

HOLY FAITH PRESENTATION SCHOOL

RAWALPORA SRINAGAR KASHMIR How Do Organisms Reproduce

(CLASS 10TH BIOLOGY)

Q.1 What is reproduction and what are its types?

Ans. Reproduction is the process by which living organisms produce young ones of their own kind to continue their existence. Reproduction is one of the characteristic feature of living organisms. Living organisms reproduce by many methods which have been broadly classified into two types:

i. Sexual reproduction ii. Asexual reproduction.

- **i. Sexual reproduction**:- It is that type of reproduction in which new individuals (offspring's one) are produced by the fusion of male and female gametes contributed by two parents.
- ii. **Asexual reproduction:-** It is that type of reproduction in which new individuals (offspring's ones) are formed with out the fusion of male and female gametes. In asexual reproduction only one parent is involved in the formation of new individuals.

Q. What are the different types of asexual reproduction.

Ans. Asexual reproduction takes place in the following ways.

i. Fission.

i.

- ii. Budding
- iii. Spore formation.
- iv. Fragmentation.
- v. Vegetative propagation.
- **Fission:-** It is the process in which the parent body (cell) divides to form daughter cells which grow as new individuals. The process of fission is most common in unicellular organisms such as bacteria and protozoa. The process of fission is of two main types:

a. Binary fission **b.** Multiple fission.

a. Binary fission:- It is a type of asexual reproduction in which the body of a unicellular organism divides into two daughter cells which grow as new individuals. This type of reproductions is found in Amoeba, paramecium, Euglena, etc.

In some organisms like amoeba, the splitting of the two cells during division can take place in any plane. However, in some organisms like leishmama (which have a whip like structure at one end of the cell) binary fission occurs in a definite orientation in relation to these structures.

b. Multiple fission:- It is a type of asexual reproduction in which the body of a unicellular organism divides into many daughter cells. This type of reproduction is found in plasmodium (a malarial parasite) and in case of Amoeba under unfavorable conditions.

ii. Budding:- In budding a small bulb like outgrowth develops on the body of an organism called bud. The bud develops into a tiny individual and when fully mature detaches from the parental in body and becomes a new independent individual. This type of reproduction takes place in coelenterates (hydra), sponges (scypha) and yeasts.

iii. Spore formation :- Spores are the specialized cells capable of growing into a new individual. The spores are formed in a sac like structure called sporangium. The spores are liberated from the sporangium which when fall on a suitable substratum grow into new individuals. Spore formation is most common in algae, bacteria and fungi.

iv. Fragmentation:- In fragmentation the body of an organism divides into two or more fragments and each fragment grows into a new individual. In case of plants, it is found in algae and in case of animals it is found in tapeworm.



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vi. **Vegetative Propagation:-** This is the most common type of asexual reproduction in plants. In vegetative propagation new individual plants are formed from the vegetative parts such as stem, branches, roots and leaves of the parent plant.

Q. Write two advantages of Vegetative Propagation.

Ans: 1. It helps in the propagation of those plants that have lost the capacity to produce seeds such as banana, orange, rose and jasmine.

2. The plants produced by vegetative reproduction are genetically similar enough to the parent plant to have all its characteristics.

Q. What are the different types of vegetative reproduction?

Ans:- The various types of vegetative reproduction are:-

i. Grafting:- It involves joining together the parts of two different plants in such as way that they can live as one plant. In this process, the cutting of a superior plant is put on the stem of an inferior quality plant having root system. The plant that contributes its root system is called stock and the plant which contributes its shoot system is called scient. This method is used to produce superior quality of plants which can not be achieved by sexual reproduction. It is co,mmon method in mangoes, apples, peaches, etc.

ii. Cutting:- Small (6-10 cm long) pieces of stem are cut and their free ends are cut to form cuttings. These cuttings are placed slightly vertical in the soil. In this way each cutting develops into a complete plant. Examples are jasmine, rose, lavender, etc.

iii. Layering:- In this process one or more shoots of a plant are bent close to the ground and covered with moist soil but the free end of the branch is kept uncovered. After few days roots start to arise from the part of the branch which is covered with soil. This part of the branch with its newly arisen roots is manually detached from the main branch of the parent plant and is planted to grow as a new complete plant. It is common method of vegetative reproduction in ornamental plants like jasmine, rose plants, etc.

iv. Adventitious buds:- The leaves of the plants like Bryophyllum also help in vegetative reproduction. Their leaves bear buds at the notches of their margins. When this leaf falls on the moist ground, each bud develops into a new plant. Thus adventitious buds formed on the margin of leaf develop into a new plant.

v. Tissue culture: In this method a small piece of tissue from the vegetative part of the plant is separated and placed in an artificial medium where it divides rapidly into a small group of un-organized cells called callus. The callus is transferred to another medium containing hormones for growth and differentiation to form plantlets. The plantlets are then placed in the soil to develop into mature plants. This technique is commonly used for ornamental plants e.g. asparagus, chrysanthemum, etc.

Q. Explain the process of sexual reproduction in plants?

Ans. The sexual reproduction in plants involves three main phases: namely formation of microspores and ovule pollination and fertilization.

1. Formation of microspores:- The microspores are formed in the microsporangia from microspore mother cells, which are present in Anther. The microspores are formed by the process of meiosis. The partly germinated microspore is called pollen grain.







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2. **Pollination:-** The transfer of pollen grains from anther to stigma of the same or another flower is called pollination. The pollen grains are transferred by wind water or insects from anther to stigma. The pollen grain absorbs water on the stigma and divides in to two cells namely a vegetative cell and a generative cell. The nucleus of the generative cell divides into two nuclei. The vegetative cell develops into a tube which protrudes through style into ovary containing ovule. The two nuclei or male gametes pass through pollen tube into ovule where one of them fuses with the egg nucleus forming zygote and another one fuses with secondary nucleus which is diploid. The fusion of one male gamete and egg cell gives rise to formation of embryo while as fusion of another male gamete and secondary nucleus give rise to formation of endosperm which provides nutrition to developing embryo.

Formation of fruit:- The fertilized ovules secrete auxins which cause the ovary to grow into a fruit. The ovary can be made to grow into a fruit with out fertilization by the artificial spray of auxins this process is called parthenocarpy.

Q. With the help of diagram describe the structure of male reproductive system in humans.

Ans. The male reproductive system consists of a scrotum, a pair of testis, vasa efferentia, a pair of epididymes, a pair of vasa deferentia, a pair of efacuratary ducts, urethra and penis.

Scrotum:- It is a pouch of pigmented skin arising from the lower abdominal wall and hanging between the legs. The testes originate in the abdominal cavity but latter during the seventh month of development descend into the respective



scrotal sacs. The scrotum acts as a thermoregulatar, maintaing the testes at a temperature 2° lower than that of the body.

Testis:- The testes are soft, smooth, pinkish oval organs about 4-5 cm long, 2.5 cm wide and 3cm thick. Testes are formed of semniferous tubules which consists of sbermelogenic cells and sertoli cells. The former becomes sperms while the latter provides nutrient to the sperms.

The semniferous tubules also contain the interstitial or Leybig's cells which secrete the male sex hormone called testosterone.

Epididymis:- The epididymis is a long tube attached to the hind surface of the testis. Maturation of sperms and their fertilization capacity occurs in head of the epididymis and are stored in the tail part of Epidydymis. The sperms not ejaculated are reabsorbed in the vas deferens.

Vasa Efferentia:- The vasa efferentia bear cilia to aid in sperm transport.

Vas deferentia:- It is about 40 cm long narrow and tubular structure which starts from epididymis and joins the seminal vesicles to form ejaculatory duct. Vas deferentia conducts the sperms by peristalsis.

Ejaculatory ducts:- These are about 2cm long thin walled tubes which open in to the urethra.





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Urethra:-It is the urinary duct leading from the bladder. It carries urine as well as sperms. It is about 20 cm long.

Penis:- Penis is a male couplatory organ through which urethra pass. It is used for depositing semen into the vagina of the female.

Accessory sex glands:- In man there are three types of sex glands namely:

- 1. Seminal vesicles:- These are a pair of glands present between rectum of urinary bladder.
- 2. **Prostate glands:**-It is a single large sized lobulated gland present just blow the urinary bladder.
- 3. Cow pars glands:-These are a pair of white pea sized glands present at the base of penis.

Q. With the help of diagram describe the structure of female reproductive system.

Ans. The female reproductive system consists of a pair of ovaries, a pair of fallopian tubes (oviducts) uterus and vagina.

Ovaries:-The ovaries are the primary sex organs of the female. They are about the size and shape of an almond. Each ovary is connected by ovarian ligament to the uterus. The ovaries remain attached to the body wall by ligament. The ovaries produce female gamete ova and female sex hormones Estrogen and progesterone. The ovaries are externally lined by germinal epithelium. Ovaries are two in number and each ovary produces eggs alternately.



Fallopian tubes:- These are a pair of elongated, ciliated muscular and tubular structures extending from just close to ovaries to uterus. The outer part of each fallopian tube laying close to ovary has a wide aperture called ostium and a number of finger like processes called fimbriae to receive the ovum released from ovary.

Functions of Fallopian Tube:- Fallopian tube is the site of fertilization also called fertilization canal. It conducts the Zygote towards uterus by its cilliary action.

Uterus:- It is a muscular pear shaped structure present between urinary bladder and rectum. Its internal linings is highly glandular and vascular and is called endometrium. Its lower and narrow part is called cervix which opens into vagina.

Function:- It is the site of foetal development.

Vagina:- It is about 7.5cm long and is adopted for receiving penis, allowing menstrual flow and serves as the birth canal.

Q. Describe the human female menstrual cycle OR Why does menstruation occur?

Ans. The menstrual cycle in humans lasts for 28 days. The days are numbered from first day of blood flow in the menstrual period. The menstrual cycle consists of 3 phases which are as described below:



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a. Follicular (Proliferating) phase:- This phase lasts for about 14 days. It comprises the following stages.

i. F.S.H. The anterior pituitary lobe secretes follicle stimulating hormone (F.S.H) which stimulates the growth of the selected primary ovarian follicle and maturation of the primary Oocyte in this follicle. F.S.H also stimulates follicle cells to secrete estradiol **ii.** Estradiol inhibits the secretion of F.S.H and stimulates the secretion of leuteinising hormone (L.H) from the anterior pituitary.

- **iii.** L.H. cause ovulation and it occurs after about 14 days.
- iv. Estradial prepares uterus for implantation and thus formation of endometrium occurs in uterus. Fallopian tube gets thickened and its ciliary movement increases. These changes prepare the fallopian tube for convening the ovum into the uterus.

b. Luteal or secretary phase: This phase lasts for 10 days. Progesterone and estradial secretion takes place by the stimulation of L.H and prolaction to empty graffian follicle. Progesterone maintains pregnancy. i.e. implantation of the foetus and stimulates endometrial glands to secrete a nutrient fluid for the foetus,

c. Menstrual or Bleeding phase:- This phase lasts for about 4 days. If fertilization does not occur, the secondary Oocyte undergoes autolysis and progesterone inhibits the release of LH from pituitary and a consequent fall in the progesterone level in the blood. The uterine lining dries due to progesterone deficiency and is sloughed off, blood vessels rupture and this causes bleeding.

Q. Write short note on: (a) Gametogenesis (b) Spermatogenesis (c) Spermiogenesis

Ans:- (a) **Gametogenesis:-** It is the formation of haploid gametes from diploid cells of germinal epithelium (the outer most covering of gonads) i.e. testes and ovaries. The gametes in males are called sperms and in females are called eggs. The formation of sperms is called spermatogenesis and the formation of eggs or (ova) is called Oogenesis. (b) **Spermatogenesis:-** It is the formation of sperms from the germinal epithelium present

in the testes.

(c) **Spermiogenesis:-** The formation of motile sperms from non-motile spermatids is called spermiogenesis. In spermiogenesis the weight of the spermatids is reduced to form active sperms

Q. Phases of spermatogenesis:-

Ans:-Spermatogenesis involves the two phases.

i. Formation of spermatids ii. Spermiogenesis.

Formation of spermatids:- The cells of the germinal epithelium which produce sperms are known as primary germ cells or primordial cells. The primordial cells pass through the following three phases for the formation of spermatids.

1. Multiplication Phase:- The undifferentiated germ cells or primordial cells multiply (increase in number) by repeated mitotic divisions. The cells formed by these divisions are known as spermatogonia. The spermatogonia are diploid cells containing 2sets of chromosomes in them represented by (2x)

ii. The Growth phase:- In growth phase the spermatogonial cells accumulate more nutrients and grow in size. Now these are known as primary spermatocytes.

iii. The maturation phase:- In maturation phase each primary spermatocyte undergoes two meiotic divisions one after another. The second meiotic division is



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reductional division reducing the chromosome no. half (X) in each spermatocyte. By the first meiotic division two secondary spermatocytes are formed. By the second meiotic division occurring in each secondary spermatocytes two spermatids are formed.

Q. What is fertilization? What arte its various types?

Ans:-Fertilization:- It is the fusion of male and female gametes of all sexually reproducing organisms. Its main idea was enunciated by Leevwon Hoek in 1683. In this process the penetration of a spermatozoon into ovum activates the egg to start the development, while the fusion of their pronuclei (amphimixis) results in restoring the diploid (2n) chromosome number.

Type of Fertilisation"-

a. External Fertilization. b. Internal Fertilization.

- **a.** External fertilization:- The type of fertilization where gametes fuse outside the body of a parent is known as external fertilization e.g. in fishes and amphibians.
- **b.** Internal Fertilization:- The type of fertilization where gametes fuse inside the body of a parent is known as internal fertilization e.g. in mammals, birds and reptiles.

Q. What means puberty? What changer occur due to puberty in boys and girls?

Ans:- Puberty:- The age at which the sex hormones or gametes begin to be produced and the boy and girl become sexually mature is called puberty. Boys attain puberty at the age of 13 to 14 years while girls reach puberty at a comparatively lower age of 10 to 12 years.

Changes due to puberty in Boys:-

- 1. Growth of thick hair on the face.
- 2. Cracking of the voice.
- 3. Muscle development.
- 4. Sperm formation and development of sexual desire.

Changes due to puberty in Girls:-

- 1. Growth and development of reproductive organs (Ovaries, Fallopian tube, Uterus, etc.)
- 2. Development of breasts.

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- 3. Starting of menstrual cycle.
- 4. The broadening of hips and development of sexual desire.

Q. How is DNA copied in cells? (DNA Copying)

Ans. DNA (Deoxyribonucleic acid) is copied in the cells by the process known as DNA replication. During this process the two strands of DNA get separated from each other and the new strands get attached to each parent strand formed from its building blocks called nucleotides. (Process of DNA replication)



- **Ans**. DNA replication helps in maintaining the same number of chromosomes in the daughter cells as that in mother cells.
- 1. Some times DNA replication helps in the formation of useful mutations.





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2. The variations caused due to DNA replication causes microevolution. i.e. formation of sub species or varieties.

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Q. What will happen if an organism reproduces through spores.

Ans. The spores help an organism to survive under unfavourable conditions such as draught and absence of suitable substratum. The spores accumulate reserve food and develop a thick wall around them which helps them to pass through unfavourable conditions on return of favourable conditions these spore germinate and form the new individuals. Thus preventing the organism from extinction.

Q. Why is variation beneficial to the species but not necessarily for the individual?

Ans. Variation is beneficial to the species as it enables a species for its survival. A favourable variation makes an organism to live better in a changed environment. e.g. A population of heat resistant bacteria in temperature of the water survives, but if the temperature of water increases by global warming most other bacteria would die. So, it is not necessarily true that a variation is beneficial to the individual always.

Binary fission	Multiple figsion
Dinal y fission	winnple lission
1. The nucleus of the parent cell	1. The nucleus of the parent cell undergoes
divides into two daughter nuclei.	repeated divisions to produce many daughter
	nuclei
2. It may be irregular (amoeba),	2. Whole body divides into pieces.
Longitudinal (Euglena) or transverse	
(paramecia)	
3. Cytoplasmic division is followed by	3. Nuclear division is followed by cytoplasmic
nuclear division	division.
4. It occurs in unicellular organisms	4. It takes place is unicellular organisms under
under favourable conditions	unfavourable conditions.

Q. How does binary fission differ from multiple fission and multiple fission:

Q. How will an organism be benefited if it reproduces through spores?

Ans. Spores have thick walls that protect them from unfavourable conditions like lack of food, lack of water and extreme temperature, such spores are produced in large numbers. They germinate when favourable conditions return. Thus, an organism gets benefited if it reproduces through spores.

Q. Can you think of reasons why more complex organisms can not give rise to new individuals through regeneration?

Ans. Complex organisms have highly differentiated tissues and organs. In this case regeneration of complex individual organism is difficult from a small piece of living cells.

Q. What are the advantages of artificial propagation?

- Ans. Because of the following reasons:
 - i. We get seedless plants by artificial propagation.
 - ii. Many plants can be grown from just one parent.
 - iii. We get a fully matured plants in very short time.



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iv. To preserve the type of character that a plant breeder desires.

Q. Why is DNA copying an essential part of the process of reproduction?

Ans. DNA copying is essential in the process of reproduction because it transmits the characters (traits) from parent to offspring and carries information to create proteins which lead to body design of the organism. If a similar individual has to be produced, the DNA should replicate to make an exact copy of itself.

Q. How is the process of pollination different from fertilization?

Pollination	Fertilization
1. It takes place by various pollinating	1. It takes place by the direct involvement
agencies like insects, birds, wind etc.	of male and female organisms or by
	artificial means.
2. It is the transfer of pollen grains	2. It is the fusion of male and female
into ovary	gametes.
3. It occurs in plant kingdom only.	3. It occurs in plant and animal kingdoms.

Q. How does the embryo get nourishment inside the mother's body?

Ans. The embryo gets nutrition from the mother's blood with the help of a special tissue called placenta. This is a disc which is embedded in the uterine wall. It contains villi on the embryo's side of the tissue. On the mother's side are blood spaces. This provides a large surface area for diffusion of glucose, oxygen and other nutrients from the mother to the embryo.

Q What are the contraceptive methods taken to avoid pregnancy?

Ans. a. Creating a mechanical barrier so that the sperms do not reach the egg. This is done with a condom which is worn around the penis or a similar device that is placed in the vagina.

b. Changing the hormonal balance of the body so that fertilization cannot occur. This is done with the help of oral contraceptive pills.

c. Contraceptive device like loop or coper-T are placed in the uterus to prevent pregnancy.

d. Surgical methods like vasectomy in males and tubectomy in females.

Q What happens when the egg is not fertilized?

If the egg is not fertilized, it lives only for a day, Every month the uterus prepares itself to receive the fertilized egg. The lining of the uterus becomes thick, spongy and richly supplied with blood. If the egg is not fertilized, the lining breaks and comes out through the vagina as blood and mucous. It usually lasts for 2-8 days. This process is called menstruation.

Q. What is pollination? Name its two types. How do they differ from each other?

Ans. The transfer of pollen grains from anther to the stigma of a carpel is called pollination. Pollination is of two types namely self pollination and cross pollination

Self Pollination	Cross Pollination
1. Transfer of pollen grains to the stigma	1. Transfer of pollen grains from anther to
of same flower or another flower on the	the stigma of a flower of another similar or



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same plant.	different plant is called cross pollination.
2. External pollinating agency is not	2. Wind, Water birds and insects are
required.	required as pollinating agency.
3. Slight variation occurs in new	3. Much more variation occurs in new
individuals	individuals

Q. What are the hermaphrodite organisms?

Ans. Those organisms which contain both male and female reproductive organs are called hermaphrodite or bisexual organisms. E.g. earthworm, tapeworm, fasciola etc.

Q. What are oviparous organisms?

Ans. Those organisms which lay eggs are called oviparous organisms. e.g. all birds, reptiles and the order monotremata in mammals.

Q. Distinguish between external fertilization and internal fertilization.

Ans.

External fertilization	Internal fertilization
1. Fertilization of egg with the sperm	2. Fertilization occurs inside the female
occurs outside the body.	reproductive system.
2. Water is a medium for fusion of	2. Secretions from sex organs helps in the
gametes.	fusion of gametes.
3. Large number of eggs are fertilized	3. Few eggs are fertilized.
with the semen of male	

Q. What are viviparous organisms?

Ans. Those organisms which reproduce by giving birth to their young ones are called viviparous organisms.

Q. Differentiate between scion an stock.

Ans.

Scion	Stock
1. The part of stem which is placed on	1. The stem which is fixed in soil is called
the top of another stem is called scion	stock.
2. The parent plant usually has poor root	2. The parent plant usually has poor
system	characters of which the desired scion is
	used.
3. It has desired characters of good	3. It has extensive absorbing capacity good
vegetative growth, flower and of fruit	root systems
production	

Q. What are the salient features of sexual reproduction?

Ans. The salient features of sexual reproduction are:

- 1. It involves two parents mostly but some times uniparental (bisexual organisms fasciola, earthworm etc.)
- 2. Haploid gametes are produced by both male and female by the process of meiosis.



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- 3. The fusion of male and female gametes (sperm and egg) is called fertilization. The male gamete is usually smaller and is known as sperm. The female gamete is a bit larger and is known as egg. The fertilization results in the formation of a zygote which is diploid.
- 4. The zygote divides repeatedly to form a multicellular organism.

Q. What are the Silent Features of Asexual reproduction?

- Ans. **i.** There is no formation and fusion of gametes.
 - **ii.** Only one parent is involved in the formation of new individuals.
 - iii. Multiplication of cells is rapid and enormous

Q. Writ two advantages of sexual reproduction.

- **i.** Sexual reproduction promotes diversity among the offspring because variations from two parents are coming together.
- **ii.** Progeny of sexual reproduction have more chance of survival because of the variations. New combinations of characters thus plays important role in the evolution of species.