis
- Garden Pea (Edible pea) – Pisum sativum
- Onion – Allium cepa
- Petunia – Petunia hybrida

Q17. 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?

Answer: The male or staminate flowers of cucurbits bear bright coloured petals and a prominent group of stamens. Male plants or staminate flowers do not bear fruits. The female or pistillate flowers bear fruits. In a fertilised young pistillate flower very small fruit is visible below petals and sepals. Other examples of plants that bear unisexual flowers are corn, papaya, cucumber, etc.

Q18. Why are offspring of oviparous animals at a greater risk as compared to offspring of viviparous animals?

Answer: Oviparous animals lay eggs outside their body. As a result, the eggs of these animals are under continuous threat from various environmental factors. On the other hand, in viviparous animals, the development of the egg takes place inside the body of the female. Hence, the offspring of an egg-laying or oviparous animal is at greater risk as compared to the offspring of a viviparous animal, which gives birth to its young ones.

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