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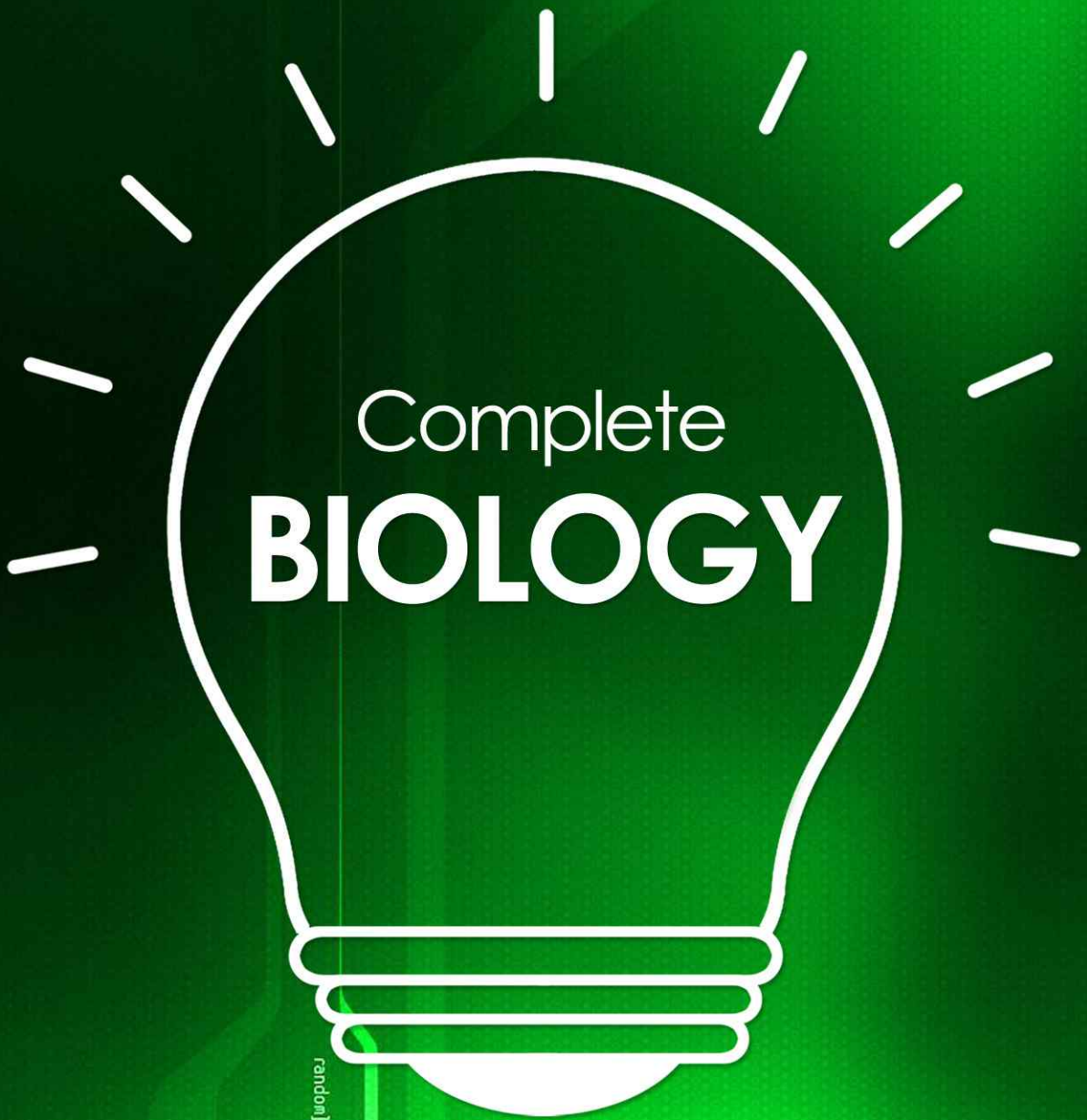

Complete BIOLOGY

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CLASS 12th

Reproduction in Organisms

01. Introduction

A vast number of plant and animal species have existed on the earth for several thousand of years. The process in living organisms that ensures this continuity is Reproduction. Reproduction is one of the most characteristic feature of living organisms. Life will not exist on the earth if plants and animals do not reproduce to make offsprings.

02. Life span

Life span can be defined as the period from birth to the natural death of an organism. It can vary from as short as few days to as long as a number of years.

Maximum Life Span : Maximum life span is the maximum number of years survived or the greatest age reached by any member of a species. The average life span refers to the average number of years survived or age reached by the members of a population. The maximum life span of a domestic dog is about 20 years and that of a laboratory mouse is 4.5 years. The maximum life span of humans has been estimated to be about 121 years. This rests on the fact that a man in Japan, Shirechiyo lzymi, reached the age of 120 years and 237 days in 1986. He died after developing pneumonia. Average life span and life expectancy of humans have grown dramatically. In general the rate of mortality of humans has gone down and the life span has increased. It is 56 in India whereas in the United State, it is 78.

03. Reproduction

Reproduction is the means of self perpetuation of a race in which new, young, similar looking individuals are formed by the grown up or adult individuals. The adults which give rise to young ones are called parents.

Functions of Reproduction :

(i) It replaces the individuals dying due to senescence or ageing.

(ii) Individuals removed from population due to predation or disease are replaced through reproduction.

(iii) It introduces variations essential for adaptability and struggle for existence.

Basic Features of Reproduction :

(i) Replication of DNA.

(ii) Division of cells. It may or may not involve meiosis.

(iii) Growth due to synthesis of more protoplasm.

(iv) Formation of reproductive units.

(v) Elaboration and development of reproductive units to form new young individuals.

04. Types of Reproduction

Broadly speaking, there are two types of reproduction, asexual and sexual. Asexual reproduction does not involve gamete formation and fusion. It is uniparental. On the other hand, sexual reproduction consists of formation and fusion of gametes of opposite sexes. It is mostly biparental with two types o parents of different sexes but can be single/uniparental also, as in case of bisexual or hermaphrodite animals.

I. Asexual Reproduction

It is the mode of reproduction in which new individuals develop directly from specialised or unspecialised parts of a single parent without involving fusion of gametes or sex cells. Asexual reproduction occurs in both single celled and multicelled individuals. The parent individual splits, buds or fragments to form identical daughter cells or individuals, e.g., Amoeba, Paramoecium, Euglena (acellular protists), Sycon, Hydra, Tubularia, Planaria, Ascidia (metazoans). Asexual reproduction is also called agamogenesis or agamogeny. In this mode of reproduction, somatic cells undergo mitosis during the formation of a new individual. Therefore, it is also called somatogenic reproduction. Young ones resulting from asexual reproduction are exactly identical with the parent except in size and are called clones. Each individual of a clone is referred to as a ramet.

Asexual reproduction occurs by fission, budding and fragmentation.

(A) Fission : It is a mode of asexual reproduction in which the body of a mature individual divides into two or more similar and equal sized daughter individuals. Fission can be binary fission or multiple fission.

(a) **Binary Fission :** It is the division of the body of an individual into two equal halves, each of which functions as an independent daughter individual. In unicellular organisms, binary fission is accompanied by mitotic division of nucleus followed by cytokinesis. In metazoans. The organisms which undergo binary fission seldom die of senescence or old age because as soon as they mature, they divide into two daughters. They are, therefore, nearly immortal. Depending on the plane of division, binary fission is of the following types:

(i) **Simple Binary Fission (Irregular Binary Fission) :** Division can occur through any plane e.g., Amoeba.

(ii) **Longitudinal Binary Fission :** The plane of fission passes along the longitudinal axis of the organism, e.g., Euglena, Vorticella.

(iii) **Oblique Binary Fission :** The plane of binary fission lies at an angle to the transverse axis e.g., Ceratium, Gonyaulax.

(iv) **Transverse Binary Fission :** The plane of binary fission runs along the transverse axis of the individual, e.g., Paramoecium, diatoms, bacteria. In Paramoecium, transverse binary fission is preceeded by a mitotic division of meganucleus and mitotic division of micronucleus. In it, binary fission produces two dissimilar daughters, one proter (anterior) and the other opisthe (posterior). Both develop the deficient components and become similar.