

HOW DO ORGANISMS REPRODUCE

Question 1: What is reproduction?

Answer: Reproduction is defined as the production of individuals of the same species, that is the next generation of the species.

Question 2: Why is reproduction necessary?

Answer: Reproduction is necessary for the continuation of the species. If there is no reproduction, the species will become extinct and die out.

Question 3: What are the types of reproduction?

Answer: There are basically two types of reproduction - asexual reproduction and sexual reproduction.

Question 4: What is asexual reproduction?

Answer: Asexual reproduction involves only one parent and the offspring is genetically similar to the parent.

Question 5: What is sexual reproduction?

Answer: Sexual reproduction involves two parents and the offspring has a fusion of the characteristics of both the parents.

Question 6: What is tubectomy?

Answer: It is the female sterilization technique in which the oviducts are cut and tied back such that eggs do not reach the uterus and the sperms that enter the female's body do not fertilize the eggs.

Question 7: Name the types of reproduction that produces genetically identical offspring?

Answer: Asexual reproduction is the type of reproduction that produces genetically identical offspring.

Question 8: What are the different types of asexual reproduction?

Answer: The different types of asexual reproduction are fission, budding, fragmentation, spore formation and vegetative propagation.

Question 9: What is fission? Give two examples of organisms that reproduce by fission.

Answer: The DNA or the nucleus of a mature cell divides first and then the cell divides into two. This is called fission. It produces daughter cells of almost the same size. It is seen in protozoans like Amoeba and Paramecium.

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Question 10: *What is binary fission?*

Answer: When the parent cell divides into two cells that are almost identical, it is called binary fission.

Question 11: *What is multiple fission?*

Answer: When the parent cell divides into many daughter cells that are genetically identical, it is called multiple fission.

Question 12: *Name two organisms that undergo: a) binary fission b) multiple fission*

Answer: Binary fission takes place in *Amoeba* and *Paramecium*. Multiple fission takes place in *Plasmodium*, *Chlamydomonas*.

Question 13: *Explain budding with an example.*

Answer: In budding, the parent cell or body gives out a lateral outgrowth called the bud. For example: In Yeast, the nucleus divides and one of the daughter nuclei passes into the daughter cell.

The bud grows in size while being attached to the parent body. It then gets separated from the parent by the formation of a wall. It may then fall off and germinate into a new individual on getting favourable conditions. Thus budding results in the formation of daughter cells of unequal sizes that later grow to adult size.

Question 14: *Write short notes on spore formation.*

Answer: It is generally seen in bacteria and most fungi. One of the cells enlarges and forms the sporangium (literally meaning spore sac). The nucleus divides many times and then the daughter nuclei are surrounded with protoplasm bits to form daughter cells called spores.

The spores are covered with a thick wall called the cyst. On maturation, the sporangium bursts and releases the spores. The spores germinate on getting favourable conditions. For example, fungi such as *Mucor* and *Rhizopus*

Question 15: *What is fragmentation? In which organisms does it take place?*

Answer: Fragmentation is a process in which the mature organism breaks up into two or more pieces or fragments. The fragments then grow into complete organisms. It takes place in some lower plants such as *Spirogyra* and animals such as ribbon worms and flat worms.

Question 16: *What is vegetative propagation?*

Answer: Regeneration of new plants from the vegetative parts of the parent plant is called vegetative propagation or vegetative reproduction.

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Question 17: Which parts of the plant are used for vegetative propagation?

Answer: Vegetative propagation is done with the help of vegetative parts such as roots, stem or leaves. These parts may also be variously modified for vegetative propagation.

Question 18: How is vegetative propagation done by roots?

Answer: Roots of some plants develop new plants either directly producing shoots or producing buds. Shoots are produced by roots of woody plants like *Dalbergia*, *Murraya* etc.

Adventitious buds are formed on the roots of plants like sweet potato, dahlia, asparagus, tapioca, etc. These buds detach from the root and develop into new plants.

Question 19: How does natural vegetative propagation take place by stem?

Answer: Stem has nodes and internodes. The nodes develop leaves. In the axils of the leaves are buds called the axillary buds that develop into new plants on detachment from the parent plant or even when the stem portion remains attached.

Question 20: What are the functions of underground stems?

Answer: The functions of underground stems are:

- 1) storage of food
- 2) tiding over unfavourable conditions

Question 21: What are the different modifications of the under ground stem?

Answer: The underground stems are variously modified into:

Tubers where the stem is swollen and has the nodal regions called the eyes.
For example: potato.

Rhizomes where the stem is swollen and branched.
For example: ginger, turmeric, etc.

Bulb where the stem is very small and disc-like. From the stem arise scaly and fleshy leaves which bear buds in their axils.
For example: onion, garlic, lilies, etc.

Corm where the stem is very similar to tuber but they do not have definite shape.
For example: *Amorphophallus*, *Colocasia*, *Gladiolus*, saffron, etc.

Question 22: Give an example of vegetative propagation by leaves.

Answer: Vegetative propagation by leaves is seen in plants such as *Bryophyllum*. It has succulent (fleshy) leaves and adventitious buds are present at the margins of the leaves. These buds fall off and grow into new plants.

Question 23: What is cloning?

Answer: Vegetative propagation produces the next generation that is genetically identical to the parent. Such an organism that is genetically identical to the parent is called a clone. Thus, the process of vegetative propagation is called cloning.

Question 24: How is vegetative propagation done artificially?

Answer: There are various ways of carrying out artificial propagation of plants. Cutting, layering, grafting and budding are some of the traditional methods whereas tissue culture is a recent technology.

Question 25: What is tissue culture? Why is it also called micropropagation?

Answer: Tissue culture is the growth of a part of the vegetative tissue in an artificial medium. This tissue is induced to differentiate and form into a whole new plant. Thus, a small piece of tissue is cultured to produce a new plant. This is also called micropropagation as only a small tissue is needed for the culture.

Question 26: What is callus?

Answer: The tissue taken from a mature plant in a test-tube medium starts dividing mitotically and produces a mass of cells. This undifferentiated mass of cells is called the callus.

Question 27: What are the advantages of vegetative propagation?

Answer: The advantages of vegetative propagation are:

- 1) The offspring are genetically identical and therefore advantageous traits can be preserved.
- 2) Only one parent is required which eliminates the need for special mechanisms such as pollination, etc.
- 3) It is faster. For example, bacteria can multiply every 20 minutes. This helps the organisms to increase in number at a rapid rate that balances the loss in number due to various causes.
- 4) Many plants are able to tide over unfavourable conditions due to the organs of asexual reproduction like the tubers, corm, bulbs, etc.
- 5) Vegetative propagation is especially beneficial to the agriculturists and horticulturists. They can raise crops like bananas, sugarcane, potato, etc that do not produce viable seeds. The seedless varieties of fruits are also a result of vegetative propagation.
- 6) The modern technique of tissue culture can be used to grow virus-free plants.

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Question 28: What are the disadvantages of vegetative propagation?

Answer: The various disadvantages of vegetative propagation are:

- 1) The plants gradually lose their vigour as there is no genetic variation. They are subject to disease over a period of time and start dying out.
- 2) Since many plants are produced, it results in overcrowding and lack of nutrients.

Question 29: What is the sexual reproduction in bacteria called?

Answer: Sexual reproduction in bacteria is called genetic recombination.

Question 30: Describe how sexual reproduction takes place in higher animals and plants?

Answer: In the higher organisms, sexual reproduction involves the production of sex cells or gametes and their subsequent fusion to produce a new individual. Whether plant or animal, sexual reproduction follows a basic pattern.

The organisms that follow sexual reproduction have the specific reproductive organs. The reproductive organs produce the haploid sex cells called the gametes by the process of meiosis. There are two types of gametes - male and female. Male gametes are called sperm cells and the female gametes are called ova or eggs. The eggs are bigger as they contain the reserve food for the growing embryo. The male reproductive organs produce the sperm cells and the female reproductive organs produce the eggs.

The sperm cells are generally motile and travel to the eggs and fuse with them. This results in the formation of diploid zygote that has the characteristics of both the male and the female parents. The zygote then grows into an embryo which grows into an adult.

Question 31: What are the reproductive structures of plants called?

Answer: The reproductive structures of plants are called the flowers.

Question 32: Which are the four whorls of a flower?

Answer: Calyx, corolla, androecium and gynoecium are the four whorls of a flower.

Question 33: Which are the reproductive and non-reproductive whorls of a flower?

Answer: The reproductive whorls are androecium and gynoecium and the non-reproductive whorls are the calyx and corolla.

Question 34: Which are the male and female gametes in plants and where are they formed?

Answer: The male gametes are the male nuclei found inside the pollen grains. They are formed in the anther lobes of the stamens. The female gamete is the egg cell found inside the ovule of the carpel.

Question 35: What is double fertilization?

Answer: On reaching the stigma, the pollen grains put out a tube. The pollen tube grows and enters the ovule where it bursts at the tip releasing the male gametes. One of the male gamete fuses with the egg, the female gamete.

The fusion of the male gamete with the female gamete is called fertilization. This results in the formation of a zygote that is diploid. The zygote develops into the embryo. The other male gamete fuses with the polar nuclei.

This results in the formation of a triploid nucleus called the endosperm nucleus. Since the process of fertilization involves two fusions, it is called double fertilization.

Question 36: What are isogametes and heterogametes? Give an example of each.

Answer: When the gametes are similar, they are called isogametes. For example: *Monocystis*. When the gametes are dissimilar, they are called heterogametes. For example, *Plasmodium* and most higher animals.

Question 37: What is external fertilization?

Answer: External fertilization takes place in animals like the fish and frog where the eggs are released from the body of the females into the water outside. These eggs are then fertilized by the sperms produced by the male species. Thus, the fertilization takes place outside the body of the female.

Question 38: What is internal fertilization?

Answer: In internal fertilization the sperms are released into the body of the females during copulation. The sperms travel inside the female body to the egg and fertilization is inside the body of the female.

Question 39: What are male and female secondary sexual characters?

Answer: Some of the male secondary sexual characteristics are facial hair, cracking of voice, etc. The female secondary sexual characteristics include development of breasts, broadening of hips, etc.

Question 40: What are the two parts of the reproductive system?

Answer: The reproductive system comprises of two different parts

Primary reproductive system that includes the gamete-producing organs, the testes and the ovaries.

Accessory reproductive system that includes the glands, passages and other such associated structures.

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Question 41: What are the main parts of the human male reproductive system?

Answer: The human male reproductive system comprises of the following:
1) a pair of testes, organs that produce the male gametes, sperms
2) a network of tubules and tubes for passage of the sperms called the duct system
3) associated glands
4) a mating organ called the penis.

Question 42: Name the constituents of the duct system of the male reproductive part.

Answer: Vasa efferentia, epididymis, vas deferens, ejaculatory tube and the urethra are the constituents of the duct system of the male reproductive system.

Question 43: Which are the various glands associated with the male reproductive system?

Answer: The various glands associated with the male reproductive system are seminal vesicles, prostate glands and Cowper's glands.

Question 44: Write short notes on seminal vesicles.

Answer: Seminal vesicles A pair of seminal vesicles are glands that are present behind the urinary bladder. Each sperm duct has the seminal vesicle of its side secreting a fluid into the common ejaculatory duct. This fluid along with the sperms is called the semen, a milky fluid.

Question 45: What are the functions of prostate and Cowper's glands?

Answer: Prostate gland makes the semen alkaline with its secretions and Cowper's glands secretes lubricating fluid into the urethral tube.

Question 46: What are the different parts of the female reproductive system?

Answer: The female reproductive system consists of a pair of ovaries, a pair of oviducts, uterus, vagina and vulva.

Question 47: What are the functions of the female reproductive system?

Answer: The main functions of the female reproductive system are:
1) to produce eggs
2) receive the sperms
3) provide the site for fertilization
4) implantation of the growing embryo and development of the foetus
5) production of hormones that control the various stages of ovulation and maintenance of pregnancy.

Question 48: What is the function of the fallopian tubes?

Answer: The fallopian tubes transport the eggs from the ovary to the uterus and also serve as the site for fertilization of the egg by sperm.

Question 49: Write short notes on uterus.

Answer: Uterus is a pear-shaped structure, broader on the upper end and narrower on the lower end. The upper end is called the body of the uterus and the lower end is called the cervix. At the upper end, it receives the oviducts of either side whereas the lower end the cervix opens into the vaginal canal that opens to the outside.

The uterine wall has three layers. They are the innermost endometrium made up of several glands and blood vessels, the middle myometrium made of smooth muscles and the outer perimetrium made of connective tissue.

The inner surface of the uterus provides a site for the implantation of the embryo. The uterine wall plays an important role during childbirth. Cervix is made of sphincter muscle that controls the opening and closing of the uterus.

Question 50: What is onset of puberty in females?

Answer: At about the age of 10 to 13 years, the ovaries of females are stimulated by the follicle stimulating hormone (FSH) of the pituitary. This is called the onset of puberty and is accompanied by release of hormones oestrogen and progesterone.

Question 51: What is reproductive phase? How long does it last in males and females?

Answer: The phase during a individual's life during which there is production of gametes is called reproductive phase. In females, it is between 13 to 50 years and in males, it is from the age of 13, life-long.

Question 52: What is ovulation?

Answer: When the follicle in the ovary matures, the pituitary gland secretes another hormone called luteinizing hormone (LH). LH stimulates the follicle to rupture and release the egg. The release of an egg is called ovulation and occurs between the 10th and the 16th day of the menstrual cycle.

Question 53: How does fertilization take place in the human reproductive system?

Answer: In the fallopian tubes, many sperms surround an egg. However, only one enters the egg leaving behind the tail.

The enzymes of the acrosome digest the several layers of tissue to reach the egg cytoplasm. Once inside the male and female nuclei become lighter and are called pro-nuclei. The two pro-nuclei fuse forming a zygote.

Question 54: What is the fate of the product of fertilization?

Answer:

The product of fertilization is called zygote. It starts dividing and forms a blastocyst, the first stage of an embryo. The blastocyst gets implanted on the uterine walls. It then grows into a foetus.

Question 55: How does the growing foetus derive its nourishment?

Answer:

The growing foetus derives its nourishment from the mother through the specialized tissue called placenta. The latter is embedded in the uterine wall. It supplies nutrients to the foetus with the help of the umbilical cord.

Question 56: What does AIDS stand for? Which organism causes AIDS?

Answer:

AIDS stands for acquired immuno deficiency virus. It is caused by human immunodeficiency virus.

Question 57: What is family planning?

Answer:

It is planning the time of arrival of children in the family according to the finances and also limiting the number of children. In India, we advocate the two child formula and that the gap between the two children should be at least three years so that each child gets enough attention and all his emotional and physical needs can be catered to. This is family planning.

Question 58: What is vasectomy?

Answer:

It is a male sterilization technique in which the sperm ducts are cut and tied back such that the sperms are not allowed to pass further.

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