

Class:8	Subject: Science	Topic: Reaching the age of adolescence
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SUMMARY SHEET		
Learner Previous Knowledge	Digestive System; Circulatory system; Respiratory system and Excretory System	
Target Knowledge for this Topic	Reproductive System Study how reproduction takes place in humans; Study the male and female reproductive organs; Find out the different signs of adolescence that occur; Understand what is puberty; Study the reproductive phase in humans; Learn about how chromosomes affect the sex of the offspring; Study about the hormonal system in humans	
Learning Goals		
More Complex Learning Goal- Students will be able to identify and rectify errors with respect to reproductive and endocrine systems.		
Target Learning Goal-Students will be able to describe how reproductive and endocrine systems function, their inter-relationship and explain the role played by hormones in adolescence and how sex determination takes place.		
Simpler Learning Goal- Students will be able to state organs and glands of reproductive system and endocrine system with their functions and different signs of adolescence that occur.		
1.	- Understands the term adolescence and puberty - Relate to changes occurring in their body due to puberty.	- Board and markers - Worksheet 1
2	Understand about endocrine system and its functions.	- Board and markers - Worksheet 2 - Reference sheet 1
3	Find out about the reproductive phase of life in humans and explain how hormones affect secondary growth in males and females	- Board and markers - Reference sheet 2 - Worksheet 3

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4 and 5	Identify and describe the problems related to adolescence	- Board and markers - Worksheet 4 - Worksheet 5
6	Explain the importance of reproductive health and personal hygiene	- Board and markers - Worksheet 6 - Chart Paper/Art sheet per group
7	Find out about how sex of a baby is determined through an activity	- Board and markers - Reference sheet 3 - Worksheet 7 - One cup having 2 black marbles and another cup having one black and one white marble (one set per group)

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Period 1

Lesson Objectives

At the end of this lesson students will be able to:

- Understands the term adolescence and puberty
- Relate to changes occurring in their body due to puberty.

Teaching Learning Materials required

- Board and markers
- Worksheet 1

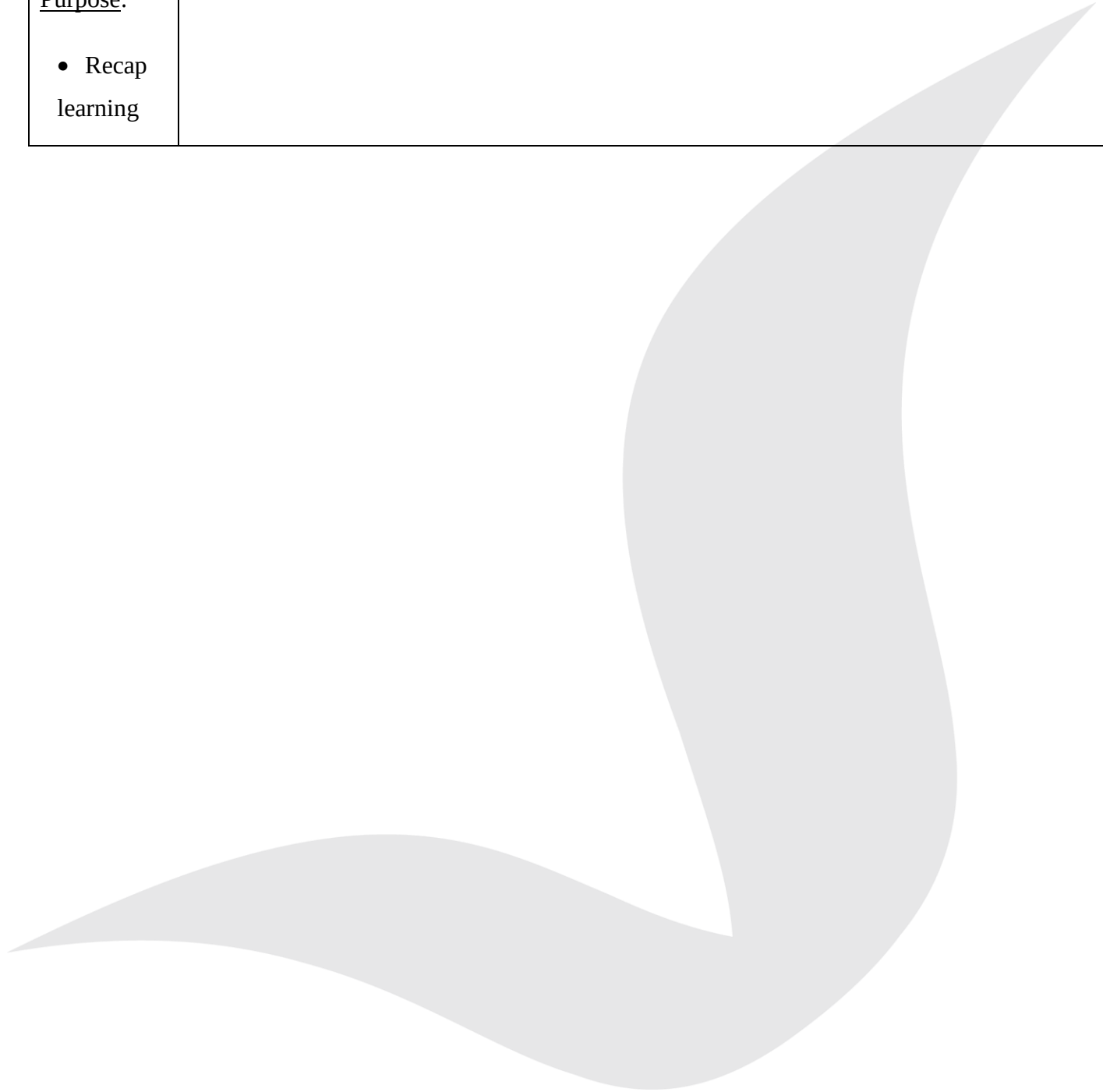
Details of Teaching Learning Experience

Seating Arrangement: - In groups of 4 or 5

Lesson Beginning <u>Time:</u> 5 min. <u>Purpose:</u> Introduction to the topic	• Ask the students to recall the concept of reproduction in humans. • Ask them about the legal age of marriage for boys and girls in India. Let them think for the reason of the appropriateness of the age. • Ask them to discuss few changes they are able to observe in themselves in last few months. • Tell the students that the changes which they are observing is due to onset of puberty in them.
Lesson Middle <u>Time:</u> 25 min. <u>Purpose:</u> Develop conceptual understanding	• Discuss about the adolescence. • Explain the term puberty and how it is different from adolescence. • Discuss the different changes occurs at the onset of puberty. • Distribute worksheet 1 to the students. • Let them attempt the question in group of worksheet. • Discuss the answers with whole class.

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Lesson End <u>Time:</u> 5 min <u>Purpose:</u> Recap learning	Clear the doubts, if any.
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Worksheet 1

Skill: Comprehension

Q1. List any three changes that takes place in boys at the onset of puberty.

Q2. List any three changes that takes place in girls at the onset of puberty.

Q3. Boys and girls show few different changes during the teenage. Name any two of them.

Q4. Are changes related to adolescence, only related physical aspect of body?

Q5. Adolescent age is like a wet clay. How?

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Period 2

Lesson Objectives

At the end of this lesson students will be able to:

- Understand about endocrine system and its functions.

Teaching Learning Materials required

- Board and markers
- Worksheet 2
- Reference sheet 1

Details of Teaching Learning Experience

Seating Arrangement: - In groups of 4 or 5

Lesson Beginning <u>Time:</u> 5 min. <u>Purpose:</u> Recap the previous learning and generate interest	• Pose the questions: ○ How does growth occur naturally? ○ Do you think only the organs are responsible for the natural processes of growth and development to occur? ○ Have you ever heard of endocrine system? If yes, what is it? • Inform the students that now they will find out how these processes occur naturally and also learn about endocrine system and how it works.
Lesson Middle <u>Time:</u> 25 min. <u>Purpose:</u> Develop conceptual understanding	• Discuss about the endocrine system with the help of the reference sheet 1. • Distribute worksheet 2 to the students. • Let the students attempt the questions and discuss the answers in group. • Discuss the answers in the class.

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Lesson End <u>Time:</u> 5 min <u>Purpose:</u> Recap learning	<u>Finish Up and Recap:</u> - Clarify any doubts that students may have. <u>Homework distribution</u> - Ask students to do homework questions given in worksheet 2.
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Worksheet 2

Skill: Comprehension

Q1. What is endocrine system?

Q2. What are hormones?

Q3. What are glands?

Q4. Which kind of glands are there?

Q5. Which hormone can be found only in females?

Q6. Anil has started getting faint mustache, now that he is 16 years old because his adrenal gland is actively giving out adrenaline. Do you agree or disagree with the statement? Why?

Q7. Sheetal's uncle has to take insulin injection every day before meals. What do you think is wrong with him? How does the injection help?

Q8. Pituitary is often called the master gland. Why do you think it is so?

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Homework

1. Answer the following questions:

- Which hormones are secreted by testes and ovaries?

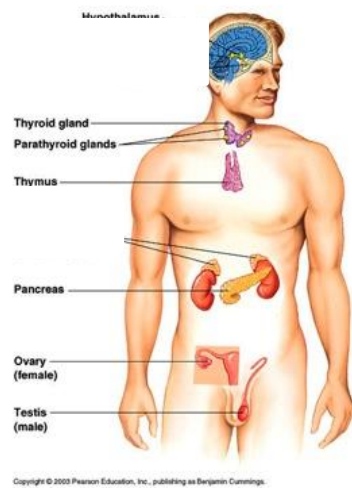
- Do the hormones affect all parts of the body or specific parts?

- Why endocrine glands are called ductless?

- What do you mean by secondary sexual characteristics?

Reference sheet 1

Endocrine system



Endocrine system: The endocrine system is made up of glands that secrete chemicals called ‘hormones’ into the bloodstream or surrounding tissues. It includes the pituitary gland, thyroid gland, parathyroid gland, adrenal glands, pancreas, ovaries and testes.

Hormones: Hormones can be called as chemical messages. From the blood stream, the hormones communicate with the body by heading towards their target cell to bring about a particular change or effect to that cell. A hormone will only act on a part of the body if it ‘fits’. A hormone can be thought of as a key, and its target site (such as an organ) as the lock. Just as a lock has a specific key, a hormone acts only on specific cells or organs.

Glands:

Pituitary gland –It oversees the other glands and keeps hormone levels in check. It releases important hormones. Example: Growth hormone which is necessary for normal growth

Thyroid gland: It is in the neck at the front of the windpipe. It releases thyroid hormone Thyroxine which is required for metabolism and maintaining internal body balance in its functions. Less thyroxine leads to goitre, a disease.

Adrenal glands – There are two adrenal glands which sit on top of each kidney. They maintain salt balance. Their major hormone is Adrenalin which helps in coping with stress.

Pancreas – It is an organ of digestion which makes insulin. Insulin is required to control the amount of sugar in the bloodstream. Less insulin leads to Diabetes.

Ovaries –These make female sex hormones like oestrogen. Oestrogen helps in developing secondary female characteristics.

Testes – These make male sex hormones like testosterone. Testosterone helps in developing secondary male characteristics.

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Period 3

Lesson Objectives

At the end of this lesson students will be able to:

- Find out about the reproductive phase of life in humans and explain how hormones affect secondary growth in males and females

Teaching Learning Materials required

- Board and markers
- Reference sheet 2
- Worksheet 3

Details of Teaching Learning Experience

Seating Arrangement: - In groups of 4

Lesson Beginning <u>Time:</u> 5-7 min. <u>Purpose:</u> Generate interest	<u>Discussion</u> - Ask the students to share one answer to any of the questions given in homework. Let there be a brief discussion on the answers and collate the responses to arrive at a common consensus. - Write the following words in that order: Adolescence Childhood Puberty Adulthood - Ask the groups to arrange them in correct order.
Lesson Middle <u>Time:</u> 30 min. <u>Purpose:</u> Develop conceptual understanding	<u>Worksheet</u> - Discuss the reference sheet 2 with the students. - Distribute worksheet 3. - Let the groups discuss the answers and attempt worksheet. - Let each group now share their answers with the rest of the class. Let the whole class decide on the answers with common consensus.
Lesson End <u>Time:</u> 5 min <u>Purpose:</u> Finish Up	<u>Finish up</u> Clear any doubts that students may have. <u>Homework Assignment</u> Read up newspaper or magazines and find out the meaning of juvenile. Then scour the newspaper and see if there is any news of adolescents or juveniles who

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Homework Distribution	have committed crimes or who have been in trouble because of adolescent-specific problems.
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Reference sheet 2

Information:

1. **Childhood** (till 10-12 years) → **Puberty** (After 10-12 years; reproductive phase) → **Adolescence** (capable of reproduction, developing of secondary characteristics)

↓
Adulthood

2. Females:

Estrogen helps develop female secondary characteristics.

Secondary characteristics that develop at onset of puberty are:

- breast enlargement and developing of sex organs
- developing of hair under the arms and the pubic region
- hips become wider

3. Males:

Testosterone helps develop male secondary characteristics.

Secondary characteristics that develop at onset of puberty are:

- growth of beard and mustache
- developing of chest hair and hair under the arms and the pubic region
- development of sex organs
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4. Menstrual cycle

- Ova mature at puberty. One ovum is released every month.
- Uterus prepares its walls to implant ovum in case it gets fertilized by preparing a thick lining with blood vessels.
- If the ovum is not fertilized, thick lining is shed along with the blood vessels which results in bleeding. This is called menstruation. In case the ovum fertilizes then the thick lining and blood vessels are ready to nourish the embryo.
- Menstruation occurs once every month. It marks the reproductive phase of a female.
- This period from puberty till end of reproductive phase is called menarche.
- When menstrual cycle stops at 45-50 years, it is called menopause.
- Menstrual cycle is controlled by hormones.

Worksheet 3**Skill: Analytical Thinking**

1. Amit has become very conscious of his hoarse voice and refuses to go to social events. He is very depressed. What advice can you give him to make him feel better?

2. In the given picture, who must have reached menopause state and who may be in menarche state? Justify your answer.



3. What is the relation between menstruation and the release of ovum?

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Lesson Plan 4 and 5

Lesson Objectives

At the end of this lesson students will be able to:

- Identify and describe the problems related to adolescence

Teaching Learning Materials required

- Board and markers
- Worksheet 4
- Worksheet 5

Details of Teaching Learning Experience

Seating Arrangement: - In groups of 4 or 5

Lesson Beginning <u>Time:</u> 15 min. <u>Purpose:</u> Recap the previous learning	• Recap the secondary characteristics that males and females develop in puberty. Inform the students that they are in the process of going through several body changes which is natural. Collect response on the homework assignment. Seek response from the students and let them share and discuss any latest news items concerning adolescent problems.
Lesson Middle <u>Time:</u> 45 min. <u>Purpose:</u> Develop conceptual understanding	<u>Discussion</u> • Distribute worksheet 4 to all students and ask them to attempt it. • Let the students exchange their answers within their group. Let there be an open forum discussion and let the students decide which answers of all the students matched a lot in majority. • Ask the students to decide what it means. Does it mean that all adolescents feel/go through a difficult time when their body is undergoing change? Have a whole class discussion where students can share personal experiences on how they sometimes feel embarrassed due to bodily changes. • Now distribute worksheet 5 to all groups. Let the students discuss the cases. Let there be a whole class discussion on the cases.

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	• Guide the discussion in the right direction so that at the end of it, they arrive at correct answers.
Lesson End <u>Time:</u> 10 min <u>Purpose:</u> • Consolidate learning	<u>Consolidate learning</u> • Ask each group to imagine and write a situation which depicts problems faced by adolescents, in their notebook. Inform them that the situation must be short, informative and crisp. They must also include leading questions at the end of the situation. • Let the groups exchange their work among themselves and attempt to answer the questions. • Let each group share their response to the situation. • Let the class arrive at a consensus with respect to the response for each situation.

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Worksheet 4
Skill: Drawing Inferences
What I think of myself

	Most of the time	Sometimes	Almost Never
I like the way I look			
I behave the way I am expected to at a party rather than being my ownself.			
I feel pressurized in dressing up the way my friends do.			
It is important for me to be popular.			
I feel conscious of my growing height and body.			
I know smoking is bad but I want to feel 'hip' and modern and try it.			
I feel conscious while talking to classmates of other sex.			
I am scared of the responsibility of being a grown up person.			
I feel my parents put a lot of pressure on me to behave in a specific manner which is not fair.			

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Worksheet 5**Skill: Analytical Thinking****Case Study 1**

1. Anita was a 14-year-old girl who was extremely tall for her age. She felt awkward while walking and soon earned the nickname 'Giraffe-nita'. This made the situation worse and she started slouching. Her physical awkwardness affected her studies too. She started withdrawing in her shell and soon stopped communicating with others.

Imagine that you are a counselor. How do you think you can help Anita? What can you convey to her to make her feel good about herself?

Case Study 2

2. Sumit, a 16 year old boy, often observed his father smoking cigarettes with disgust. He knew it was bad habit and he often told his father who ignored him. Once, on a school picnic, 3-4 classmates got together and soon one of them produced a cigarette packet from his pocket. Very confidently, he asked others to share a cigarette with him. Seeing others picking one, Sumit felt hesitant. He wanted to feel to be a part of their group. He was in a dilemma. If he refused, then his friends would consider him to be a 'wimp'. If he accepted, he would be miserable.

What should Sumit do? Should he accept it? What is your opinion?

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Lesson Plan 6

Lesson Objectives

At the end of this lesson students will be able to:

- Explain the importance of reproductive health and personal hygiene

Teaching Learning Materials required

- Board and markers
- Worksheet 6
- Chart Paper/Art sheet per group

Details of Teaching Learning Experience

Seating Arrangement: - In groups of 4 or 5

Lesson Beginning <u>Time:</u> 5 min. <u>Purpose:</u> Recap the previous learning	• Recap the problems related typically to adolescence from the previous class. Jot down the responses quickly, on the board. • Now ask the students to recall their knowledge on balanced diet and how different food groups are required to maintain health. • Announce that adolescence is a stage of rapid growth and development and hence the diet must be nutritious and healthy.
Lesson Middle <u>Time:</u> 25 min. <u>Purpose:</u> Develop conceptual understanding	<u>Activity & Collection of Information</u> • Distribute worksheet 6 to all students. Also distribute art sheets to each group. • Ask the groups to collect information on what their friends had for breakfast, lunch and dinner on the previous day. Each group should collect information from at least 5 students. • Based on the collected data, they should now draw inferences whether adolescents are having nutritious and balanced diet or not. • The last part of the annexure that is, part B should be attempted by the group together. • Let each group now make a slogan for saying NO to drugs and make a creative poster.

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Lesson End <u>Time:</u> 5 min <u>Purpose:</u> • Finish Up	<u>Finish Up</u> • Let each group show the posters to others and now they can put up these posters in the class.
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Worksheet 6
Skill: Spirit of Enquiry
Part A

Name of the Student	Breakfast	Lunch	Dinner

Based on the above data, answer questions:

1. Is the meal of average students balanced and nutritious?

2. Does the diet include cereals which give energy and milk, nuts, and pulses which provide protein?

3. Does it include fat and sugar that give energy?

4. Does it include adequate fruit and vegetable?

Part B

❖ Given below are some statements. They are popular myths (untruths) Argue in your groups why they are myths and not facts.

- A girl becomes pregnant if she looks at boys during menstruation.
- The mother is responsible for the sex of her child.
- A girl should not enter kitchen during menstruation.

❖ Focus on the given information. Make a creative poster with a slogan saying NO to drugs.

- Drugs are addictive.
- Drugs harm mental and physical health severely.
- Do not feel pressurized or come under peer pressure to take drugs.
- The deadly AIDS caused due to HIV virus spreads easily through infected syringes shared while using drugs.
- HIV is spread through sexual contact with a partner infected with HIV or it can be passed on to the offspring from its mother if she is infected with HIV.

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Lesson Plan 7

Lesson Objectives

At the end of this lesson students will be able to:

- Find out about how sex of a baby is determined through an activity

Teaching Learning Materials required

- Board and markers
- Reference sheet 3
- Worksheet 7
- One cup having 2 black marbles and another cup having one black and one white marble (one set per group)

Details of Teaching Learning Experience

Seating Arrangement: - In groups of 4 or 5

Lesson Beginning <u>Time:</u> 5 min. <u>Purpose:</u> Recap the previous learning	• Ask the students to define terms such as menarche, menopause, secondary characteristics etc. to recap the previous class. Now inform the students that they will learn about how the sex of a baby is determined. • Ask the students: What is it that decides that the baby is going to be a girl or a boy? After collecting response, discuss the information given in reference sheet 4.
Lesson Middle <u>Time:</u> 30 min. <u>Purpose:</u> Develop conceptual understanding	<u>Activity</u> • Distribute worksheet 7 and the cups containing marbles to each group. • Ask the students to do the activity as per the instructions given in worksheet. They must now discuss the results and write their observations/answers in the sheet. • After they have attempted it, let there be a whole class discussion. • Guide the discussion in the right direction so that at the end of it, they arrive at correct answers.

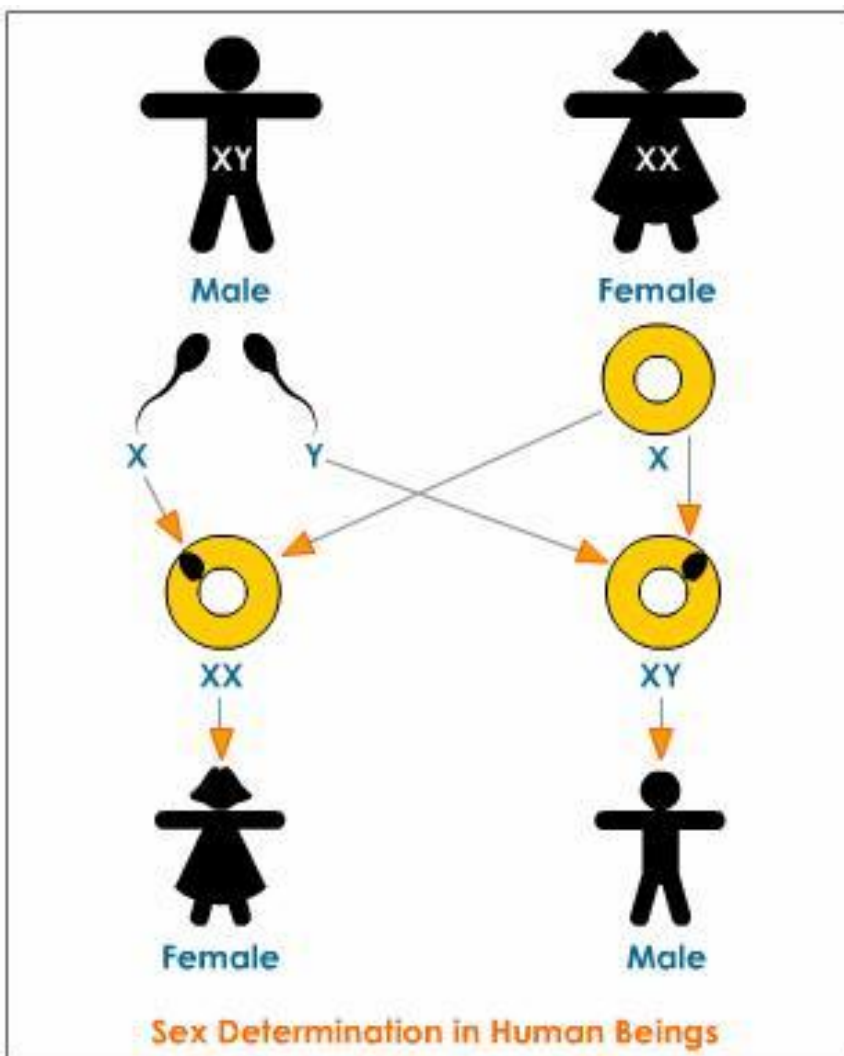
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Lesson End <u>Time:</u> 5 min <u>Purpose:</u> • Finish Up	<u>Finish Up</u> • Clear any doubts that the students may have.
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Reference sheet 3

1. Every nucleus of a cell has chromosomes.
2. Every human being has 23 pairs (i.e. 46) chromosomes. 22 pairs are identical while 2 chromosomes of these are called sex chromosomes. The sex chromosomes are of 2 types: X and Y. Females have only two X chromosomes while males have one X and one Y.
3. As opposed to cells of other organs, the egg cell has only half the number of chromosomes i.e. X type.
4. On the other hand, males have sperms of two types: X and Y. Half the sperms have X chromosome and the other half have Y.
5. If a sperm with an X chromosome fertilizes the ovum, the foetus will be female. Boys have an X and a Y chromosome. If a sperm with a Y chromosome fertilizes the ovum, the foetus will be male.



7. The sex cells of parents combine to form a zygote. The zygote thus has 23 chromosomes from the mother and 23 from the father, resulting into 46 chromosomes.

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Worksheet 7
Skill: Drawing Inferences
ACTIVITY

1. Mark one cup “ova”, and put 2 black marbles into that cup.
2. Mark the other cup “sperm” and put on black marble and one white marble into that cup.
3. Look away and choose one marble from each cup.
4. Observe the combination that you have got and tick the correct box in the table.
5. Let each member do this. Each one should record their observation in the table.

Name of the student	Combination obtained 2 black marbles	Combination obtained 1 black marble+ 1 white marble	Girl/Boy

A. Answer the questions:

1. Based on your observation, what do you think are the chances that the foetus will be a boy or a girl?

2. How many boys did you get?

3. How many girls did you get?

4. What will happen if sex cells too contain 46 chromosomes instead of 23?

5. Who do you think is responsible for the sex of a child; mother or father?
