Lesson 9. Reproduction in Animals

Grade VIII **Basic concepts – A Flow Chart**

Reproduction

Asexual Reproduction

Type of reproduction involving only one parent.

Budding

- Seen in Hydra.
- Under normal conditions, Parent develops buds.

↓

Buds grow gradually and get detached after some time.

↓

Each bud develop into an adult.

Binary Fission

- Seen in Amoeba.
- Nucleus legthens and divides into two.

↓

Cytoplasm also divides into two.

↓

Daughter cells are formed having a nucleus each.

Sexual Reproduction

Type of reproduction involving fusion of male and female gametes.

Male Reproductive system

- **Testes** produce the male sex cell called sperm and testosterone.
- **Scrotal sac** holds the testes outside the abdominal cavity of the body.
- **Epididymis** stores the sperms temporarily .
- **Sperm duct** (vas deferens) transports the sperms to the urethra.
- **Urethra** transports sperm and urine.
- **Prostate glands** secrete fluids that provide nutrition to the sperms.
- **Penis** allows urine and semen to be released.

Female Reproductive system

- **Ovary** produces female gamete called ova and estrogen and progesterone.
- **Fallopian tubes** (oviducts) take up the ovum and transport it to the uterus.
- **Uterus** is a bag where the fertilized egg develops.
- **Cervix** closes the lower end of the uterus.
-

fertilisation

- Sperms from the testes of a man are introduced into the vagina of the woman through penis during copulation.
- The motile sperms come up through cervix into the uterus and then pass into the oviducts.
- Only one sperm fuses with the ovum (or egg) in the oviduct.

Development of Embryo

- The zygote divides many times to give rise to a ball of cells called embryo.
- It gets embedded in the wall of the uterus for further development.
- Embryo gradually develops body parts such as hands, legs, eyes, etc and is called foetus.

External Fertilisation

- The eggs are fertilized outside the body of the female.
- Example: Fish and amphibians.

Internal Fertilisation

- Fertilisation occurs inside the body of the female.
- Example: Birds, Mammals, etc.

Viviparous Animals : Animals that give birth to young ones are called viviparous animals, e.g., cows humans, mice, etc.

Oviparous Animals: Animals that lay eggs are called oviparous animals, e.g., frogs, lizards, butterflies, etc.

Know the Terms

- **Gametes** : The special reproductive cell formed by male and female individuals that takes part in sexual reproduction is called gamete. It is haploid in nature. Male gametes are called sperms, while female gamete is called ovum or egg.
- **Internal Fertilization** : Fertilization which takes place inside the body of the female is called internal fertilisation. For Example: as in humans, dogs, cows, birds etc.
- **External Fertilization** : Fertilization which takes place outside the body of the female is called external fertilisation. It is very common in aquatic animals, such as fish, starfish and amphibians (animals who live in water as well as on land such as frogs).
- **IVF or invitro Fertilisation:** The fertilisation of an egg that takes place outside the body in a test tube or in any other apparatus is known IVF or invitro fertilisation.
- **Test-tube Babies** : In this technique freshly released egg and sperms are put together for a few hours for IVF. In case fertilisation occurs the zygote is allowed to develop for about a week and then placed in the uterus of the mother. Complete development takes place in the uterus and the baby is born like any other normal baby. The term test-tube babies is misleading, because babies cannot grow in test-tubes.
- **Embryo** : The stage, when cells produced by the division of the zygote begin to form groups that develop into different tissues and organs of the body, is termed as an embryo.
- **Viviparous** : The animals such dog, lion, elephant, cat etc., which give birth to young ones are called viviparous.
- **Oviparous** : The animals, such as lizards, butterfly, crow and hen, which lay eggs that hatch and give rise to young ones are called oviparous.
- **Metamorphosis** : The process of transformation of larva to an adult through a series of drastic changes is referred to young ones are called oviparous.
- **Cloning** : It is an artificial method invented by man to produce organ cell or part of living organisms without sexual or asexual reproduction. Sheep named Dolly was cloned by Ian Wilmeut (Scotland).

Objective Type Questions

(1 Marks)

I. Multiple Choice Questions

1. Sets of reproductive terms are given below. Choose the set that has an incorrect combination. **(NCERT Exemplar)**

   a. Sperm, testis, sperm duct, penis b. Menstruation, eggs, oviduct, uterus

   c. Sperm, oviduct, egg, uterus d. Ovulation, egg, oviduct, uterus

2. In humans, the development of fertilized egg takes place in the: **(NCERT Exemplar)**

   a. ovary b. testis c. oviduct d. uterus

3. In the list of animals given below, hen is the odd one out.

   (human being, cow, dog, hen)

   The reason for this is **(NCERT Exemplar)**

   a. It undergoes internal fertilisation b. It is oviparous

   c. It is viviparous d. It undergoes external fertilisation

4. Animals exhibiting external fertilisation produce a large number of gametes. Pick the appropriate reason from the following. **(NCERT Exemplar)**

   a. The animals are small in size and want to produce more offsprings

   b. Food is available in plenty in water.

   c. To ensure better chance of fertilization

   d. Water promotes production of large number of gametes

5. Reproduction by budding takes place in **(NCERT Exemplar)**

   a. Hydra b. Amoeba c. Paramecium d. Bacteria

6. Which of the following statements about reproduction in humans is correct? **(NCERT Exemplar)**

   a. Fertilization takes place externally

   b. Fertilisation takes place in the testes

   c. During fertilisation egg moves towards the sperm

   d. Fertilisation takes place in the human female.

7. In human beings, after fertilisation, the structure which gets embedded in the wall of uterus is

   a. Ovum b. Embryo c. Foetus d. Zygote

8. Aquatic animals in which fertilisation occurs in water are said to be **(NCERT Exemplar)**

a. Viviparous without fertilisation
b. Oviparous with external fertilisation
c. Viviparous with internal fertilisation
d. Oviparous with internal fertilisation

9. After fertilisation, the resulting cell which gives rise to a new individual is the **(NCERT Exemplar)**

a. Embryo b. Ovum c. Foetus d. Zygote

10. In human beings, the correct sequence of events during reproduction is **(NCERT Exemplar)**

a. Gamete formation, fertilisation, zygote, embryo
b. Embryo, zygote, fertilisation, gamete formation
c. Fertilisation, gamete formation, embryo, zygote
d. Gamete formation, fertilisation, embryo, zygote

1. c	2. c	3. b	4. c	5. a	6. d	7. b	8. b	9. d	10. a

II. Multiple Choice Questions

1. The animals that produce young ones are called

a. Oviparous
b. Viviparous
c. Both
d. None of these

2. Tadpoles is the developing stage of

a. Dogs
b. Cats
c. Frogs
d. Human

3. The fusion of male and female gametes usually takes place inside the

a. Fallopian tube
b. Ovary
c. Uterus
d. Zygote

4. The cell formed after fertilization is called

a. Foetus
b. Zygote
c. An embryo
d. None of these

5. Eggs are formed in the

a. Testes
b. Penis
c. Ovary
d. None of these

6. The modes of reproduction in animals are

a. Only one type
b. Two types
c. Three types
d. Four types

7. A sperm consists of

a. Two parts
b. True parts
c. Three parts
d. Four parts

8. Foetus is the

a. Well developed embryo
b. Developing embryo
c. A zygote
d. Male gamete

9. Viviparous organisms are those which

a. Produce eggs
b. Produce young ones
c. Produce sometimes eggs or sometimes young ones
d. None of these

10. Cloning is a mode of

a. Sexual reproduction
b. Asexual reproduction
c. Both sexual and asexual reproduction
d. None of these

1. b	2. c	3. a	4. b	5. c	6. b	7. c	8. a	9. b	10. b

I. Fill in the blanks.

I. Fill in the blanks **(NCERT Exemplar)**

1. The fusion of male and female gametes is called _____reproduction.
2. The reproductive organs in male include_____, _____ and _____.
3. The fertilized egg is called _____.
4. External fertilization occurs in _____.
5. Animals that given birth to young ones are called _____.
6. Reproduction in which a single parent is involved is called _____ reproduction.
7. Amoeba is reproduced by _____.
8. _____ is the production of an exact copy of a cell any other living part or a complete organism.

1. sexual	2. testes, sperm duct, penis	3. zygote	4. frogs
5 viviparous	6. asexual	7. binary fission	8. clonnig

II. Fill in the blanks.

1. All living organisms have the power of _____.
2. There are two modes of reproduction : (i) _____ and (ii) _____.
3. Amoeba can be reproduced by the process of _____.
4. Snakes can reproduce by laying _____.
5. There are two types of fertilisation : (i) _____ and (ii) _____.
6. Testes are the main reproductive organs in _____.
7. Oviparous organisms are those which produce _____.
8. The fusion of male and female gametes to form zygote is called _____.
9. Human zygote is a single cell containing _____ number of chromosomes.

1. Reproduction	2. Sexual, asexual reproduction	3. Binary fission	4. Eggs	5. Internal, external fertilisation
6. Males	7. Eggs	8. Fertilisation	9. 46	

I. Match the following

I. Column A		Column B	
(i)	Yeast	(a)	Asexual Reproduction
(ii)	Ovary	(b)	Lays eggs
(iii)	Single parent	(c)	Budding
(iv)	Testes	(d)	Ovum
(v)	Oviparous	(e)	Sperm

(i). (c)	(ii). (d)	(iii) . (a)	(iv) . (e)	(v) . (b)

II. Column A		Column B	
(i)	Vegetative reproduction	(a)	Fertilisation
(ii)	Female gamete	(b)	Ovary
(iii)	Fusion of male and female gametes	(c)	Frog
(iv)	Main female reproductive organ	(d)	Asexual reproduction
(v)	External fertilisation	(e)	Eggs
		(f)	Zygote

(i). (d)	(ii). (e)	(iii) . (f)	(iv) . (b)	(v) . (c)

II. Match the following

II. Match the following.

Column I	Column II
1. Budding	i. Well developed embryo
2. Eggs	ii. Fertilized egg
3. Embryo	iii. Give birth to young ones
4. Foetus	iv. Ovary
5. Zygote	v. Embedded in wall of uterus
6. Oviparous	vi. Yeast

1. vi	2. iv	3. v	4. i	5. ii	6. iii

III. Match the following

Column I	Column II
a. Scrotum	i. Carries sperm to penis
b. Testes	ii. Receives Ova
c. uterus	iii. Holds testes
d. Ovary	iv. Carries sperm out of body
e. Penis	v. makes eggs
f. Oviduct	vi. Where the baby grows

a. iii	b. i	c. vi	d. v	e. iv	f. ii

I. True or False

1. External fertilisation can occur both in water and on land.
2. The eggs of fish are covered by scales or protection.
3. Human sperm has head, middle piece and tail.
4. In adult human females, a single mature egg is released into an oviduct every month.
5. A sperm is a unicellular body.
6. An egg cell is a single cell.
7. Ovary produces female gametes called eggs.
8. In human beings a single matured egg is released into the oviduct by one of the ovaries every month.
9. In fertilization, an egg cell comes from mother cell and sperm from father cell.
10. External fertilization also takes place outside female body.
11. Zygote is divided repeatedly and sticks to uterus.

1. False	2. False,	3. True	4. True	5. False	6. True
7. True	8. True	9. True	10. True	11. False	

II. True or False

1. Sperms are called female gametes.
2. Testes are male reproductive organs which produce sperms.
3. All living animals reproduce to produce new young ones.
4. Amoeba can reproduce by the process of budding.
5. Snake are oviparous because they produce eggs.
6. Earthworm can reproduce by the both sexual and asexual reproduction.
7. Cloning is a method of sexual reproduction.
8. Ovary is the main male reproductive organ.
9. After fertilisation zygote is formed.
10. Test tube babies are born by the IVF technique.

1. False	2. True	3. True	4. False	5. True	6. True	7. False	8. False	9. True	10.True

Quiz Time

1. Which process is essential for the continuation of a species?

2. Testes produce male germ cells. What are these cells called?

3. How many ovaries are there is a female body?

4. Expand IVF.

5. Write the name of mode of reproduction by which Dolly sheep is produced.

6. Which type of fertilisation takes place in human beings?

7. Name two organisms in which external fertilisation takes place.

8. In which part of female reproductive system, fertilisation in human takes place?

9. What is a well developed human embryo called?

10. In which type of fertilisation animals produce a large number of eggs and sperms?

Answers:

1. Reproduction
2. Sperms
3. Two ovaries (one pair)

4. In vitro fertilisation

5. Cloning (a mode of asexual reproduction)

6. Internal fertilisation

7. (i) Fish (ii) Frog

8. Fallopian tube

9. Foetus

10. External fertilisation

NCERT Corner

Intext Questions

1. Paheli wants to known the purpose of tail in sperms.

The sperms swim in the oviduct with the help of their tails to reach the egg.

2. Why animals which undergo external fertilization such as fish and frogs lay eggs in hundreds whereas a hen lays only one egg at a time?

Though these animals lay hundreds of eggs and release millions of sperms, all the eggs do not fertilize and develop into new individuals. This is because the eggs and sperms get exposed to water movement, wind and rainfall. These factors prevent the sperms from reaching the eggs. Thus, production of large number of eggs and sperms is necessary to ensure fertilization of at least of few of them.

3. How could a single cell become such a big individual?

Fertlization results in the formation of zygote, which begins to develop into an embryo.

Textbook questions

1. Explain the importance of reproduction.

Reproduction is very important as it ensures the continuation of similar kinds of individuals, generations after generation.

2. Describe the process of fertilisation in human beings.

The first step in the process of reproduction is the fusion of a sperm and an ovum. For this to happen, millions of sperms from the male are transferred into the female body. The

sperms swim in the oviduct with the help of their tails to reach the egg. When they come in contact with the egg, one of the sperms may fuse with the egg. Such fusion of the egg and the sperm is called fertilisation. During fertilisation, the nuclei of the sperm and the egg fuse to form a single nucleus. This results in the formation of a fertilized egg or zygote. The zygote is the beginning of a new individual. The zygote divides repeatedly to give rise to a ball of cells. The cells then begin to form groups that develop into different tissues and organs of the body. The developing structure is termed as embryo. The embryo continues to develop and forms foetus, which gives birth to the young one after development.

3. Choose the most appropriate answer :

(a) Internal fertilization occurs :

(i) in female body **(ii) outside female body**

(iii) in male body **(iv) outside male body**

Internal fertilization occurs in female body.

(b) A tadpole develops into an adult by the process of:

(i) fertilization **(ii) metamorphosis** **(iii) embedding** **(iv) budding**

Metamorphosis.

(c) The number of nuclei present in zygote is :

(i) None **(ii) One** **(iii) Two** **(iv) Four**

Only one nucleus is present in zygote.

4. Indicate whether the following sentences are True (T) or False (F) :

(i) Oviparous animals give birth to young ones.

(ii) Each sperm is a single cell.

(iii) External fertilization occurs in frog.

(iv) First cell of a new human individual is called a gamete.

(v) Egg laid after fertilization is made up of a single cell.

(vi) A zygote is formed as a result of fertilization.

(vii) Fertilization is necessary even in asexual reproduction.

(viii) Binary fission is a method of asexual reproduction.

(i) False,	(ii) True,	(iii) True,	(iv) False,	(v) False,
(vi) True,	(vii) False,	(viii) True,		

5. Give two differences between a zygote and a foetus.

During fertilization, the nuclei of the sperm and the egg fuse to form a single nucleus. This results in the formation of a fertilized egg or zygote. It is the beginning of a new individual. The stage of the embryo in which all the body parts are identifiable is called foetus, which gives birth to young one after development.

6. Define asexual reproduction. Describe the two methods of asexual reproduction in animals.

The type of reproduction in which only a single parent is involved is called asexual reproduction.

Types of Asexual reproduction :

(i) Budding **:** In this, new individuals develop from the buds of organism as in hydra.

(ii) Binary fission **:** In this, an animal reproduces by dividing into two individuals as in amoeba.

7. In which female reproductive organ does embedding of the embryo take place?

The embryo gets embedded in the wall of the uterus.

8. What is metamorphosis? Name some animals that undergo metamorphosis.

The drastic change which takes place during the development of an animal is called metamorphosis. Examples : Frogs, caterpillar, silkworm etc. undergo metamorphosis.

9. Differentiate between internal fertilization and external fertilization.

Fertilization which takes place inside the female body is called internal fertilization. Internal fertilization occurs in many animals including cows, dogs and hens. The type of fertilization in which the fusion of a male and a female gamete takes place outside the body of the female is called external fertilization. It is very common in aquatic animals such as fish, starfish, etc.

10. Complete the cross-word puzzle using the hints given below

Across :

(1) The process of the fusion of the gametes.

(6) The type of fertilization in hen.

(7) The term used for bulges observed on the sides of the body of hydra.

(8) Eggs are produced here.

Down :

(2) Sperms are produced in these male reproductive organs.

(3) Another term for the fertilized egg.

(4) These animals lay eggs.

(5) A type of fission in amoeba.

Across :

(1) Fertilization

(3) Zygote

(5) Binary

(7) Buds

Down :

(2) Testes

(4) Oviparous

(6) Internal

(8) Ovary

I. Very Short Answer Type Questions.

1. Name the processes which are essential for the survival of individuals.

Digestion, circulation, excretion and respiration.

2. What do you mean by reproduction?

The process which is essential for the continuation of species is called reproduction.

3. What are different modes of reproduction?

(i) Sexual reproduction

(ii) Asexual reproduction

4. Define the term sexual reproduction.

The process of reproduction in which fusion of male and female gametes takes place is called sexual reproduction.

5. What is male gamete?

The reproductive cell produced by male reproductive organs is called male gamete.

6. What is female gamete?

The reproductive cell produced by female reproductive organs is called female gamete.

7. Name the male gamete.

Sperm.

8. What is name of the reproductive organ which produces sperm?

A pair of testes.

9. Name the female gamete.

Ovum or egg cell.

10. Which organ produces the ovum?

A pair of ovaries.

11. What do you mean by fertilisation?

The process of fusion of male and female gametes to produce zygote is called fertilisation.

12. Name male reproductive organs.

A pair of testes, two sperm ducts and a penis.

13. Write the names of female reproductive organs.

A pair of ovaries, oviducts and uterus.

14. What is the other name of oviducts?

Fallopian tubes.

15. How many types of fertilisation are there?

There are two types of fertilisation:

(i) Internal fertilisation (ii) External fertilisation

16. What types of fertilisation takes place in humans?

Internal fertilisation.

17. What type of fertilisation takes place in frog?

External fertilisation.

18. Write full form of IVF.

In Vitro Fertilisation.

19. What are test-tube babies?

The babies born through IVF technique are called test-tube babies.

20. What is embryo?

The developing zygote having group of cells that develop into tissues and organs, is called embryo.

21. Where does development of embryo take place in the body of female?

The embryo develops in the uterus of female reproductive organ.

22. What is foetus?

The well developed embryo is called foetus.

23. Where does the development of embryo take place in those animals which undergo external fertilisation?

Outside the female body in open.

24. What are viviparous animals?

The animals which give birth to young ones are called viviparous animals.

25. What are oviparous animals?

The animals which lay eggs are called oviparous animals.

26. Give some examples of viviparous animals.

Cow, dog, cat and human beings.

27. Give some examples of oviparous animals.

Hen , lizards etc and all birds.

28. What do you understand by metamorphosis?

The transformation of larva into adult through drastic changes is called metamorphosis.

29. Do we also undergo metamorphosis?

No, we do not undergo metamorphosis.

30. Define the term asexual reproduction.

When only single parent is involved in reproduction, then it is called asexual reproduction.

31. Name the various methods of asexual reproduction in animals.

(i) by budding (ii) by fission

(iii) by regeneration (iv) by cloning

32. Write an animal's name in which asexual reproduction takes place by budding?

Yeast.

33. What type of reproduction takes place in amoeba?

Asexual reproduction by binary fission.

34. What is that process which is essential for the continuation of generation?

Reproduction.

35. What is the name of young one of human and hen?

Human – Baby

Hen – Chick

36. What is the Zygote?

The gametes fuse togather to form zygote.

37. How many ovaries are there in human female?

Two ovaries.

38. What is the function of tail of sperm?

The tail of sperm helps to move the sperm.

39. Which protects the eggs of frog or fish?

A layer of jelly holds the eggs and protects them.

40. What are buds?

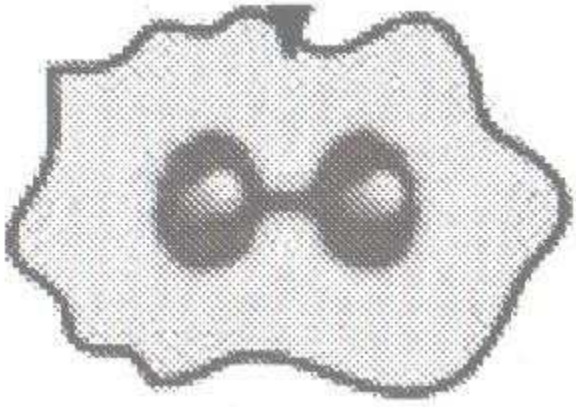
The bulges in the body of hydra are called buds.

II. Very Short Answer Type Questions.

1. The eggs of frogs do not have shells for protection, yet they are safe in water, how? (NCERT Exemplar)

Frog's eggs are without any external covering or shell but a layer of jelly-like coat holds the eggs together, thus providing them protection.

2. What does figure represent? (NCERT Exemplar)



The figure represents binary fission in Amoeba. The single celled Amoeba divides (both nucleus and cytoplasm) to form two daughter cells that develop into two independent Amoebae.

3. How can we say that fish exhibits external fertilisation?

Female fish lay eggs in water while male fish release their sperms in water. Sperms swim and reach the eggs of fish, randomly due to water currents.

4. What is the importance of reproduction? (NCERT Exemplar)

Reproduction is important for continuation of species generations after generation. It also helps in production of new individuals of same kind and transmission of certain characters from parents to offsprings.

5. Define fertilization.

The fusion of ovum and sperm is called fertilization.

6. Which babies are known as test-tube babies?

Babies born through test-tube technique are called test-tube babies.

7. What is meant by ovulation?

Release of ovum from ovary is called ovulation.

8. Write different stages in life cycle of frog.

Egg → Early tadpole → Late tadpole → Adult Frog

9. Write two types of asexual reproduction.

Budding, Binary Fission.

10. What is cloning?

Cloning is the production of an exact copy of a cell, any other living part or a complete organism.

11. Name the male sex hormone.

The male sex hormone is testosterone.

III. Very Short Answer Type Questions.

1. Although 2 Cells called gametes fuse, the product formed is a single cell called zygote. Justify.

During fertilization, only the nucleus of the sperm moves into the egg cell and fuses with the egg nucleus to form the zygote. The sperm degenerates.

2. Stages in the life cycle of silkworm are given below, write them in sequential order.

Pupa, silkworm, egg, silk moth

Egg, silkworm, pupa, silk moth

3. In markets, egg of birds are available but never eggs of dogs, why?

Dogs do not lay eggs.

5. Why do only male gametes have a tail?

Because they have to be motile and reach the non-motile female gamete.

I. Short Answer Type Questions.

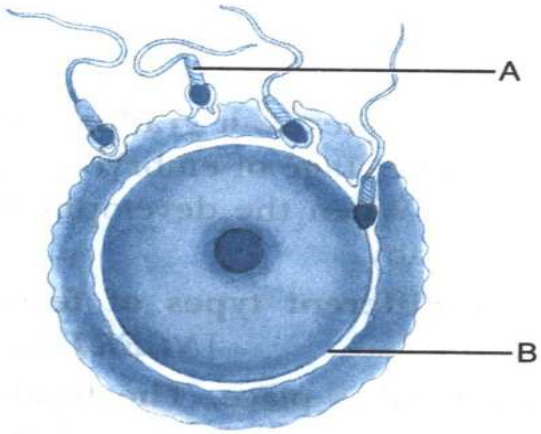
1. The term metamorphosis is not used while describing human development, why?

In human beings, body parts of an adult are present from the time of birth itself. Whereas, in metamorphosis, the parts of the adult are different from those at the time of birth.

2. Mother gives birth to a baby but the baby has characters of both parents. How is this possible?

Although mother gives birth to a child, fertilization involves two gametes, one from the mother and the other form father. They zygote, therefore has both father and mother's contribution. Since the zygote develops into the baby it has characters of both parents.

3. Observe the figure given below and answer the question that follow.



a. Label A and B.

b. Identify the process.

c. What happens

a. A- Sperm; B- Ovum (egg)

b. Fertilisation

c. Sperm nucleus fuses with the egg nucleus to form zygote.

4. How can we say that fish exhibits external fertilization?

Female fish releases egg into water and male fish releases sperms. Sperms swim randomly in water and comes in contact with the eggs. The nucleus of the sperm moves into the egg and fuses with it. Since fertilization occurs in water, outside the female body, it is external fertilization.

5. After observing above figure, answer the following.

a. Read the following statement and label them in the figure.

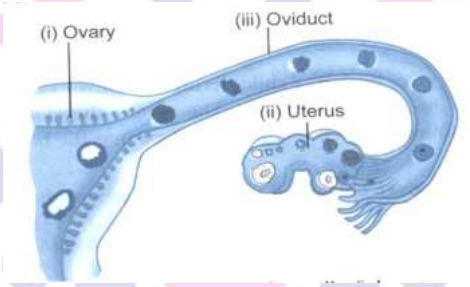
i. The part which produces female gametes.

ii. The part where development of the baby takes place.

iii. The part through which the developing embryo passes to reach the uterus.

b. Explain the future development of the embryo that would take place after in gets embedded in the uterus.

a.



b. After the embryo gets embebbed in the wall of the uterus, it gradually develops body parts such as hands, legs, head, eyes etc. the stage of embryo in which all the body parts can be identified is called foetus. When the development of the foetus is complete, the mother gives birth to the baby.

6. Hens and frogs are both oviparous exhibiting different types of fertilization.

Explain.

Hens are oviparous in which internal fertilization takes place. The fertilized egg develops into an embryo inside the body. However, the development of chick from the embryo takes place outside the body.

Frogs are oviparous in which both fertilization and development of zygote to embryo and young ones occurs outside the body.

II. Short Answer Type Questions.

1. What is reproduction? Explain its various modes.

The process by which organisms produce new offsprings of same species is called reproduction.

Modes of reproduction : There are following two modes of reproduction.

(i) Sexual reproduction: The method of reproduction in which two parents male, and female are involved is called reproduction.

(ii) Asexual reproduction: The method of reproduction in which only one parent (male or female) is involved is called asexual reproduction.

2. What are the male reproductive organs?

Male reproductive organs include a pair of testes, two sperm ducts and a penis. The testes produce the male gametes called sperm. Millions of sperms are produced by testes. The sperms are very small in size.

3. What is sperm? Explain its structure.

Sperm is a male reproductive cell. It is also called male gamete. There are mainly three parts of sperm: (i) Head, (ii) Middle piece and (iii) A long tail. Indeed each sperm is a single cell with all the usual cell components.

4. What are the female reproductive organs?

The female reproductive organs are a pair of ovaries, oviducts (fallopian tubes) and a uterus. The ovary produces female gametes called ova or eggs. In human beings only one matured egg is released into oviduct by one of the ovaries every month. The development of baby takes place in uterus.

5. What is ovum? Explain its structure.

The female reproductive cell is called egg or ovum (pl. Ova). It is produced by ovaries. Like sperm, ovum is also a single cell and contains nucleus and other usual components.

6. What do you understand about test-tube baby?

Some women are unable to bear babies because sperms cannot reach the egg for fertilisation. In such cases, doctors collect freshly released egg and sperm and keep them together for few hours for IVF or in vitro fertilisation. In case fertilisation occurs the zygote is allowed to develop for a week and then it is placed in the mother's uterus. Complete development takes place in the uterus and the baby is born like any other baby. Babies born through this technique are called test-tube babies.

7. Why is it necessary to produce large number of eggs and sperms by the animals which reproduce by external fertilisation?

The animals in which external fertilisation takes place produces a large number of eggs and sperms. This is because the eggs and sperms get exposed to water movement, wind and

rainfall. There are some other animals that may feed on eggs in the pond. Thus, production of large number of eggs and sperms is necessary to ensure fertilisation of at least a few of them.

8. How do chicks born from hens?

After fertilisation the zygote divides repeatedly and travels down the oviduct. As it travels down, many protective layers are formed around it. The hard shell on the hen's egg is one such protective layer. The hen finally lays egg. The embryo takes about three weeks to develop into a chick. After the chick is completely developed it bursts open the egg shell.

9. Explain the terms viviparous and oviparous with examples.

Viviparous : The animals which give birth to young ones are called viviparous animals. For example : cat, dog, cow and human beings.

Oviparous : The animals which lay eggs are called oviparous animals. In such animals development of embryo take place outside the female body. For example : All birds and reptiles.

10. Explain the life-cycle of silkworm in brief.

In silkworm, the young ones may look very different from the adults. We can write the life-cycle of a silkworm as follows;

Egg → Larva or caterpillar → Pupa → Adult

The caterpillar or pupa of silkworm looks very different from the adult moth.

11. Explain the life-cycle of a frog.

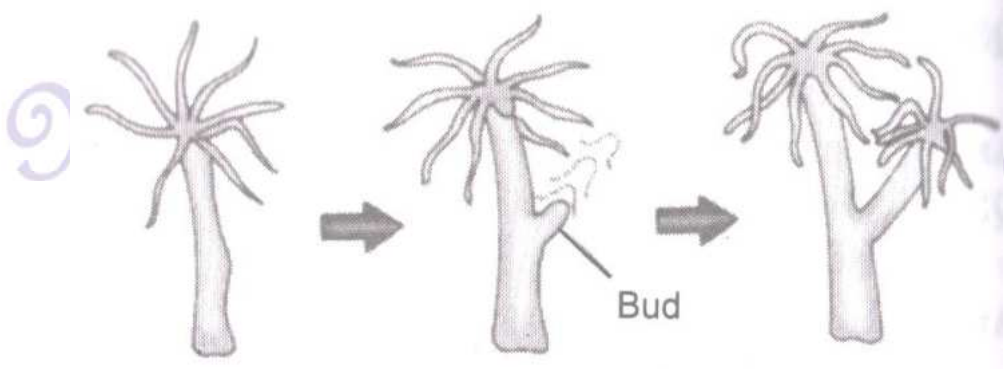
There are three main stages in the life-cycle of a frog;

(i) Egg (ii) Tadpole (larva) (iii) Adult

Tadpoles look different from the adults. After some time, these tadpoles are converted into adult frog.

12. Explain the asexual reproduction in hydra with diagram.

In hydra, reproduction takes place by budding. A part of the organism starts bulging out. Slowly it grows and develops into a separate individual.



13. What is asexual reproduction? Write various methods of asexual reproduction.

The type of reproduction in which only a single parent is involved is called asexual reproduction.

There are following methods of asexual reproduction;

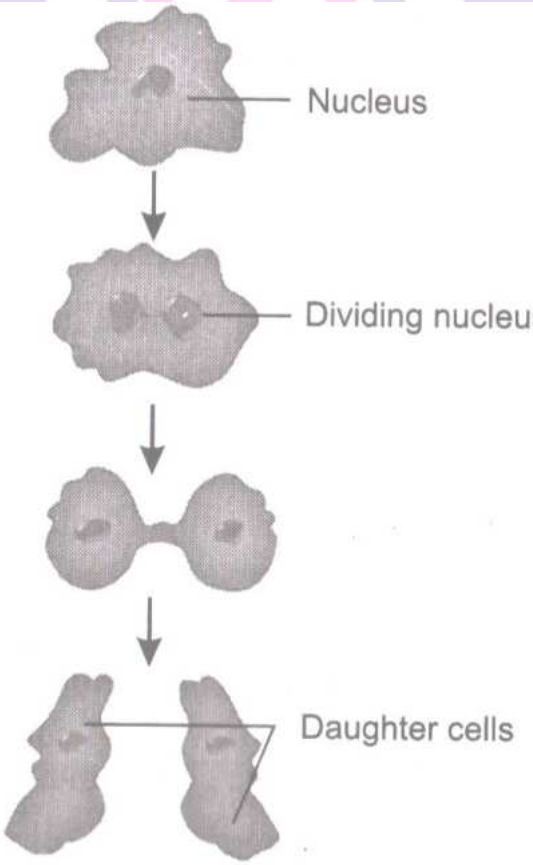
(i) By budding

(ii) By binary fission

(iii) By vegetative reproduction

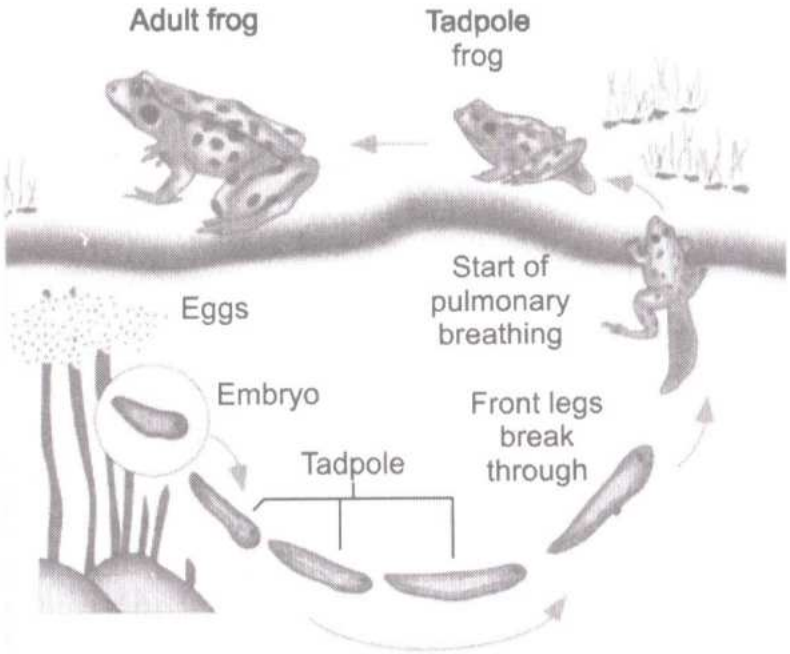
14. Explain the asexual reproduction in amoeba.

The reproduction in amoeba takes place by binary fission. In this process amoeba reproduces by dividing into two individuals. The nucleus of amoeba cell is divided into two. This is followed by division of its body into two, each part receiving a nucleus. Finally two amoebae are produced from one parent amoeba.



15. Explain Metamorphosis.

The transformation of larva into an adult through drastic changes is called metamorphosis. For example : the tadpole which develops from the eggs laid by the frog is entirely different from the frog. But when it grows, it becomes just like the frog. This drastic change in tadpoles called metamorphosis.



16. Explain the function of testes and ovaries.

Function of Testes : The testes are used to form sperms and to produce male hormone testosterone.

Function of Ovary : The ovary is used to form eggs and to produce female hormone estrogen.

17. What is binary fission?

It is a type of asexual reproduction. In this process the single celled organisms are reproduce by dividing of cell into two parts which developed into two individual. Such a type of reproduction is called binary fission.

III. Short Answer Type Questions-I

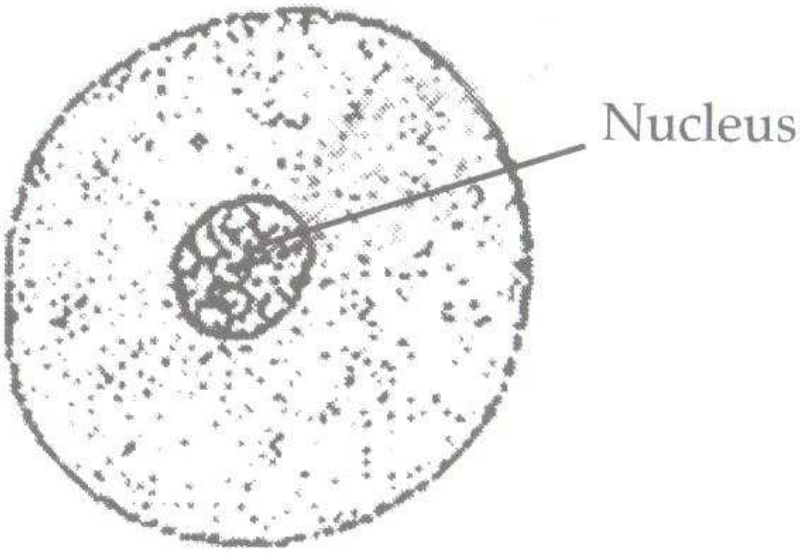
1. In markets, eggs of bird are available but never eggs of dogs, why? (NCERT Exemplar)

Birds are oviparous, lay eggs outside the female body, so their eggs are available in market, while dogs are viviparous, i.e., do not lay eggs but give birth to young ones.

2. How is reproduction in Hydra different from that in Amoeba? (NCERT Exemplar)

Both Hydra and Amoeba reproduce asexually involving only single parent but the modes are different. Hydra reproduces from bulges or buds arising from the parent body that grow and mature into another organism, while Amoeba reproduces by binary fission.

3. Draw a labelled diagram of human ovum. **(NCERT Exemplar)**



4. Amoeba reproduces by which process? Explain in brief.

Amoeba reproduces by asexual reproduction, binary fission. It begins the process of reproduction by the division of its nucleus into two nuclei. This is followed by division of its body into two, where each part receives a nucleus. Finally two amoebae are produced from one parent amoeba.

5. Write difference between viviparous and oviparous animals.

Difference between viviparous and oviparous :

Viviparous	Oviparous
The animals that give birth to young ones are called viviparous animals. e.g., Human beings, Cats, Dogs.	The animals that lay eggs are called oviparous animals. e.g., Frogs, fishes.

6. How is egg formed in the hen?

After fertilization, the zygote divides repeatedly and travels down the oviduct. As it travels down, many protective layers are formed around it. The hard shell is formed around the developing embryo. The hen finally lays the egg.

7. Write difference between internal fertilization and external fertilization.

Internal fertilization	External fertilization
Fertilization that takes place inside the female body is called internal fertilization. e.g., Human, Cats, Dogs,	Fertilization in which the fusion of a male and a female gamete takes place outside the body of the female is called external fertilization. e.g., fish, star fish etc.

8. What is IVF?

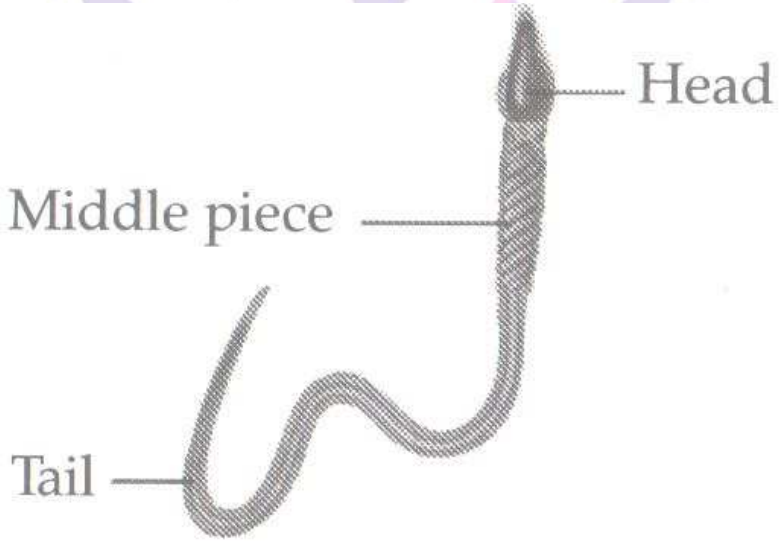
IVF is In-vitro fertilization. In such cases doctor collects freshly released egg and sperms and keeps them together for a few hours for fertilization. When fertilization occurs, the zygote is formed and allowed to develop for about a week and then, it is placed in the mother's uterus. Babies produced through this technique are called test-tube babies.

9. Explain the structure of male reproductive system in human beings.

Male reproductive system : The male reproductive organs include a pair of testes, two sperm ducts and a penis. The testes produce the male gametes called sperms. Millions of sperms are produced by the testes.

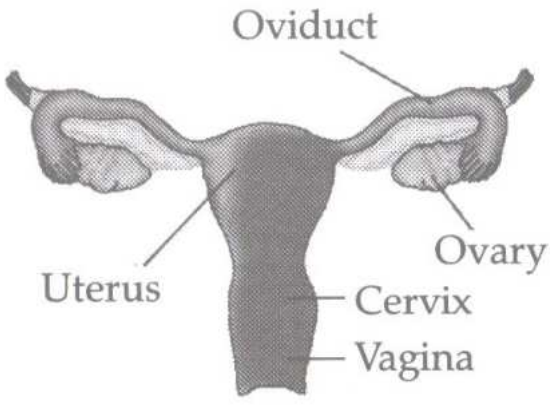
10. Draw a well labelled diagram of human sperm.

Human Sperm :



III. Short Answer Type Questions-II

1. Draw a labelled diagram of female reproductive organs.

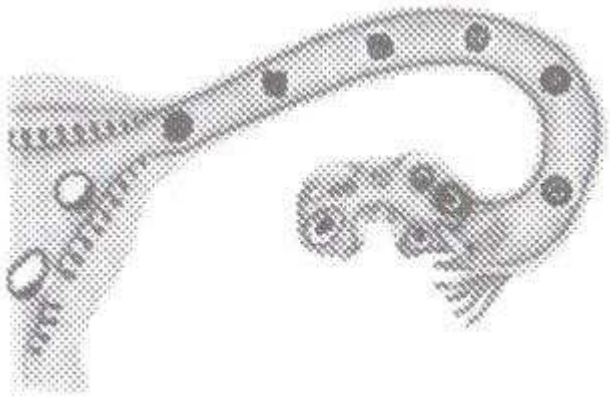


2. Why does the new individual inherit some characteristics from the mother and some from the father? (NCERT Exemplar)

The process of fertilization is the meeting of an egg cell from the mother and a sperm cell from the father. So the new individual inherits some characteristics from the mother and some from the father.

I. Long Answer Type Questions

1. After observing answer the following.



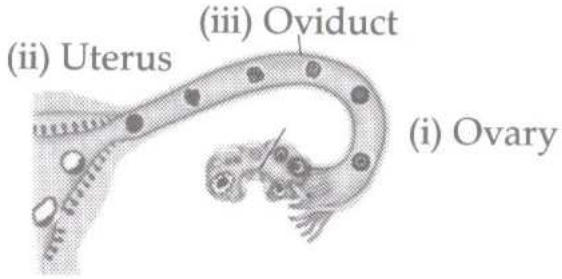
(i) Read the following statements and label them in the figure :

(a) The part which produces female gametes.

(b) The part where development of the baby takes place.

(c) The part through which the developing embryo passes to reach the uterus.

(ii) Explain the future development of the embryo that would take place after it gets embedded in the uterus.



(i) (a) Ovary (produces gametes)

(b) Uterus (development of body takes place)

(c) Oviduct (tube through which embryo reaches uterus)

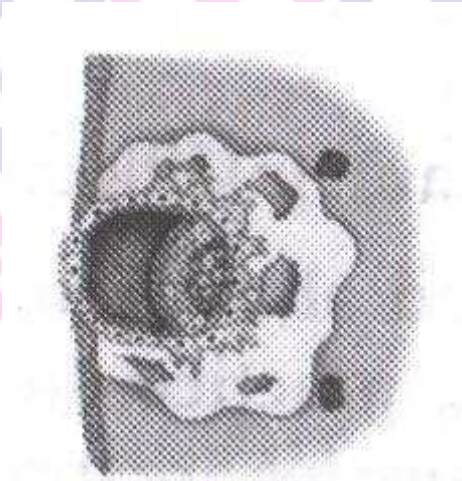
(ii) The embryo continues to develop after it gets embedded in the uterus. It divides and differentiates into three germ layers which give rise to different body parts such as hands, legs, head, eyes, ears etc. This stage where all the body parts are distinct and easily identified in developing embryo is called foetus. After completion of development of foetus, mother gives birth to baby.

2. Hens and frogs are both oviparous exhibiting different types of fertilisation, explain.

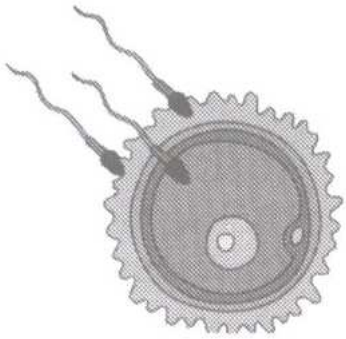
Hens lay eggs after fertilisation, therefore their eggs are covered with hard shell to protect the young ones. This shows that fertilisation in her is internal. The frogs on the other hand lay both sperms and eggs in water prior to fertilisation. Thus, the fertilisation in frog takes place in water, hence it is external.

3. Observe the following figures.

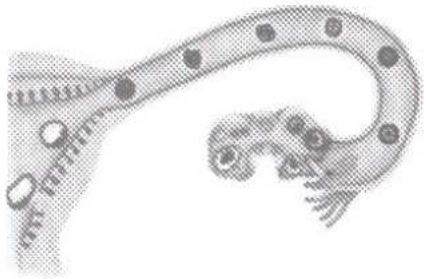
(a)



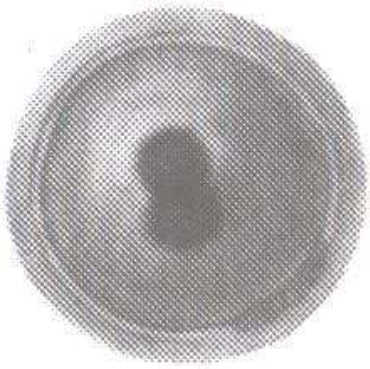
(b)



(c)



(d)



(i) Identify the stages a to d in figures during development of human baby.

(ii) Arrange the stages in correct sequence of development.

(iii) Explain the development that takes place in any one stage.

(i) The given figures showing stages during development of embryo are identified as :

(a) Embedding of the embryo in the uterus (implantation)

(b) Fertilisation (fusion of egg and sperm)

(c) Zygote formation and development of an embryo from the Zygote.

(d) Zygote (showing fusion of gametes) single celled.

(ii) The above stages in sequence are :

(a) Implantation of embryo in uterus. (d)

(b) Fertilisation (a)

(c) Development of embryo (c)

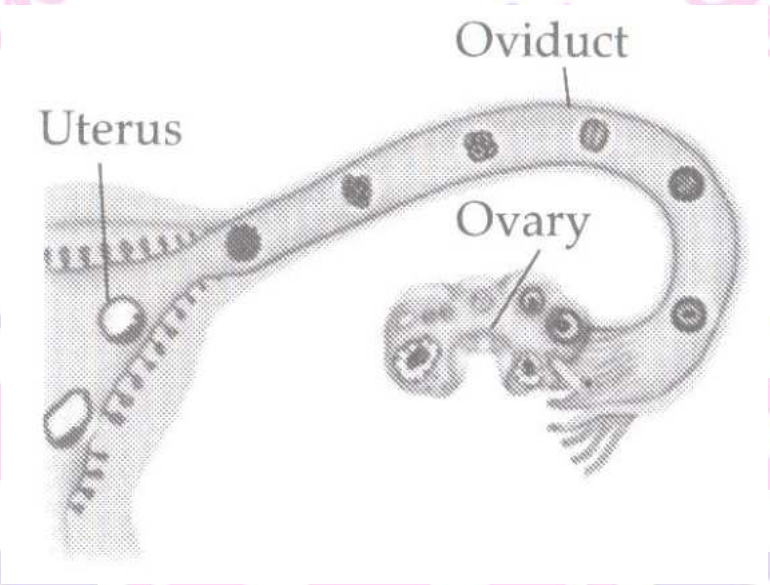
(d) Zygote formation (b)

(iii) The embryo after being implanted in uterus, continues to develop and divide and differentiate into body parts. This stage of embryo where body parts are distinct and

identified is called foetus. After the complete development of foetus, the mother gives birth to baby.

4. Explain the process of reproduction in human beings with suitable diagrams.

Reproduction in human beings : In humans, internal reproduction takes place. There are two sexes in human beings — male & female. Male reproductive parts include a pair of testes, two sperm ducts and a penis. The testes produce the sperms. The female reproductive organs are a pair of ovaries, oviduct and the uterus.



The ovary produces female gametes called ova. Fusion of the egg and the sperm is called fertilization. This results in the formation of a fertilized egg or zygote. Zygote begins to develop into an embryo. The zygote repeatedly gives rise to a ball of cells. The cells then begin to form groups and organs of the body which form embryo. The stage of the embryo in which all the body parts can be identified is called foetus. When the development of the foetus is complete, the mother gives birth to the baby.

5. What are clones? What are the various steps of this process? Explain with examples.

Cloning is the production of an exact copy of a cell any other living part, or a complete organism. Ian Wilmut and his colleagues at the Roslin Institute, Edinburgh, Scotland successfully cloned a sheep named Dolly.

Following steps were involved in cloning :

(i) A cell was collected from the mammary gland of a female sheep.

(ii) An egg was obtained from a Scottish blackface and its nucleus was removed.

(iii) The nucleus from the mammary gland cell of Dorset sheep was introduced in the egg.

(iv) This egg was then implanted in the uterus.

II. Long Answer Type Questions

1. What do you mean by reproduction? Explain various modes of reproduction.

The process of producing young ones of the same species is known as reproduction. It is very important process. It helps in the continuation of a species on the earth.

Modes of Reproduction: There are following modes of reproduction;

(i) Sexual reproduction

(ii) Asexual reproduction

(i) Sexual Reproduction : The process of reproduction in which two parents (male and female) are involved is called sexual reproduction. In this process male produces male gametes and female produces female gametes. Both the gametes are fused to form zygote. The zygote develops into baby. **Example :** cow, cat, dog and human beings.

(**ii) Asexual Reproduction :** The mode of reproduction in which only one parent is involved to produce new young ones is called asexual reproduction. Budding, fragmentation spore formation and binary fission are the methods of asexual reproduction like in hydra, amoeba and bacteria etc.

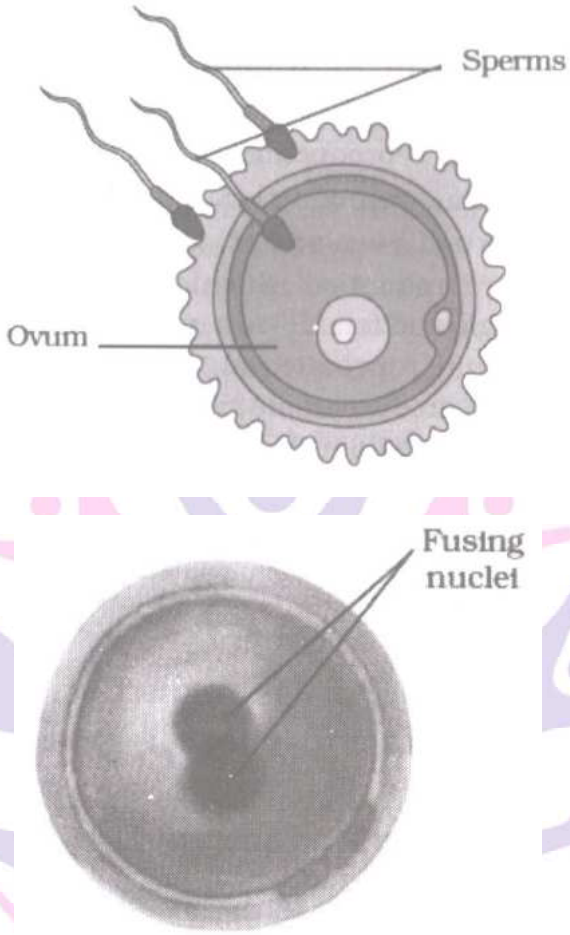
2. What is fertilisation? Explain various types of fertilisation.

When sperms come in contact of an egg, one of the sperms may fuse with the egg. Such type of fusion of sperm and egg is called fertilisation. In this process formation of zygote takes place. There are following two types of fertilisation;

(i) Internal fertilisation **(ii) External fertilisation**

(i) Internal Fertilisation : The fertilisation in which fusion of egg and sperm takes place inside the body of female is called internal fertilisation. Internal fertilisation takes place in many animals like , cow, dogs, hens and human beings.

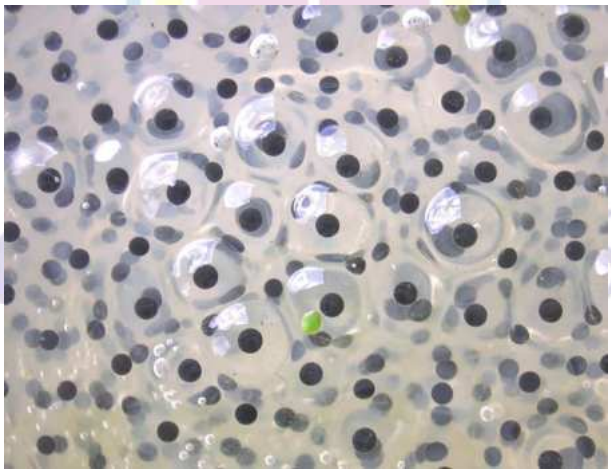
(ii) External Fertilisation : The fertilisation in which fusion of egg and sperm takes place outside the body of female is called external fertilisation. It is very common in aquatic animals like fish, frog and starfish etc.



3. Explain the fertilisation in frog.

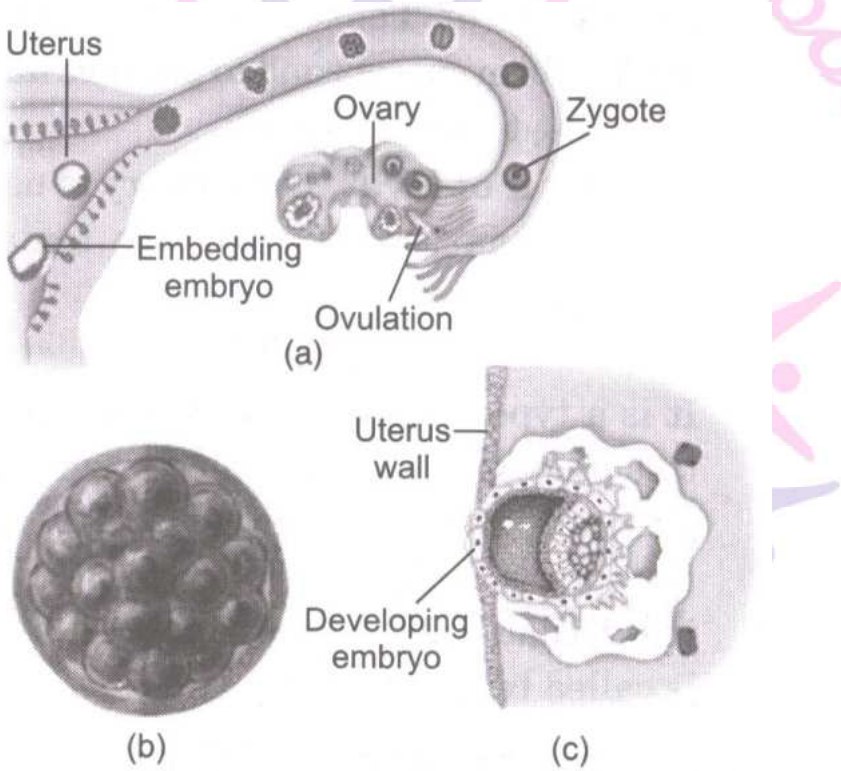
In frogs external, fertilisation takes place. During rainy season frogs move to ponds and slow-flowing streams. When the male and female frog come together in water, the female lays hundreds of eggs. The eggs of frog are not covered by a shell and they are comparatively very delicate. A layer of jelly holds the eggs together and provides protection to the eggs.

As the eggs are laid, the male deposits sperms over them. Each sperm swims randomly in water with the help of its tail. The sperms come in contact with eggs and fuse together. This results in fertilisation.



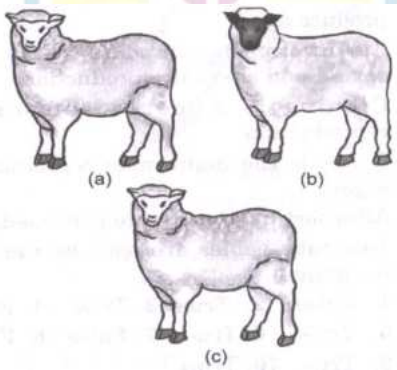
4. Explain the development of embryo.

Fertilisation results in the formation of zygote which begins to develop into an embryo. The zygote divides repeatedly to give rise to a ball of cells. The cells then begin to form groups that develop into different tissues and organs of the body. This developing structure is termed as embryo. This embryo gets embedded in the wall of the uterus for further development. The embryo continues to develop in the uterus. It gradually develops body parts such as hands, legs, head, eyes and ears etc. This stage is called foetus. Mother gives birth to the baby when foetus developed completely.



5. Explain the formation of clone Dolly.

Cloning is the production of an exact copy of a cell, a part or complete body. Dolly was the first clone born on 5th July 1996 and was the first mammal to be cloned. It is cloned by Ian Wilmut and his colleagues. During the process of cloning Dolly, a cell was collected from the mammary gland of female Finn Dorsett sheep.



Simultaneously, an egg was obtained form a Scottish blackface ewe. The nucleus was removed from the egg, then the nucleus of mammary gland cell from the Finn Dorsett sheep was inserted into egg of Scottish blackface ewe. Development of this egg followed normally and finally Dolly was born. It was found to be absolutely identical to the Fin Dorsett sheep and produced several offspring of her own through normal sexual means. Dolly died on 14th February 2003 due to a certain lung disease.

6. What are Sexually Transmitted Diseases? How can they be prevented?

The diseases spread only by sexual contact are called sexually transmitted diseases (STDs). When a healthy person contacts sexually to a person which is infected, then the microorganisms are transmitted from infected person to the healthy person and that becomes infected. Syphilis, gonorrhoea, herpes and AIDS are some sexually transmitted diseases. Herpes and AIDS are not curable diseases. These are fatal diseases, which destroy the immune system of the patient. Sexual hygiene and safe sexual relationship are the only way to prevent sexually transmitted diseases.

I. High Order Thinking Skills (HOTS) Questions

1. An organism has both male and female reproductive organs. Is it possible? If yes, name such organism.

Yes, there are organisms that have both male and female reproductive organs in the same body e.g., earthworm, leech.

2. X is the reproductive cell produced in a woman's Y while Z is the reproductive cell that is produced in the testes of a man. What can X, Y and Z be?

Egg is the reproductive cell produced in a woman's ovary while sperm is the reproductive cell that is produced in the testes of a man.

3. The change from tadpole to frog is given a particular term. What is it?

Metamorphosis is the term used for the change from tadpole to frog.

4. Hen is an oviparous animal. What type fertilisation takes place in a hen?

Internal fertilization takes place in a hen.

5. 'Sperms need to have mobility'. Give reason.

Sperms have to enter the female reproductive passage and fertilise the ovum by travelling through the vagina and uterus to reach the fallopian tube. This is the reason why sperms need to have mobility.

6. Can a women with a blocked fallopian tube give birth to a baby? How?

A woman with a blocked fallopian tube cannot produce babies in normal way because the eggs released by her ovary cannot meet the sperms and get fertilised in the oviducts. But such women can have babies by using 'invitro fertilization' technique.

7. A single cell becomes such a big individual. How?

The zygote become of cell after cell division and of forms embryo. The embryo gets embedded in the wall of uterus and starts developing till it is grown into fully developed baby inside the female body and grows through mitosis an individual.

II. High Order Thinking Skills (HOTS) Questions

1. Why do fishes and frogs produce enormous number of gametes?

Fishes and frogs fertilise externally producing enormous number of gametes because some eggs may be lost due to environmental agents like flowing water. Wind, etc. and this increases the chances of fertilization.

Value Based Questions.

1. Sumitra saw a bird protecting her eggs in a nest in the balcony of her house. After few days, she saw the little birds coming out of the eggs. She wondered if humans are also born this way. Her mother explained the difference.

(i) Is there a difference between birth of a baby, in case of a bird and a human?

(ii) Name few animals who lay eggs like the bird.

(iii) Identify the values displayed by Sumitra.

(i) Yes, there is a difference because bird lays eggs from which its young ones hatch out whereas human gives birth to a baby directly.

(ii) Hen, frog, snake and lizards are few animals that lay eggs.

(iii) Sumitra is observant, intelligent and curious.

2. We hear and read about female foeticide, which is really a wrong practice. In some families, be it rural or urban, females are tortured for giving birth to a girl child. They do not seem to understand the scientific reason behind the birth of a boy or a girl. In your opinion, is the approach of the society towards mother in this regards correct or not?

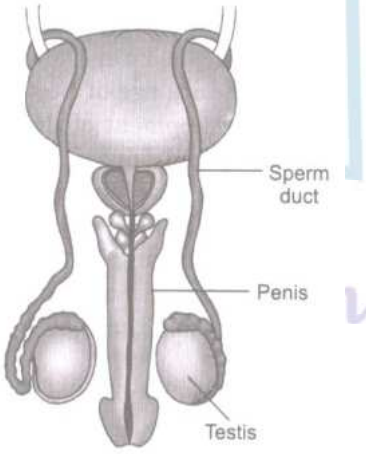
In rural and uneducated families till today in India female foeticide is a common practice. The females are blamed for giving birth to female or girl child. But as per truth and scientific reason the sex of the child is determined by the male as they have XY chromosomes and female body has XX chromosome. If male produces X chromosome the born child will be female and if they produce Y chromosome male child will be born. Hence, we must educate the citizens regarding this through lectures, campaigns etc.

3. The test-tube babies are called so as they grow inside a test-tube. Give your opinion.

The babies born through IVF technique are called test-tube babies because the fertilisation takes place in a glass test tube. This is however, a misleading name as a very brief period is spent in a test tube. After that, the entire growth and development of the baby takes place inside the uterus of the woman as in normal pregnancy.

Skill Based Questions.

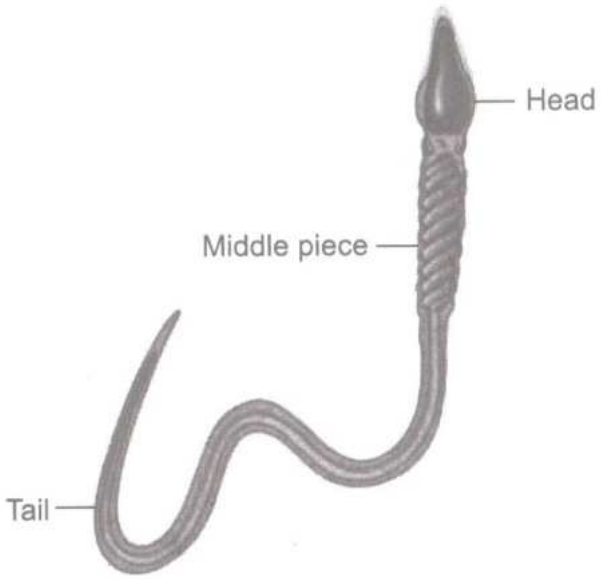
1. Draw a diagram of human male reproductive organs and label sperm duct, penis and testis on it.



2. (i) Draw a diagram of human sperm and label head, middle piece and tail on it.

(ii) What is the function of tail?

(i)

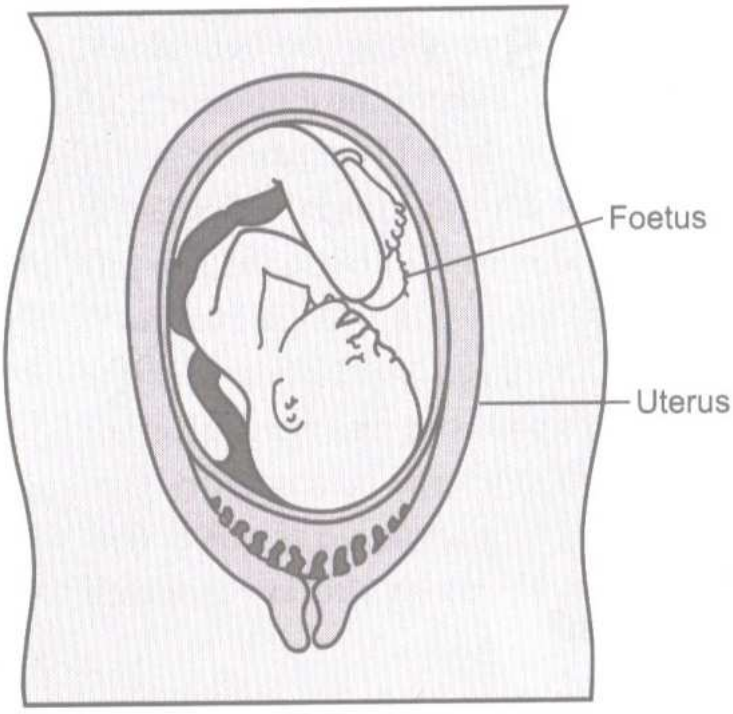


(ii) The tail of the sperm helps in swimming of sperm in the liquid medium.

3. Identify the following diagram and answer the following questions.

(i) Where does the embryo develop in human body?

(ii) How many days an embryo take to develop into a fully complete foetus.

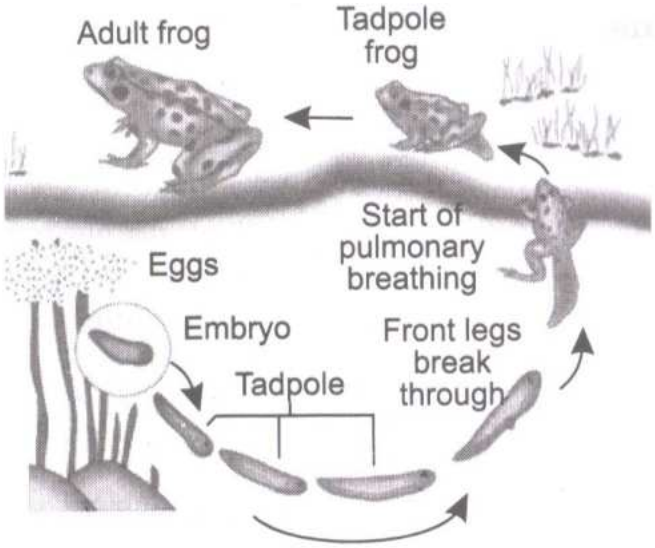


The diagram shows the development of foetus from embryo.

(i) The embryo develops in uterus of human female body.

(ii) The embryo takes about 270 to 280 days to develop into fully complete foetus.

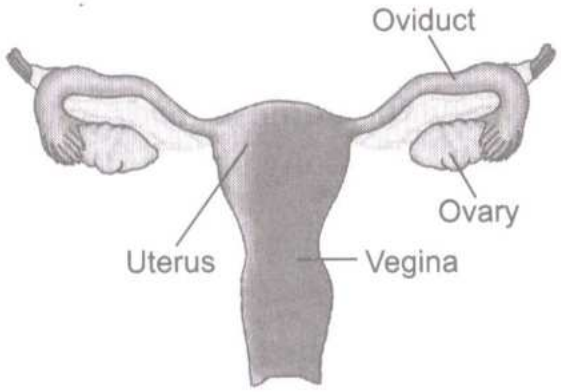
4. Draw a diagram to show life-cycle of a frog from egg to adult frog.



5. (i) Draw a labelled diagram of human female reproductive organs.

(ii) Where does the fertilisation take place?

(iii) Name the structure formed after fertilisation.

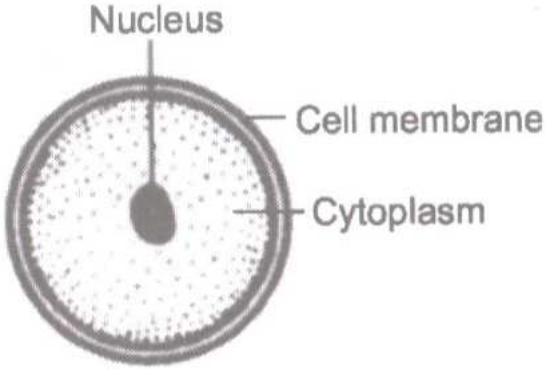


(ii) The fertilisation takes place in fallopian tube of female reproductive system.

(iii) Zygote is formed.

6. (i) Draw a diagram of human egg and show nucleus in it.

(ii) Which organ produces egg?



(ii) Ovary produces egg.

7. Draw a diagram of fertilisation to form zygote.