

LESSON PLAN (PERIOD -WISE)

SUBJECT: BIOLOGY

GRADE: XII

Chapter Number and Title of Chapter	CHAPTER 6 : MOLECULAR BASIS OF INHERITANCE (STRUCTURE OF DNA)
Period Number	(approx. 40 min each) One period
Learning Objectives	Given the content (chapter) the learners will be able to - Identify the components of DNA - Understand the arrangements of these components in the macro molecule. - Gain knowledge of the physical structure and dimensions of DNA
Teaching Aids / Resources	Videos (Teaching and Explanation video will be shown to the students) PPT (A presentation on the topic will also be included as a part of the discussion in the class room).
Previous Knowledge/ Curiosity Questions	The students should have the knowledge of Inheritance and variations. Their knowledge will be tested by asking them oral questions on the above mentioned topics. - What are names of the two nucleic acids found in living organisms? - Which molecule is responsible for transmission of characters from one generation to the next?
Announcement of topic	The facilitator announces to the class “Let us begin our discussion by first understanding the structure of the molecule that controls inheritance and the day to day functioning of the cell, that is, the DNA”.
Teaching Methodology/ Strategy	Transaction would proceed in the following manner- Suggestive Methodologies: Brain Storming / Curiosity Questioning Anticipatory Set The facilitator introduces the chapter by Brain Storming (Critical, Collaboration). Class would be divided into 3 groups. Each group will be asked to answer one of the following questions- - Why we resemble more to our parents than our aunty/ uncle? - What do you think is the role of nucleic acids in an organism? - Why DNA is called the master molecule of a cell? Active learning- The students will answer the above questions and read them out to the class for further discussion which will be aided by the PPT and the video which will be shown on the structure of DNA.

	Questioning- <i>Guided practice followed by Independent Practice.</i> NCERT questions to be discussed in the classroom. : Q.1- 3 on page no. 125 of the textbook will be discussed
Content Obligatory Vocabulary (Keywords)	NUCLEOTIDES. A combination of ribose sugar, phosphorus and nitrogenous bases is called a nucleotide. WATSON – CRICK MODEL: The famous model through which the structure of DNA was proposed by these two scientists. ANTIPARALLEL CHAINS: The two chains of DNA that run parallel to each other but the sugar molecule in one base is upright and inverted in the other chain. This is called antiparallel chain arrangement. BASE PAIRS: The nitrogen bases are joined together by hydrogen bonds and this pairing of two bases is called a base pair. Adenine (A) always pairs with thymine (T) and guanine (G) always pairs with cytosine (C).
Learning Concepts/ Teaching Points	1. DNA is a right handed double helix. The helix is held together by hydrogen bonds between the nitrogen bases. 2. The two polynucleotide chains of DNA are antiparallel to each other. 3. Each base pair is separated from the other by $3.4 \text{ \AA}$ and the DNA makes one full turn after $34 \text{ \AA}$. 4. Adenine (A) always pairs with thymine (T) by two hydrogen bonds and guanine (G) always pairs with cytosine (C) by three hydrogen bonds.
Hard Spots/ Focus Spots	The focus point of this topic is: The concept of Anti parallel chains of the DNA helix. The reason: The concept is abstract and students cannot understand it easily because it is difficult to visualize how two chemically similar chains can be anti-parallel. The effect: The students are unable to explain the concept clearly when asked in the form of a question in the examination.
Experiential Content	Name of the activity: Extraction of DNA from the given plant material. Type: Individual. Learning outcome: The students will be able to see the DNA strands for themselves. Procedure: 1. Chop the onion into small pieces and place inside the pestle. • 2. Measure out 200 mls (1 cup) of the water. Pour this into a

	glass and add one level teaspoon of salt and stir well. • 3. Add enough of the salty water to cover the onions in the pestle add 4-7 drops of detergent to the solution, then crush the onions with the mortar. • 4. Pour the onion-salt-water mixture through the strainer and collect the liquid in a glass. • 5, Slowly spread the above solution in a petri dish so that it just covers the base of the petri dish completely. • 6. Add 100 ml of chilled 95% ethyl alcohol to the petri dish slowly and allow to stand for 10 minutes. • 7. White strands of DNA will appear on the surface of the liquid. Questions: What do you see? Why was it necessary to chop the onion and mix it with a solution of salt and detergent? Hints/Answers 1, The white colored strands are DNA fibers. 2. Salt and detergent break up the cell wall and cell membrane of the onion cells.
Subject Enrichment Activities for Internal Assessment	1, The students will draw a diagram of the DNA double helix in their note books. 2. They will write down the salient features of the Watson – Crick model in their note books. 3. They will attempt the NCERT back question numbers 1-3 in their note books.
Recapitulation :	The facilitator will ask oral questions on the concept points covered in the lesson and then close the topic by going over the main features of the Watson Crick model once again.
Assignment:	The students will be asked to attempt the following questions: • How many strands make up a DNA double helix? • What holds one strand against the other in the double helix? • Why a cell keeps the DNA safe? • How many base pairs would a DNA segment of length 1.36 nm have? • Draw a detailed diagram of dinucleotide and label its components. • A DNA segment has a total of 1500 nucleotides, out of which 340 are adenine containing nucleotides. How many pyrimidine bases

	this DNA segment possesses? • Draw a diagram of a part of double stranded dinucleotide DNA chain having all the four nitrogenous bases and showing the correct polarity. • A DNA segment has a total of 2000 nucleotides, out of which 520 are guanine containing nucleotides. How many purine bases this DNA segment possesses? • What background information did Watson and Crick had available with them for developing a model of DNA? What was their own contributions?
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