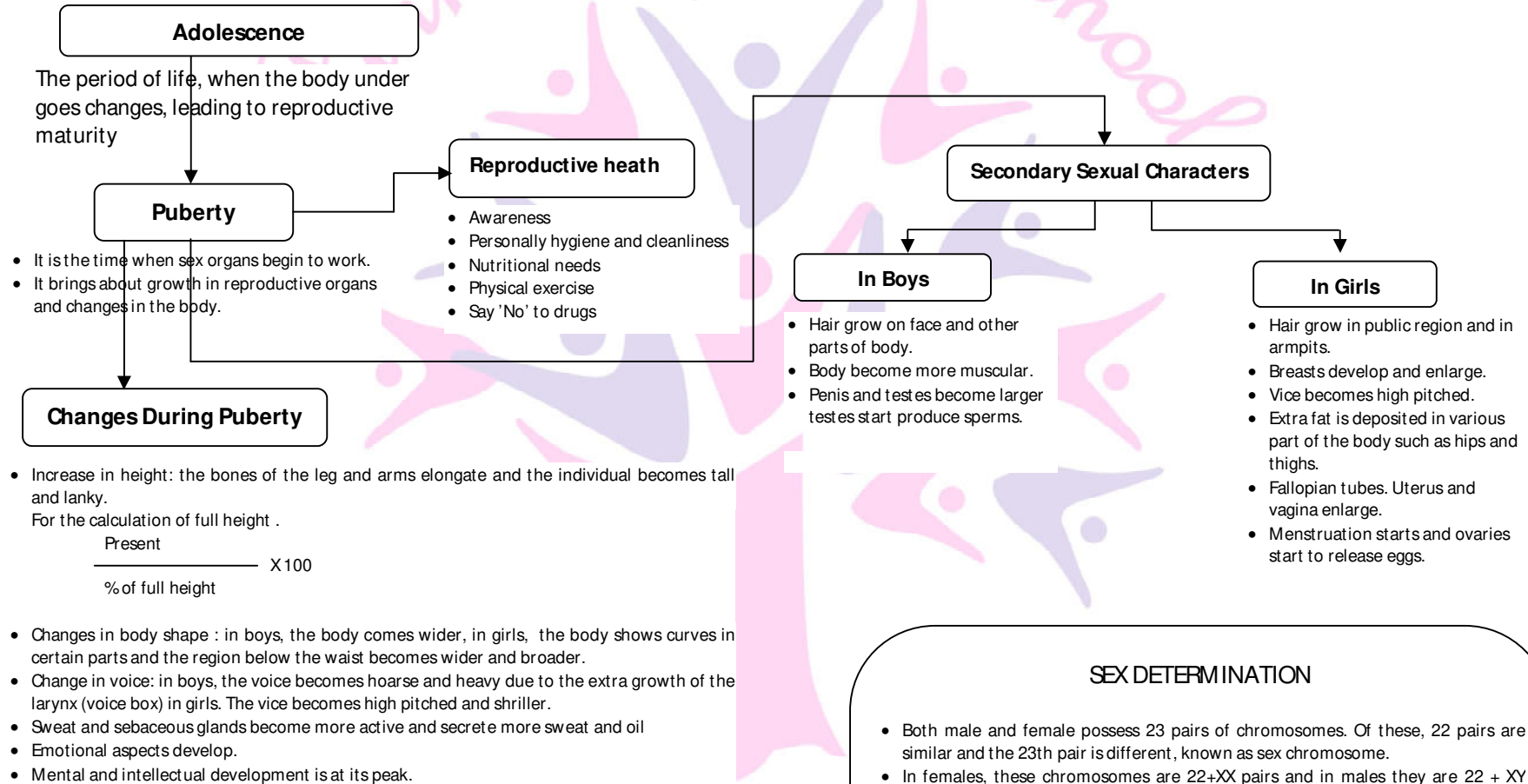


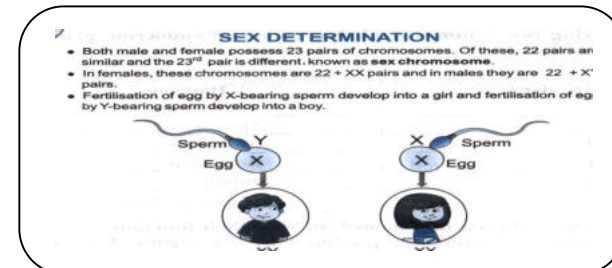
## Lesson 10. Adolescence

### Basic concepts – A Flow Chart



### SEX DETERMINATION

- Both male and female possess 23 pairs of chromosomes. Of these, 22 pairs are similar and the 23rd pair is different, known as sex chromosome.
- In females, these chromosomes are 22+XX pairs and in males they are 22 + X' pairs.
- Fertilisation of egg by X-bearing sperm develop into a girl and fertilization of egg by Y-bearing sperm develop into a boy.





## Know the Terms

- **Adolescence** : The period of life, when the body undergoes changes, leading to reproductive maturity is known as adolescence.
- **Target Site** : The hormones reach through blood into particular body part. These body parts are called target site.

## Objective Type Questions

(1 Marks)

### I. Multiple Choice Questions

1. The belief that the mother is completely responsible for the sex of the child is wrong because the child : (NCERT Exemplar)
  - a. Gets sex chromosome only from the mother
  - b. Develops in the body of the mother
  - c. Gets one sex chromosome from the mother and the other from the father
  - d. Gets sex chromosome only from the father
2. AIDS can spread from an infected person to another person through : (NCERT Exemplar)
  - a. Sharing food
  - b. Sharing comb
  - c. Blood transfusion
  - d. A mosquito bite
3. Given below are events that lead to pregnancy and development of embryo : (NCERT Exemplar)
  - (i) Fertilization of egg
  - (ii) Maturation of egg
  - (iii) Release of egg
  - (iv) Embedding of embryo in thickened uterine wall.

Which of the following options gives the correct order of sequence in which they occur ? (NCERT Exemplar)

  - a. i , ii , iii , iv
  - b. ii , i , iii , iv
  - c. i , iv , ii , iii
  - d. ii , iii , i , iv



4. For the metamorphosis of tadpoles which of the following elements must be available in water? **(NCERT Exemplar)**
- a. Chlorine
  - b. Carbon
  - c. Sulphur
  - d. Iodine
5. The most conspicuous change that occurs in boys during puberty is: **(NCERT Exemplar)**
- a. Development in voice box
  - b. Increase in height
  - c. Production of sperms
  - d. Increased sweating
6. Structure present in a cell which is responsible for determination of the sex of a baby is **(NCERT Exemplar)**
- a. Cytoplasm
  - b. Cell membrane
  - c. Nucleus
  - d. Chromosome
7. The right meal for adolescents consists of : **(NCERT Exemplar)**
- a. Chips, noodles etc
  - b. Chapati, dal, vegetables
  - c. Rice, noodles, burger
  - d. Vegetable, cutlet, puri, cold drink
8. Reproductive age in women starts when : **(NCERT Exemplar)**
- a. Menstruation starts
  - b. Breasts start developing
  - c. Body weight increases
  - d. All of the above
9. Protruding part of the throat in a boy is called : **(NCERT Exemplar)**
- a. Voice box
  - b. Larynx
  - c. Adam's Apple
  - d. All of these
10. Secondary sexual character not present in male : **(NCERT Exemplar)**
- a. Growth of facial hair
  - b. Hair grows under the arms
  - c. Hair grows in the region above thighs
  - d. Development of breasts
11. Reproductive phase in females is from the age of : **(NCERT Exemplar)**
- a. 10 – 12 years to 45 – 50 years
  - b. 18 – 21 years to 30 – 35 years
  - c. 21 – 23 years to 40 – 45 years
  - d. 25 – 30 years to 40 – 45 years
12. Sex chromosomes in a female body are: **(NCERT Exemplar)**
- a. X
  - b. Y
  - c. XX
  - d. YY
13. Adrenaline is produced by the
- a. Pancreas
  - b. Thyroid gland
  - c. Adrenal gland
  - d. All of these

1. c	2. b	3. d	4. d	5. b
6. d	7. b	8. a	9. c	10. d
11. a	12. c	13. c		

## II. Multiple Choice Questions

- Larynx is called
  - Voice Box
  - Music Box
  - Respiratory organ
  - None of these
- The egg is
  - Male gamete
  - Female gamete
  - Both of these
  - None of these
- Thyroxine is produced by
  - Pituitary gland
  - Adrenal gland
  - Thyroid gland
  - Testes
- There are \_\_\_\_\_ pairs of chromosomes in human cell.
  - 23
  - 46
  - 22
  - All are wrong
- Initially girls grow \_\_\_\_\_ than boys.
  - Faster
  - Slower
  - Both of these
  - None of these
- The period of maturity of reproductive organs is called
  - Adolescence period
  - Menstruation
  - Gestation period
  - None of these
- Fertilisation is
  - To produce sperms
  - To produce eggs
  - Fusion of sperms and eggs
  - All of these
- Puberty age in females is
  - 10 to 12 years
  - 12 to 14 years
  - 8 to 10 years
  - More than 14 years
- The stoppage of menstruation is called
  - Menarche
  - Menopause
  - Puberty
  - Adolescence



10. The male hormone is

a. Estrogen

b. Progesterone

c. Testosterone

d. All of these

1. a	2. b	3. c	4. a	5. a	6. a	7. c	8. a	9. b	10. c
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### I. Fill in the blanks

1. In females, the uterine wall thickens to receive the \_\_\_\_\_.
2. Endocrine glands release hormones directly into \_\_\_\_\_ for transportation to the \_\_\_\_\_.
3. The sex hormone regulate \_\_\_\_\_ characters.
4. Release of sex hormones is under the control of a hormone secreted from the \_\_\_\_\_.
5. The meal that includes all \_\_\_\_\_ is a balanced diet.
6. Insufficient production of \_\_\_\_\_ in the tadpoles leads to their incomplete development.
7. Endocrine glands are also called \_\_\_\_\_ glands.
8. After attaining puberty boys develop a \_\_\_\_\_ voice.
9. Voice of boys become \_\_\_\_\_ as the voice box enlarges during adolescence.
10. \_\_\_\_\_ glands release hormones directly into blood stream.
11. \_\_\_\_\_ is male hormone and \_\_\_\_\_ is the female hormone.
12. The first menstruation flow begins at puberty and is termed as \_\_\_\_\_.
13. Menstrual cycle is controlled by \_\_\_\_\_.
14. Chromosomes which determine the sex of unborn child are called \_\_\_\_\_.

1. Fertilised egg	2. Stream, target site	3. testosterone, sexual	4. Pituitary gland	5. Nutrients
6. Thyroxine	7. Ductless	8. Deep	9. Hoarse	10. Endocrine
11. Testosterone, estrogen	12. Menarche	13. Hormones	14. Sex chromosomes	

## II. Fill in the blanks

1. Voice box is also called \_\_\_\_\_.
2. Initially girls grow \_\_\_\_\_ than the boys.
3. Testosterone is the \_\_\_\_\_ hormone and estrogen is \_\_\_\_\_.
4. Male contains XY chromosome while female contains \_\_\_\_\_.
5. Growth hormone is produced by the \_\_\_\_\_ gland.
6. Testes produce \_\_\_\_\_ hormone.
7. There are \_\_\_\_\_ pairs of chromosomes in human cell.
8. One should eat a \_\_\_\_\_ diet.
9. The chemical substances which are produced by endocrine glands are called \_\_\_\_\_.
10. Out of 23 pairs \_\_\_\_\_ pair of chromosomes is called sex chromosomes.

1. Larynx	2. Faster	3. Male, female	4. XX chromosomes	5. Pituitary
6. Testosterone	7. 23	8. Balanced	9. Hormones	10. One

## I. Match the following

I. Column A		Column B	
(i)	Larynx	(a)	Male hormone
(ii)	Adam's apple	(b)	Pituitary
(iii)	Testosterone	(c)	Stoppage of menstruation
(iv)	Growth hormone	(d)	Voice box
(v)	Menopause	(e)	Boys

(i) . (d)	(ii) . (e)	(iii) . (a)	(iv) . (b)	(v) . (c)
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II . Column A		Column B	
(i)	Puberty age in females	(a)	Estrogen
(ii)	Number of chromosomes	(b)	11 to 18 years
(iii)	X type or Y type of chromosomes	(c)	Diabetes
(iv)	Female hormone	(d)	10 to 12 years
(v)	Age of adolescence	(e)	23 pairs
(vi)	Less secretion of insulin	(f)	Sperms

(i) . (d)	(ii) . (e)	(iii) . (f)	(iv) . (a)	(v) . (b)	(vi) . (c)
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### II . Match the following

1. Match the hormones given in Column with their deficiency disease given in Column B.

Column A		Column B	
(i)	Thyroxine	(a)	Salt imbalance
(ii)	Growth hormone	(b)	Diabetes
(iii)	Insulin	(c)	Goitre
(iv)	Adrenal hormone	(d)	Dwarfism

(i). (c)	(ii). (d)	(iii) . (b)	(iv) . (a)
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2. Match the columns.

Column A		Column B	
(i)	Adrenaline	(a)	Diabetes
(ii)	Balance of diet	(b)	Master Gland
(iii)	Estrogen	(c)	Adjust stress
(iv)	Insulin	(d)	Marked changes during adolescence
(v)	Pituitary gland	(e)	X and Y
(vi)	Puberty	(f)	Female hormone
(vii)	Target site	(g)	During adolescence
(viii)	Sex chromosomes	(h)	Particular body part or cell

(i). (c)	(ii). (g)	(iii) . (f)	(iv) . (a)	(v) . (b)	(vi) . (d)	(vii) . (h)	(viii) . (e)
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### I. True or False

1. Drugs should always be taken on the prescription of doctor.
2. Junk food is a healthy diet during adolescence.
3. Adolescence is a stage of slow growth and development.
4. Diabetes is caused by imbalance of insulin.
5. Males have XX chromosomes whereas females have XY chromosomes.
6. Females are responsible for the sex determination of a child.
7. The first menstruation flow is termed as menopause.

1. True	2. False	3. False	4. True	5. False	6. False	7. false
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### II. True or False

1. Stomach is called voice box.
2. Boys have enlarged and well developed Adam's apple.
3. The chemicals secreted by endocrine glands are called enzymes.
4. Insulin is the hormone which is produced by pituitary gland.
5. There are 23 pairs of chromosomes in the nuclei of human cell.
6. Diabetes is caused by less secretion of insulin by pancreas.
7. Estrogen is male hormone.
8. The puberty age in females is 14 to 16 years.
9. Some sperms have X type and some have Y type chromosomes.
10. Out of 23 pairs of chromosomes only two pairs are called sex chromosomes.

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

1. What is the age called at which reproductive organs are matured?
2. Is the puberty age of a male and a female same?
3. What is the specific name of voice box?
4. What is protruding part of the throat in boys called?





5. Do girls also have Adam's apple?
6. How many pairs in human chromosomes called sex chromosomes?
7. How many types of sperms are there on the basis of sex chromosomes?
8. Who is responsible for sex determination of a child father or mother?
9. Which gland is responsible for the growth in human?
10. Which virus is causative organism of AIDS?

**Answer :**

1. Puberty age
2. No, it is not same
3. Larynx
4. Adam's apple
5. No
6. One pair
7. Two types-sperms with X chromosomes and sperms with Y chromosomes
8. Sex chromosomes of father
9. Pituitary gland
10. HIV virus

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**NCERT Corner**

**Intext Questions**

1. Boojho wondered what kind of changes in the body make a person capable of reproduction.

At puberty, male sex organs like the testes and penis develop completely. The testes also begin to produce sperms. In girls, the ovaries enlarge and eggs begin to mature. Also ovaries start releasing matured eggs.

2. Boojho began wondering how long this period marked by changes in the body would last.

Adolescence begins around the age of 11 and lasts upto 18 or 19 years of age.



- 3. Paheli, on the other hand, was worried about this period of life when you are neither a child nor an adult. She wondered whether this period between childhood and adulthood had a special name.**

The period of life, when the body undergoes changes, leading to reproductive maturity is called adolescence.

- 4. Paheli and Boojho realised that sudden increase in height and hairy line above the lips in boys were signs of adolescence. They wanted to know about other changes at puberty.**

- (a) Increase in height
- (b) Change in body shape
- (c) Voice change
- (d) Increased activity of sweat and sebaceous glands
- (e) Reaching mental, intellectual and emotional maturity
- (f) Development of sex organs

- 5. Boojho said many of my classmates have a hoarse voice. Why?**

In adolescent boys, sometimes the muscles of the growing voice box go out of control and the voice becomes hoarse.

- 6. Paheli says that the reproductive life of a woman lasts from menarche to menopause.**

**Is she right?**

Yes, she is right.

- 7. Paheli was wondering how an infant grows healthily on only mother's milk!**

Milk is a balanced food in itself. So, infant grows healthy on only mother's milk.

- 8. What makes the fertilized egg develop either into a boy or a girl?**

Sex of a baby is determined by the chromosomes which it receives from the male. Males have two types of gametes one with X-chromosome and other with Y-chromosome. If a sperm (gamete) with X-chromosome fertilizes the egg, the zygote would develop into female and if a sperm with Y-chromosome fertilizes the egg, the zygote would develop into male.

- 9. Are there hormones in other animal also? Have they any role to play in reproduction?**

Yes, animals also have hormones. In animals like frogs, thyroxine hormone has also role to play in reproduction as it controls metamorphosis i.e., conversion of larva into adult.

## Textbook Questions

**1. What is the term used for secretions of endocrine glands responsible for changes taking place in the body?**

Hormones are the secretions of endocrine glands responsible for changes taking place in the body.

**2. Define adolescence.**

Adolescence is the period of life, in which organisms become reproductively active. In other words, it is the period of attaining reproductive maturity in boys and girls, which starts from 11 to 13 years and lasts upto 18 to 19 years of age in humans.

**3. What is menstruation? Explain.**

Menstruation is the monthly reproductive cycle that occurs in women once in about 28 to 30 days. It is the release of unfertilised egg along with blood. If the egg released from ovary does not get fertilised, the released egg, and the thickened lining of uterus along with its blood releases off from body.

**4. List changes in the body that take place at puberty.**

At puberty, the body undergoes following changes :

- (i) Boys and girls become capable of reproduction.
- (ii) Sudden increase in height.
- (iii) Broad shoulders and wide chests in boys and region below the waist becomes wider in girls.
- (iv) Growth of hairs on the different parts of the body.
- (v) Voice of girls becomes high pitched and that of boys become deep.
- (vi) Secretions of sweat and sebaceous glands increase.
- (vii) Sex organs become active. In boys, testes start to form sperms and in girls, ovaries start to produce eggs.
- (viii) Changes in mental, intellectual and emotional level.

**5. Construct a table having two columns depicting names of endocrine organs and hormones secreted by them.**

S.No	Name of Endocrine Gland	Secreted Hormone
1	Testes	Testosterone
2	Ovaries	Estrogen

3	Thyroid	Thyroxine
4	Pancreas	Insulin
5	Adrenals	Adrenalin
6	Pituitary	FSH

**6. What are sex hormones? Why are they named so? State their function.**

The testes and ovaries secrete sex hormones. These hormones are responsible for the male and female secondary sexual characters, so these are called sex-hormones. The male hormone or testosterone begins to be released by the testes at the onset of puberty. This causes changes in boys, for example, the growth of facial hair. Once puberty is reached in girls, ovaries begin to produce the female hormone or estrogen which makes the breasts develop. Milk secreting glands or mammary glands develop inside the breasts. Its production is under the control of a hormone from another endocrine gland called pituitary gland.

**7. Choose the correct option.**

**(a) Adolescents should be careful about what they eat, because:**

- (i) Proper diet develops their brains.
- (ii) Proper diet is needed for the rapid growth taking place in their body.
- (iii) Adolescents feel hungry all the time.
- (iv) Taste buds are well developed in teenagers.

**(b) Reproductive age in women starts when their :**

- (i) Menstruation starts
- (ii) Breasts start developing
- (iii) Body weight increases
- (iv) Height increases

**(c) Which of the following constitutes the right meal for adolescents?**

- (i) Chips , noodles , cake
- (ii) Chapati , dal , vegetables
- (iii) Rice, noodles and burger
- (iv) Vegetable cutlets, chips and lemon drink

a. ii	b. i	c. ii
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## 8. Write notes on:

### (i) Adam's Apple

### (ii) Secondary sexual characters

### (iii) Sex determination in the unborn baby

(i) **Adam's Apple:** At puberty, the voice box or the larynx begins to grow. Boys develop larger voice boxes. The growing voice box in boys can be seen as protruding part of the throat called Adam's apple.

(ii) **Secondary Sexual Characters:** Testes and ovaries are the reproductive organs, they produce the gametes, i.e., sperms and ova respectively. In girls, breasts begin to develop at puberty and boys begin to grow facial hair i.e., moustaches and beard. As these features help to distinguish the male from the female they are called secondary sexual characters.

Boys also develop hair on their chest. In both, boys and girls, hair grows under the arms and in the region above the thighs or the pubic region.

(iii) **Sex Determination in Unborn Baby:** When a sperm containing X chromosome fertilizes the egg, the zygote would have two X-chromosomes and develop into a female child. If the sperm contributes a Y chromosome to the egg (ovum) at fertilisation, the zygote would develop into a male child.

## 9. Words game : Use the clues to work out the words.

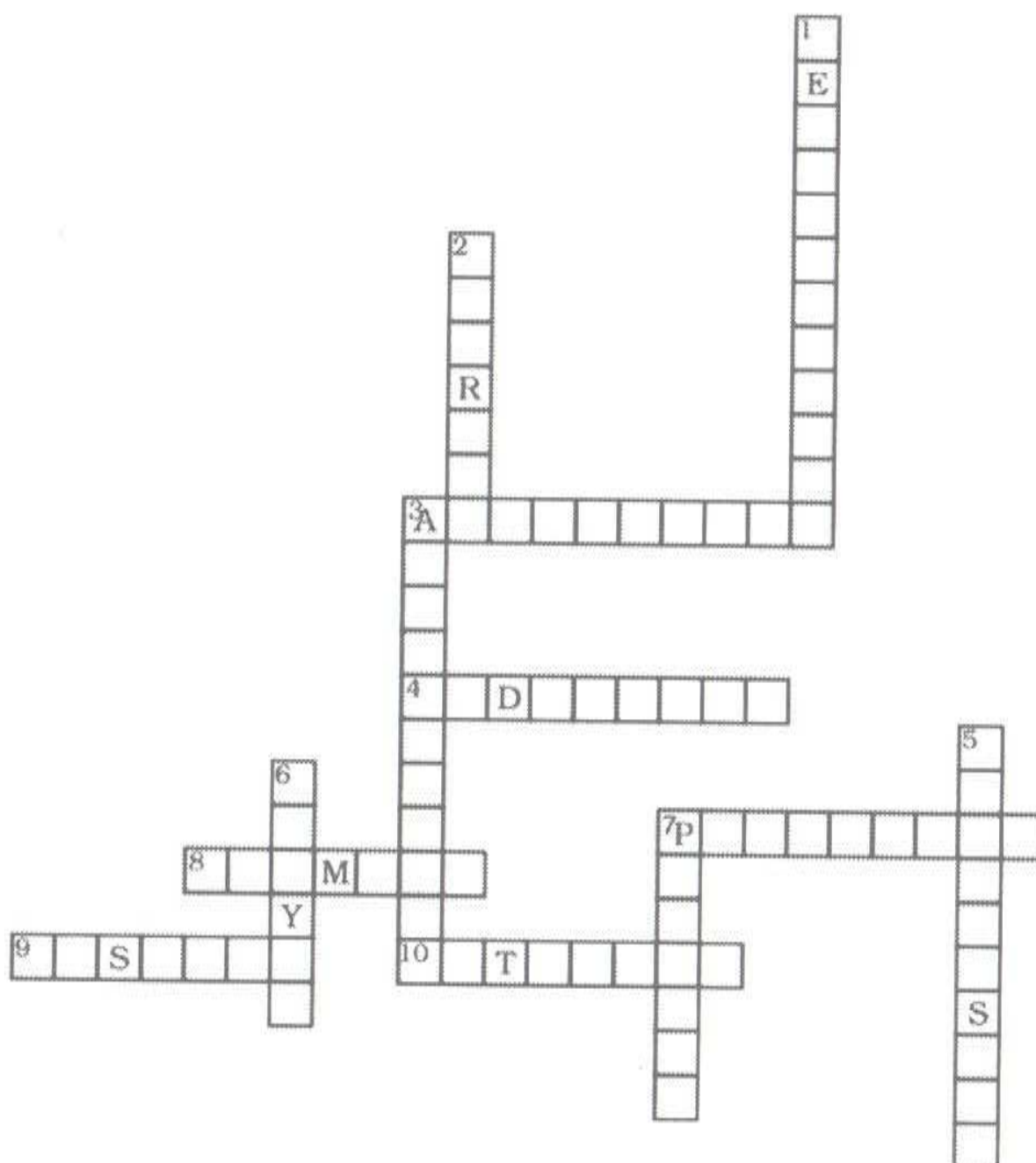
### Across :

- (3) Protruding voice box in boys
- (4) Glands without ducts
- (7) Endocrine gland attached to brain
- (8) Secretion of endocrine glands
- (9) Pancreatic hormone
- (10) Female hormone

### Down:

- (1) Male hormone
- (2) Secretes thyroxine
- (3) Teenage
- (5) Hormone reaches here through blood stream
- (6) Voice box

(7) Changes at adolescence constitute



**Answers:**

- (1) Testosterone
- (2) Thyroid
- (3) Adam's apple, Adolescence
- (4) Endocrine
- (5) Target sites
- (6) Larynx
- (7) Pituitary, Puberty
- (8) Hormone



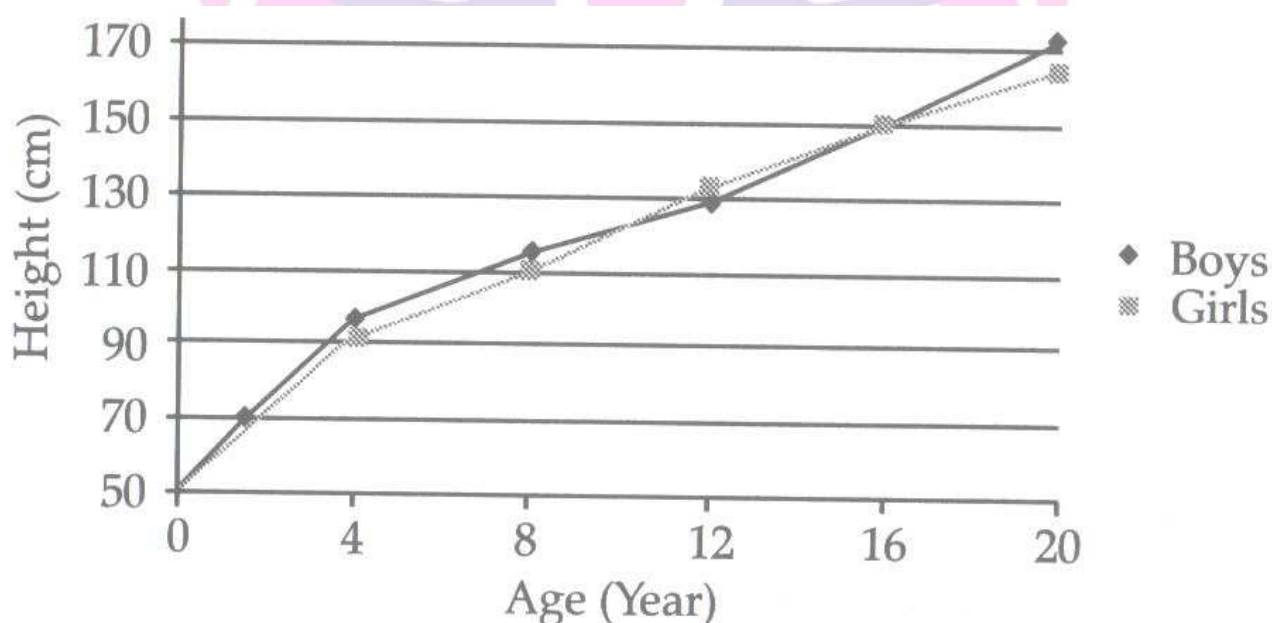
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(9) Insulin

(10) Estrogen

10. The table below shows the data on likely heights of boys and girls as they grow in age. Draw graph showing height and age for both boys and girls on the same graph paper. What conclusion can be drawn from these graphs?

Age (Years)	Height (cm)	
	Boys	Girls
0	53	53
4	96	92
8	114	110
12	129	133
16	150	150
20	173	165



We can conclude that the height of boys and girls attains maximum value around age of 20.

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## I. Very Short Answer Type Questions.

**1. When does the growth start in human?**

Growth begins from the day the child is born.

**2. When do sudden and noticeable changes begin in human?**

The sudden and noticeable changes begin in human in adolescence age.

**3. What do the changes in the body of a child indicate?**

The changes in the body of a child indicate that a child is on the way to become an adult.

**4. What is the age of adolescence in human?**

The age between 11 to 18 or 19 years is called the age of adolescence.

**5. What is puberty?**

The age at which boys and girls become capable of reproduction.

**6. What changes occur during puberty?**

At the time of puberty the bones of the arms and the legs elongate and make a person tall.

**7. Do both boys and girls grow at the same rate?**

No, girls grow faster than boys.

**8. Do all the parts of the body grow at the same rate?**

No, all the parts of the body do not grow at the same rate.

**9. Which organ is called voice box?**

Larynx.

**10. What is Adam's apple?**

The protruding part of the throat in boys is called Adam's apple.

**11. Name main male and female reproductive organs.**

Testes are the main male reproductive organs and ovaries are the main female reproductive organs.

**12. What are hormones?**

Hormones are the chemical substances which are produced by endocrine glands.

**13. Name the male hormone.**

Testosterone.

**14. Name the female hormone.**

Estrogen.



**15. What is the name of the endocrine gland which controls the production of these male and female hormones?**

Pituitary gland.

**16. What is the puberty age in females?**

10 to 12 years.

**17. What do you mean by menarche?**

The first menstrual flow indicates menarche.

**18. What is menopause?**

Stoppage of menstruation is called menopause.

**19. What are chromosomes?**

The thread like structures in the nucleus are called chromosomes.

**20. How many chromosomes are there in human cell?**

There are 23 pairs of chromosomes in the nucleus of human cell.

**21. What are sex chromosomes?**

Out of 23 pairs, one pair of chromosomes is called sex chromosomes.

**22. What are the name of these sex chromosomes?**

Sex chromosomes are named as X and Y.

**23. What are the chromosomes in female and male?**

A female has two X chromosomes while a male has one X and one Y chromosomes.

**24. What types of chromosomes occur in egg (female gamete)?**

The egg always has only X chromosome.

**25. What types of chromosomes occur in sperms?**

Sperm has only X chromosome or only Y chromosome.

**26. How many types of sperms are there?**

Sperms are of two types:

(i) One kind has X chromosomes

(ii) Other kind has Y chromosomes

**27. Who is responsible for sex determination of a child- mother or father?**

The sex chromosomes of father determine the sex of an unborn baby.

**28. Name some endocrine glands other than pituitary gland.**

Some endocrine glands are thyroid, pancreas and adrenals.



**29. Name the hormone produced by thyroid gland.**

Thyroxine.

**30. What is the name of hormone produced by pancreas?**

Insulin is the hormone produced by pancreas.

**31. Name the disease caused by less or not secretion of thyroxine hormone by thyroid.**

Goitre.

**32. Name the disease caused by less secretion of insulin hormone by the pancreas.**

Diabetes.

**33. What is the name of hormone produced by adrenal gland?**

Adrenalin.

**34. What is the function of adrenalin hormones?**

Adrenalin hormone maintains the correct balance of salts in the blood.

**35. Name the hormone which is necessary for the normal growth of a person.**

Growth hormone.

**36. Which endocrine gland produces the growth hormone?**

Pituitary gland.

**37. What do you mean by metamorphosis?**

The changes from larva to an adult is called metamorphosis.

**38. Name the hormone which controls metamorphosis in frog.**

Thyroxine hormone which is produced by thyroid controls the metamorphosis in frogs.

**39. Name the element which is essential to produce thyroxine hormone.**

Iodine.

**40. What happens if there is no iodine present in water?**

If there is no iodine present in water, the tadpole cannot become adult.

**41. What do you mean by health?**

The physical and mental well being of a person is called health.

**42. How can we keep our body healthy?**

To keep the body healthy everyone needs to have a balanced diet.

**43. What do you understand about the balanced diet?**

The food containing proteins, Carbohydrate, fats and vitamins in requisite proportions is called balanced diet.



**44. Why does mother's milk is considered a better diet for infants?**

Mother's milk provides all the nutrients that they need. So mother's milk is better food for infants.

**45. What is the function of iron?**

Iron helps to make the blood (haemoglobin in blood)

**46. Name some iron rich food items.**

Leafy vegetables, jiggery, meat and citrus fruits are rich in iron.

**47. What do you mean by personal hygiene?**

To keep themselves neat and clean by washing of clothes and by bathing is called personal hygiene.

**48. What happens if cleanliness is not maintained?**

If cleanliness is not maintained then there are chances of catching bacterial infection.

**49. Name the causative organisms of AIDS.**

It is a virus called HIV.

**50. What is the legal age for marriage for girls and boys?**

Legal age for marriage is 18 years for girls and 21 years for boys.

**II. Very Short Answer Type Questions.**

**1. Name the hormone that is released by testes at the onset of puberty.**

Testosterone is the male hormone which is released from testes at the onset of puberty.

**2. Name the female hormone produced by ovaries that helps in development of mammary glands.**

Oestrogen is the female hormone produced by ovaries that helps in development of breasts/ mammary glands.

**3. What name is given to the period between childhood and adulthood?**

Adolescence.

**4. What is puberty?**

The human body undergoes several changes during adolescence. These changes mark the onset of puberty.



**5. When does puberty end?**

Puberty ends when an adolescent reaches reproductive maturity.

**6. Write two changes which occur during puberty.**

- (i) Increase in height                      (ii) Change in body shape

**7. Why during adolescence voice of some boys becomes hoarse?**

Because boys develop large voice box. It can be seen as a protruding part of the throat called Adam's apple.

**8. What do you mean by personal hygiene?**

To keep oneself neat and clean by washing of clothes and by bathing is called personal hygiene.

**III. Very Short Answer Type Questions.**

**1. Which gland is called the master gland?**

Pituitary gland

**2. What do you mean by the term menarche?**

The first menstrual flow begins at puberty is termed as menarche.

**I. Short Answer Type Questions.**

**1. Mention any two features that are seen in boys and girls each to distinguish them from each other at puberty.**

Two features seen in boys at puberty are:

- a. Growth of facial hairs.
- b. Voice becomes hoarse.

Two features seen in girls at puberty are:

- a. Development of breasts
- b. Region below the waist becomes wider.

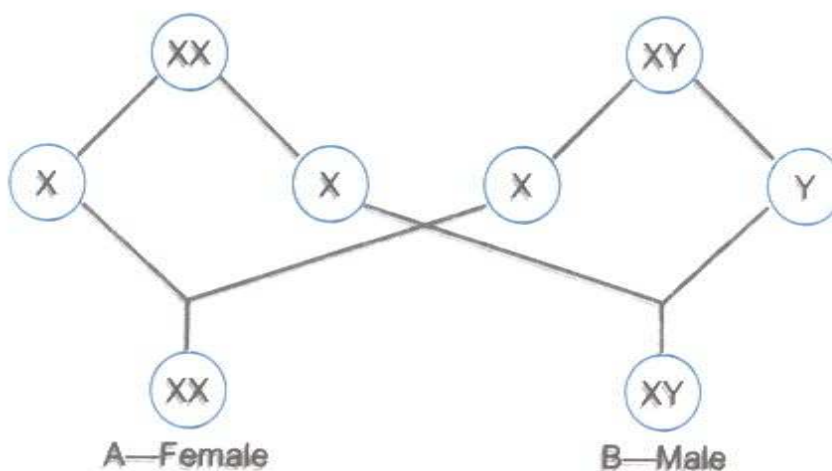
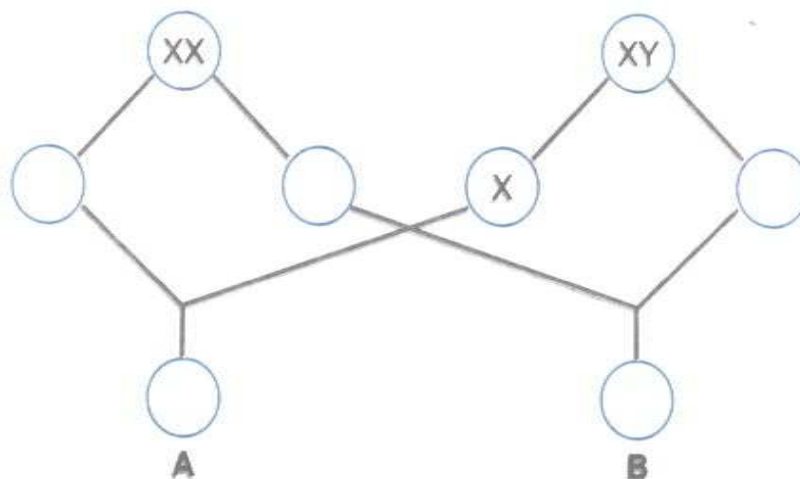
**2. We should avoid taking medicines/ drugs unless prescribed by a doctor. Give reasons.**

Several medicines have adverse side effects and have specific dosage levels which if not followed may harm the body. Drugs can be addictive too and can ruin our health and happiness.

3. A few of Paheli's classmates eat potato chips and burgers regularly during the recess at school. Are they healthy eating habits? Give reasons.

No, They are not healthy eating habits because. Potato chips and burgers have very little nutritional value.

4. Fill the blank circles in figure and identify the sex of child A and B.



5. What is menstruation? Explain.

Menstruation is the process of the shedding of the uterine lining on a regular monthly basis. It begins at puberty and is the reproductive cycle of the female body. Every month, the uterus prepares itself to receive a fertilized egg. Therefore, the inner lining of the uterus becomes thick and is supplied with blood to nourish the embryo, if the egg is not fertilized, then the lining of the uterus breaks down and get released in the form of blood through the vagina. This lasts for about two to eight days. This cycle occurs every month and is known as the menstrual cycle.

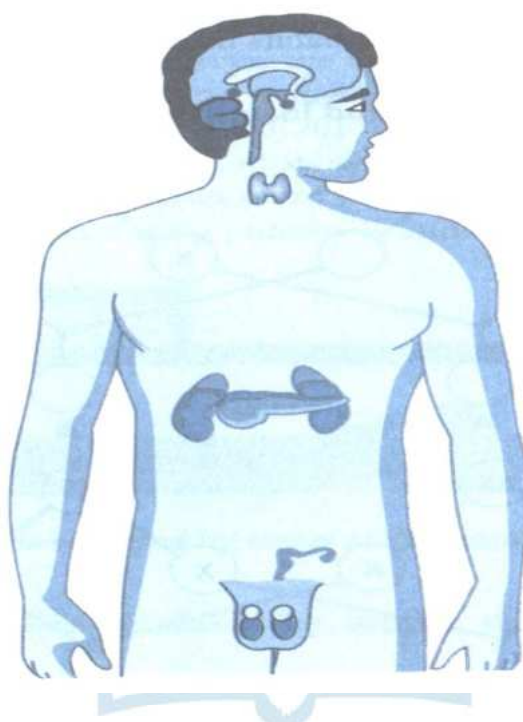
6. Name the hormone which would be released during the following situation

- a. A frightened person
- b. Growth of a child adult
- c. Development of caterpillar to moth
- d. Development of tadpole to frog

- a. Adrenaline
- b. Growth hormone
- c. insect hormones
- d. Thyroxine

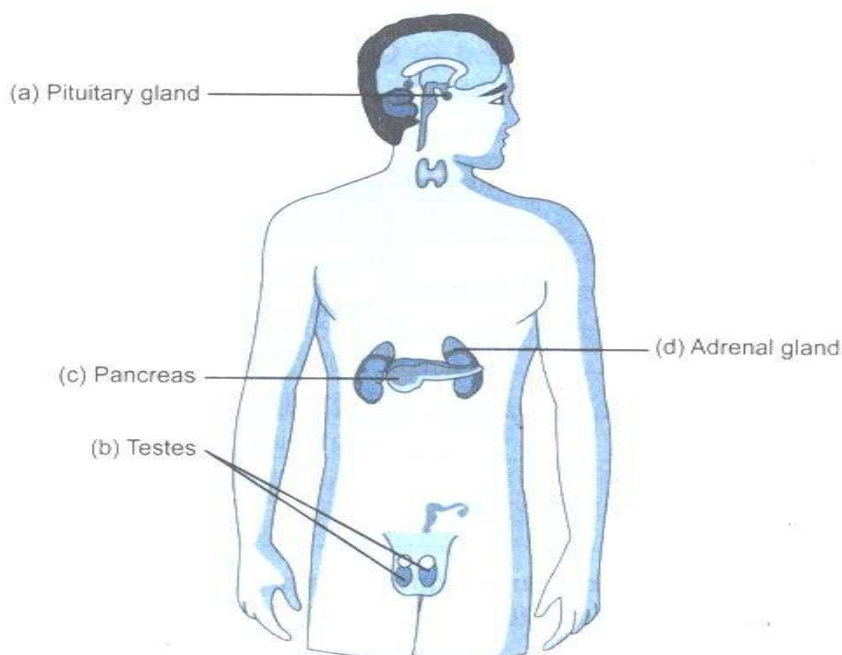
7. In the figure given below mark the positions of the endocrine glands which release the hormones that

- a. Controls the release of sex hormones.
- b. is responsible for the secondary sexual characters in boys.
- c. prevents diabetes
- d. maintains the correct salt balance in the blood.



Next Generation School





8. Give a suitable word for each of the following statements.

- The site which responds to a hormone
  - Name of a gland which transports secretions through ducts
  - Chemicals which control changes at adolescence stage
  - it marks the beginning of reproductive period
- Target site
  - sweat glands/ salivary glands/ oil glands (any one)
  - Hormones
  - Puberty

## II. Short Answer Type Questions.

1. What is adolescence?

Growing up is a natural process. The period of life, when the body undergoes changes, leading to reproductive maturity is called adolescence.

2. Why is adolescence also called teenage?

Adolescence begins around the age of 11 and lasts up to 18 or 19 years of age. Since this period covers the teens (13 to 18 or 19 years of age) adolescence is also called teenage.



### 3. What is the most important change which marks puberty?

The human body undergoes several changes during adolescence. These changes mark the onset of puberty. The most important change which marks puberty is that boys and girls become capable of reproduction.

### 4. A boy is 9 years old and 120 cm tall. Calculate the height of the boy at the end of growth period.

Present height = 120 cm

% age of height at this age = 75

So, height at the end of growth period

$$= \frac{\text{Present height (cm)}}{\% \text{ of full height at this age}} \times 100$$

$$= \frac{120}{75} \times 100 = 160 \text{ cm}$$

### 5. Write the factors which affect the height of a person.

There are following two factors which affect the height ;

(a) **Genes inherited** : The height of an individual is more or less similar to that of his or her parents. The height depends on the genes inherited by the parents.

(b) Height also depends on the diet taken by the person in this growing period.

### 6. Explain the development of sex organs in male and female.

At the puberty, male sex organs like testes and penis develop completely. The testes also begin to produce sperms. In girls, the ovaries enlarge and eggs begin to mature. Ovaries also start releasing mature eggs.

### 7. Some boys and girls have impropertionate body parts during adolescence. Why?

Sometimes boys and girls have impropertionate body parts. They look tall but face looks smaller. This is because all body parts do not grow at the same rate. But slowly they all catch up and body becomes balanced.

### 8. Explain the changes that occur in the voice of boys and girls during puberty.

The voice box or larynx begins to grow. The growing voice box in boys can be seen as protruding part of the throat, called Adam's apple. In girls the larynx is hardly visible from the outside because of its small size. Girls have high pitched voice, whereas boys have a deep voice.



### **9. Why some young people get acne and pimples on the face during puberty?**

During puberty, the secretions from sweat glands and sebaceous glands increase. Many young people get acne and pimples on the face at this time because activity of these glands in the skin increase.

### **10. What are the secondary sexual characters in girls?**

In girls, breasts begin to develop at the time of puberty. These features help us to distinguish the male from the female. These characters are called secondary sexual characters. Hair grows under the arms and in the region above the thighs or the pubic regions in girls.

### **11. Write some secondary sexual characters in boys.**

The facial hair begins to grow in boys that is moustaches and beard. Boys also develop hair on their chest. Hair grows under the arms and in the region above thighs or pubic region in boys like the girls.

### **12. What is the cause of the changes in human body during puberty?**

The changes which occur during puberty are controlled by hormones. The hormones are the chemical substances. There are secretions from endocrine glands or endocrine system. These hormones are secreted from ovary, testes or pituitary gland at the time of puberty. The hormones secreted by pituitary stimulate testes and ovaries to secrete male and female hormones respectively.

### **13. How do hormones work?**

Hormones are released by endocrine glands into blood stream to reach a particular body part called target site. The target site responds to the hormone. There are many endocrine glands or ductless glands in the body.

### **14. How do sex hormones work in the human body?**

In girls, oestrogen causes the development of mammary glands. They develop inside the breast and cause enlargement of breasts. In boys testosterone is secreted by testes and it causes growth of moustaches and beard.

### **15. Explain the term menstruation.**

At the time of maturation of ovaries the eggs are released by these ovaries. One egg is released at a time. If this egg is not fertilized, the released egg and thickened lining of the uterus along with its blood vessels are shed off. This causes bleeding in women which is called menstruation. Menstruation occurs once in about 28 to 30 days.



**16. Explain menarche and menopause.**

**Menarche** : The first menstrual flow beginning at puberty is termed as menarche.

**Menopause**: At 45 to 50 years of age the menstrual cycle stops. Stoppage of menstruation is termed as menopause.

**17. What happens when egg is fertilised?**

In case the egg is fertilized it begins to divide and then gets embedded in the uterus for further development. At last the fertilized egg is developed into a foetus.

**18. Why pituitary gland is called master gland?**

Pituitary gland is called master gland. It is the most important endocrine gland. The hormones secreted by the pituitary gland stimulate testes and ovaries to produce their hormones. Pituitary gland also controls the secretions of other endocrine glands. It is attached to the brain.

**19. How do hormones help in the completion of life history of insects and frogs?**

The changes from larva to adult is called metamorphosis. Metamorphosis in insects is controlled by insect hormones. In a frog it is controlled by thyroxine, the hormone produced by thyroid. Thyroxine production required the presence of iodine in water. If the water in which the tadpoles are growing does not contain sufficient iodine, the tadpoles cannot become adults.

**20. Name the virus that causes AIDS. What are the medium through which this virus is transmitted?**

AIDS is caused by a virus named HIV. It can be transmitted from an infected person to healthy person by following ways;

- (i) By infected syringes
- (ii) By infected mother to an infant
- (iii) By sexual contact with infected person

**21. Write some myths which are not facts.**

The myths which are not facts;

- (i) A girl becomes pregnant if she looks at a boy during menstruation
- (ii) The mother is responsible for the sex of her child
- (iii) A girls should not be allowed to work in the kitchen during menstruation



### III. Short Answer Type Questions- I

1. Salma had a very soft and smooth skin during her childhood. As she entered adolescence, she developed pimples on her face. The skin specialist advised her to wash her face at regular intervals. Can you explain the reasons for the appearance of pimples on her face and suggest ways to prevent them? (NCERT Exemplar)

During adolescence, the secretion of sweat glands and sebaceous glands increase leading to the formation of acne and pimples. Regular face wash keeps the face clear and dry and helps to reduce the pimples.

2. What are the drawbacks of adolescent pregnancy?

In our control, the legal age for marriage is 18 years for girls and 21 years for boys. This is because teenage mothers are not prepared mentally or physically for motherhood. Early marriage and motherhood cause health problems in the mother and the child.

3. What happens due to increased activity of sweat and sebaceous glands?

During puberty, the secretion of sweat glands and sebaceous glands (Oil glands) increases. Many young people get acne and pimples on the face due to the increased activity of these glands in the skin.

4. What is target site?

Endocrine glands release hormones into the blood stream to reach a particular body part called target site.

5. Write any two myths about adolescence.

Two myths about adolescence are:

- (i) A girl gets pregnant if she looks at boys during menstruation.
- (ii) A girl should not be allowed to work in the kitchen during menstruation.

6. What must an adolescent do for personal hygiene?

For personal hygiene an adolescent should have a bath at least once every day, because increased activity of sweat glands makes body smelly. If cleanliness is not maintained there can be bacterial infection. Girl should take special care of cleanliness during the time of menstrual flow.

7. Humans attain sexual maturity during puberty. How does this happen? Explain.

At puberty, the male and female sex organs get fully developed. The testes start secreting testosterone and start producing sperms. Similarly in females, ovaries get enlarged



and secrete estrogen so as to produce matured eggs. Due to these sex hormones, human attain sexual maturity.

**8. Write four ways through which AIDS is transmitted?**

Four ways through which AIDS is transmitted are;

- (i) Sharing the syringes for injecting drugs.
- (ii) Unprotected sex with an infected person.
- (iii) Transfusion of blood into a healthy person from an infected person.
- (iv) Through milk from an infected mother to infant.

**III. Short Answer Type Questions-II**

- 1. Lila always eats only dal and rice in every meal. She often falls ill and has become prone to diseases. Can you suggest changes in her diet which can make her healthy and free from disease? (NCERT Exemplar)**

Lila's diet is not a balanced diet because her meal does not contain the adequate nutritional requirement. She takes only protein and carbohydrates in every meal. She requires vitamins and minerals in her meal to protect her from various diseases. Thus, I would suggest her to include fruits and vegetables in her meal as a source of vitamins and minerals.

- 2. A few of Paheli's classmates eat potato chips and burgers regularly during the recess at school. Are they healthy eating habits? Give reasons. (NCERT Exemplar)**

No, these are not healthy eating habits because burgers and potato chips have very little nutritional value. Although, these are very tasty but can never replace regular meals as balanced diet which is essential for the adolescents for their normal growth and development.

- 3. John and Radha were classmates since childhood. When Radha became eleven years old, she developed a little swelling on her neck. She visited the doctor who started medication for her. After a few years, John also developed a slight protrusion on his throat. He got worried and went to the doctor. But the doctor assured him that it was a normal feature in boys while they are growing up. Can you think of any reasons for the difference in diagnosis?**

The swelling in the neck of Radha may have been because of goiter, a condition during which the thyroid gland produces insufficient quantity of thyroxine. However, the protrusion in John's throat would be Adam's apple, a result of growth of voice box in adolescent boys.





**4. In human females, each time during maturation and release of egg the inner wall of uterus thickens. Is this thickening permanent? Give reasons.**

In human females, each time during maturation and release of egg, the inner wall of uterus thickens. This thickening of the uterine wall is not permanent. In the egg gets fertilized, it starts developing and gets embedded in the uterine wall resulting in pregnancy. During pregnancy no more eggs are released and the thickened lining is discharged only when the baby is born. However, if fertilisation does not occur, the released egg and the thickened lining are shed off resulting in menstruation.

**5. Write a short note on nutritional needs of the adolescents.**

Adolescence is a stage of rapid growth and development. Hence, the diet for an adolescent has to be carefully planned. They should be provided a balanced diet, which means that meal should include proteins, carbohydrates, fats and vitamins in requisite proportions, e.g., milk is a balanced food itself. Fruits provide nourishment. Iron builds blood and iron rich foods such as leafy vegetables, jiggery, meat, citrus, Indian gooseberry are good for adolescents.

**6. What is the role of hormones in completing the life history of frogs?**

In the life cycle of frog the tadpole passes through certain stages to become a frog. It is controlled by thyroxine, the hormone produced by thyroid. It requires the presence of iodine in water. If water in which tadpoles are growing does not contain sufficient iodine, the tadpoles cannot become adults.

**7. What is the function of pituitary gland?**

Pituitary gland exerts hormonal control over testes and ovary which secrete their own hormone testosterone and estrogen respectively. These hormones help in the development of secondary sexual characters during adolescence. Pituitary gland also secretes another hormone called growth hormone that helps in growth of body.

**8. Name the disease or side effects caused by deficiency of following hormones:**

**(a) Thyroxine**

**(b) Insulin**

**(c) Adrenaline**

**(d) Growth hormone**

(a) Thyroxine is produced by thyroid gland. Its deficiency causes 'goitre' disease.

(ii) A person suffers from diabetes if pancreas does not produce the hormone insulin in sufficient quantities.





(iii) Adrenal glands produce hormone adrenaline, which helps the body to adjust to stress, when a person is very angry, embarrassed or worried.

(iv) Pituitary gland secretes growth hormone that is necessary for the normal growth of a person.

#### **9. How is the sex of the baby determined?**

The sex of the baby is determined by sex chromosomes that are X and Y. In human beings, the female has a pair of XX chromosome, whereas a male body has one 'X' and 'Y' chromosome. When a sperm containing 'X' chromosomes fertilizes the egg, the zygote receives two X chromosomes and develops into a female child. If the sperm contributes a 'Y' chromosome to the egg at fertilization the zygote develops into a male child.

#### **10. How does adolescence affect in reaching mental, intellectual and emotional maturity?**

Adolescence is also a period of change in a person's way of thinking. They are more independent than before and are also self-conscious.

Intellectual development takes place and they tend to spend considerable time in thinking. It is time of one's life when the brain has the greatest capacity for learning. An adolescent may feel insecure while trying to adjust to the changes in the body and mind.

#### **11. Why is pituitary gland called 'Master Gland'?**

It is called so as it is the most important endocrine gland. Its size is just equal to a small pea. The hormones secreted by pituitary gland stimulate testes and ovaries to secrete their hormones. It also regulates the activity of other endocrine glands.

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### **I. Long Answer Type Questions.**

**1. During adolescence, the body of boys and girls undergoes certain changes. Given below are a few of those changes.**

- (a) Broad shoulders
- (b) Wider chests
- (c) Wider region below waist
- (d) Development of muscles
- (e) Development of mammary glands
- (f) Growth of facial hair
- (g) Acne and pimples on face

(h) Development of sex organs

(i) High- pitched voice

(j) Growth of pubic hair

Categorise these changes into those that occur in boys and those that occur in girls and fill in the table : (NCERT Exemplar)

Body changes during Adolescence	
Boys	Girls

S.No	Boys	Girls
(i)	Broad shoulders	Wider region below waist
(ii)	Wider chests	Development of mammary glands
(iii)	Development of muscles	Acne and pimples on face
(iv)	Growth of facial hair	Development of sex organs
(v)	Development of sex organs	High pitched voice
(vi)	Growth of pubic hair	Growth of pubic hair

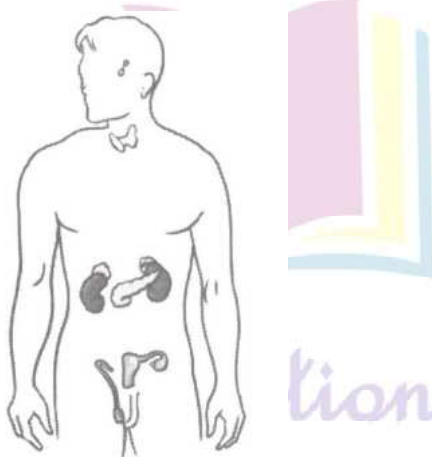
2. In Fig. Mark the positions of the endocrine glands which release the hormones that :

(a) controls the release of sex hormones.

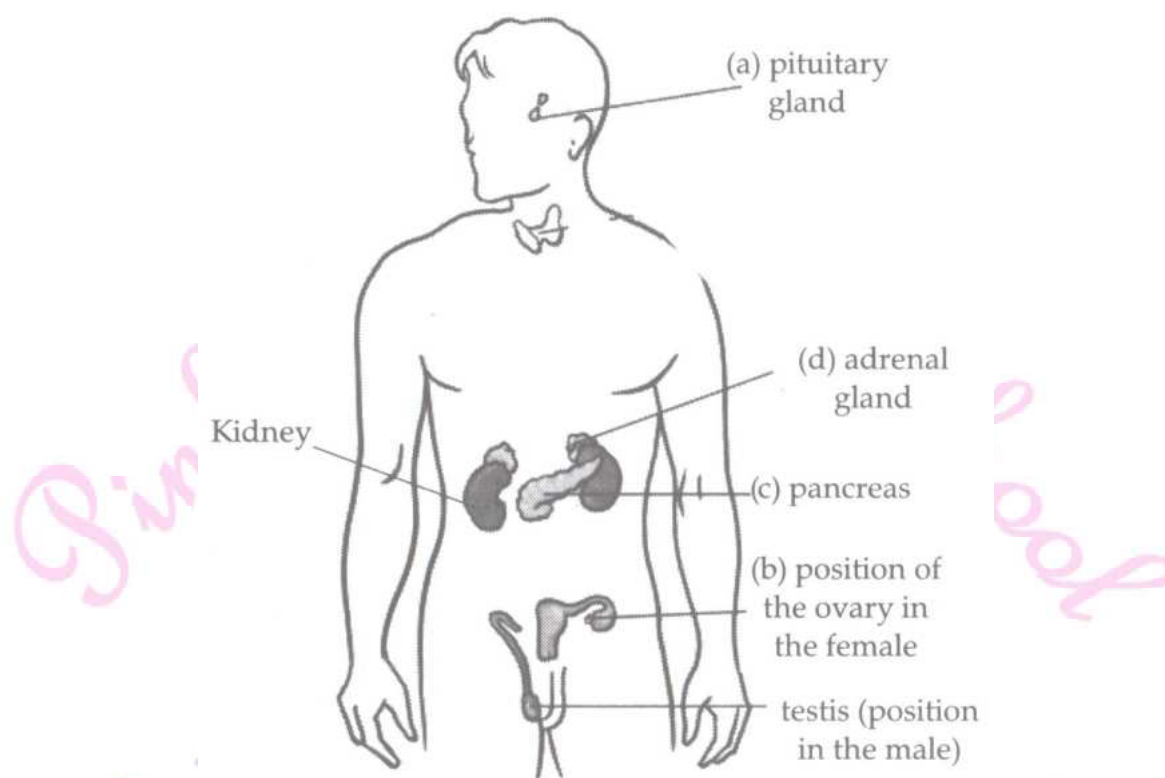
(b) is responsible for the secondary sexual characters in boys.

(c) prevents diabetes.

(d) maintains the correct salt balance in the blood.



(NCERT Exemplar)



**3. Our government has legalized the age for marriage in boys and girls. Give reasons as to why one should get married after a certain age.**

In our country, the legal age for marriage is 18 years for girls and 21 years for boys. This is because teenage mothers are not prepared mentally or physically for motherhood. Early marriage and motherhood causes health problems in both, mother and the child. It also curtails employment opportunities for the young woman and may cause mental agony as she is not ready to shoulder responsibilities or motherhood. Also the boys before that age may not be mentally matured and financially secure enough to take the responsibilities of a family.

**4. It is believed that height of a child depends upon the genes inherited from parents.**

**However, it is often seen that tall parents may have short children and vice-versa.**

**Are there factors other than genes, that can cause these variations?**

Height of a child depends upon the genes inherited from parents. However, there are some other factors also, that can affect height. These factors include balanced diet, hormones, exercises, diseases. Balanced diet is essential for the adolescents as it helps the bones, muscles and other parts of the body to get adequate nourishment for growth.

**5. Explain reproductive Phase of life in humans.**

Reproductive phase of life in humans: Adolescents become capable of reproduction when their testes and ovaries begin to produce gametes. The hormone testosterone in male is



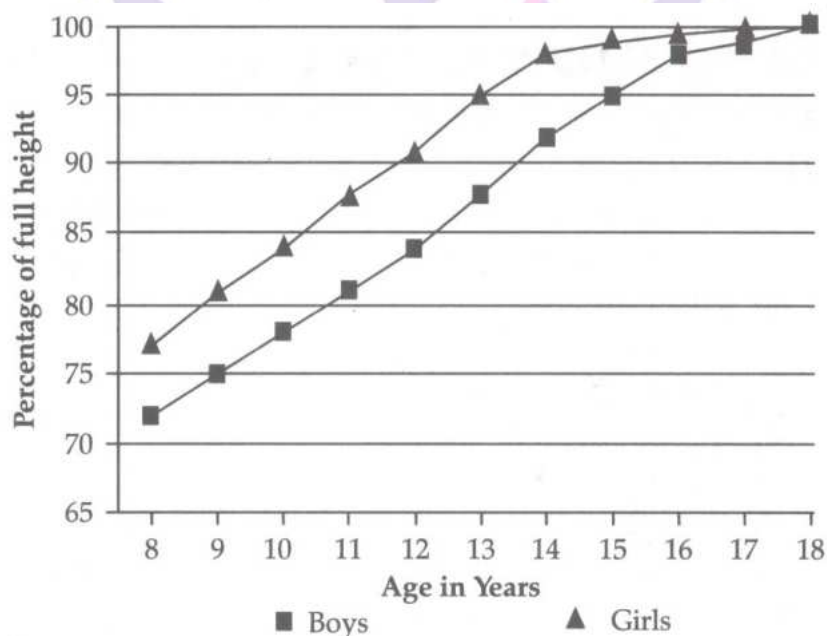
secreted by testes. In female the reproductive phase begins at puberty – 10 to 12 years and lasts up to 45-50 years.

The ovum matures and is released by one of the ovaries once in 28 to 30 days. During this period, the wall of the uterus becomes thick. If it is fertilized it results in pregnancy. If fertilization does not occur the egg and the thickened lining of the uterus along with blood vessels is shed off. This causes menstruation.

Sex is also determined by the sex hormones X and Y. Males have 'XY' chromosomes and females have 'XX' chromosomes in their body. The baby child will be male if the sperm contributes 'Y' chromosome and child will be female if the sperm releases 'X' chromosome.

Hence, males are responsible for sex determination in humans.

**6. Observe the chart and graph given in Fig carefully and answer the following questions.**



Age in	% of full height	
Years	Boys	Girls
8	72%	77%
9	75%	81%
10	78%	84%
11	81%	88%
12	84%	91%
13	88%	95%
14	92%	98%

15	95%	99%
16	98%	99.5%
17	99%	100%
18	100%	100%

(i) Which of the lines represents the height of boys?

(ii) Which line represents the height of girls?

(iii) What is the difference between the pattern of increase in the height of boys and girls?

(iv) Is this pattern true for each individual?

(i) The solid line with arrows represents the height of boys.

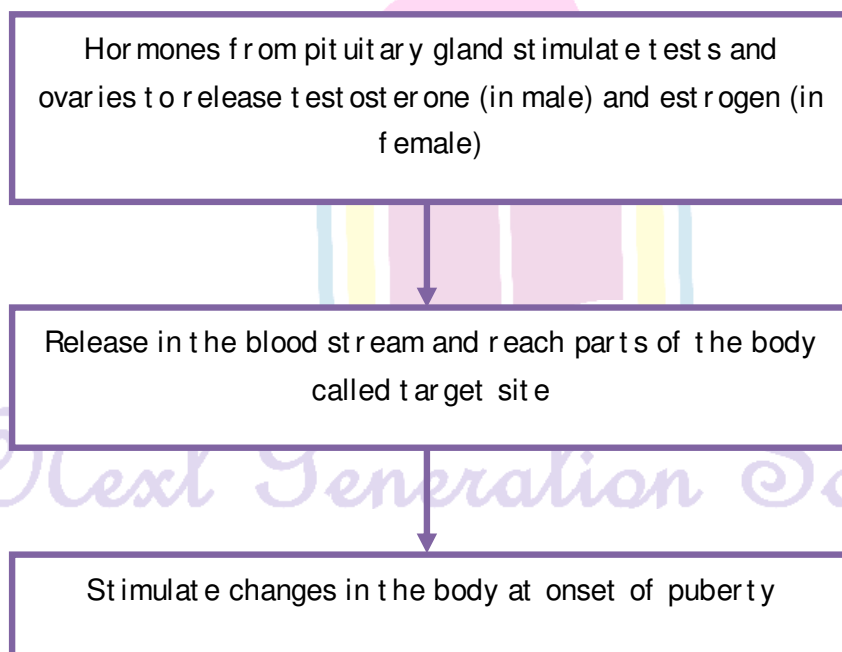
(ii) The Solid line represents the height of girls.

(iii) At the onset of puberty, girls grow faster in height than the boys and by the age of 18 years, approximately both reach their maximum height.

(iv) No, the rate of growth in height varies among individuals. Some may grow in height suddenly at puberty and then slow down, while others may grow gradually.

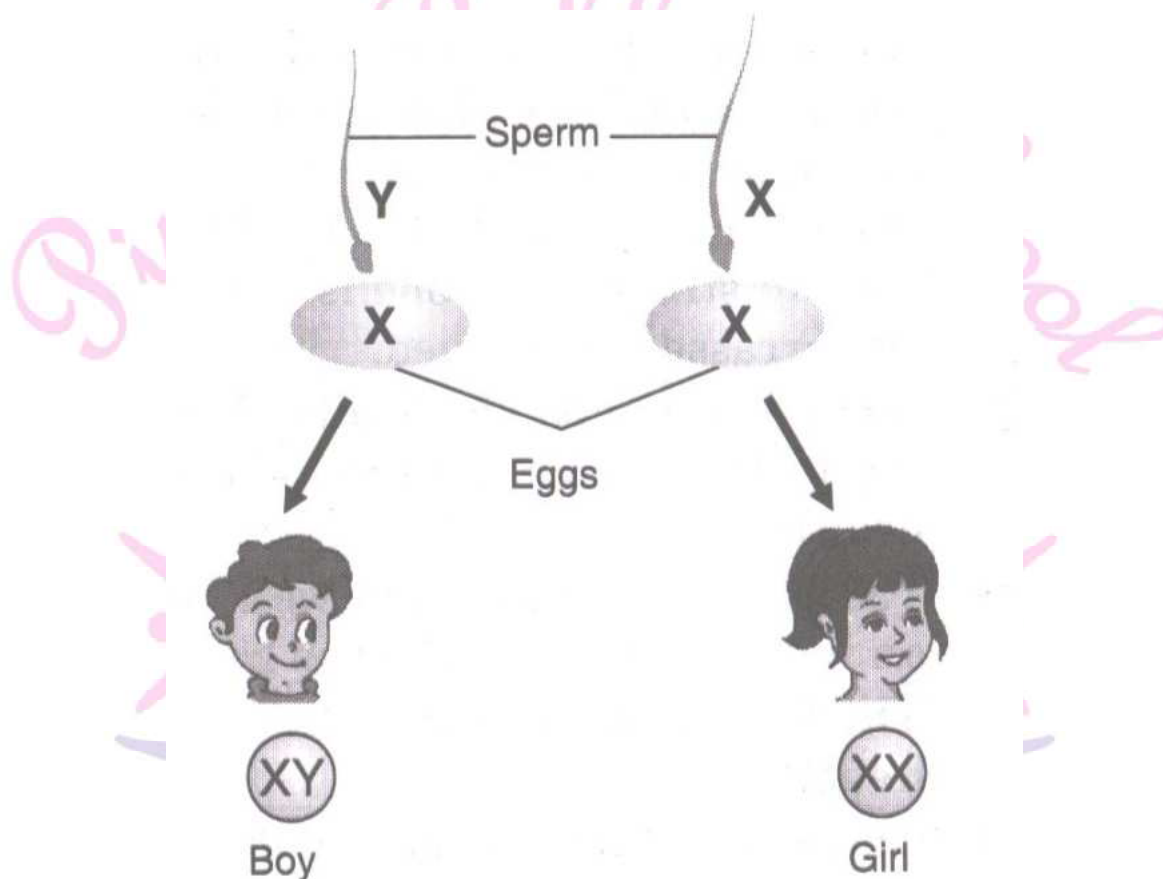
## II. Long Answer Type Questions.

1. How do hormones work? Explain with the help of a flow chart.



## 2. Explain the sex determination of a baby in human.

Inside the fertilised egg or zygote is the instructor for determination of sex of the baby. The instruction is present in the chromosomes in the fertilised egg. All human beings have 23 pairs of chromosomes in the nuclei of their cells. Out of these chromosomes



two chromosomes are the sex chromosomes named X and Y. A female has two X chromosomes while a male has one X and one Y chromosomes. The eggs and sperms have only one set of chromosomes. The unfertilised egg always has one X chromosome. But sperms are of two kinds. One kind has an X chromosome and other kind has Y chromosome. When a sperm containing X chromosome fertilises the eggs the zygote develops into a female child. If sperm contributes a Y chromosome to the egg at fertilisation, the zygote develops into a male child.

## 3. What are endocrine glands? Write the names of hormones and the functions of thyroid, pancreas and adrenal glands.

The glands which have no any duct to pour their secretions (hormones) into blood directly are called endocrine glands.

**Thyroid** : Thyroid is the endocrine gland. It secretes thyroxine hormone. If thyroid does not produce thyroxine, then thyroid glands increase in size and cause a disease called goitre.





**Pancreas** : Pancreas is also an endocrine gland which produces insulin hormone. If insulin is not produced sufficient then a person suffers from a disease called diabetes.

**Adrenal** : The hormone produced by adrenal gland is called adrenalin. This hormone maintains the correct salt balance in the blood. It also adjusts the body to stress when one is very angry, embarrassed or worried.

#### **4. What do you mean by health? What are the factors which help to keep a good health?**

The physical and mental well being of an individual is regarded as health.

##### **The factors that help to keep a good health:**

- (i) One should take a balanced diet.
- (ii) One should care and keep personal hygiene.
- (iii) Walking and playing in fresh air keeps the body fit and healthy.
- (iv) All young boys and girls should take walks, exercise and play outdoor games to keep health.
- (v) Avoid the alcohol and tobacco.
- (vi) Drink clean water, breathe in clean air and eat clean food.

#### **5. What are sex hormones? Write their functions.**

The hormones which constitute the secondary sexual characters are called sex hormones. In general, hormones work instantly when they released in blood. Sex hormones are different because they start to work later on. They gradually prepare the body for reproduction. The sex hormones are responsible for the fundamental change in growth and development and stimulate the development of secondary sexual characters. The testes and the ovaries are the reproductive organs and both are stimulated by the pituitary hormone during puberty. That is the reason these are called sex hormones.

#### **6. Name endocrine glands, their hormone and their functions.**

**Endocrine glands and their hormones are following;**

- (i) Thyroid - Thyroxine
- (ii) Pituitary gland – Growth hormones
- (iii) Pancreas – Insulin
- (iv) Adrenal – Adrenaline
- (v) Testes – Testosterone
- (vi) Ovary – Estrogen





**Functions :** Growth hormone regulate the growth.

Insuline regulate sugar level in blood.

Thyroxine regulate Metabolism and metamorphosis in frog.

Adrenaline controls blood pressure and heart beats.

### III. Long Answer Type Questions.

1. During adolescence, the boys and girls undergoes certain changes. Give below are a few of those changes

- a. Broad shoulders      b. Wider chests      c. Wider region below waist
- c. Growth of muscles      d. Development of mammary glands
- f. Growth of facial hair      g. Acne and pimples on face
- h. Development of sex organs      i. High-pitched voice
- j. Growth of public hair

Categorise these changes into those that occur in boys and those that occur in girls.

Body changes during Adolescence	
Boys	Girls
Broad shoulders	Wider region below waist
Wider chests	Development of mammary glands
Growth of facial hair	Development of sex organs
Acne and pimples on face	High-pitched voice
Development of sex organs	Growth of public hair
Growth of public hair	

2. Given below are certain food items required for proper nourishment of adolescents.

Name the nutrients present in the food items and write their functions.

S.No	Food items	Major Nutrient	Functions
1.	Pulses and nuts		
2.	Oranges and amla		

3.	Sugar, roti		
4.	Oils		
5.	Vegetables		

S.No	Food items	Major Nutrient	Functions
1.	Pulses and nuts	Proteins	Growth, repair of body cells
2.	Oranges and amla	Iron and vitamins	Formation of blood keeps the body healthy
3.	Sugar, roti	Carbohydrates	Provide energy
4.	Oils	Fats	Provide energy
5.	Vegetables	Vitamins and minerals	Keep the body healthy and disease free.

3. In human females, each time during maturation and released of egg the inner wall of uterus thickens, is this thickening permanent? Give reasons.

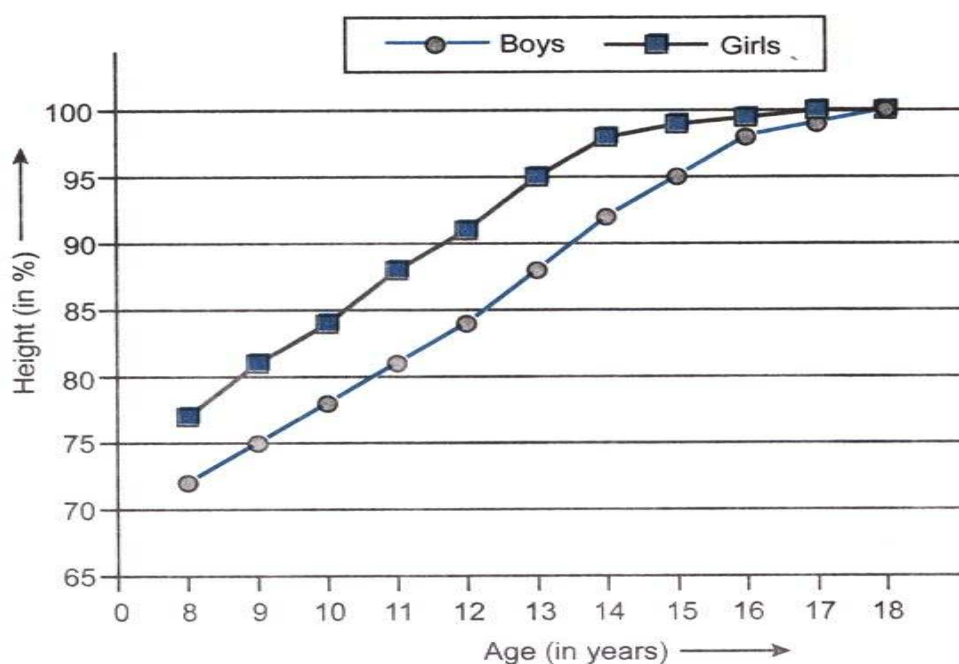
No, this thickening of the uterine wall is not permanent.

If the egg gets fertilized, it starts developing and gets embedded in the uterine wall resulting in pregnancy. During pregnancy no more eggs are released and the thickened lining is discharged only when the baby is born. However, if fertilization does not occur, the released egg and the thickened lining are shed off resulting in menstruation.

4. Observe the given chart and graph carefully and answer the questions that the following.

Age in years	% of full height	
	Boys	Girls
8	72%	77%
9	75%	81%
10	78%	84%

11	81%	88%
12	84%	91%
13	88%	95%
14	92%	98%
15	65%	99%
16	98%	99.5%
17	99%	100%
18	100%	100%



a. Which of the line represents the height of boys?

b. Which line represents the height of girls?

c. What is the difference between the pattern of increase in the height of boys and girls?

d. is this pattern true for each individual?

a. The red line represents the height of boys.

b. The blue line represents the height of girls.



c. At the onset of puberty, girls grow faster in height than the boys and by the age of 18 years, approximately both reach their maximum height.

d. No, the rate of growth in height varies among individuals. Some may grow in height suddenly at puberty and then slow down, while others may grow gradually.

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### **I. High Order Thinking Skills (HOTS) Questions.**

**1. Are hormones responsible for controlling the change from tadpole to frog? If so name the hormone.**

Yes thyroxine hormone is responsible for controlling the change from tadpole to frog i.e. metamorphosis.

**2. During which time, should the adolescent girls take special care of personal hygiene?**

Adolescent girls should take special care of cleanliness during the time of menstrual flow.

**3. A tadpole is kept in iodine deficient water. How will it affect its growth? Explain.**

Tadpoles growing in iodine deficient water have retarded growth. This is because the growth and development is regulated by thyroxine hormone which is produced by thyroid gland. As iodine is required for thyroxine production, retarded growth is seen in tadpoles when kept in iodine deficient water.

**4. Rinku is 13 years old. She is getting pimples on her face these days about which she is worried. Can you explain why she is getting pimples during this age?**

During puberty, there is increase in the activity of sweat and sebaceous glands. This leads to increased sweating often resulting in body odour. The excess oil and sweat get collected in the tiny pores of the skin, blocking them so that the bacteria can grow in it. This causes the formation of pimples and acne on the face of boys and girls at this time.

**5. Name the virus that causes AIDS. What are the medium through which this virus is transmitted?**

AIDS is caused by a virus named HIV. It can be transmitted from an infected person to a healthy person by following ways:

- (i) By infected syringes
- (ii) By infected mother to an infant



(iii) By sexual contact with infected person.

## II. High Order Thinking Skills (HOTS) Questions.

1. Lila always eats only dal nad rice in every meal. She often falls ill and has become prone to diseases. Can you suggest changes in her diet which can make her healthy and free from disease?

Lila's diet is not a balanced diet because her meals do not contain the adequate nutritional requirement. She takes only proteins and carbohydrates in every meal. She requires to take vitamins and minerals in her meals to protect her from various diseases. Thus, I would suggest her to include fruits and vegetables in her meals.

2. Why many of the boys have a hoarse voice?

At puberty, the voice box or the larynx begins to grow. So that boys develop larger voice boxes. It can be seen as a protruding part of the throat called Adam's Apple. In adolescent boys, sometimes, the muscles of the growing voice box go out of control and the voice becomes hoarse.

## Value Based Questions

1. Reena was happy when she gave birth to her second child. Her in-laws were dissatisfied at her not giving birth to a male child and blamed her. Reena tried to explain her in-laws but she was afraid; then her husband took up the matter and explained them biologically.

(i) What are sex chromosomes?

(ii) Is it right to blame mother for the child's gender? Give reason to your answer.

(iii) What were the values shown by Reena's husband?

(i). A specific pair of chromosomes determine the sex of the individual. These are called sex chromosomes named X and Y.

(ii) No, the belief that the mother is responsible for the sex of her baby is completely wrong and to blame her for this is totally unjustified. It is so because the sex chromosomes of the father determine the sex of an unborn baby.



(iii) Strong and determined personality with responsibility towards the family and respect of elders.

**2. Female human beings have period after a certain age. This is an indication by the body that she is able to make new tiny humans now.**

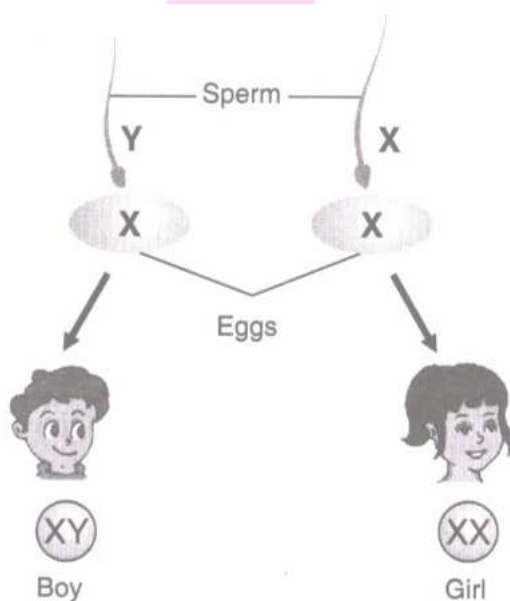
- (i) Does the process have a scientific term?
- (ii) What is the human female said to have attained at this stage?
- (iii) Does the onset of this process in human female signify anything?
- (iv) A particular name is given to the event when this process stops permanently. What is it?

- (i) This process is known as menstruation.
- (ii) The human female is said to have attained puberty.
- (iii) The onset of this process signified that the reproductive system of human female has started working.
- (iv) Menopause is the term used when this process stops permanently.

### Skill Based Questions

**1. Draw a diagram to show sex determination in human and answer these questions.**

- (i) What happens when sperm containing X chromosomes fertilises the egg.
- (ii) What is the sex of a baby if sperm containing Y chromosomes fertilises egg.



- (i) Female sex determination takes place.
- (ii) The sex of the baby will be male.

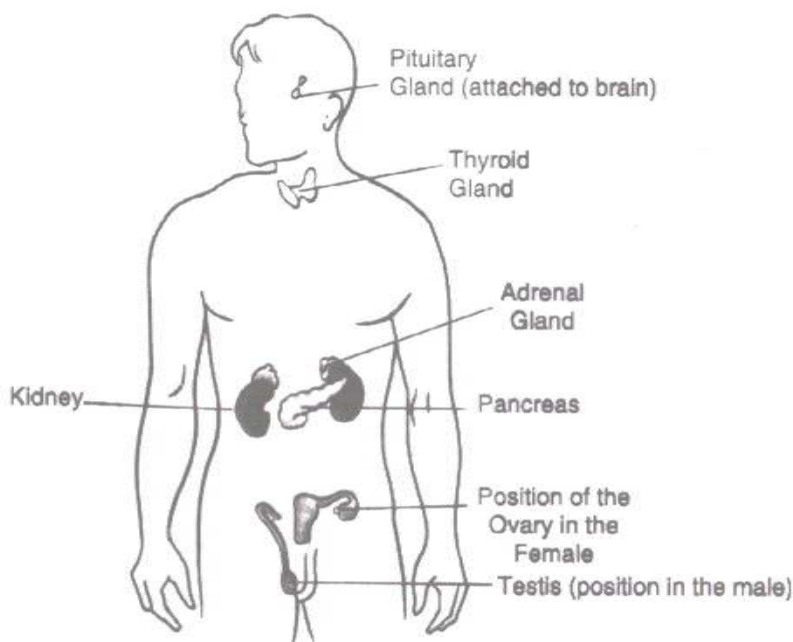


2. (i) Draw a diagram to show the position of various endocrine glands. Label pituitary gland, thyroid gland, adrenal gland, pancreas, ovary and testes.

(ii) Name the hormones released by ovary and testes.

(iii) Out of ovary and testes which produces egg and which produces sperm?

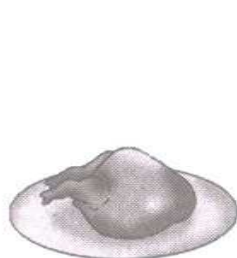
(i)



(ii) Ovary produces estrogen and testes produce testosterone hormones.

(iii) Egg is produced by ovary and sperm is produced by testes.

3. Draw a diagrams of some nutritious items of food like meat, vegetables, milk and eggs, fruits and grains.



meat



vegetable



fruits



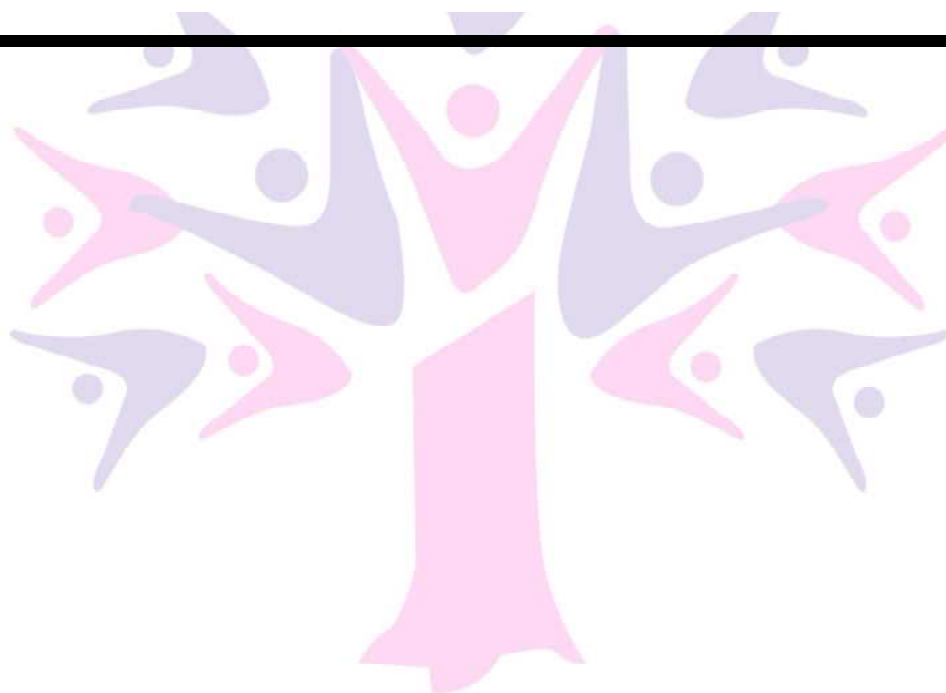
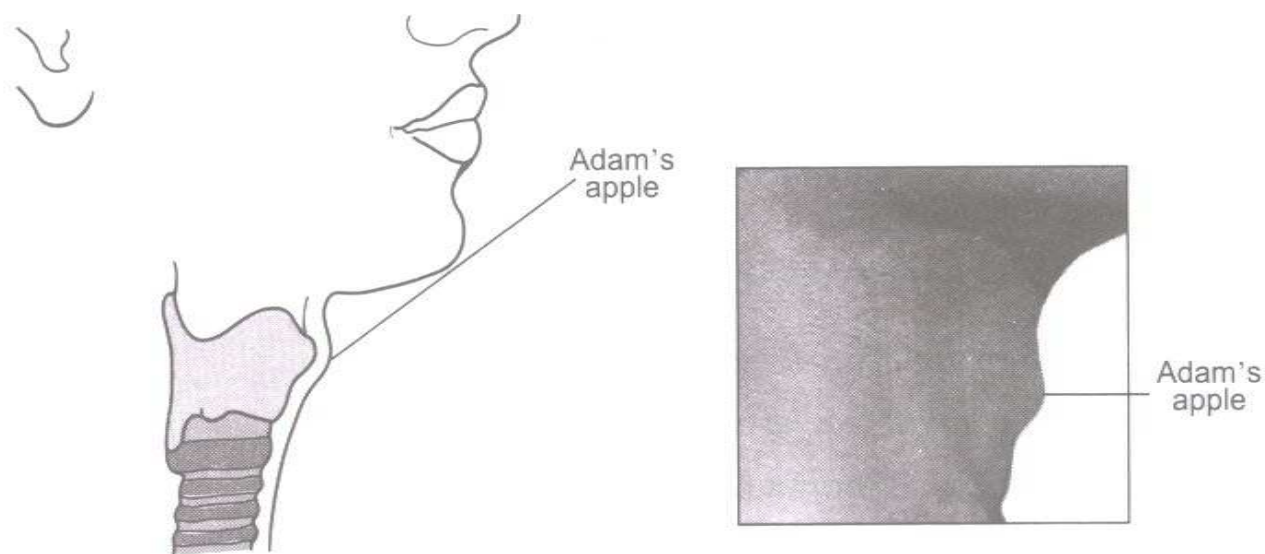
milk and eggs



grains



4. Draw a diagram of Adam's apple in a boys.



Next Generation School