

## 5. ATTAINING THE AGE OF ADOLESCENCE



Naveen is studying VIII class. He is very active, he has been idle these days. He even feels shy while talking to strangers and even with the relatives visiting their home. If he starts speaking, his voice becomes somewhat hoarse. He does not care to follow suggestions and advises of his parents. He shows restlessness if parents tell him to put his books in the bag or bring something from the market. His parents are worried on noticing his changing behaviour. Naveen's Grandmother says he is growing now, that is why he is not listening to their words.

- Some of you also may behave like this, Why?
- Have you noticed that you are growing?

Usually, we see changes in the age of 13-19 years (according to WHO). This period is called "Adolescence". During this period changes are observed inside (internal) and outside (external) the body. For example, Changes in voice, growing tall etc.

Do you observe these changes in you too? Write down the changes usually you observed during your adolescence.

### Have you attaining the age of "Adolescence"?

- Is mustache growing on your upper lip?
- Did your voice change?
- Are hairs growing under arm pit?
- Are there pimples or acne on your face?
- Are you taking care of your face by applying powder and combing your hairs frequently?
- Are you feeling shy when talking with opposite sex?
- Are you not interested to play with opposite sex which you have done earlier?
- Are you showing restlessness while your parents suggest you to do something?

If your answers are 'Yes' for most of the above questions it reflects that you are in adolescence phase.

During adolescence, changes occur in external, internal parts of the body. You will show interest to spend time with peers. The changes may be misleading. That could be one of the reason for the worry of your parents. Adolescents does not show interest to discuss about the changes with their parents. This is a complex stage of life, because they grow from childhood to adolescence. They have a lot of stress due to these changes and are unable to decide whether they belong to adulthood or childhood. This is the period of confusion and transition.

Who am I?



You are not old enough to sit with us go and play

You are too old to play

*Fig-1*

## Changes at adolescence

### Increase in Height

Growth is one of the important characteristic in human beings. Can we go on growing through out our life time? We can't grow like plants. We grow to certain height for certain period only. This change takes place in adolescence. at maximum pace. You may have observed that you and your friends are growing and slowly losing the child like features.

An individual reaches his / her maximum height during adolescence period only. You may also be growing taller now.

- Do you know upto which age you will grow?
- Can you guess the maximum height you will reach?

### Activity-1

#### Observing growth rate

The following chart gives the average rate of growth in height for both boys and girls with age (table-1).

The figures in column-2 and 3 give the percentage of the height a person has reached at the age, as given in column-1.

These figures are only representative and there may be individual variations.

**TABLE-1**

Age in years	% of maximum height (boys)	% of maximum height (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

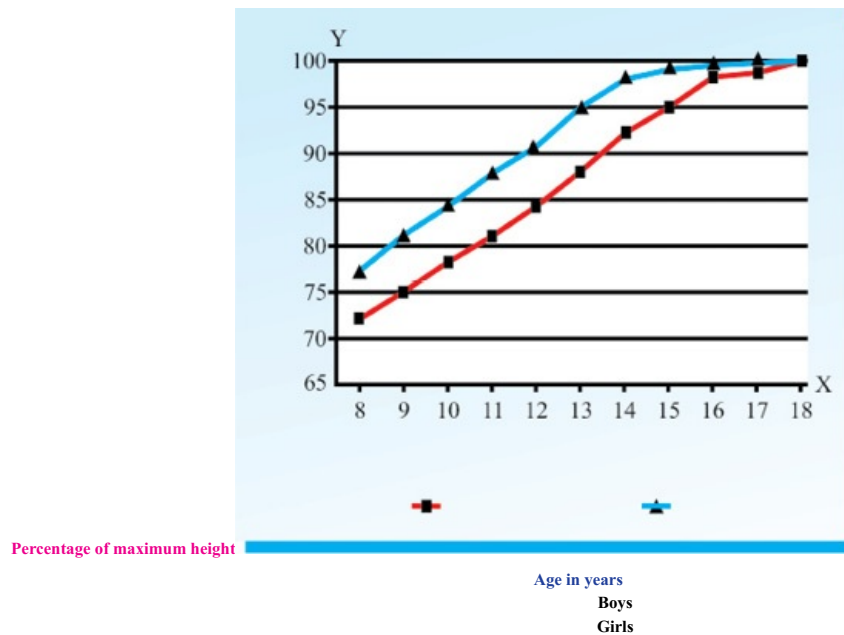


Fig-2

What have you observed from the above table? Using the data of table-1, graph has been drawn. Observe the graph and answer the following questions.

- When does growth in height nearly stop?
- Which period of age according to you is the fastest growing period for girls?
- Which period of age is the fastest growing period for boys?
- Who do grow faster? How can you say?

Initially the girls grow faster than boys. But by about 18 years of age both reach their maximum height. The rate of growth in height varies in different individuals.

Some may grow suddenly and then growth slows down gradually.

I will tell how much height you will grow:

You can also tell how much height your friend will grow. For this you need the following formulae.

Present height (cm) X 100 = Maximum height that you may gain

% of full height at this age (as given in the chart)

For example Sneha is 13 years old with 125 cm tall. At the end of the growth period she is likely to be  $125/95 \times 100 = 131.5$  cm.

Use the information as given in Table- 1 and calculate the maximum height that you will reach.

Table -1 shows that girls grow faster than boys in their adolescent period. As for example by the age of 11 years a boy has grown to 81 % of his probable maximum height, while a girl grows to 88% of her maximum height. From a group with six students in your class. Measure their height and calculate the future heights in the following table.

TABLE-2

Name of the Student	Age	Present height	Maximum growth in height
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The above activity helps you to calculate how tall you would be. To reach a proper height there are several factors involved. One of them is proper nourishment.

## Activity-2

## Changes in your body

Form five groups in your class. Take at least 15 students in each class. Your selection should be random which means students with Odd role number or whose name starts with letter 'S' etc.

Collect body measurement data of the selected 15 students. For this you need to observe health record which is available in your school.

Find an average body measurements for boys and girls in each class separately (If school health record is not available you will take teachers help to measure the components perfectly) record them in your note book as per the table given below.

(For component under voice, you put tick (☑) mark in relevant column)

**TABLE-3**

S.No	Name	Age	Height	Chest	Shoulder	
	Voice					
						Soft
						Horse

For each class (VI to X) you have to prepare one table. And then we have to calculate averages of the collected information with the help of your teacher.

- Find the average for each component of your table.
- What relations do you find in these four components?
- Is there any sudden change or gradual change that you observe?
- Between which classes do you find a maximum growth in height?

(Information collected by you will give a clue to about some changes you notice that in your body as you grow especially during a particular period of life, that is the adolescent period).

You might have noticed that boys in your class have broader shoulders and wider chests than the boys of class 6. In girls the region below the waist starts becoming wider to prepare the body to deliver baby in future. Muscles of the body grow more prominent in boys than in the girls. Thus changes occurring in adolescent boys and girls are different.

## Voice Change

- If you attend a phone call of a child, can you say whether the child is a boy or a girl? Why?
- How do you know whether the speaker is a boy or a girl?
- Why do break in voice commonly occur in boys during adolescence?

Generally change in voice is seen during adolescence

the voice of boys become hoarse in this stage. Let us know about this.

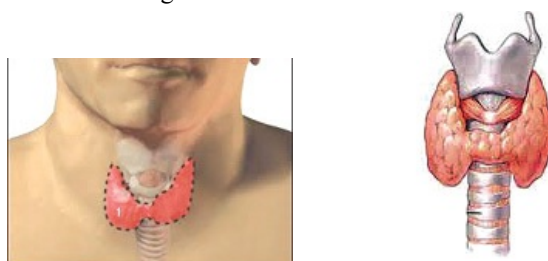


Fig. 3

## Adam's apple in an adolescent boy

Look at figure-3 and observe some projections at the boy's throat. Try to see the same things in any of your school mates. This is known as Adam's apple.

The Adam's apple is actually a partial growth of our voice box or larynx. The larynx is made up of 9 cartilages (the kind of substance that you can feel by bending your external ear) one of which is the largest, called as thyroid cartilage. The Adams apple is formed due to elongation of the thyroid cartilage which protrudes out in front of the neck. This is caused mainly by some male hormone (regulatory chemicals) during adolescence. As a result of this, muscles (chords) attached to the cartilage get loosened and thickened. When air passes through these loosened and thickened chords a hoarse sound is produced. The laryngeal prominence is usually more prominent in adult men than in adolescent boys.

This is the reason for disturbance in your voice in the stage of adolescence. At the end of the adolescence stage you will get perfect voice.

### Sweat and pimples:

Naturally in adolescence, boys and girls take care of their face and look frequently in mirror. They also feel worried of their pimples and acnes. Sometimes these pimples lead to infection. Can you guess the reason?

The secretions of sweat and sebaceous glands in adolescents are very active. Many adolescent boys and girls get pimples on the face, because of increased activity of these glands in the skin. Owing to extra secretions sometimes a distinctive odour is also produced from their bodies. Do not squeeze the pimples. They make your face appear with black spots.

### What should be done?

- Do not scratch the pimples
- Wash your face regularly with a mild soap
- Use luke warm water to wash pimples and acne.
- Never get worried of pimples because stress and strain may help them to increase.

### Development of sex organs

Let us recall about the male and female reproductive organs already learnt in the previous chapter.

At this age, male sex organs like the testes and penis develop completely. The testes also begin to produce sperm. In girls, the ovary enlarges and eggs begin to mature. Ovaries also start releasing mature eggs.

In girls breasts begin to develop whereas in boys, facial hair, moustaches and beards begin to grow. Hair starts growing on the chest of boys. In both boys and girls hair grows in the armpits and at the genital region. They are called '**secondary sexual characters**'. The sex organs by which children are identified as boys or girls at birth represent **primary sexual characters**.

### Reproductive phase of life in humans:

Reproduction is most important for continuation of human race. You know that reproduction takes place by the fusion of male and female gametes.

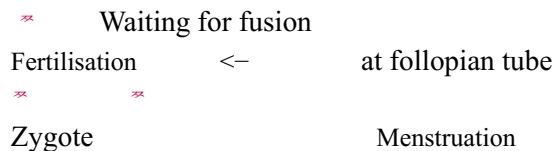
Do you know? When our reproductive capacity begins?

Adolescents become capable of reproduction when their testes and ovaries begin to produce gametes. Actually there is no specific age; mostly in between

11-15 years. It differs from person to person. (Now-a-days girls are reacting adolescent period earlier than expected. Some observations explain that it is because of polluted food material such as estrogen present in milk. This fact may also effect the boys and delay the reach of the reproductive phase.) The capacity lasts for a much longer in males than in females. Though their bodies are prepared for reproduction physically, mental growth and maturity are still far way..

Look at the sequential order of reproductive stage and answer the questions that follow

Male	Female
Testis	Ovary
Sperm	Ovum



**Fig-4**

Schematic diagram of menstrual cycle and reproduction

The first menstrual cycle begins at adolescence and is termed as 'menarche'. It is the sign of starting of release of ova in female reproductive life.

- Do the production of eggs last long in females?
- What would happen if ovulation stops?
- What happens if ovum is not released?
- How does nature prepare the uterus to receive the fertilized egg?
- What happens if fertilization does not take place?

In females, the reproductive phase of life begins usually around 10-12 years of age and generally lasts till the age of approximately 45-50 years. The ova begin to mature with the onset of adolescence. One ovum matures and is released by one of the ovaries once in about 28 to 30 days. During this period the wall of the uterus becomes thick so as to receive a fertilized egg and this results in pregnancy. If fertilization does not occur, 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. It is nature's wonderful phenomena.

At 45 to 50 years of age, the menstrual cycle stops. This stage is known as menopause.

Menstruation occurs once in about 28-30 days. In some cases, initially menstrual cycle may be irregular. It takes some time to become regular. If it remains irregular for over a year, then there is a need to consult a doctor (gynecologist).

## People and myths

Some sections of people in our society believe that during the period of menstruation woman are untouchable. So, they are asked to keep a distance from others. During this time girls may be restricted from taking bath, cooking food or going to school. In that case they may lag behind in their studies. In some sections of the society even women are also forced to stay in the huts built at the outskirts of the village.



## Think and Discuss

- In what way this kind of discrimination is harmful for girls and women?
- Several researches have been done to prove that all these are myths and there is no scientific reason behind these. The blood and egg that is discarded would give rise to a baby if fertilization took place.
- This is a biological phenomena. So how can it be impure or unclean?
- During menstruation period proper care regarding health and hygiene is needed rather than following myths.

## Child marriage – A social evil

Marriage is social and cultural practice to produce next generation in our country. Before reaching required age to get married is an unhealthy issue.

Child marriage is social evil which causes unwanted damage to their lives. Let us read the story of Latha who fought against her marriage.

Latha was studying VIII class in Bigyaram village of Kodangal Mandal in Mahaboobnagar district. Her parents decided to get her married. She protested as much as possible.

But they did not agree. Teachers and local social workers and officials stopped this child marriage. Now she is studying in the school along with her friends.

- Discuss in your class why child marriage is a social sin. It should be avoided.
- Ask your teacher and write how child marriages cause damage to her health.

You might know that in our country, the legal age for marriage is 21 years for girls and 23 years for boys. This is because teenage mothers are not prepared mentally or physically for motherhood.

Early marriage and motherhood cause health problems for the mother and the child. It also curtails employment opportunities for the young woman and may cause mental agony, as she is not ready for responsibilities of motherhood.

## Fast and frigid

Adolescence is the growing age where physical changes takes place. Apart from this we may observe some changes in behavior also. Adolescents are very fast in taking decisions. They do not want to be forced to do any work, behave sometimes fast and sometimes frigid

### Activity-3

Read the following check list. Put tick (☑) mark, which points reflect your behaviour.

#### Check list:

Prefers to spend more time before the mirror and like to use perfumes (	)
Do not want to listen to parent's suggestions	( )
Feels only friends are correct not parents	( )
Searching for identity from teachers and peer groups	( )
Want more independence in taking decisions	( )
Feeling responsibility in work allotted at school, house	( )
Showing risk taking behavior	( )
Taking decisions by critical thinking	( )
Sometimes feel shy sometimes feel happy	( )
If try to get friendship with opposite sex	( )
Inclined towards unhealthy habits	( )
Having more self consciousness	( )
Show more sensitive towards others emotions	( )

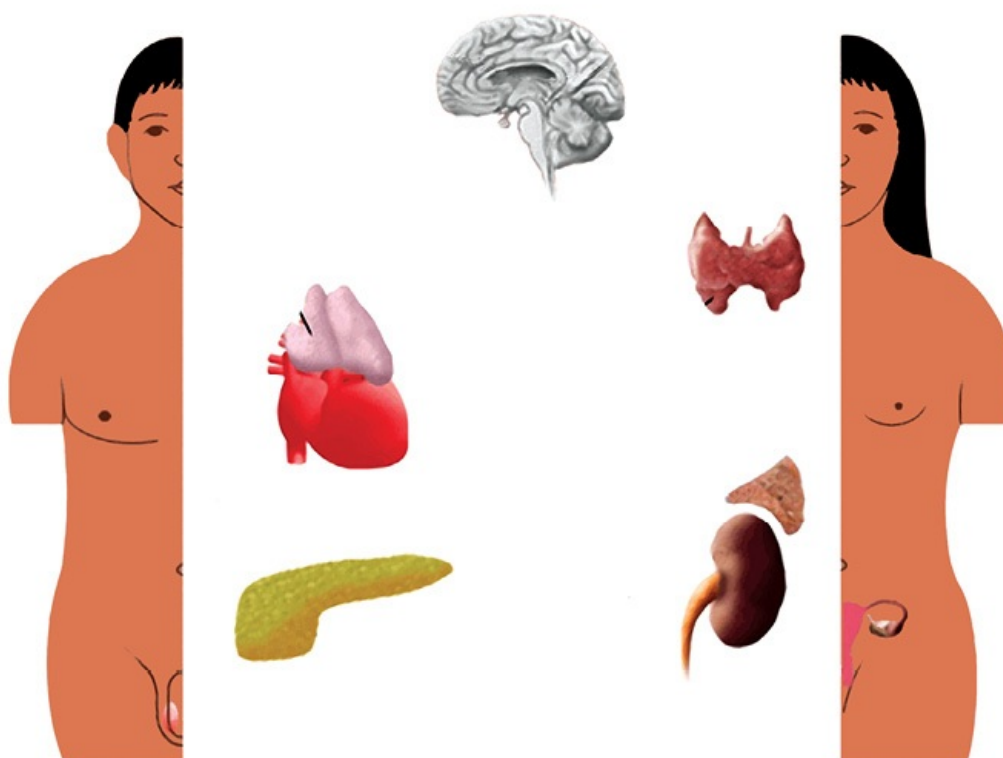
To make your future in a right way, you need to know more about adolescence. For this here are some points to help. Do you know why you behave like this. You know what is good what is bad. But you people are more inclined towards which attracts to you.

- These are all common in the phase of adolescence. Interest towards body and self is natural. Attraction towards opposite sex is also a normal response. No one needs to worry.
- The mind of an adolescent is full of zealous acts and urge to find reasons of several things around. They develop abstract ideas as well.
- Emotionally they are in a turbulent state all the time they get new thoughts for their life activities.
- Adolescents behave in a different manner as compared to what they did during childhood with peers and elders.
- Adolescents are more independent in nature and very self conscious.
- An adolescent feel insecure while trying to adjust to the changes in the body and the mind. They seek company of friends to share their feelings even if they are of the opposite sex. This is normal. They need a lot of attention, love and care as well as answer to all their queries regarding their body and its developments.
- It is the first and foremost duty of every adult to prepare oneself to reveal to the adolescent the secrets of nature and the natural course of life as it is. Adolescent queries must never go unanswered

## Hormones and adolescence

The following figure helps you to know more about hormones that influence on adolescence. This figure shows the position of a special group of glands called endocrine glands in the human body. These glands help in the

regulation of the functioning of the human body by releasing some chemicals directly into the blood.



**Fig-5 Position of some endocrine glands in the human body**

The endocrine glands do not have specialized ducts so, they are called as ductless glands. The secretions of these glands are known as hormones which are directly released into blood. The endocrine hormones perform several functions in the body like; Hormones control the sugar levels, salt and calcium levels in the blood. Also control water levels of the body. Along with these endocrine glands play an important role in development of the reproductive system. Physical changes during adolescence, starting of menses, pregnancy and menopause etc are largely under the control of these hormones.

The male hormone 'testosterone' begins to be released by the testes at the onset of adolescence which causes changes in boys. In girls ovaries begin to produce the female hormone 'estrogen' which brings about the development of breasts. Milk secreting glands or mammary glands develop inside the breasts.

**Following table shows a list of some endocrine glands and some of the hormones produced by them.**

S. No.	Gland	Hormone	Effect
1	Testis	Testosterone	Release of sperm, secondary sexual characters in male
2	Ovaries	Estrogen	Release of ovum, menstruation, secondary sexual characters in female
3	Pituitary	Pituitary hormones like growth hormone, follicle stimulating hormone (FSH) Leutinizing hormone(LH)	Brings about general growth, stimulus other endocrine glands. FSH directs estrogen for formation of ovum or eggs in uterus of females, while in males directs testosterone to stimulate sperm sacs to produce sperms. LH causes the egg to burst out and flow into the



fallopian tubes.

4

Adrenal

Adrenalin

Controls emotions

## Adolescence and health

It is very important to be healthy and fit at any stage of life. For this, proper nutrition and hygiene is necessary. So far we have discussed that adolescence is the age when growth and development takes place at a faster rate. That is why it becomes more essential to be careful about health and hygiene in the adolescent period.

### Balanced diet

Hunger levels of adolescents are very high. They need to eat different varieties of food. This is the stage of rapid growth and development, because the diet for an adolescent has to be carefully planned. Taking healthy and nutritive food is very important.

You already studied in the earlier classes that the balanced diet includes proteins, carbohydrates, fats and vitamins in requisite proportions. Our Indian meal of *roti/rice*, *dal* (pulses) and vegetables is a balanced meal. Milk and Fruits are also useful for nourishment. Iron builds blood and iron rich food such as leafy vegetables, jaggery, meat, citrus, Indian goose berry (amla) are good for adolescents.

Because of this hunger, adolescents generally prefer to eat chips, packed or tinned snacks, road side foods appears to be very tasty, but they never replace the balanced diet. Eating them regularly may cause unwanted problems, like obesity, mouth and stomach ulcerations, increase in blood sugar levels and blood pressure etc. So adolescents you must say no to junk food.

### Cleanliness

We have studied that sweat glands becomes more active in adolescents and give body a distinctive odour. So it is better to have bath at least twice a day. All parts of the body and inner wears should be washed and cleaned every day. If cleanliness is not maintained there are chances of having fungal, bacterial and other unwanted infections. Girls should take special care of cleanliness during the time of menstrual cycle. Making use of disposable napkins may reduce chances of infections.

- Under NPEGEL scheme girls are provided sanitary napkins in most of the schools of our state. Write down the programmes conducted by NPEGEL in your school.

### Physical Exercise

Walking and playing in fresh air keeps the body fit and healthy. All young boys and girls should take a walk, exercise and play outdoor games. The physical activity leads to conditions of better health, sound sleep and there by mental peace. Mental peace promotes happiness in day to day existence. Instead of playing outdoor games spending time by watching T.V. or working on computer leads to drowsiness. That is why you are not able to pay attention on our studies.

Adolescence is a period when many changes take place in the body. Because of these changes one may get tensed, confused or insecure. In this situation if anybody suggests that you will get relief if you take some drugs, just say “NO”, unless prescribed by the medical doctor. In case of having any problems, insecurity or tensions it is better to discuss and take help of your elders, parents, teachers or doctors.



### Do you know?

Consuming tobacco (gutkha, cigarettes, cigar, beedi, khaini) damages the internal organs of the body. The number of addicted people at the age of 15 or below is 57.57 lakhs (68%) in AP. When they reach 30 years of age their internal organ system becomes damaged, and this leads to several problems and sometimes, may cause death also. It is a dangerous trend in our country. So you should be aware of healthy habits.

A famous psychiatrist Stanly Hall stated that adolescence is the age of stress and strain. By getting proper guidance from teachers, parents and elders, you ultimately be able to lead a happy meaningful life.



### Think and Discuss

- If young generation is trapped into such unhealthy habits, what will be the future of our country? What are its effects?

Are you participating in adolescent education programmes in your school? Do you have a membership in red ribbon club? List out the programmes held for the last three months in your school and also add your opinion.



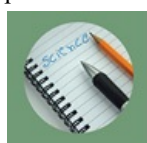
### Key words

*Adolescence, Teenage, Larynx, Adam's apple, Maturity, Sweat glands, Sebaceous glands, Secondary sexual characters, Menstruation cycle, Menarche, Menopause, Pregnancy, Endocrine glands, Hormones, Testosterone, Estrogen.*



### What we have learnt

- Adolescence is the period of reproductive maturity which lies usually between the ages of 10 to 19 years.
- During adolescence a child's body undergoes many changes physically as well as mentally.
- Voice of boys becomes harsh as chords of voice box get loosened and thickened during adolescence.
- Height gain in children during adolescence and stops after words.
- The onset of puberty or development of secondary sexual characters and maturity of reproductive parts are controlled by hormones that become functional at the onset of adolescence.
- Hormones are the secretions of endocrine glands without ducts which secretes them directly into the bloodstream.
- Pituitary glands secrete hormones which include growth hormones and other stimulating hormones that make other glands such as the testes, ovary, adrenals etc secrete hormones.
- Testosterone is the male hormone and estrogen is the female hormone that bring about development of several secondary sexual characters.
- The uterine wall in female prepares itself to receive the developing fertilized eggs. In case there is no fertilization, the thickened lining of the uterus wall breaks down and goes out of the body along with the blood. This is called menstruation.
- It is important to take balanced diet for overall growth and development during adolescence.



### Improve your learning

1. How is adolescence different from childhood? (AS1)
2. Write short notes on the following. (AS1)
  - a) Secondary sexual characters
  - b) Adam's Apple.
3. List out the changes in the body that take place at the age of adolescence? (AS1)
4. Match the following: (AS1)
  1. Testes ( ) a. Estrogen
  2. Endocrine gland ( ) b. Pituitary
  3. Menarche ( ) c. Sperm
  4. Female hormone ( ) d. First menstruation
5. Why acne and pimples are common in adolescents? (AS1)
6. What can you suggest to your classmates to keep himself / herself clean and healthy? (AS1)

7. If you have chance to talk with a doctor, what questions you would ask about adolescent emotions and changes in the body? (AS 2)
8. Some mobile phones have auditory meter to measure frequency of produced sound. By using this phone measure your friend's voice frequency one from each class VI to X. Report your findings. (AS 3)
9. Write five suggestions to improve the performance of Red Ribbon club of your school? (AS 6)
10. Prepare a three minute speech on behavioural changes in adolescents. (AS6)
11. Nature prepares human body to reproduce her generations. What do you think of it? (AS 6)
12. You know that early marriage is a social taboo. Prepare some slogans to prevent this. (AS 6)
13. 13 years old Swaroop always think of his height. Can he improve his height? What do you suggest him? (AS 7)
14. Are you angry with your parents. How do you wish your parents to be? (AS 7)
15. What are your expectations about your parents and teachers? (AS7)