

DELHI PUBLIC SCHOOL, JAMMU
Foundation Worksheet (2020-2021)

Sub: Biology

Class XII

Chapter – 1: - REPRODUCTION IN ORGANISMS

Briefing of Concept

Life Span: Period from birth till natural death. Every organism lives only for certain period of time

Reproduction –Producing young-ones of their kind, generation after generation.

Types of reproduction:

1. **Asexual reproduction:** single parent capable of producing offsprings.
Somatogenic reproduction.
2. **Sexual reproduction :** two parents are involved in producing offspring.

Modes of asexual reproduction

1. **Binary fission:** parent body divides into two halves, genetically identical to parent.
Organisms considered immortal

Amoeba: It is simple or irregular. Paramecium: Transverse binary fission.

2. **Multiple fission:** parent body divides into many daughter organisms e.g., Plasmodium.

3. **Budding:** daughter organisms grow from small buds arising in parent body. Exogenous budding: out side the body eg. Hydra, Yeast.
Endogenous budding: inside the body eg. Gemmule in sponge.

4. **Spore Formation:** Exogenous spores **Conidia:** non-motile eg. Fungi. **Zoospores:** microscopic motile structures eg. Algae.

5. **Vegetative reproduction:** In plants term vegetative reproduction frequently used instead of asexual reproduction, units of vegetative propagation called **vegetative propagules**. Eg runner, rhizome, sucker, tuber offset, bulb give rise to new plant

PHASES OF LIFE SPAN.

- i. **Juvenile phase:** The phase of growth before reproductive maturity.
- ii. **Reproductive phase:** Reproductive maturity.

- iii. **Senescent phase:** Phase between reproductive maturity and death.

The main events of sexual cycle are:

1. PRE-FERTILISATION EVENTS:

a. Gametogenesis :

The process of formation of male and female gametes by meiosis (cell-division).

- ✓ Homogamete (Isogamete): - gametes similar eg. Algae
- ✓ Heterogamete(an-isogamete): - morphologically dissimilar gamete ,male gamete (antherozoid or sperm) ,female gamete (egg or ovum) eg. Human.

➤ Sexuality in organisms:

- **In plants**

Bisexual term is used for Homothallic and Monoecious plants: Both male and female reproductive structures in same plant eg. Higher plants, cucurbits and coconut.

Unisexual term used for Heterothallic and Dioecious plants: Male and female reproductive-structure on different plants. Male flower–**staminate flower** and female flower–**pistillate flower** eg. papaya and date-palm.

- **In Animals**

Bisexual term is used for Hermaphrodite animals-eg. Earth-worm, Tape-worm, Leech, Sponge.

Unisexual animals have male & female sexes in separate individuals-e.g. insects, frogs, human beings

➤ Cell division during gamete formation:

- **Haploid-parent (n)** produces haploid gametes (n) by mitotic division, eg. Monera, fungi, algae and bryophytes.

- **Diploid parent (2n)** produces haploid gametes(n) by meiosis division (possess only one set of chromosomes)and such **specialized parent cell** is called **meiocyte or gamete mother cell**.

b) Gamete transfer:- to facilitate fusion. Male gametes mostly motile and female non-motile, exception few fungi and in algae both gametes are motile in some cases.

Water medium for gamete transfer- in lower plants. Large number of male gametes are produced to compensate loss. Higher plants, pollen-grains are transferred by pollination.

2. FERTILIZATION: Fusion of male and female gametes to produce diploid zygote.

Two types- external and internal .

- **External fertilisation**- outside the body of organism in external- medium (water) eg. majority of algae, fishes, amphibians.

Advantage-

1. Show great synchrony between the sexes
2. Release of large number of gametes into surrounding medium
2. Large number of off springs produced.

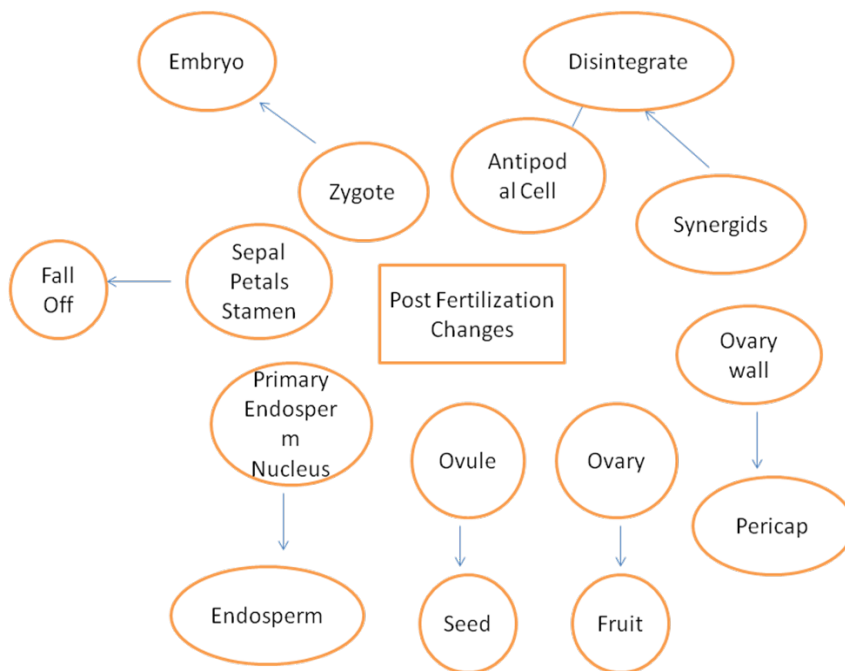
Disadvantage- offspring vulnerable to predators, natural disasters.

- **Internal fertilisation**- fusion occurs inside female body eg. majority of plants and animals. Egg non-motile and formed inside female body. Male gamete motile, produced in large numbers to reach egg and fuse with it. In seed plants, non- motile male gamete carried to female gamete by pollen-tube.

3. POST -FERTILISATION EVENTS-

Formation of zygote. Zygote. One celled, diploid, vital link between two generations.

- ✓ **Haplontic life cycle**- zygote (2n) divides by meiosis to form haploid (n) spores.
- ✓ **Diplontic life-cycle**- zygote (2n) divides mitotically, develops into embryo (2n).
UNDERGO MEIOSIS –HAPLOID SPORES----HPLONTIC LIFE CYCLE
ZYGOTE UNDERGO MITOSIS ---DIPLONTIC LIFE CYCLE



Embryogenesis: development of embryo from zygote by cell division (mitosis) and cell differentiation. **Cell- division** increases the number of cells in the developing embryo

Parthenogenesis.-development into new organism without fertilisation eg. Rotifers, honey-bees, some lizard, bird(turkey).

Parthenogenesis: Female gamete develops into new organism.

- ✓ **Seedless fruits** formed by **parthenogenesis**
- ✓ **Clone:** A group of individuals of the same species that are morphologically and genetically similar to each other & their parents
- ✓ **Turion :** Fleshy overwintering buds in aquatic plants help in perrenation Eg *potomegaton, utricularia*
- ✓ **Bulbil :** Fleshy buds that produce new plant Eg *Agave and Oxalis*

Exemplar Question

Q1. If chromosomes number in meiocyte in rat, elephant and rice is 42, 56, 24 what will be the chromosomes number in their gamete?

Ans) Rat 21, elephant 28, rice 12

Q2. Arrange the following w.r.t. increasing life span : Rose, Fruit fly, Rice

(1) Fruit fly, Rice, Rose (2) Rose, Rice, Fruit fly (3) Rice, Rose, Fruit fly (4) Fruit fly, Rose, Rice

Sol. Answer (1)

Fruit fly = 2 Weeks

Rice = 3-4 Months

Rose =5-7 Years

Fruit fly < Rice < Rose

Practice Questions

Multiple Choice Questions

Q1. Which of the following factor is/are responsible for how organism reproduces?

- (1) Organisms habitat
- (2) Internal physiology
- (3) Environmental factors
- (4) More than one option is correct

Sol. Answer (4)

- ❖ Organism habitat is responsible because if organism will live in nutrient deficient condition it will promote sexual reproduction.
- ❖ Environmental factor also decides that how organism reproduce.
- ❖ Internal physiology is also responsible.

Q2. Cell division itself is a mode of reproduction in

(1) Amoeba, Penicillium

(2) Chara, Bacteria

(3) Chlamydomonas, Penicillium

(4) Amoeba, Bacteria

Sol. Answer (4)

- ❖ Cell division itself is mode of reproduction in unicellular organism like Amoeba and Bacteria.

Q3. During budding in yeast

(1) Cytokinesis is unequal

(2) Identity of parent is lost

(3) Clones are produced

(4) More than one option is correct

Sol. Answer (4)

- ❖ Because yeast reproduce by asexual method to produce clone.

Q4. Most common asexual structure produced in algae is

(1) Thick walled

(2) Multicellular

(3) Flagellated

(4) Produced in chains

Sol. Answer (3)

- ❖ Zoospores possess flagella.

Q5. In which of the following plants root bud is involved in vegetative propagation?

(1) Sugarcane

(2) Banana

(3) Ginger

(4) Dahlia

Sol. Answer (4)

- ❖ Sugarcane → Segment of stem with atleast one node
- ❖ Banana → Rhizome
- ❖ Ginger → Rhizome
- ❖ Dahlia → Root buds

Q6. Offsprings produced through which of the following processes/structures represent clone?

(1) Gametic fusion

(2) Syngamy

(3) Vegetative propagule

(4) More than one option is

correct

Sol. Answer (3)

- ❖ Vegetative propagule produce offspring.

Q7. In all the sexually reproducing organisms, events involved are

(1) Same, sequential

(2) Same, non-sequential

(3) Different, sequential

(4) Different, non-sequential

Sol. Answer (1)

- ❖ Ist Pre-fertilization Fertilization Post-fertilization

Q8. Majority of sexually reproducing organisms form

(1) Isogametes

(2) Homogametes

(3) Heterogametes

(4) More than one option is correct

Sol. Answer (3)

❖ Heterogametes → Oogamous reproduction

Q9. In flowering plants, zygote is formed

(1) Inside ovule

(3) In water

(2) Inside archegonium

(4) More than one option is correct

Sol. Answer (1)

❖ Zygote formed inside ovule

Q10. Self fertilisation is seen in

(1) Unisexual flower of papaya

(3) Unisexual flower of date palm

(2) Bisexual flower of pea

(4) Bisexual flower of coconut

Sol. Answer (2)

❖ Bud pollination in pea.

Very Short Questions

Q11. Define external fertilization? Mention its disadvantages?

- Syngamy occurs in the external medium. i.e. water outside the body of the organism. Disadvantage- offspring are extremely vulnerable to predators. Threatening there development up to adulthood.

Q12. Compare monoecious & dioecious plants?

- Monoecious-Bisexual condition- having both male and female reproductive organs. Dioecious -Unisexual condition- having either of the reproductive organs.

Q13. Distinguish between.

1) Oviparous & viviparous.

- ✓ **Oviparous:** Lay eggs. Development of zygote takes place outside the body of female parent
- ✓ **Viviparous:** Give birth to young one. Development takes place inside the body of female parent

2) External & internal fertilization.

- ✓ **External Fertilization:** Syngamy occurs outside body, Danger of predation is always there
- ✓ **Internal Fertilization:** Syngamy occurs inside the body of the organism, No danger of predator to offspring because they are protected inside the body of female.

Q14. Define: a) Juvenile Phase b) Senescent Phase.

- **Juvenile phase:-** The period of growth involving an increase in the body dimensions before attaining sexual maturity is called juvenile phase.
- **Senescence phase:-** The part of life involving an increase in degenerative changes rather than repair.

Q15. What are staminate and pistillate flowers? Name the types of gametes that are formed in staminate and pistillate flowers?

- Staminate – unisexual male flower bearing stamen is called staminate flower.
- Pistillate - the unisexual female flower bearing pistils .

i) Staminate flower – male gamete, ii) Pistillate flower – female gamete.

Q16. Give two examples of animals in which oestrus cycle occurs?

- Non – Primate mammals like cows, sheep.

Q17. Name the two stages that a zygote undergoes during embryogenesis?

- Zygote undergoes cell division (mitosis) and cell differentiation.

Short Questions

Q18. Describe major events of sexual reproduction?

The major events are:

- Pre fertilization: Gametogenesis & gamete transfer.
- Fertilization: Syngamy resulting in diploid zygote.
- Post fertilization: Embryogenesis after the formation of zygote.

Q19. Describe vegetative reproduction in plants?

- In plants different plant parts which are modified into structures like runner, rhizome, sucker, tuber, etc. are capable of giving rise to new plants, such a method of reproduction is called vegetative propagation. For e.g., Offset in Water hyacinth, Tuber in Potato.etc.

Q20. Which are the vegetative propagules found in the following angiosperms?

- a) _____ of ginger.
- b) _____ of Agave.
- c) _____ of water hyacinth.
- d) _____ of potato
- e) _____ of onion.

- Rhizome, bulbil, offset, tuber and bulb.

Q21. Describe with suitable diagrams.

- a) Budding in yeast
- b) Binary fission in amoebae.

Q22. a) Differentiate between gametogenesis and embryogenesis.

b) Differentiate between zoospore and Zygote.

- Gametogenesis: The process of formation of two types of gametes male and female.
- Embryogenesis: The process of development of embryo from the zygote

- Zoospore: They are special asexual reproductive structure formed during asexual reproduction.
- Zygote: It is formed by fusion of gametes in sexual reproduction

Q23. Why higher organisms have resorted to sexual reproduction in spite of its complexity?

1. It brings about variations.
2. Variation helps in better adaptation in nature.
3. Variation is the basis of evolution.

Q24 .What is parthenogenesis. Give Example?

- Parthenogenesis: Female gamete develops into new organism.
- Seedless fruits are formed by parthenogenesis
- Occurs naturally in some plants and invertebrate animals

Q25. Mention the reason for difference in ploidy of zygote and primary endosperm nucleus in angiosperm.

- Zygote is diploid due to the fusion of two haploid gametes
- Endosperm nucleus is triploid formed by triple fusion