

DEPARTMENT OF SCHOOL EDUCATION



# STRUCTURED LESSON PLANS FOR CBSE-AFFILIATED SCHOOLS

# BIOLOGY

GRADE-10



A Teacher Resource Book for  
Competency Based Teaching-Learning

STATE COUNCIL OF EDUCATIONAL



RESEARCH AND TRAINING (SCERT)

# Committee for Development of Structured Lesson Plans

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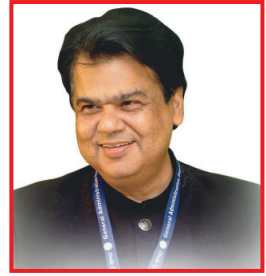
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## MESSAGE BY PRINCIPAL SECRETARY

It brings me a great joy to invite all the teachers of CBSE-affiliated government schools to this valuable resource book of structured lesson plans. Inspired by the vision of our honorable Chief Minister, we are committed to supporting the teachers in shaping a bright future for all the children in Andhra Pradesh. We envision our children transforming into global citizens, excelling in academics and being ready for the world of work. In order to aid the teachers in this pivotal task of preparing the students to emerge as global citizens, the School Education Department is committed to making available the best resources and training. This lesson plans resource book is a transformational step in that direction. Utilized appropriately, this resource books will transform the teaching-learning process and experience in the classroom and lead to deeply engaging the students.

I hope you make the best use of this resource, which has been put together by our own teachers trained by experts from Azim Premji University and facilitated by the Center for Research in Schemes and Policies (CRISP). They have taken into consideration the teaching-learning needs of all types of learners and created lesson plans that are rich in activities, examples, and assessments. They have followed the CBSE Learning Framework and NCERT Learning Outcomes for Secondary Stage, along with principles from the National Curriculum Framework: School Education 2023.

At the crucial juncture of secondary school, our children need spirited teachers like you to prepare them for the changing and dynamic world. You bear the power and responsibility to shape their minds and hearts and guide them to step out into the world and contribute to our state's growth and country's economy.

Your dedication and efforts in implementing these structured pedagogical approaches will not only enhance the learning experience of our students but also equip them with the necessary skills and knowledge to thrive in an ever-evolving global landscape. Together, let us embark on this journey of educational excellence and empower our students to become the leaders of tomorrow.

With great hope and appreciation,

**Shri Praveen Prakash, IAS**  
**Principal Secretary, Department of School Education**  
**Government of Andhra Pradesh**





## MESSAGE BY COMMISSIONER

The United Nations Sustainable Development Goal 4 (SDG 4) underscores the pivotal role of education in unleashing human potential and fostering self-respect. As the Commissioner of School Education, I am privileged to champion a vision that empowers the children of Andhra Pradesh with boundless possibilities and opportunities. Through pioneering reforms in education, encompassing cutting-edge infrastructure, ongoing professional development for educators and administrators, innovative digital initiatives, and an unwavering commitment to providing top-tier educational resources, our state stands as a beacon of educational transformation.

Government of Andhra Pradesh is committed to implement best initiatives to enhance the quality of education in the State. Obtaining CBSE affiliation to 1000 schools is one of such key initiatives. This lesson plan resource book developed for the use of teachers working in CBSE schools represents yet another milestone in our journey. Recognizing teachers as the cornerstone of our education system, we have entrusted them to craft these lesson plans for your benefit. After undergoing rigorous training in pedagogy, subject matter, learning outcomes and competencies, our educators have infused these lesson plans with their profound knowledge of the subject, and understanding of our students and their diverse contexts. It is a labor of love and thought, an amalgamation of explorations and experiments, presented for you to embrace and utilize effectively.

These lesson plans are created with the aim of providing a rich repository of ideas to enhance classroom engagement and productivity, and provide yet another innovative resource that teachers can employ. Feel free to adapt and supplement these plans as you see fit. The teacher reflections section serves as a tool for self-assessment and improvement, allowing you to augment your lessons and address any gaps you may identify.

I am optimistic about our state's trajectory towards competency-based teaching, with a focus on measurable learning outcomes that can be continually evaluated and enhanced. The decision to affiliate 1000 schools with CBSE and implement a curriculum aligned with national standards is indeed a significant stride in the right direction. Together, let us embrace this transformative journey towards educational excellence and empower our students to thrive in an ever-evolving world.

I congratulate everyone who worked towards bringing this excellent resource book for the teachers. I thank Center for Research in Schemes and Policies (CRISP) for the innovative ideas they presented to the Government, including development of structured lesson plans. The support of SPD Samagra Shiksha, continuous facilitation by CRISP, expert technical advice of Azim Premji University faculty, hard work of our teachers, CBSE team in Commissionerate office and SCERT made it possible to bring out this resource book in time for the 2024-25 academic year.

**With sincere optimism and appreciation,  
Shri S Suresh Kumar, IAS  
Commissioner,  
Department of School Education,  
Government of Andhra Pradesh**

## **MESSAGE BY THE STATE PROJECT DIRECTOR**



The National Education Policy 2020 highlights that the purpose of education is to develop good human beings capable of rational thought and action, possessing compassion and empathy, courage and resilience, scientific temper and creative imagination, with sound ethical moorings and values. It aims at producing engaged, productive, and contributing citizens for building an equitable, inclusive, and plural society as envisaged by our Constitution. To realize the NEP's vision, it is essential for educators to align with this goal and transition from curriculum-centric to competency-driven teaching methods.

The State's commitment to this shared vision is visible in the Strengthening Andhra's Learning Transformation (SALT) Project, where one of the pivotal focus areas is the professional development of teachers. This entails utilizing insights from self-assessments, academic performance data from school-based evaluations, and classroom observations to enhance pedagogical skills. With continuous support from the education department, teachers will refine their pedagogical approaches, ensuring effective delivery of lessons.

In the same vein, I am delighted to introduce this Lesson Plan resource book for our CBSE-affiliated schools, crafted by experts from both within our state and across the nation. These lesson plans signify a shift away from rote memorization and content accumulation towards a structured approach aimed at fostering values, dispositions, and competencies in students. Rooted in the vision of the NEP and operationalized by the National Curriculum Framework: School Education 2023, each plan corresponds to a 40-minute class targeting specific learning outcomes from NCERT's Secondary Stage. These outcomes collectively contribute to observable learning achievements and the development of competencies over time. Moreover, this resource book empowers teachers to tailor their content and assessments dynamically by monitoring and addressing students' learning needs continuously.

I hope the teachers will find these resources valuable and helpful in transforming classroom transactions. Together I hope we will reshape the educational landscape of Andhra Pradesh in the years ahead. Best wishes for your endeavors!

**Shri B Srinivasa Rao, IAS**  
**State Project Director, Samagra Shiksha**  
**Government of Andhra Pradesh**



## **MESSAGE BY JOINT DIRECTOR, CBSE**

In a landmark decision, the Government of Andhra Pradesh affiliated 1000 Government schools with the Central Board of Secondary Education (CBSE). This transition marks a significant milestone in our efforts to provide standardized and high-quality education to our students. The CBSE curriculum is widely recognized for its comprehensive and contemporary approach to learning, offering students a competitive edge on a national scale. The Board emphasizes holistic development of learners by providing a stress-free learning environment that will develop competent, confident and enterprising citizens who will promote harmony and peace. It is committed to providing quality education to promote intellectual, social and cultural vivacity among its learners.

By aligning our schools with CBSE, we aim to ensure our students are well-prepared to compete on a national level and excel in today's dynamic world. In order to achieve this, our utmost efforts have gone into developing these structured lesson plans incorporating NCERT's Secondary Stage Learning Outcomes, the National Curricular Framework: School Education 2023, and CBSE Learning Framework document developed by Azim Premji University. 'Structured Pedagogy' is a scientific, evidence-based, learner-centric approach for teaching that equips every teacher with clearly defined objectives, proven methods, well-structured tools, and practical training. After many rounds of rigorous training, expert teachers from our CBSE schools integrated the conceptual and practical aspects of their subjects and condensed them into these easy-to-use lesson plans.

We thank the Center for Research in Schemes and Policies (CRISP) and Azim Premji University for their innovative ideas and tireless support.

I encourage each of you to fully utilize these plans and personalize them to fit your teaching style. May this invaluable resource serve as a valuable tool as you guide Grade 10 students through this critical stage of their education. Your dedication as teachers brings us immense joy and pride, as we entrust the future of our state's children to your capable hands. Wishing you all the best!

**Mr Krishna Reddy**  
**Joint Director, CBSE**  
**Department of School Education**  
**Government of Andhra Pradesh**

## MESSAGE BY CENTRE FOR RESEARCH IN SCHEMES AND POLICIES (CRISP)



**Shri. R. Subrahmanyam**  
I.A.S.(Retd), Secretary of CRISP



**Ms. K. Sandhya Rani**  
IPoS.(Retd), Founding member of CRISP



**Mrs. P. Usha Kumari**  
I.A.S.(Retd), State Lead of AP  
Team CRISP

In October 2023, the Centre for Research in Schemes and Policies (CRISP) forged a significant partnership with the Government of Andhra Pradesh, to help bring about a transformation for the state's School Education system. Our inaugural initiative was designed to cultivate excellence within the 1000 CBSE-affiliated schools. CRISP's primary focus was to support both teachers and students during the transition from the State Board to the CBSE Board.

Research reveals that an average teacher grapples with approximately 1,500 decisions daily. While it may be impractical to intervene in every decision-making process, our aim was to alleviate the cognitive load associated with tasks such as lesson planning, question formulation, activity design, and assessment creation. Recognizing the novelty of transitioning from the State Syllabus to CBSE, our initiative encompassed the provision of essential resources alongside comprehensive training for all educators involved.

To enhance our efforts, we collaborated with Central Square Foundation, a renowned organization in the field of Education, to train our teachers in their Structured Pedagogy approach. This evidence-based, learner-centric methodology equips educators with clearly defined objectives, proven methods, well-structured tools, and practical training.

We are thankful to professors from Azim Premji University who provided invaluable support by mentoring the core group of teachers over a six-month period, guiding them through NCERT's Learning Outcomes for the Secondary Stage and the National Curriculum Framework: School Education 2023. The culmination of these efforts is the creation of this resource book, comprising structured lesson plans for the benefit of teachers, and vetted meticulously by the SCERT. We hope that the tremendous effort of our teachers serves as an inspiration to continue shaping the minds of our youth.

We extend our sincere gratitude to Dr. Emmanuel Joseph, Joint Commissioner (Academics) at CBSE, New Delhi, professors from Azim Premji University, experts from Central Square Foundation, the State CBSE team, SCERT, and the entire Department of School Education for their invaluable guidance and support throughout this endeavor. Their deep commitment to enhance the quality of education and to transform the teaching-learning process in the classrooms made it possible to bring this initiative to life within a remarkably short span of time.

We thank the Government of Andhra Pradesh for giving us this opportunity, for the trust they reposed in accepting the innovative idea and facilitating it to germinate and fructify.



## FOREWORD BY DIRECTOR, SCERT

At the heart of quality education lie two indispensable pillars: the teacher and the student. While textbooks, digital resources, infrastructure, and curriculum play crucial roles in the educational landscape, it is the teacher who bears the primary responsibility of delivering lessons, facilitating comprehension of complex concepts, nurturing independent thinking, and molding individuals into responsible members of society. The Department of School Education, Government of Andhra Pradesh aspires to create citizens equipped with the skills and competencies to succeed and solve problems at a global scale, while remaining locally rooted and aware.

To achieve this goal, we have developed a comprehensive resource book to support teachers across the state, enhancing their planning and teaching processes with ease and creativity.

These meticulously crafted lesson plans have been curated by trained educators and thoroughly reviewed by SCERT experts. Each lesson plan is structured into distinct period plans, addressing specific topics within the lesson. Clear learning outcomes are outlined at the beginning of each lesson and progressively addressed throughout the class session. Furthermore, each period plan is divided into sections including Learning Outcomes, Teaching-Learning Process, Pointers for Assessment, and Material Required, offering teachers a flexible framework to tailor to their preferences. The provided questions to assess prior knowledge, suggested activities, and prompts for understanding checks serve as guides, encouraging teachers to adapt the plans to suit the unique needs of their classroom and students.

The SCERT extends its sincere appreciation to the dedicated members of its textbook committee, source material reviewers, lesson plan creators, and technical partners for their invaluable contributions in realizing this vision. We also express our gratitude to the Principal Secretary and Commissioner, Department of School Education, and State Project Director, Samagra Siksha, Department of School Education for their steadfast commitment to promoting quality education, consistently driving us toward excellence in all facets. We appreciate the steadfast support of Center for Research in Schemes and Policies (CRISP) and professors from Azim Premji University in developing the lesson plans.

**Dr B Pratap Reddy**  
**Director,**  
**State Council of Educational, Research, and**  
**Training Government of Andhra Pradesh**

## INTRODUCTION AND BACKGROUND TO THE STRUCTURED LESSON PLANS RESOURCE BOOK

The National Education Policy, 2020 (NEP) focuses strongly on a need for a well-defined Curriculum and a Structured Pedagogy in schools, to ensure holistic, integrated, enjoyable and engaging learning of the students.<sup>1</sup> In pursuance of the Memorandum of Understanding (MoU) signed between Government of Andhra Pradesh (GoAP) and Centre for Research in Schemes and Policies (CRISP), and the recommendation made by CRISP in the Action Plan for CBSE, GoAP agreed that *“Structured pedagogy should be adopted for Classes 8 and above in the newly converted CBSE schools. For this purpose, while using material already available, standard lesson plans should be prepared.”* In furtherance of adapting structured pedagogy approach in Government CBSE Schools to improve the quality of teaching-learning, the GoAP organized the following:

1. Organised a Structured Pedagogy workshop was organized in collaboration with CRISP in Vijayawada from 11th to 13th July 2023. Experts from Central Square Foundation and Azim Premji University (APU) anchored the workshop, with additional sessions by Room to Read, Leadership for Equity, Ambitus World School, and SCERT Telangana. Sessions focused on the need for a structured way of teaching and learning, shifting from rote method to competency based curriculum, and delved into the NCERT Learning Outcome Framework for the Secondary Stage. A total of 60 subject teachers along with A.P SCERT subject experts participated in the workshop representing English, Mathematics, Social Science, Biology, Chemistry, and Physics. Each subject group consisted of 10 teachers, 1 SCERT expert, and 1 CBSE School Principal acting as a Coordinator. With guidance from CSF and APU, the subject groups prepared one sample lesson plan per subject by the end of the 3-day workshop.
2. Post the workshop, facilitated the expert subject teachers to work on lesson plan development, with virtual support from APU faculty virtually.
3. Organised a Capacity Building workshop from 11th to 14th October 2023 in Vijayawada with expert support of experts from APU. Sessions were held on mapping content to specific learning competencies, designing and using creative Teaching-Learning Materials, adding Check for Understanding questions, using interdisciplinary approach in the lessons, addressing student misconceptions, and creating a diverse range of assessments. The workshop enhanced the ability of the teachers to

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<sup>1</sup>Chapter 4 & 5, National Education Policy, 2020 (NEP, 2020)



- a. understand the principles and practices underpinning competency-based curriculum as outlined in NEP 2020 and NCF-SE 2023;
  - b. equip the teachers to analyse the need to effectively align curriculum content, competencies, pedagogical practices, and assessment methods in the classroom;
  - c. helped them to learn to develop competency-based lesson plans that integrate NCF-SE 2023 guidelines, ensuring that learning outcomes are aligned to the desired competencies with the help of model lesson plans
  - d. trained them to gain practical insights into designing and implementing both formative and summative assessments that accurately measure students' progress toward achieving the competencies set forth in NCF-SE 2023
4. Held a physical camp for the core team of teachers to develop and quality check the lesson plans for all the subjects in Vijayawada for 12-days, from 20th November to 1st December 2023. APU teachers and Leadership for Equity team provided technical support.
  5. In early February 2024 the lesson plans developed for Grade 9 and 10 were vetted and finalised by AP SCERT and sent to the Textbook Press for printing and distribution.

## **ELEMENTS OF THE STRUCTURED LESSON PLANS**

All lesson plans are meticulously organized into detailed period plans, each focusing on a specific topic and its corresponding Learning Outcomes. These period plans are then subdivided into four essential sections:

1. Topic and Learning Outcomes, along with associated Indicators
2. Teaching-Learning Process, highlighting Pedagogical Strategies
3. Assessment Strategies to gauge student understanding and progress
4. Materials required, ensuring all necessary resources are readily available for effective instruction.

Within these sections, the following elements have been covered:

- **Higher order thinking questions** have been added to encourage critical thinking, problem-solving, creativity, and analysis. These questions usually move beyond 'What', and 'When', and focus on 'Why', or 'How'. Some examples of these are:  
"Explain the twinkling of stars." [Physics]  
"How does trade help connect the countries in the world?" [History]



“Why can amphibians and reptiles tolerate mixing of blood to some extent?”

[Biology]

“Do you think it was right for the farmer to be angry with the postmaster? Why or why not? [English]

“What should India do or achieve to become a developed country?” [Economics]

“Why does a snail change its sex?” [Biology]

“How did Gendhadhur, a backward village in Mysore, Karnataka, become rich in rain water?” [Geography]

“Why can’t astronauts see the rainbow from the surface of the moon?” [Physics]

- **Keywords and key concepts** are stated in the beginning of every chapter so that the teacher can be sure to cover them during the course of the lesson
- **Prior knowledge and skills are tested** at the beginning of every period to assess whether students have retained concepts covered in previous lessons, and to gauge the overall level of knowledge on the topic to be covered
- **Prompts and questions to address common misconceptions** about the topic have been given in the plans to clarify any incorrect ideas students may have. For example: “A woman in your neighborhood is blamed for giving birth to a baby girl. Is the sex of the baby determined by her? Remove the misconception through your argument.” [Biology]
- **Discussion prompts** for class or group discussions have been given, especially for the humanities subjects. For example:  
“Why do you think men receive higher wages than women for the same job? Discuss.” [Economics]  
“Human societies have steadily become more interlinked. Comment.” [History]  
“Discuss the benefits and drawbacks of using chemical fertilizers.” [Geography]
- **Assessment and remedial periods** have been allocated after every lesson plan to gauge student learning, and revise concepts that students need more clarity or practice in, before moving to the next lesson
- **Inter-disciplinary nature of subjects and topics** has been encouraged in the plans so that students recognize the value of all subjects equally. It also promotes a holistic understanding of the topic and opens them up to thinking about an issue from various lenses
- **Formative and summative assessments, check for understanding questions, and worksheets** are given for every lesson to assess student learning at every stage of the lesson
- **Space for teachers to reflect on every period** has been provided at the end of the plan. The prompts are designed to assist teachers in assessing the alignment of their plan with overarching curricular goals and competencies, evaluating student engagement levels, ensuring effectiveness of assessment strategies in measuring student understanding, and gauging the efficacy of teaching materials, activities, and case studies utilized

## HOW TO USE THESE LESSON PLANS

Teachers should have a comprehensive understanding of the curricular goals, competencies, and the nature of the subject they teach. It is essential to thoroughly review the section on "Pedagogical Practices" to gain deeper insight into teaching methodologies. With this groundwork, teachers can then delve into the lesson plans for their subject. It is highly recommended to study the entire lesson plan before initiating the lesson in class. Throughout the lesson, teachers can refer to each period plan and manage class time effectively to cover the elements outlined in the plan. Additionally, teachers are encouraged to modify the plan as needed, incorporating or removing content, questions, or activities to address the specific needs of their students and contextual requirements.

## PEDAGOGICAL PRACTICES

### Broad Aims of School Education

The Learning Standards are guided by certain widely agreed upon broad Aims of School Education that are articulated in this NCF. These aims have been arrived at from the vision and purpose of education as envisaged by NEP 2020:

- 1. Rational Thought and Autonomy:** An individual should have the capacity of rational reasoning and sufficient knowledge to understand the world around them. An individual should be able to make an informed decision. This fundamentally requires knowledge in breadth and depth.
- 2. Health and wellbeing:** School education should be a wholesome experience for students. Students should acquire Knowledge, Capacities, and Dispositions that promote mind-body wellness.
- 3. Democratic participation:** This requires appropriate knowledge capacities, values, and dispositions so that an individual may be oriented towards sustaining and improving the democratic functions of Indian society.
- 4. Economic participation:** Education should work as an enabler for a healthy democracy as well as a healthy economy.
- 5. Cultural and social participation:** Along with democracy and economy, society, and culture also play an important role in the mode of associated living. An individual should acquire capacities and a disposition to contribute meaningfully to culture.

### NATURE OF THE SUBJECT: SCIENCE

*(Adapted from the CBSE Learning Standards document. Please refer to it here: [https://cbseacademic.nic.in/cbe/documents/Learning\\_Standards\\_Science.pdf](https://cbseacademic.nic.in/cbe/documents/Learning_Standards_Science.pdf))*

Among many ways in which the inquiring and imaginative human mind engages, expresses, and explains nature's wonder is through science. It is a human endeavour that observes the physical and biological environment carefully, looks for any meaningful patterns, processes,

and relations, making and using new tools to interact with nature, and building conceptual models to understand the world. Also, the knowledge developed helps understand the evolutionary past, current state and predict the future of humanity and nature. It provides us with a way to present ideas that can be tested, repeated, and verified. Scientists gather evidence (as opposed to “proof”) to support or falsify hypotheses. Theories, laws, and principles are supported, modified, or replaced as new evidence appears and are central to scientific thinking.

Despite many attempts to shrug it off in textbook chapters and a note to the teacher section, the prevailing perception on the nature of doing science is through the scientific method and not a scientific method. And that method is linear. This perception of the nature of doing science needs countering, for the art of doing science is a creative, iterative, and interconnected process built on curiosity, healthy scepticism, and questioning.

While science is at its best in understanding simple linear systems of nature, its predictive or explanatory power is limited when it comes to dealing with nonlinear complex systems of nature. Yet, with all its limitations and failings, science is unquestionably the most reliable and powerful knowledge system about the physical world known to humans, augmenting the spirit of enquiry, creativity, objectivity, and aesthetic sensibility leading towards the development of scientific temper. The school science curriculum across classes could gradually nurture scientific temper through appropriate learning opportunities.

NCF 2005 position paper on teaching of science at secondary stage emphasises the learning of science as a composite discipline, in doing so, it encourages the designing of advanced technological modules, analysing issues of health and the surrounding environment, and experimenting systematically to discover and verify theoretical principles.

In a progressive forward-looking society, science can play a truly liberating role, helping people out of the vicious circle of poverty, ignorance, and superstition. In a democratic political framework, the possible aberrations and misuse of science can be checked by the people themselves. Science, tempered with wisdom, is the surest and the only way to human welfare. This conviction provides the basic rationale for science education.

The structured lesson plans in this book are rooted in the vision of the National Education Policy 2020, operationalized by the National Curriculum Framework: School Education 2023, and based on the Learning Outcomes from NCERT’s Learning Outcomes at the Secondary Stage. The following content has been adapted from the original documents to provide context and explanation for the pedagogical practice behind the development of these lesson plans.

## NCERT Curricular Expectations for the Secondary Stage:

For detailed Learning Outcomes and suggested Pedagogical Processes, please refer to the [NCERT Learning Outcomes at Secondary Stage](#)

### SCIENCE Curricular Expectations

At this stage learners are expected to:

- develop understanding of concepts, principles, theories, and laws governing the physical world, consistent with the stage of cognitive development.
- develop the ability to acquire and use the methods and processes of science, such as observing, questioning, planning investigations, hypothesising, collecting, analysing and interpreting data, communicating explanations with evidence, justifying explanations, thinking critically to consider and evaluate alternative explanations, etc.
- conduct experiments, also involving quantitative measurements.
- appreciate how concepts of science evolve with time giving importance to its historical perspective.
- develop scientific temper (objectivity, critical thinking, freedom from fear and prejudice, etc.).
- nurture natural curiosity, aesthetic sense, and creativity.
- imbibe the values of honesty, integrity, cooperation, concern for life and preservation of the environment.
- develop respect for human dignity and rights, equity and equality.

For a more detailed explanation, please refer to the [National Curriculum Framework: School Education 2023](#) (p.45-51, p.88-92, p.101-102, p.116-121)

### Aims of Science:

Science aims to develop an understanding of the natural and physical world through systematic inquiry. Learning Science also builds important capacities such as observation, analysis, and inference. This in turn enables the meaningful participation of individuals in society and the world of work with scientific temper, critical and evidence-based thinking, asking relevant questions, analysing practices and norms, and acting for necessary change. Science Education aims to achieve:

- a. Scientific understanding of the natural and physical world:** Scientific understanding develops through scientific observations, questions, experiments, theories, laws, principles and concepts. An adequate knowledge of these is essential to build a systematic and verifiable understanding of the way the natural and physical world functions.
- b. Capacities for Scientific enquiry:** The abilities to put forth hypotheses, arguments, predictions and analyses, and to test hypotheses, evaluate situations, and draw logical

conclusions, are fundamental to the learning of science. Science education must thus build these skills in students systematically over the stage in school.

- c. **Understanding the evolution of scientific knowledge.** There are crucial historical moments in the development of Science and scientific knowledge that could not have occurred without the efforts of various individuals and organisations over thousands of years. Understanding these key moments and discoveries will develop students' understanding of how scientific knowledge and the methods of science evolved and still evolve over time.
- d. **Interdisciplinary understanding between Science and other curricular areas:** Learning in science involves understanding interlinkages across disciplines. Students would learn to inquire and learn about the world through such an interdisciplinary approach.
- e. **Understanding of relationship between science, technology and society:** Engaging with issues related to connections between Science, Technology and Society including the ethical aspects and implications, and appreciating the role of science in addressing the challenges and the world is undergoing, will add to the breadth of students' learning.
- f. **Scientific temper:** Students will imbibe scientific values and dispositions such as honesty, integrity, scepticism, objectivity, tenacity, preservice, collaboration and cooperation, concern for life, and preservation of the environment.
- g. **Creativity:** Asking good questions, formulating hypotheses and designing good experiments to test those hypotheses often require artistry and creativity. Developing such creativity and a sense of aesthetic in the pursuit of scientific understanding and exploration is very important.

For more details on the Aims of specific subjects please refer to the NCFSE following pages:  
English: p234-267; Mathematics: p268-293; Science: p294-319; Social Science: p320-352.

**CLASS : X**

**CHAPTER : LIFE PROCESSES**

**TOTAL NO. OF PERIODS: 18**



**Aims of Education:**

1. Rational thought and Independent thinking
2. Health and wellbeing
3. Democratic and community participation

**Aims of Science Education:**

1. Scientific understanding of the natural and physical world:
  - Student develops scientific understanding through specific observations, questions, experiments, principles and concepts.
2. Capacities for scientific inquiry:
  - Student puts forth hypotheses, predictions and analyses and evaluates situations and draws logical conclusions fundamental to the learning of science.
3. Interdisciplinary understanding between science and other curricular areas:
  - Student understands inter linkages across disciplines.'
4. Creativity:
  - Student develops creativity in designing good experiments and formulating hypothesis.

## Curricular Goals and Competencies

**Curricular Goal – 1** : Explores the world of matter, its interactions and properties at the atomic level  
Competency -1.3: Describes and represents chemical interactions and changes using symbols and chemical equations (to describe the mechanism of life processes like nutrition, transportation, respiration and excretion)

**Curricular Goal – 3** : Explores the structure and function of the living world at the cellular level  
Competency - 3.2 : Analyses similarities and differences in the life processes involved in nutrition (photosynthesis in plants., absorption of nutrients in fungi; digestion in animals); , transport (transport of water in plants; circulation in animals); exchange of materials ( respiration and excretion).

**Curricular Goal – 4** : Explores interconnectedness between organisms and their environment  
Competency - 4.1 : Applies the knowledge of cellular diversity in organisms along with the ecological role organisms play to classify them into different groups (autotrophs, heterotrophs; aerobes. Anaerobes)

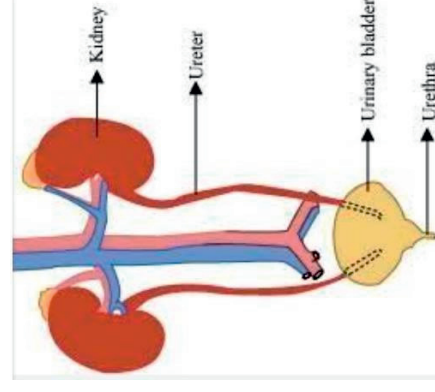
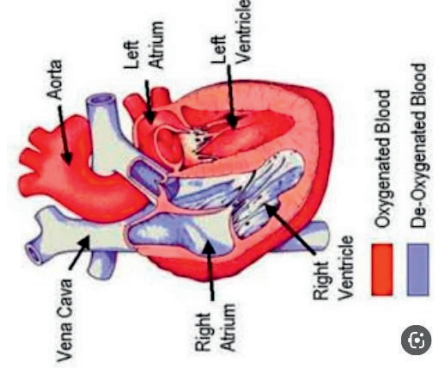
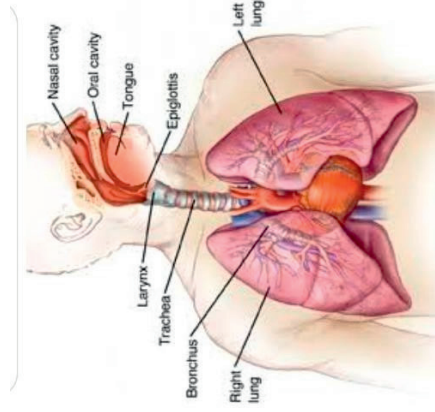
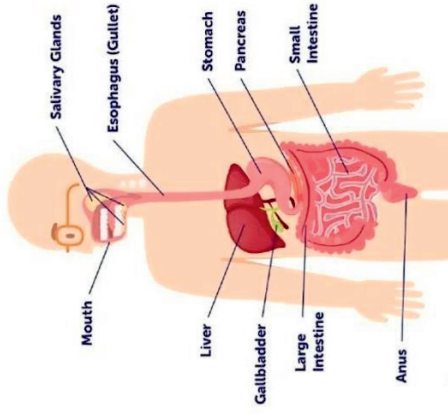
**Curricular Goal - 5**: Draws linkages between scientific knowledge and knowledge across other curricular areas  
Competency - 5.1 : Explores how mathematics is applied in science

**Curricular Goal - 8**: Explores the nature of science by doing science  
Competency - 8.1: Develops appropriate models to represent real life events  
Competency - 8.2 : Designs experiments, formulates hypothesis and represents data

\*\*\*\*\*



# CONCEPT FLOW OF LIFE PROCESSES



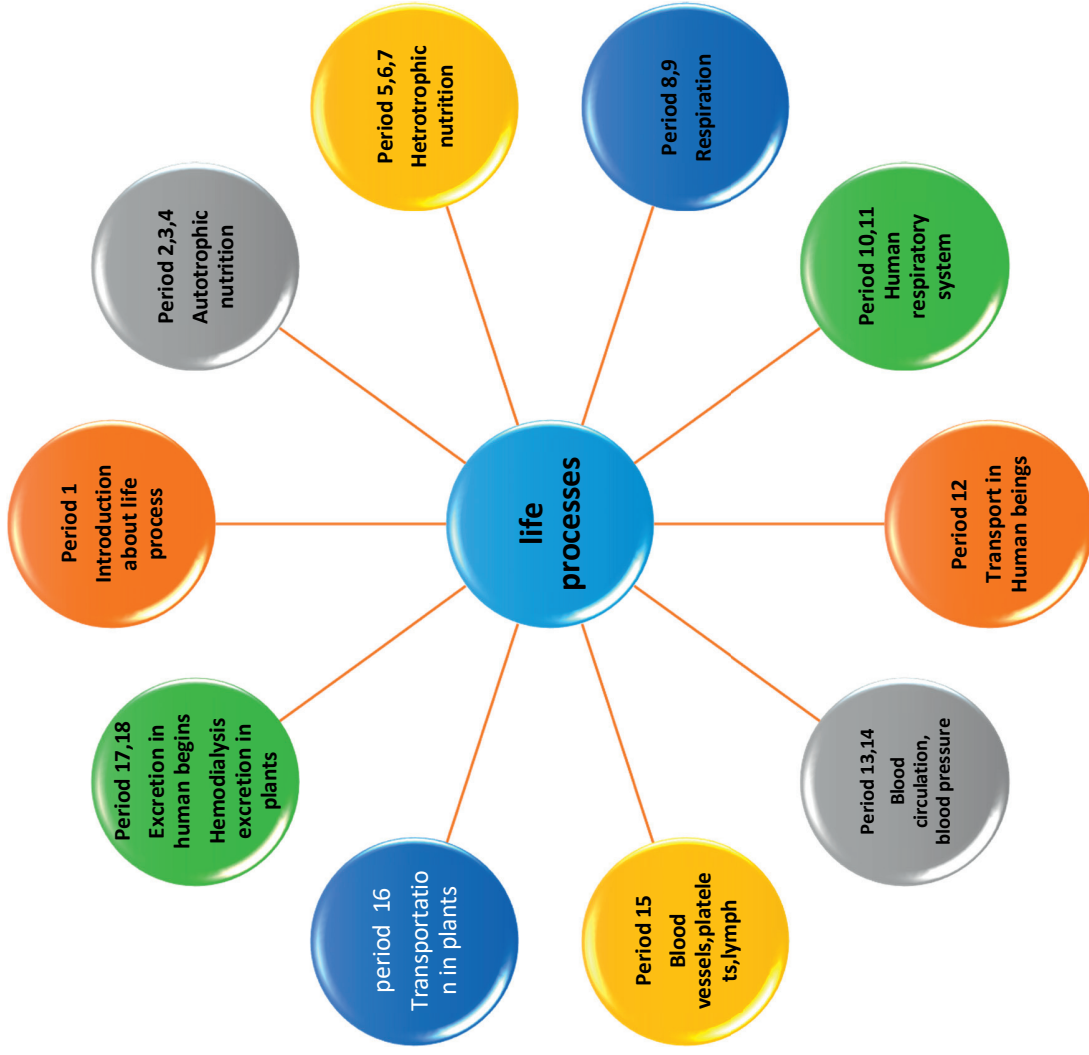
DIGESTION

RESPIRATION

TRANSPORTATION

EXCRETION

# PERIOD MAP



## TOPIC WISE LEARNING OUTCOMES

Period No.	Topic	Learning outcomes
1	Introduction, What are life processes?	Relates life processes with their functions in living organisms
2	Nutrition: Autotrophic nutrition	Differentiates autotrophs and heterotrophs based on their nutritional strategies
3	Activity- Chlorophyll is essential for photosynthesis	Plans and conducts an experiment and draws inferences based on the data
4	Opening and closing of stomata, Co <sub>2</sub> is essential for photosynthesis	Plans and conducts investigation to verify the fact that Co <sub>2</sub> is essential for photosynthesis
5	Heterotrophic nutrition	Classifies heterotrophs into different types based on mode of nutrition
6	Nutrition in human beings	Explains the process of digestion taking place in various parts of the digestive system Draws labelled diagram of human digestive system
7	Nutrition in human beings... contd...	Explains the role of digestive juices in the process of digestion
8	Respiration- Activities showing release of Co <sub>2</sub> during Aerobic and Anaerobic	Differentiates Aerobic and Anaerobic respiration

	Respiration	
9	Respiratory pathways	Explains the mechanism of Cellular Respiration in living organisms
10	Respiration in terrestrial and aquatic animals	Differentiates respiration in terrestrial and aquatic animals
11	Human respiratory system	Explains the structure and function of human respiratory system Draws labelled diagram of human Respiratory System
12	Transportation in Animals	Exhibits creativity in designing the model of heart and understanding its structure and function Draws labelled diagram of human heart
13	Blood circulation and blood pressures	Differentiates double and single circulation Applies knowledge in understanding variations in blood pressure in elderly people
14	Blood vessels, Platelets and lymph	Classifies blood vessels into different types Relates platelets with coagulation of blood Differentiates lymph and plasma
15	Transportation in plants	Analyses the role of vascular tissues in transportation of plants
16	Excretion in human beings	Relates the phenomena of excretion to the functioning of kidneys
17	Excretion in human beings contd....	Draws labelled diagrams of Human excretory

	structure of nephron	system and nephron Analyses the role of nephron in formation of concentrated urine
18	Haemodialysis, organ donation, Excretion in plants	Takes initiative to know about discovery of dialysis technique Explains mechanism of Excretion in plants

# PERIOD PLAN 1

Name of the Chapter: LIFE PROCESSES

Class 10

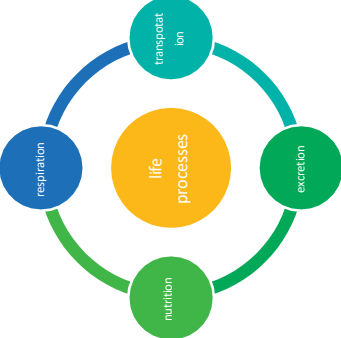
Total no. of periods 18

Period plan : 01/18



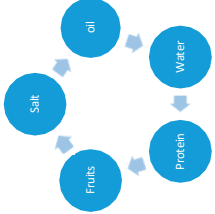
Time : 40 min

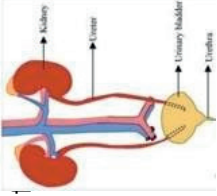
Key Concepts :Life processes-Nutrition, Respiration., Transportation and Excretion

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	POINTERS FOR ASSESSMENT	MATERIALS REQUIRED
	<p>Testing previous knowledge</p> <ul style="list-style-type: none"> <li>Can you identify living and non-living organisms?</li> <li>If a dog or cow is asleep, do you say it is alive?</li> <li>What about plants? Are they living?</li> <li>Do plants move like animals?</li> <li>How do you justify that plants are living?</li> </ul>		<p>Images of different living organisms</p>
<p>Analyses visible and invisible movements in plants and animals</p>	<ul style="list-style-type: none"> <li>Explains that visible and invisible movements are characteristic features of living organisms</li> </ul>	<ul style="list-style-type: none"> <li>Do you find internal movement in plant cells?</li> <li>What are the minute organisms that we see in the world?</li> <li>Are viruses living or non-living?</li> <li>Why are molecular movements needed for life?</li> </ul>	
	<ul style="list-style-type: none"> <li>How do living organisms maintain their structure to perform various functions?</li> </ul>		

	<ul style="list-style-type: none"> <li>• If you are sitting idle, does it mean that your body is not working?</li> <li>• What happens when you take food into your mouth?</li> <li>• How is oxygen utilised in the cells of your body?</li> <li>• How are wastes removed from our body?</li> <li>• All the functions that occur in the body of living organisms are called as life processes</li> </ul>	<p>Identify the following functions with a tick mark</p> <table border="1"> <thead> <tr> <th>Functions</th> <th>Plant</th> <th>Animal</th> </tr> </thead> <tbody> <tr> <td>Digestion</td> <td></td> <td></td> </tr> <tr> <td>Reproduction</td> <td></td> <td></td> </tr> <tr> <td>Coordination</td> <td></td> <td></td> </tr> <tr> <td>Excretion</td> <td></td> <td></td> </tr> <tr> <td>Respiration</td> <td></td> <td></td> </tr> <tr> <td>Photosynthesis</td> <td></td> <td></td> </tr> </tbody> </table>	Functions	Plant	Animal	Digestion			Reproduction			Coordination			Excretion			Respiration			Photosynthesis			
Functions	Plant	Animal																						
Digestion																								
Reproduction																								
Coordination																								
Excretion																								
Respiration																								
Photosynthesis																								
	<p>Emphasises the role of life processes in maintaining the structure (to prevent damage and breakdown) of living organisms</p> 																							
<p>Relates life processes with their functions</p>	<ul style="list-style-type: none"> <li>• How are these life processes maintained in living organisms?</li> <li>• Where do living organisms get energy from?</li> <li>• Which process denotes the transfer of a source of energy from outside the</li> </ul>																							
		<p>How do plants and animals obtain energy?</p>																						



	<p>body of the organism to the inside.</p> <ul style="list-style-type: none"> <li>Students are asked to discuss various sources of food in plants and animals.</li> </ul>	<p>Find out carbon based food substances from the given options:</p>	
 	<ul style="list-style-type: none"> <li>How is energy obtained from food?</li> <li>Which process converts different sources of food into energy?</li> <li>How are unicellular organisms different from multicellular organisms in carrying out their life processes?</li> <li>How does Amoeba take its food from its surroundings?</li> <li>Diffusion is a method of movement of substances from a region of higher concentration to a region of lower concentration</li> <li>Teacher explains the role of diffusion in carrying out life processes in unicellular organisms.</li> <li>How are materials transported in multicellular organisms?</li> <li>What is the tissue that helps in</li> </ul>	 <ul style="list-style-type: none"> <li>What is the role of oxygen in the process of breakdown of food materials?</li> <li>What do you notice when you burn an incense stick in the house?</li> <li>What is diffusion?</li> <li>How diffusion helps in carrying out functions in unicellular organisms?</li> <li>Why diffusion is not a suitable method of transport of materials in multicellular organisms?</li> <li>Why do multicellular organisms need a transport system?</li> </ul>	<ul style="list-style-type: none"> <li>Images of unicellular and multicellular organisms</li> <li>Incense sticks</li> </ul>
	<ul style="list-style-type: none"> <li>How are materials transported in multicellular organisms?</li> <li>What is the tissue that helps in</li> </ul>		
			<p>I</p>

	transportation of materials in human beings?	<ul style="list-style-type: none"> <li>• What happens if materials are not transported to different places in the body?</li> </ul>	
<ul style="list-style-type: none"> <li>• How are harmful by products of different life processes are removed</li> </ul>	 <ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Why harmful by products need to be removed from the body?</li> <li>• What happens if wastes get accumulated in the body?</li> </ul>	Chart of Human excretory system
		Students are divided into teams and asked to discuss the various life processes and their functions and to present the data in the form of a table.	

Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process

## PERIOD PLAN 2

Name of the chapter : Nutrition

Class: 10

No. of Periods: 18

Period plan : 2/18

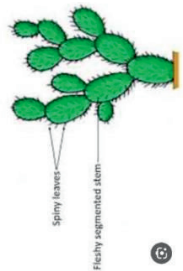
Key Concepts: Nutrition, Autotrophs, heterotrophs

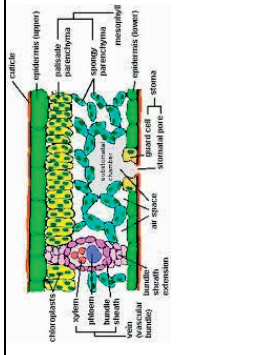
LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	POINTERS FOR ASSESSMENT	MATERIALS REQUIRED
	<p>Recalls previous knowledge</p> <ul style="list-style-type: none"> <li>• How do plants obtain their food?</li> <li>• Which process help in breakdown and release of energy from food materials?</li> <li>• Do all organisms have the same energy requirements?</li> </ul>		
	<ul style="list-style-type: none"> <li>• How do you go to school?</li> <li>• Which game did you play in the school?</li> <li>• Asking students to do the following activities:               <ul style="list-style-type: none"> <li>• Reading</li> <li>• Eating</li> <li>• Jumping</li> <li>• Writing</li> </ul> </li> <li>• Do all these activities require energy?</li> <li>• What purpose does energy serve in living organisms?</li> <li>• What are the different life processes in living organisms?</li> </ul>		
	<ul style="list-style-type: none"> <li>• How do plants and animals get energy?</li> <li>• How are plants different from animals in obtaining energy?</li> </ul>	How do plants obtain food?	



<ul style="list-style-type: none"><li>• Differentia</li></ul>	<ul style="list-style-type: none"><li>• The process of obtaining food is called as Nutrition</li><li>• Explores that energy is obtained in different ways in living organisms.</li><li>• Teacher introduces the terms autotrophs and</li></ul>	<p>What is nutrition? What is the mode of nutrition in animals?</p>	Images of
<ul style="list-style-type: none"><li>• Teacher introduces the terms autotrophs and heterotrophs from</li></ul>			

<p>tes autotrophs and heterotrophs with examples</p>	<p>heterotrophs.</p> <ul style="list-style-type: none"> <li>How are complex substances broken down into simple forms in autotrophy and heterotrophy?</li> </ul>	<p>the given list. Algae, Fungi, Animals, Plants, Mushrooms</p> <table border="1" data-bbox="300 728 539 1093"> <tr> <td>Autotroph</td> <td>heterotroph</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>	Autotroph	heterotroph													<p>autotrophs and heterotrophs</p>
Autotroph	heterotroph																
<ul style="list-style-type: none"> <li>Relates enzymes to their functions in living organisms</li> </ul>	<ul style="list-style-type: none"> <li>What are enzymes?</li> <li>Where do you find enzymes?</li> <li>Enzymes act as catalyst as they enhance the rate of reaction</li> <li>Emphasizes the role of enzymes as biocatalysts in living organisms.</li> </ul>	<p>What is a catalyst? How can you justify enzymes as biocatalysts? What happens if there are no enzymes in living organisms?</p>															
<ul style="list-style-type: none"> <li>Explains photosynthesis through a balanced equation.</li> </ul>	<ul style="list-style-type: none"> <li>What are the simple substances that become a part of nutrition in autotrophs?</li> <li>Describes the process of photosynthesis in autotrophs</li> <li><math>6\text{CO}_2 + 12\text{H}_2\text{O} \xrightarrow{\text{chlorophyll, sunlight}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 + 6\text{H}_2\text{O}</math></li> </ul>	<p>What are the raw materials in the process of photosynthesis?  What are the by products of autotrophic nutrition in plants Find out the missing components in the equation  _____ + <math>12\text{H}_2\text{O} \xrightarrow{\hspace{1cm}}</math> <math>\text{C}_6\text{H}_{12}\text{O}_6</math> + _____ + <math>6\text{H}_2\text{O}</math></p>	<p>Flow chart of photosynthesis</p> <p><a href="https://youtu.be/K8OssnSp8ks?si=mpZWbmZNY15QqMyl">https://youtu.be/K8OssnSp8ks?si=mpZWbmZNY15QqMyl</a></p>														
<ul style="list-style-type: none"> <li>Relates starch and glycogen to its function in different</li> </ul>	<ul style="list-style-type: none"> <li>Do we exhaust all the energy as and when produced?</li> <li>What could be the consequences of such a situation?</li> <li>In which form energy is stored in plants and</li> </ul>	<ul style="list-style-type: none"> <li>Do plants and animals store energy in the same form?</li> <li>How is energy stored in animals?</li> </ul>	<p><a href="https://youtu.be/mZ-Nk8NzTmo?si=M8.ir8Etz6Xs8pXW">https://youtu.be/mZ-Nk8NzTmo?si=M8.ir8Etz6Xs8pXW</a></p>														

organisms	animals ? <ul style="list-style-type: none"><li>Explains how energy produced is stored in different parts in both plants and animals.</li></ul>		
Differentiates light and dark reaction in the process of photosynthesis	Describes the events in the process of photosynthesis	<ul style="list-style-type: none"> <li>Do all parts of the plant body participates in photosynthesis?</li> <li>What is the site of photosynthesis in leaf cells?</li> <li>How is light reaction different from dark reaction?</li> <li>Which pigments are responsible for absorption of light energy?</li> <li>What happens if there is no splitting of water molecules?</li> <li>Is <math>\text{CO}_2</math> reduced or oxidised during photosynthesis?</li> </ul>	
Applies knowledge in acknowledging opening of stomata during night time in desert plants	<ul style="list-style-type: none"> <li>When do stomata open in plants for photosynthesis?</li> <li>What could be the consequence if desert plants open their stomata to absorb <math>\text{CO}_2</math> during day time, like other plants?</li> </ul> 	<p>Why do stomata open during night time in desert plants?</p> <p>How do desert plants adapt themselves to the process of photosynthesis during night time?</p>	Pictures of xerophytes
Draw the conclusio	Observing chloroplasts in transverse section of leaf as green dots	Which side of the leaf is dark green in colour?	chart showing transverse section of

<p>n that chloroplasts contain chlorophyll pigment for photosynthesis</p>		<p>Why is it dark green in colour on the upper surface of the leaf?  Why is chlorophyll essential for photosynthesis?</p>	<p>leaf</p>
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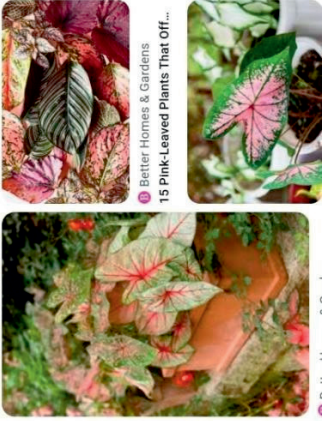
Teacher's Reflections:

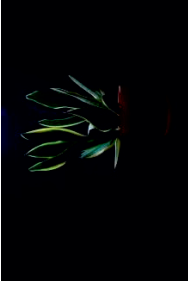
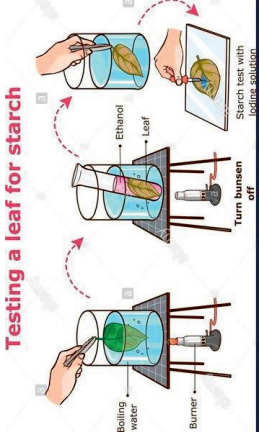
1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

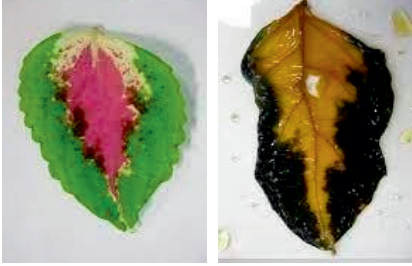


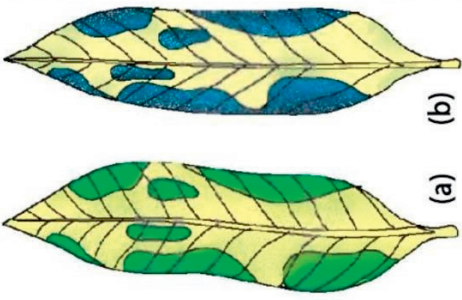
# PERIOD PLAN 3

**Class** X  
**Chapter** : Life processes  
**Period** : 3 / 18  
**Total no. of periods:**18  
**Key concepts** : Chlorophyll is essential for Photosynthesis

Learning outcomes	Teaching learning process	Pointers for Assessment	Materials Required
	Testing previous knowledge <ul style="list-style-type: none"> <li>• In which part of the plant photosynthesis takes place?</li> <li>• What is the site of photosynthesis in leaf cells?</li> <li>• Which pigments absorb energy from sunlight?</li> </ul>		
	Are there pigments other than chlorophyll in leaves? 	What are the different colours that are seen in leaves?  Why leaves occur in different colours?	

<p>Classifies pigments into different types</p>	<p>Can you justify their role in photosynthesis?</p> <p>Teacher removes the misconception that chlorophyll is present only in green leaves</p> <p>Discusses the types and functions of different pigments in plants</p> <p>Do all pigments take part in the synthesis of starch?</p>	<p>Match column I with column II</p> <table border="1" data-bbox="531 611 687 1070"> <thead> <tr> <th>Pigments</th> <th>Colours</th> </tr> </thead> <tbody> <tr> <td>Chlorophyll</td> <td>A.Yellow</td> </tr> <tr> <td>Carotene</td> <td>B.Green</td> </tr> <tr> <td>Xanthophyll</td> <td>C.Orange</td> </tr> </tbody> </table>	Pigments	Colours	Chlorophyll	A.Yellow	Carotene	B.Green	Xanthophyll	C.Orange	<p>Potted plant</p> <p>Water, alcohol beaker ,water bath iodine</p> 
Pigments	Colours										
Chlorophyll	A.Yellow										
Carotene	B.Green										
Xanthophyll	C.Orange										
<p>Plans and conducts investigation to verify the fact that chlorophyll is essential for photosynthesis</p>	<p>Demonstrate Activity 5.1 to conduct starch test.</p>  <p>Testing a leaf for starch</p>	<p>Why do we use alcohol solution to boil the leaf?</p> <p>Are pigments soluble in water?</p> <p>Why should we destarch a plant?</p> <p>Why do we have taken plant with variegated leaves?</p> <p>In which form food is stored in plants and animals?</p>	<p>Potted plant in dark room</p>								

	<p>Is the step of de-starching needed for this experiment?</p>	<p>Do you find other pigments in the leaf? Is iodine necessary for starch test? Boil the leaf in water and record your observation. Compare it with the leaf boiled in alcohol.</p>	
<p>Explains the importance of chlorophyll in the process of photosynthesis</p>	<p>Testing the leaf with iodine solution for the presence of starch</p>	<p>Which part of the leaf turns bluish black in colour? Why the non green part of the leaf remained colourless? Which pigment is essential for synthesis of starch during photosynthesis? Repeat the experiment with green leaves , and completely coloured leaves and record the observations and submit a project report.</p>	 <p><a href="https://youtube.com/shows/-3VWMVfeOo?si=H5DMgY1OAWrby3TK">https://youtube.com/shows/-3VWMVfeOo?si=H5DMgY1OAWrby3TK</a></p>



**Variegated leaf**  
(a) before starch test  
(b) after starch test

**Teacher's Reflections:**

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
4. Measures taken to refine the teaching-learning process.

# PERIOD PLAN 4

Class: X

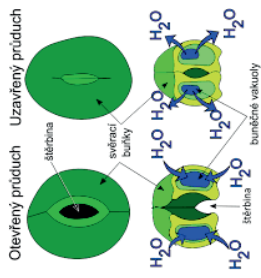
Chapter : Life processes

Period : 04/18

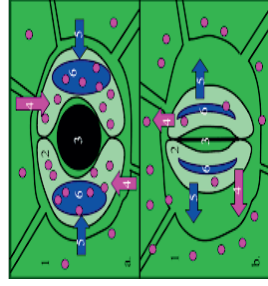
Total no. of periods: 18

Key concepts: Opening and closing of stomata, carbon dioxide is essential for photosynthesis.

Learning outcomes	Teaching learning process	Pointers for Assessment	Materials Required
	<ul style="list-style-type: none"> <li>• Testing previous knowledge:</li> <li>• How does Co<sub>2</sub> enters into the plant body during photosynthesis?</li> <li>• What do you call the tiny pores that are present on the leaf surface?</li> </ul>		
Explains the function of guard cells in opening and closing of stomata	<p>How does exchange of gases takes place in the leaves?</p> <p>What happens when water enters guard cell?</p> <p>What happens when water leaves guard cells?</p> <p>Discusses mechanism involved in opening and closing of stomata during exchange of gases</p>	<p>Why do guard cells swell?</p> <p>What happens when guard cells shrink?</p> <p>Is there any other function done by guard cells other than exchange of gases?</p> <p>Are stomata similar in their shape in Dicot and Monocot leaves?</p>	<p>Rhoeodiscolor leaves</p> <p>Microscope, water</p> <p><a href="https://youtu.be/JQvdXX7hGqI?si=xaGunl0ozCvetz0i">https://youtu.be/JQvdXX7hGqI?si=xaGunl0ozCvetz0i</a></p> <p>Permanent slide of stomata</p>



Are they equally distributed on both the surfaces of leaves?  
Label the parts of the given diagram




What happens if stomata open through out the day?

Opening and closing of stomata depends on:

Choose the correct option

- A. Temperature
- B. Water content in the guard cells
- C. Oxygen concentration
- D. Carbondioxide concentration

<p>Plans and conducts investigation to prove that CO<sub>2</sub> is essential for photosynthesis.</p>	<p>Demonstrates experiment to show that CO<sub>2</sub> is essential for photosynthesis.</p>  <p>Why do we need two potted plants for this experiment?</p> <p>What is the purpose served by bell jars in this experiment?</p> <p>What is the difference in the conditions for control setup and sample setup?</p> <p>Record your observations and draw inference.</p>	<p>Why is KOH used in the experiment?</p> <p>Do both the leaves show the presence of the same amount of starch?</p> <p>Project: Design an experiment to show that light is essential for photosynthesis and record your observations.</p>	<p>Potted plant Bell jar KOH Iodine solution BYJUS VIDEO</p> <p><a href="https://youtu.be/vR6W34EoYU?feature=shared">https://youtu.be/vR6W34EoYU?feature=shared</a></p>
<p>Relates plant growth with essentiality of other elements like Nitrogen, Phosphorus and Potassium</p>	<ul style="list-style-type: none"> <li>• What are the elements required for plant growth other than CO<sub>2</sub> and H<sub>2</sub>O?</li> <li>• What are the building blocks of cell?</li> <li>• What is the major element of protein?</li> </ul>	<ul style="list-style-type: none"> <li>• How do plants synthesize proteins and fats other than carbohydrates?</li> <li>• How is nitrogen obtained by plants?</li> <li>• Give examples of symbiotic</li> </ul>	

	<ul style="list-style-type: none"> <li>Plants absorb carbon in the form of CO<sub>2</sub> from atmosphere. Similarly, can they absorb nitrogen from atmosphere?</li> <li>Why is it not possible for the plants to acquire their nitrogen requirement from atmospheric nitrogen?</li> <li>Teacher introduces the concept of nitrogen fixation.</li> <li>Of the three types of N<sub>2</sub> fixation... Physical, chemical and biological., Which one is not a natural process?</li> <li>What are the two main types of biological N<sub>2</sub> fixation?</li> <li>Teacher explains the mechanism of N<sub>2</sub> fixation.</li> </ul>	<p>and non-symbiotic nitrogen fixing organisms?</p> <ul style="list-style-type: none"> <li>Which plants have symbiotic N<sub>2</sub> fixing bacteria.</li> <li>Collect information about microorganisms which help in Nitrogen fixation</li> </ul>	<p>Chart showing Nitrogen cycle</p>
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Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

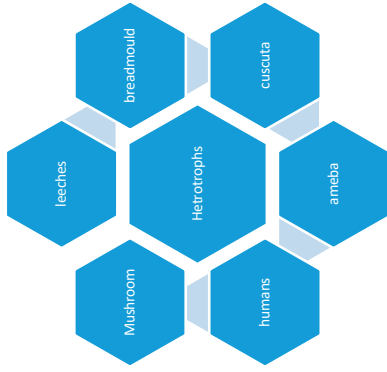


# PERIOD PLAN 5

**Class:**X  
**Chapter:** Life processes  
**Period:** 05/18  
**Total no. Of periods:** 18  
**Key concepts:** Heterotrophic nutrition, parasites, saprophytes, Holozoic nutrition

Learning outcomes	Teacher learning process	Pointers for Assessment	Materials Required
	<p>Recalls previous knowledge by posing questions..</p> <p>How can you differentiate autotrophs from heterotrophs</p> <p>How does heterotrophs obtain their food?</p> <p>Give some examples of heterotrophs.</p>		<p>Specimens of bread mould, mushrooms, cuscuta</p> <p>Charts showing Amoeba and Paramoecium</p> <p>Images of parasites, saprophytes and Holozoic</p>

**Differentiates parasitic, Saprophytic and Holozoic nutrition**



How do you take food into your body?

Do other kinds of organisms show the same type of Nutrition that you have?

Teacher Introduces the term Holozoic nutrition

Do all plants prepare food on their own?

Which plant seems to be dependent on the other plant in the picture?  
How do you think cuscuta plant obtains its food?

Teacher explains about parasitic mode of nutrition.

**organisms**

<https://youtu.be/mZ-Nk8NzTmo?si=x15i2KV4UqX7P-lh>

Is the mode of nutrition similar in all kinds of organisms?

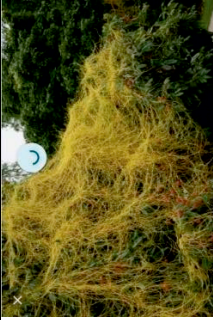


Why different organisms adapt different nutritional strategies?

What do you call the type of nutrition where food is digested inside the body?

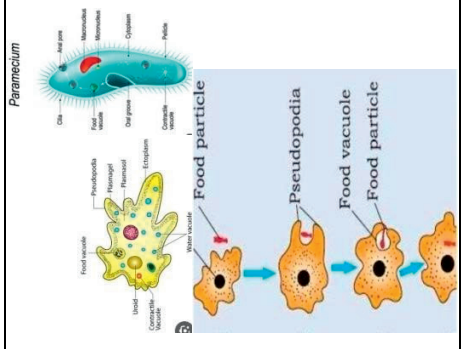
Which structures help in drawing nutrition in Cuscuta?

Identify parasites with a tick mark in the table

Organism	Parasite
Ticks	
Mushroom	
Leeches	
Yeast	

	 <p>What are the different habitats where mushrooms grow? What could they be feeding on?</p>  <p>Teacher helps students understand the concept of Saprophytic nutrition</p>	<p>How is mushroom similar to bread mould in its mode of nutrition?</p>  <p>What makes fungi breakdown the food material outside the body and then absorb it?</p> <p>Find the mismatched pair: Mushrooms- saprophytes Cuscuta-Holozoic Lice-Parasite</p>	
<p>Explains the method of obtaining food in unicellular organisms</p>	<p>Describes the process of obtaining food in unicellular organisms</p>	<p>Why unicellular organisms lack specialization in their mode of nutrition?</p>	<p>Charts of Amoeba and Paramecium Byjus video <a href="https://youtu.be/5_4Y0tTHqvK?si=NMO3XpLO1AXGybsM">https://youtu.be/5_4Y0tTHqvK?si=NMO3XpLO1AXGybsM</a></p>

## like Amoeba and Paramecium



**What are the structures that help in nutrition in Amoeba and Paramecium?**

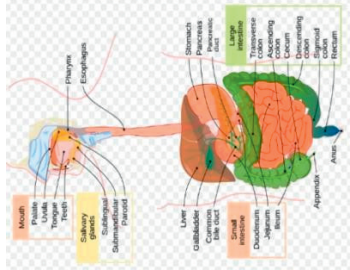
**Collect information about different nutritional strategies in few examples and display the data in the classroom**

### Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

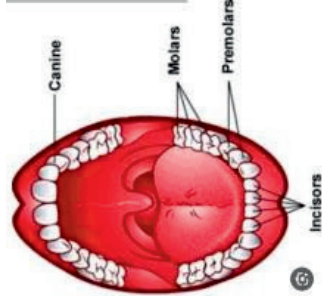
# PERIOD PLAN 6

Class : 10  
 Chapter : LIFE PROCESSES  
 Total No. of Periods : 18  
 Period Plan No. : 06/18  
 Topic : Nutrition in human beings  
 Key concepts : Digestion of food in mouth, oesophagus and stomach

Learning outcomes	Teaching learning process	Pointers for Assessment	Materials required
	Recalls the previous knowledge by posing questions *What is the mode of nutrition in human beings? *Why do we have a digestive system in our body? *Can you name the part where digestion		model of digestive system
starts from in human beings? *Discuss the various parts of digestive system. *Do all the parts of alimentary canal carry out the same function?			

Relates mastication with the structure of teeth

- Does the food change its texture inside the mouth?
- Which structure will help us to crush the food?
- Why do we find different sets of teeth?



Plans and conducts investigation to observe role of saliva on starch

- What happens in the mouth cavity when you see delicious food?
- \*Do you think food get digested outside the body when it is mixed with water?
- \*Demonstrate the activity (5.3) to show action of saliva on starch

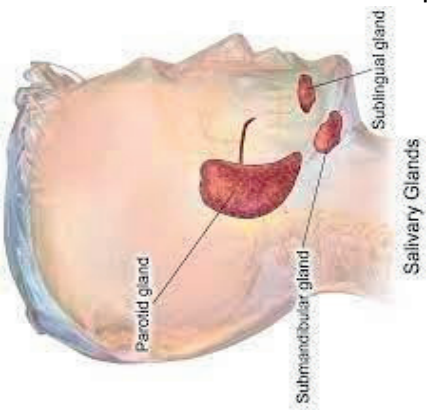
- What is the dental formula in human beings?

- Why children suffer frequently from tooth decay?
- Which teeth are mostly affected in dental infections?
- What are milk teeth?

- What is dental plaque? What are the symptoms associated with it?

- Why are toothpastes basic in nature to protect our teeth?

- \*What could be the

	<ul style="list-style-type: none"> <li>• What role do enzymes play in the process of digestion?</li> </ul>  <ul style="list-style-type: none"> <li>•</li> </ul>	<p>impact on digestion if saliva is not produced in our mouth?</p> <ul style="list-style-type: none"> <li>• *How does absence of saliva affect taste?</li> <li>• * _____ enzyme digests carbohydrates in the mouth.</li> <li>• How many pairs of salivary glands can you find in humans?</li> <li>• Which part of the body is infected in Mumps disease?</li> </ul>	
<p>Relates peristalsis with movement of food</p> <p>Analyses the role of HCL in the process of digestion</p>	<ul style="list-style-type: none"> <li>• *What makes the food move from oesophagus to stomach?</li> <li>• *In which form food moves in the oesophagus?</li> <li>• Teacher discusses the process of digestion in the stomach</li> <li>• *Name the glands present in the stomach.</li> <li>• *We understand that meat is digested in stomach. Then how does the wall of stomach protect itself from getting damaged by HCL and other digestive enzymes?</li> <li>• Teacher emphasizes the role of</li> </ul>	<ul style="list-style-type: none"> <li>• *Does any enzymatic reaction take* place in oesophagus?</li> <li>• *How does food move along oesophagus?</li> <li>• *Identify the enzyme involved in the following reaction</li> <li>• <b>P</b>rotein peptones</li> <li>• *What facilitates the action of enzyme pepsin?</li> <li>• *How could acidity of HCL contribute to immunity?</li> </ul>	<p><a href="https://youtu.be/VwiGXtNnh1E?si=iha0ZDVgqx--D9Ns">https://youtu.be/VwiGXtNnh1E?si=iha0ZDVgqx--D9Ns</a> (Video on peristaltic movement)</p>

<p>Exhibits creativity in designing model of digestive system using eco friendly material</p>	<p>mucus in protecting the inner lining of stomach</p>	<ul style="list-style-type: none"> <li>• Identify the correct statement</li> <li>• 1.Mucus – protects the inner lining of the stomach.</li> <li>• 2.HCL— kills bacteria</li> <li>• 3.Digestive juices— break down proteins</li> <li>• 4. Chyme-Partially digested food in the mouth.</li> <li>• Why do people suffer from acidity problems?</li> <li>• Whom do you consult if you have a severe gastric pain?</li> <li>• *What precautions will you suggest to avoid acidity in elders?</li> <li>• *Group activity - Prepare a model of digestive system using eco friendly material.</li> </ul>	
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Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

# PERIOD PLAN 7

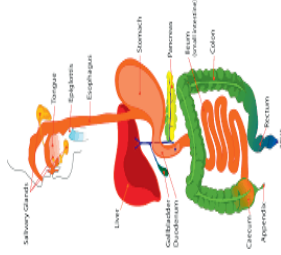
Class 10  
 Chapter : Life processes  
 Period : 07/18  
 Total no. of periods 18  
 Topic : Nutrition in human beings.... contd....  
 Key concepts : Small intestine - Digestion, absorption., large intestine – defecation., Dental caries

Learning outcomes	Teaching learning process	Pointers for Assessment	Material Required
Explains the process of digestion in	<ul style="list-style-type: none"> <li>• Testing previous knowledge</li> <li>• *Why food changes into acidic medium in the stomach?</li> <li>• *How are proteins and carbohydrates digested in the stomach and mouth?</li> <li>• *What is the role of saliva in the mouth?</li> <li>• *What facilitates the action of pepsin on proteins?</li> </ul>	<ul style="list-style-type: none"> <li>*Which is the longest part of the alimentary canal?</li> </ul>	Model of digestive system

small intestine

intestine

- Teacher describes the process of digestion in small intestine :



- Why is the length of small intestine different in herbivores and Carnivores?
- Teacher removes the misconception that digestion of green leafy vegetables is easier than meat.
- Teacher Compares the process of digestion in ruminants with that of humans.
- \* Compare the number of chambers in the stomach of Humans and Ruminant animals.
- \*Cattle are often seen sitting leisurely and chewing for long periods after they return from grazing, Where as ingestion and chewing are

\*How is the movement of food from stomach to duodenum controlled?

\*What is emulsification?

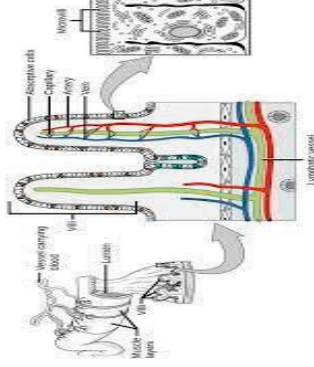
\*Compare emulsification of fats to that of soaps.

Fill in the table with appropriate answers

Digestive juice	Released into	Acts on the substrate	End product
Bile juice			
Pancreatic juice			
Intestinal juice			
Gastric juice			

The juice which does not contain enzymes is \_\_\_\_\_

<p>Explains the function of villi in increasing surface area of absorption</p>	<p>simultaneous in humans and other animals. Why and How do they do it?</p> <ul style="list-style-type: none"> <li>• *Do you think structure of small intestine is similar to that of Oesophagus?</li> <li>• *Discusses the structure of villi in small intestine.</li> <li>• *Which function is retarded on surgical removal of Pyloric sphincter?</li> <li>• *Of the 3 parts of small intestine, why does jejunum have more number of blood vessels?</li> </ul>	<ul style="list-style-type: none"> <li>• How is small intestine designed to increase the surface area of absorption?</li> <li>• What are villi made up of?</li> <li>• *List out the end products of the given food after digestion: <ul style="list-style-type: none"> <li>• Carbohydrates -</li> <li>• Proteins-</li> <li>• Fats -</li> </ul> </li> <li>• In which part of the alimentary canal food is finally digested? <ul style="list-style-type: none"> <li>• Stomach</li> <li>• Mouth cavity</li> <li>• Large intestine</li> <li>• Small intestine</li> </ul> </li> </ul>	<p>Chart showing villus</p>
	<ul style="list-style-type: none"> <li>• Which function is served in the large intestine?</li> </ul>	<ul style="list-style-type: none"> <li>• *How is absorption in large intestine different from small intestine?</li> <li>• *How unwanted solid waste is removed from our body?</li> </ul>	



<p>Relates infections in teeth with dental hygiene</p>	<ul style="list-style-type: none"> <li>• Discussion in groups about dental hygiene to avoid infections</li> <li>• Teacher throws light on Dental plaque and dental caries.</li> </ul>	<ul style="list-style-type: none"> <li>• Which teeth are mostly damaged by dental caries?</li> <li>• Do you need to change your food habits to protect your teeth?</li> <li>• What precautions do you suggest to protect teeth from dental caries?</li> </ul>	<p><a href="https://youtu.be/AUaVINUiO2I?si=M2se9Tx2ggDH5Fw6">https://youtu.be/AUaVINUiO2I?si=M2se9Tx2ggDH5Fw6</a></p> <p>Images showing tooth decay in IFP</p>
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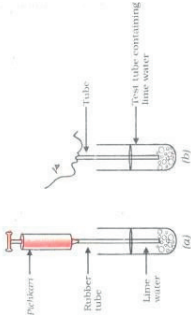
Teacher's Reflections:

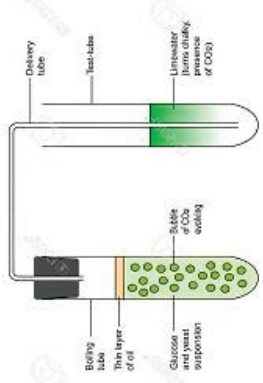
1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

# PERIOD PLAN 8

Class X  
Chapter : Life processes  
Total no. of periods : 18  
Period No. : 8 / 18  
Key concepts : CO<sub>2</sub> is liberated during aerobic and anaerobic respiration

Learning outcomes	Teaching learning process	Pointer for Assessment	Material required
	Recalls the knowledge by posing questions:  *Do you get energy after food gets digested?  *Can we live without breathing?  *Why do you think we need to		

	<p>breathe to stay alive?</p> <p>*Can all the animals survive without respiration?</p> <p>*What is the need of exchange gases in organisms?</p> <p>*How is respiration involved in generating energy?</p> <p>*What are the factors needed for the breakdown of molecules?</p>		
<p>Plans and conducts experiments to validate release of CO<sub>2</sub> during respiration</p>	<p>Activity 5.7</p>  <p>Teacher guides students to carry out the experiment.</p> <p>*Which gas is inhaled during respiration?</p> <p>*Which gas is exhaled by you for the demonstration of the experiment?</p> <p>*What is the chemical</p>	<p>*Did you find same change taking place in both the test tubes?</p> <p>*What difference you might have observed in the test tubes?</p> <p>Why the lime water turns more milky when you blow air in the tube than the other one?</p> <p>Which gas turns lime water milky?</p> <p>Why Co<sub>2</sub> concentration is more in exhaled air than atmospheric air?</p> <p>Do all living organisms release Co<sub>2</sub> during respiration?</p>	<p>Test tubes, Lime water Rubber tube, syringe</p> <p><a href="https://youtu.be/uaqANcUYX4?si=eAOluMIY2-VlPtB3">https://youtu.be/uaqANcUYX4?si=eAOluMIY2-VlPtB3</a></p>

	<p>terminology for lime water used for this experiment?</p> <p>* What is the change observed on blowing air into lime water?</p>		
<p>Draw the conclusions through activity that yeast produces Carbon Dioxide during anaerobic respiration</p>	<p>Do all the organisms liberate Carbon Dioxide in respiration?</p> <p>Activity 6.5:</p>  <p>Teacher give materials like sugar solution, test tubes, one hold cork, lime water and Yeast and ask them to do the activity</p> <p>Do you observe any similarities between both the activities you have done?</p> <p>Why do we use yeast to conduct to this activity?</p>	<p>What environmental factors influence the rate of fermentation in Yeast?</p> <p>Why does this process is called as fermentation?</p> <p>Can you describe the ideal conditions for yeast fermentation to optimize its productivity?</p> <p>How is Yeast fermentation used in various industries apart from brewing and baking?</p> <p>Identify which substances are produced by yeast in fermentation</p> <p>How is respiration in yeast different from other organisms?</p> <p>Can you give some examples for food products which are made by using yeast?</p>	<p>Sugar solution or fruit juice, yeast, glass tube one-hold cork, lime water</p>



	<p>What are your observations after completion of this activity?</p> <p>How does yeast convert sugar into ethanol and carbon dioxide during fermentation?</p>																	
		<p>Complete work sheet given below</p> <table border="1" data-bbox="432 786 603 1310"> <thead> <tr> <th></th> <th>Co<sub>2</sub></th> <th>Alcohol</th> <th>Lactic Acid</th> <th>Water</th> </tr> </thead> <tbody> <tr> <td>Yeast</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Human Being</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			Co <sub>2</sub>	Alcohol	Lactic Acid	Water	Yeast					Human Being				
	Co <sub>2</sub>	Alcohol	Lactic Acid	Water														
Yeast																		
Human Being																		

Teacher's Reflections:


1. How did the lesson go?
2. Were the teaching learning strategies adequate?
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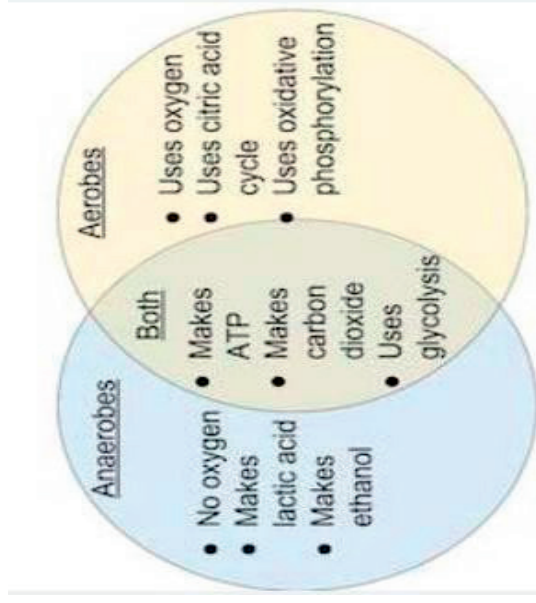
# PERIOD PLAN 9

CLASS X  
 CHAPTER :LIFE PROCESSES  
 TOTAL NO. OF PERIODS: 18  
 PERIOD :9/18  
 TIME :40min

KEY CONCEPTS: AEROBIC RESPIRATION AND ANAEROBIC RESPIRATION

Learning outcomes	Teaching learning process	Pointer for Assessment	Material required
<p>Explains the process of respiration in living organisms</p>	<p>Recall the previous Knowledge</p> <ol style="list-style-type: none"> <li>1) What do you think will happen inside our bodies when we breathe ?</li> <li>2) How do you think our bodies use the air that we breathe?</li> <li>3) What do you know about the connection between breathing and energy production?</li> <li>4) Is respiration similar in unicellular and multicellular organisms?</li> </ol> <p>Teacher now introduces the concept of Glycolysis ,the first step in respiration which occurs in cytoplasm</p> <p style="text-align: center;">             Cytoplasm              Glucose <math>\xrightarrow{\text{energy}}</math> Pyruvate +              (6-carbon molecule) (3-carbon molecule)           </p> <p>How many carbon atoms are present in</p>	<p>Which metabolic process generates energy?</p> <p>Which gas is evolved in breaking down of glucose molecules to generate energy?</p> <p>In which part of the cell energy gets released ?</p>	<p>Labelled picture of Respiratory tract on IFPs</p>

<p>glucose? How many carbon atoms are in Pyruvate? What happened to the remaining carbon atoms? Teacher explains that depending on availability of oxygen, further oxidation of glucose takes place.</p>	<p>Identify the missing substrate in the given equation? <math>C_6H_{12}O_6 + \underline{\hspace{2cm}} \longrightarrow \underline{\hspace{2cm}} + \text{water} + \underline{\hspace{2cm}}</math></p>	<p>Chart displaying glycolysis</p>
<p>Differentiates aerobic and anaerobic respiration</p>	<ul style="list-style-type: none"> <li>• Do all the organisms need O<sub>2</sub> for the oxidation of glucose?</li> <li>• Why Mitochondria are called as power houses of the cell</li> <li>• Why proteins and fats are not directly used as respiratory substances?</li> <li>• What is Aerobic Respiration</li> </ul>	
<p>Energy production takes place in Mitochondria Do all organism require breakdown of glucose to get energy? Explains that some organisms use oxygen for breakdown of glucose and some donot use oxygen for their respiration</p>		



Teacher shows the above venn-diagram and asks them to discuss the following questions.

- 1) Which process is common for both aerobic and anaerobic respiration?
- 2) What features of aerobic respiration differ from anaerobic respiration ?

- What is anaerobic respiration?
- In which organism does it commonly occur?
- What is primary metabolic path way utilized by yeast during fermentation?
- Can yeast produce alcohol in the presence of oxygen. If yes why? If not why? Justify the statement?

Yeast, pictures  
Image  
mitochondria Cell  
image

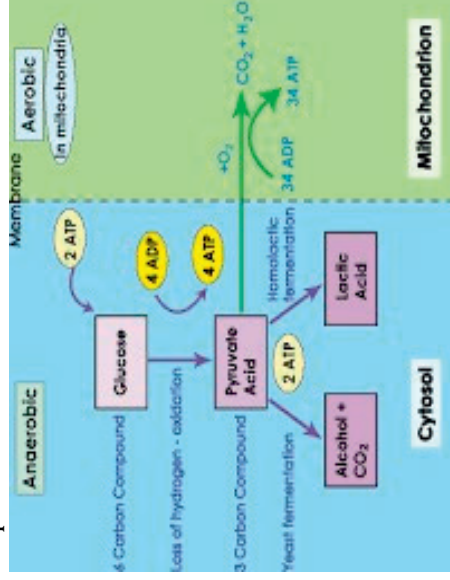
- 3) Why is glycolysis the first step in both the respiratory processes?
- 4) Where can you place mitochondrion in this venn-diagram?

**Student activity** : Students are asked to exert their muscles by repeated hand movement or leg movement.

- 1) Explain the sensation produced in the body?
- 2) What could be the reason for such a sensation?

Explains the mechanism of cellular respiration

Teacher discusses the mechanism of cellular respiration.



- What happens if anaerobic respiration is absent in yeast?
- What could be its economic consequences?
- Which type of respiration is involved in the production of bread by yeast?

Which acid gets accumulated in the muscle cells due to vigorous exercise?

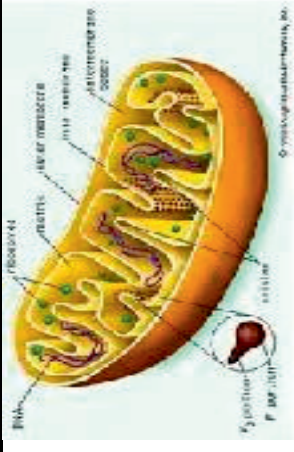
Why do we get muscle cramps ?

Which is the common pathway for aerobic and anaerobic respiration?

Why does huge amount of energy is released in Aerobic Respiration?

What is the full form of ATP?

How can you compare batteries used in our houses with that of ATP?



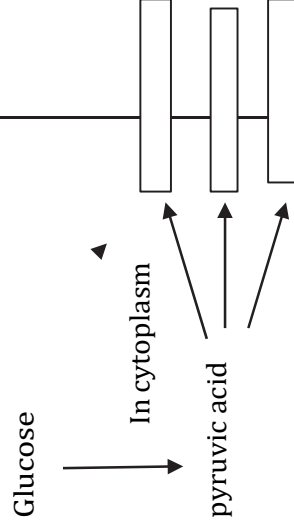
Work sheets

How does aerobic respiration differ from anaerobic respiration in terms of energy production?

Which organism causes fermentation of Dosa and Idly dough at home?

**Group discussion among students about cellular respiration**

- 1) What is energy currency of the cell?
- 2) What are the end products of Anaerobic respiration in Bacteria
- 3) Write the three metabolic fates of the pyruvic acid in aerobic and anaerobic condition In the diagram



	<p style="text-align: center;"><b>Complete the work sheet and display in the class room ?</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;"></th> <th style="width: 25%;">Aerobic</th> <th style="width: 25%;">Anaerobic</th> </tr> </thead> <tbody> <tr> <td>Oxygen</td> <td></td> <td></td> </tr> <tr> <td>End products</td> <td></td> <td></td> </tr> <tr> <td>Amount of ATP</td> <td></td> <td></td> </tr> <tr> <td>Process involved</td> <td></td> <td></td> </tr> </tbody> </table>		Aerobic	Anaerobic	Oxygen			End products			Amount of ATP			Process involved			
	Aerobic	Anaerobic															
Oxygen																	
End products																	
Amount of ATP																	
Process involved																	
	<p style="text-align: center;">Students are given a project to collect information on the different sources of energy in various organisms.</p>																

**Teacher's Reflections:**

6. How did the lesson go?
7. Were the teaching learning strategies adequate?
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9. Areas of improvement
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# PERIOD PLAN 10

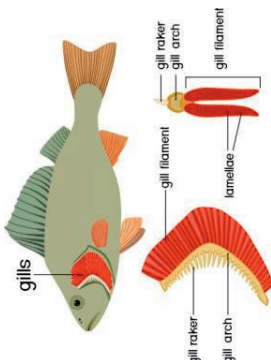
CLASS X  
 CHAPTER :LIFE PROCESSES  
 PERIOD :10/18

TOTAL NO. OF PERIODS : 18 TIME :40min

KEY CONCEPTS: Exchange of gases in plants, Terrestrial and Aquatic animals

Learning outcomes	Teaching learning process	Pointer for Assessment	Material required
	Recalls the previous knowledge 1) What type of respiration will you observe in yeast? 2) How do amoeba respire? 3) Do plants breathe? 4) How do animals respire? 5) Do you find the same kind of respiratory organs in terrestrial and aquatic animals?		



<p>Explains mechanism of exchange of gases in plants</p>	<p>Do all parts of the plant body undergo respiration?          How does exchange of gases takes place in stems and roots?          Why we do not find special respiratory organs in plants?</p>	<p>Do plants need respiration process ?          How do plants obtain oxygen for respiration?          Match the following</p> <p>A          Stomata          Lenticels          Roots</p> <p>B          Root hair          Leaves          Stem</p>	<p>IFP</p>
<p>Plans and conducts investigation to observe respiration through gills in fishes</p>	<p>Activity 5.6 (students are asked to observe aquarium)</p> <p>Count the number of times the fish opens and closes its mouth in a minute.</p> 	<p>What are the respiratory organs in fishes?          Is the respiratory rate similar in fishes and human beings?          Do all fishes respire in the same way ?          Are there specific fish species that have unique respiratory mechanism other than gills?  <b>How is oxygen present in water?</b>  <b>Why rate of breathing is much faster in aquatic animals than terrestrial animals?</b></p>	<p>Byju's content          Respiration in fishes</p>

- 1) How do fish respire under water?
- 2) What respiratory organs do fish use?
- 3) How does the oxygen content in water impact

**Figure out the odd men out in the matches given below**

Dolphins – lungs

Images of different fish species

the breathing patterns of fish?



Frog



Earthworm



Cockroach

**Group activity** (teacher make students into group and give a task to identify respiratory organs of terrestrial organism

- 1) What is the source of oxygen in terrestrial organism?
- 2) Why are the

Whales – gills  
Fishes - gills

Complete the given table in area P,Q,R,S with accurate answers

Organism	Respiratory
P	Skin, lungs, gill
Earth worm	Q
R	Trachea , (spiracles on skin
humans	S

	<p>respiratory organs in terrestrial organisms located deep inside the body?</p> <p>3) What is the relation between the absorption of oxygen and surface area ?</p>		
		<p>Complete the worksheet and submit</p> <ul style="list-style-type: none"> <li>• Terrestrial animals use _____ of the atmosphere for respiration.</li> <li>• Process of respiration in green plants takes place through _____</li> <li>• _____ are the respiratory organs in insects.</li> <li>• What are the respiratory organs in Dolphins?</li> </ul>	

Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
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# PERIOD PLAN 11

**Class: X**

**Chapter: Life processes**

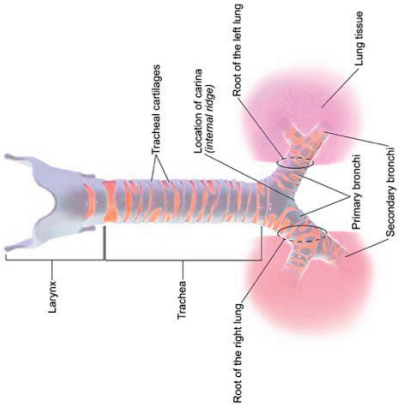
**Period: 11 / 18**

**Total no. of periods:18**

**Key concepts : Human respiratory system**

<b>Learning outcomes</b>	<b>Teaching learning process</b>	<b>Pointers for Assessment</b>	<b>Materials required</b>
	Recalls previous Knowledge by posing questions. Why are respiratory organs different in different animals?  What is the primary purpose of the respiratory system in the Human Beings  What are the organs involved in the respiratory pathway  How does the process of respiration occur at a cellular level? Could you explain the role of Oxygen and Carbon dioxide in the Respiratory pathway		
Explains mechanism of respiration in human beings	When you breathe in air enters into which part of the body?		

	<p>What are the primary organs involved in the Respiratory System?</p> <p>What is purpose of the Nasal Cavity in respiration?</p> <p>What is the role of Fine Hair like structures present in the Nostrils?</p>		
<p>?</p> <p>How does mucus helps in protecting the respiratory tract?</p> <p>What is the primary role of epiglottis in the respiratory system?</p> <p>Describe the significance of Vocal CorRds in the Larynx?</p>	<p>Find out the Missing Words</p> <p>Inhalation</p> <p>Nasal Cavity → <input type="text"/> → Larynx → Trachea → <input type="text"/> → <input type="text"/> → <input type="text"/> → <input type="text"/> → Cavity</p> <p>Exhalation</p> <p>Lungs → <input type="text"/> → <input type="text"/> → <input type="text"/> → <input type="text"/></p>	IFP	

<p>Explains the structure and function of Trachea.</p>	<p>Teacher ask the students to observe the given diagram and discuss on the questions.</p> <p><b>Anatomy of the Trachea</b></p> 	<p>Picture of trachea</p>
<p>Analyses and interpret the function of Alveoli.</p>	<p>Teacher ask the students to watch the video that shows Mechanism of Respiration in Alveoli and discuss about its process</p> <p>Can you name the smaller tubes present in the Lungs?</p>	<p>Find out the Odd man Out.</p> <p>Larynx - Vocal Cards</p> <p>Pharynx - Speech</p> <p>Cartilage - Bony tissue</p>
<p>Byju's Video</p> <p><a href="https://youtu.be/zeG-Ros7AF8?si=iQelTajf5rFl6NC6">https://youtu.be/zeG-Ros7AF8?si=iQelTajf5rFl6NC6</a></p>	<p>Imagine what happens if blood capillaries are absent in the Alveoli.</p> <p>Describe the relationship between the Alveoli and Capillaries during respiration?</p>	

In which part of the Lungs gases exchange will take place?

What role do Alveoli play in the Respiratory System?

How does oxygen move from the Alveoli into the blood stream?

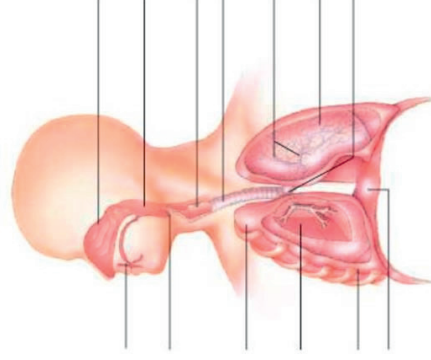
What is the main function of thin walls surrounding the Alveoli?

What are the components that are involved in the gases exchange?

How is the structure of the Alveoli adopted for efficient exchange of gases?

How does the number of Alveoli effect respiratory process efficiently?

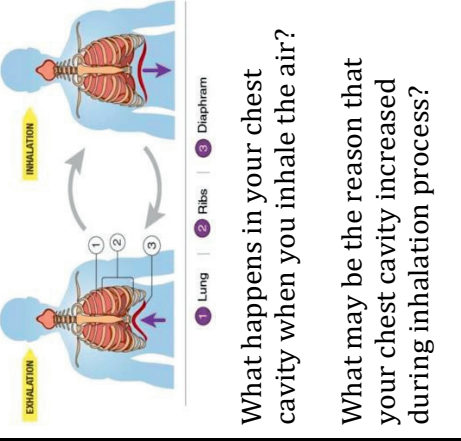
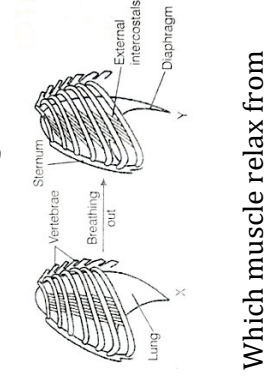
Observe the given diagram and label the parts and find out the function of the following.



Alveoli Walls:

Capillaries:



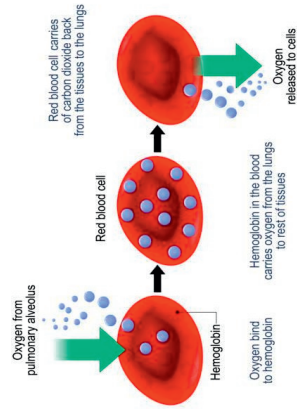
<p>Explains the role of Diaphragm and ribs in the mechanism of the Respiration</p>	<p>Students Activity</p> <p>Students are asked to take the breath and observe the things happen physically during Inhalation and Exhalation</p> 	<p>Bronchia:</p> <p>Trachea:</p>	<p>The diagram shows the ribs and some of the muscles used in breathing</p>  <p>Which muscle relax from moving from position X to position Y</p> <p>Describe the interplay between the diaphragm and ribcage in creating changes in lungs volume during breathing?</p>	<table border="1"> <thead> <tr> <th></th> <th>Inhalation</th> <th>Exhalation</th> </tr> </thead> <tbody> <tr> <td>Diaphragm Movement of Diaphragm</td> <td></td> <td></td> </tr> <tr> <td>Movement of Rib</td> <td></td> <td></td> </tr> </tbody> </table>		Inhalation	Exhalation	Diaphragm Movement of Diaphragm			Movement of Rib		
	Inhalation	Exhalation											
Diaphragm Movement of Diaphragm													
Movement of Rib													

breathing?

What is the process takes in lungs that helps exchange of gases during breathing cycle?

Ribs	
Volume of Chest Cavity	

Analyses the role of respiratory pigment in transportation of gases



Why there are no respiratory pigments in unicellular organisms?

In which cells haemoglobin is present?

Identify the gas which shows more affinity to bind with haemoglobin in the blood from the options given below

- A. Carbondioxide
- B. Oxygen
- C. Carbonmonoxide

What is primary function of Haemoglobin in the respiratory

<p>system?</p> <p>How does Haemoglobin bind to oxygen in the lungs?</p> <p>What factors influence the affinity of Haemoglobin for oxygen?</p> <p>Once oxygen is bound to Haemoglobin how is it transported through the blood stream?</p> <p>How does haemoglobin release oxygen to the tissues?</p> <p>What role does the Carbon dioxide play in the transportation by Haemoglobin?</p>	<p>Why carbon dioxide is mostly transported in dissolved form?</p>	
<p>Exhibits creativity in designing working model of respiration.</p>		<p>Prepare working model of respiration and display in the science lab.</p> <p>Collect information about lung cancer among people of different ages and report the data and display in class room.</p>

Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

# PERIOD PLAN 12


CLASS : X

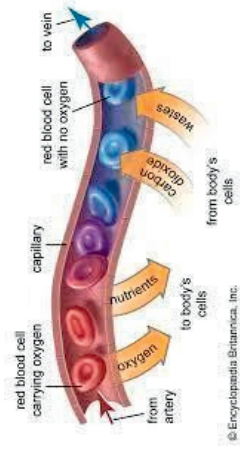
Chapter : Life processes

Period : 12\18

Total no. of periods :18

Key concepts : Transportation in human beings, structure of heart

LEARNIN G OUTCOM ES	TEACHING LEARNING PROCESS	POINTERS FOR ASSIGNMENT	MATERIALS REQUIRED
	<p>Recalls previous knowledge How are materials transported in our body? How are materials transported in unicellular organisms?</p> <p>What do you find when garbage is not disposed off for several days?</p> 		

	<p>How are waste materials removed from our body?</p> <p>What happens if food materials are not transported to the tissues in our body?</p> <p>What is the source of energy in our body?</p> <p>What carries this source of energy to different tissues in our body?</p> <p>Discusses blood as the medium that transports food, gases and waste materials</p>		
<p>Explains blood as the medium of transport in human beings</p>	 <p>The diagram illustrates a cross-section of a blood capillary. On the left, an artery carries red blood cells (RBCs) that are carrying oxygen. Arrows show oxygen moving from the artery into the capillary and then to the body's cells. On the right, a vein carries RBCs that are without oxygen. Arrows show carbon dioxide moving from the body's cells into the capillary and then to the vein. Additionally, nutrients move from the capillary to the body's cells, and wastes move from the body's cells into the capillary and then to the vein.</p> <p>© Encyclopaedia Britannica, Inc.</p>	<ul style="list-style-type: none"> <li>• Which component of blood is important in transportation of oxygen that also contributes to the colour of the blood?</li> <li>• How do you explain the presence of white</li> </ul>	<p>Pictures of cockroach and snail</p>

and blue  
blood in  
animals  
like insects  
and snails?

- Why blood  
is called as  
a fluid  
connective  
tissue? What  
are the  
various  
components  
of blood?

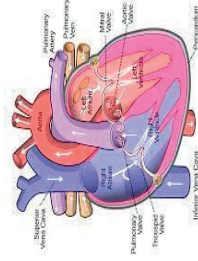
- What will  
be the  
texture of  
blood if  
plasma is  
absent?

- Which  
function of  
blood will  
be affected  
in such a  
case?

Can you start a bike without petrol? .



Similarly blood plays a vital role in transportation of materials to the cells in our body.  
How is blood pumped to different tissues in our body?  
Teacher demonstrates the structure and function of heart using Goat heart.



Why do we need oxygen for survival?

What do you call the blood rich in oxygen?

Differentiates oxygenated and deoxygenated blood

What happens when deoxygenated blood is carried to the lungs?

Model of heart  
Chart  
Activity:  
Internal structure of heart  
  
Goat heart  
Tray  
Water  
scalpel





How many rooms do you have in your house?

Why do you have separate rooms like kitchen, bedroom, drawing room, in your house?

Considering structure of heart as that of a house, do you think there is a need for different rooms in heart?

What could be the function of each room?

Teacher reinforces students' response by emphasising that heart needs different chambers to prevent mixing of oxygen rich blood with carbon dioxide rich blood.

How many chambers are present in our heart?

Match the following

Crocodile(

)A.2chambered heart

Frog (

)B.4chambered heart


Fishes (

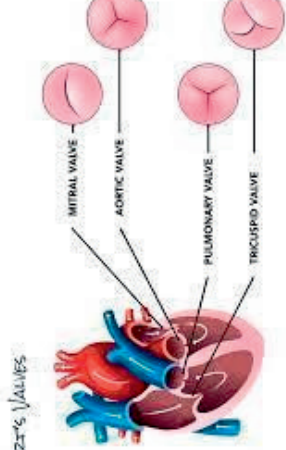
)C.3chambered heart

Why is it necessary to separate oxygenated and deoxygenated blood in mammals?

Indicate the functions of blood vessels in the given format  
Systemic aorta –  
Pulmonary artery

Working of heart  
Byjus video

		<p>Pulmonary vein – Vena cava –</p> <p>Why are the walls of ventricles thicker than walls of atria?</p>	
	<p>Why is heart tilted slightly towards left side of the chest cavity?</p> <p>What happens when you hit a ball on the ground?</p> 	<p>Why do we check for heart beat on the left side of the heart?</p>	

<p>Relates valves to their function in the heart</p> <p>Plans and conducts investigation to verify the fact that pulse rate is equal to heart beat</p>	<p>What is the function of pyloric sphincter in between stomach and duodenum</p> <p>Similarly there are valves in the heart which prevents backward flow of blood</p>  <p>Whom do you consult when you are sick?</p> <p>How does doctor test your heart beat?</p> <p>Students are asked to hold the wrist of the left hand with the thumb and the index and forefinger of the right hand and to record the number of rhythmic movements.</p>	<p>What happens if valves are damaged in the heart?</p> <p>What prevents backward flow of blood inside the heart during contraction?</p> <p>Project: Compare and tabulate the rate of your heart beat with your grandparents' and with your aunt's one year old baby?</p>	<p>Images of Heart with valves on IFP</p> <p><a href="https://youtube.com/watch?v=kcQBhGFZx90&amp;feature=shared">https://youtube.com/watch?v=kcQBhGFZx90&amp;feature=shared</a></p>
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Do you find any relation between pulse rate and heart beat?

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Is there any relationship between body weight and number of heart beats?

Removes misconception that fat people have more number of heart beats than thin people.

What could be the probable reason for these variations?

Try to compare the heart beat of an athlete and a patient. Justify your findings.

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Worksheet

1. Which is the largest artery in human body
2. Heart is composed of

Muscle

3. All reptiles have three chambered heart except
  - a. Snake
  - B. Crocodile
  - c. Lizard
  4. Right atrium

IFP

receives blood from

- a. Pulmonary veins
- b. Pulmonary arteries
- c. systemic aorta

5. Assertion-All the arteries carry oxygenated blood from the heart to various organs

Reason- pulmonary vein carries deoxygenated blood to the heart

- a. A is true, R is true
- b. A is true, R is false
- c. A is false, R is true
- d. A is false, R is false

6. Assertion- Amphibians can tolerate mixing of oxygenated blood

Reason- Amphibians are

receives blood from

- a. Pulmonary veins
- b. Pulmonary arteries
- c. systemic aorta

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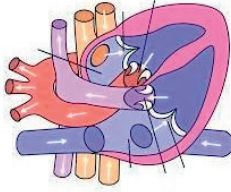
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6. Assertion- Amphibians can tolerate mixing of oxygenated blood

Reason- Amphibians are

		<p>animals with to chambered heart</p> <p>a.A is true, R is true</p> <p>b.A is true, R is false</p> <p>C.A is false,R is true</p> <p>d. A is false, R is false</p>	
		<p>7. Identify the parts in the given diagram</p> 	

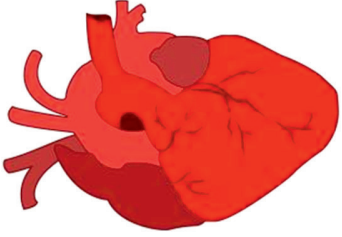
Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

## PERIOD PLAN 13

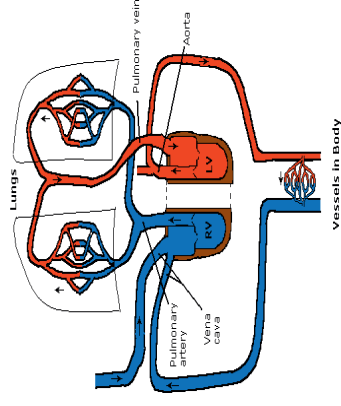
Class X  
 Chapter : Life processes  
 Period : 13/18  
 Total no. of periods :18  
 Key concepts : Double and single circulation, Blood pressure

Learning outcomes	Teaching learning process	Pointers for Assessment	Material Required
	Recalls previous knowledge  How many chambers are present in the human heart?  Which part of the heart receives oxygenated blood?  Arteries usually carry oxygenated blood. Which artery carries deoxygenated blood?  Why are atria smaller in size than ventricles?		Images in IFP

	 <p>Which blood vessel collects blood from body parts? How blood from lungs is brought back into the heart? Why blood is brought twice into the heart? Teacher introduces the concept of double circulation,</p>	<p>Why is left ventricle larger in size compared to right ventricle? Why blood is brought twice into the heart in human beings? Complete the pathway of blood circulation in human beings: Right Ventricle--?-- Lungs --? Left ventricle--?---- Body parts --? Why can amphibians and reptiles tolerate mixing of blood to some extent?</p>	
<p>Differentiates double and single circulation</p>			<p>Byju's Video Link <a href="https://youtu.be/sSn6G1r9UDw?si=1IX8Y3ZfVY2ux_fg">https://youtu.be/sSn6G1r9UDw?si=1IX8Y3ZfVY2ux_fg</a> Blood Circulation video in Diksha App.</p>



Schematic diagram showing how the two sides of the heart operate. (The "double circulation").



Relates blood circulation to the number of chambers in the heart

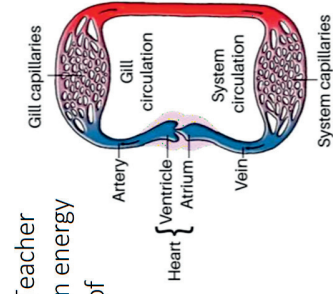
Why mammals are adapted to double circulation?  
In fishes, reptiles and amphibians body temperature changes with respect to change in environment. They are considered as cold blooded animals

Warm blooded animals require high energy to maintain their body temperature

Is there any difference in the energy requirements of mammals and fishes?

Teacher in energy of

validates this variation through the concept single circulation.



Find the odd man out

- a) Human
- b) Crocodile
- c) Fishes
- d) Cows

Why cold blooded animals have less energy requirement as compared to warm blooded animals?

Sphygmomanometer



How does water flow when you open a tap?  
Similarly blood flows with pressure in our body.  
Teacher introduces the terms Systolic and diastolic blood pressures

Why blood flows with low pressure in veins when compared to arteries?

What happens when systolic pressure is above 120 mm of HG and below 120 mm of HG

Plans and Conducts investigation to identify Blood Pressure among ages of different people

What do you call the instrument used to measure Blood Pressure?

Collect data on different instruments used to measure different functions of the body?

Suggest precautions to avoid Hyper and Hypotension in elders.

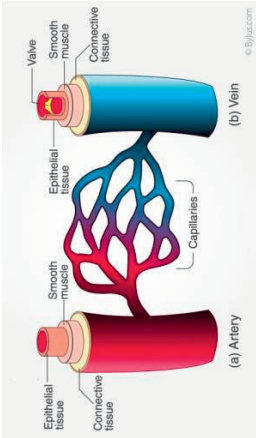
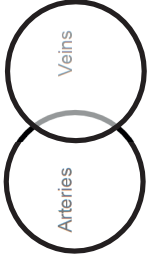

Project:  
Collect the Blood Pressure readings of your family members and neighbours of different age groups and report it in the form of a table. Analyze the data and categorize them into normal and abnormal.

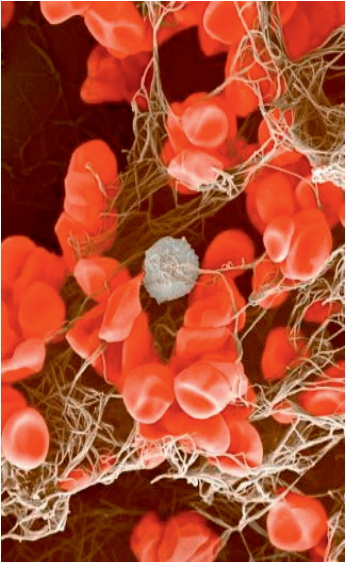
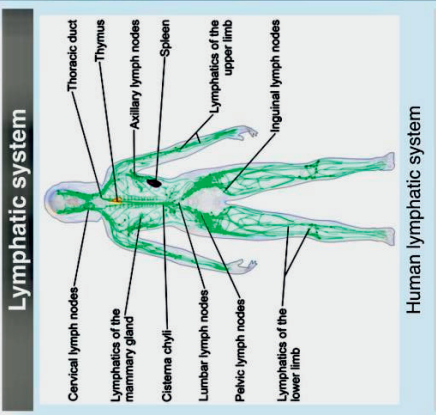
Blood Pressure Category	Systolic (Upper) mm Hg	Diastolic (Lower) mm Hg
Normal	Less than 120	Less than 80
Prehypertension	120-139	80-89
High Blood Pressure Stage 1	140-159	90-99
High Blood Pressure Stage 2	160 or higher	100 or higher
High Blood Pressure Stage 3 EMERGENCY CARE NEEDED	180 and over	Higher than 110

## PERIOD PLAN - 14

Class : x  
 Chapter : Life processes  
 Period : 14  
 Total no. of periods : 14/18  
 Key concepts : Blood vessels, platelets, lymph

Learning outcomes	Teaching learning process	Pointers for Assessment	Materials required
	Testing previous knowledge How are materials transported in our body?  Does blood directly reach tissues?  How is blood pumped to various parts in our body?		
Differentiates open and closed circulatory system	Do you find blood vessels in all the living organisms?  In which organisms blood is carried to tissues directly?  Teacher explains open and closed circulatory system in animals	Why mammals have an open circulatory system?  In which primitive group of animals, open circulatory system is seen?	

<p>Differentiates arteries and veins</p>	<p>What components are involved in Blood Circulation along with Heart?</p> <p>Emphasizes the role of the Blood Vessels in blood circulation.</p>  <p>The diagram illustrates the structure of blood vessels. (a) Artery: Shows a thick wall with layers of connective tissue, epithelial tissue, and smooth muscle. (b) Vein: Shows a thinner wall with layers of connective tissue, epithelial tissue, smooth muscle, and a valve. Capillaries are shown as a network of small vessels connecting the artery and vein.</p>	<p>Why Arteries have thick walls than veins?</p> <p>Which structures control movement of blood in veins that are absent in arteries.</p> <p>Have you heard of any medical complication where the valves do not function properly?</p> <p>Identify the blood vessels which connect Arteries and Veins</p>  <p>What is special about blood capillaries?</p>	<p>Images in IFP</p>
	<p>What happens when there is a leakage in pipes?</p>  <p>What precaution will you take to prevent leakage in pipes?</p> <p>What do you observe when you are injured and start bleeding?</p>	<p>How clot will be formed at the place of wound due to injury?</p> <p>What role do enzymes play in the formation of blood clot?</p>	<p>Byju's Video Link</p> <p><a href="https://www.youtube.com/live/W-1h5TugbVA?si=2fyP7oJWr s253B">https://www.youtube.com/live/W-1h5TugbVA?si=2fyP7oJWr s253B</a></p>

<p>Relates platelets with its function of clotting</p>	<p>Teacher elaborates the role of platelets in blood clotting.</p> 	<p>Which vitamin is responsible for blood clotting in human beings?</p> <p>What will happen if platelets were absent in the blood?</p> <p>Collect information about Genetic Disorders in blood and display the data in the Classroom.</p>									
<p>Differentiates Lymph and Plasma.</p>	<p>Is there any other system collecting wastes in our body other than Circulatory System? Teacher elaborates lymphatic system.</p> 	<p>What is Lymph?</p> <p>Which system works parallel to the venous system in our body?</p> <p>Identify the Correct match in the given table</p> <table border="1" data-bbox="967 703 1203 1079"> <tr> <td>a) Arteries</td> <td>Carry Blood towards Heart</td> </tr> <tr> <td>b) Veins</td> <td>Carry Blood away from heart</td> </tr> <tr> <td>c) Platelets</td> <td>clotting</td> </tr> <tr> <td>d) Lymph Vessels</td> <td>plasma</td> </tr> </table> <p>What precautions do you suggest to prevent edema in elderly people?</p>	a) Arteries	Carry Blood towards Heart	b) Veins	Carry Blood away from heart	c) Platelets	clotting	d) Lymph Vessels	plasma	
a) Arteries	Carry Blood towards Heart										
b) Veins	Carry Blood away from heart										
c) Platelets	clotting										
d) Lymph Vessels	plasma										

Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

# PERIOD PLAN 15

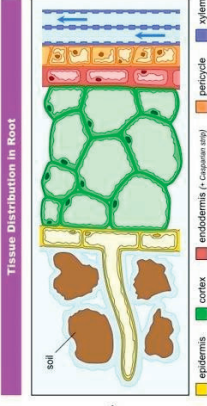
**Class: X**

**Chapter: Life processes**

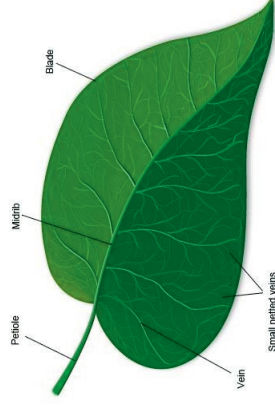
**Period: 15 / 18**

**Total no. of periods:18**

**Key concepts: Transportation in plants,Xylem,Phloem**

Learning outcomes	Teaching learning process	Pointers for Assessment	Materials Required
	<p>Testing previous Knowledge</p> <p>How are materials transported in Animals?</p> <p>Do plants have a circulatory system like animals?</p>		
	<p>Why there is a difference in evolution of Transportation System in plants and animals?</p> <p>How water and minerals are obtained by plants?</p> <p>In which form food is</p>  <p>The diagram illustrates the cross-section of a root. From the outside in, it shows the soil, epidermis (yellow), cortex (green), endodermis (red), pericycle (orange), and xylem (blue). The xylem is shown as large vessels with thick walls, and the phloem is shown as smaller cells. The diagram is titled 'Tissue Distribution in Root'.</p>	<p>Why plants need water and minerals?</p> <p>In which tissues plants stores food material?</p>	<p>Images in IFP</p>

synthesized in the leaves during photosynthesis



Are there any kind of structures that are similar to blood vessels in

the plant body?

Why do they need a conducting system?

Why diffusion does not support transportation in plants for long distances?

Teacher explains that there are special tissues in plants which help in transportation over long distances.

Group Activity:

Dividing students into 2 Groups

One group is asked to discuss about the structure and function of the Xylem and the other group is asked to discuss about the structure and function of the Phloem in

Why food has to be transported to different places?

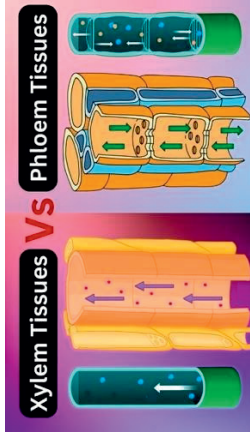
Why plants have low energy needs as compared to animals?

[https://www.youtube.com/like/fTEAhLoogc?si=MEAMt\\_nb\\_zVdD\\_jpv](https://www.youtube.com/like/fTEAhLoogc?si=MEAMt_nb_zVdD_jpv)



Differentiates  
Xylem and  
Phloem  
Tissues

plants



Why xylem and phloem are called as complex tissues?

What will happen if xylem tissue in plants is removed?

Out of xylem and phloem, which one carries materials

i) Upwards as well as downwards

ii) Only upwards

During daytime what plays major role in transportation of water?

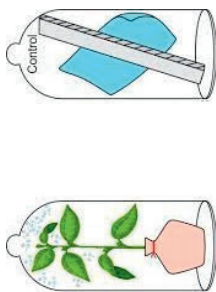
Why at night time root pressure helps in transportation of water in plants?

Which cells help in conduction of food materials in phloem?

What are the components of Xylem and Phloem tissue?

How is xylem different from phloem in its function?

Charts of  
xylem and  
phloem  
Images in IFP

<p>Plans and Conducts investigation to observe the role of transpiration in upward movement of water.</p>	<p>Teacher Demonstrate Activity 5.8:</p>  <p>How is transpiration different from Guttation?</p> <p>Explores that transpiration helps in upward moment of water in the tall trees.</p> <p>Why there is a need for transportation of food to other parts of the Plant Body.</p> <p>Do you think all the materials are transported in all the directions in the plant body?</p>	<p>Why do plants transpire?</p> <p>What are the structures which help in transpiration in plants?</p> <p>Why diffusion cannot support upward moment of water in tall trees.</p> <p>What is source and sink relationship in plants</p> <p>How transport in Xylem tissue is different from Phloem tissue.</p> <p>Repeat the experiment by keeping one plant in light and other plant in dark.</p>
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		Collect the data and record your observations.	
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**Teacher's Reflections:**

- 1. How did the lesson go?**
- 2. Were the teaching learning strategies adequate?**
- 3. Were the students engaged?**
- 4. Areas of improvement**
- 5. Measures taken to refine the teaching-learning process.**

## PERIOD PLAN 16

**Class: X**

**Chapter: Life processes**

**Key concepts: Excretion, Excretory system in human beings**


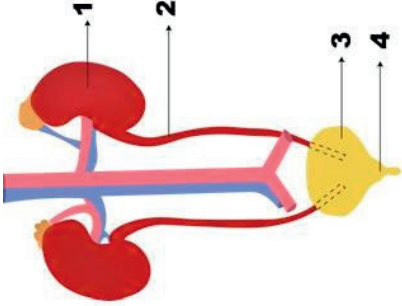
**Total no. of periods : 18**

**Period: 16 / 18**

**Total no. of periods: 18 Time Duration : 40 Min**

Learning outcomes	Teaching learning process	Pointers for Assessment	Materials Required
	<p>How are the gaseous waste materials are excreted out during photosynthesis/respiration</p> <p>Can you name the protein that carries CO<sub>2</sub> form the body?</p> <p>What are metabolic wastes?</p> <p>Is it essential to remove metabolic wastes form the body.</p> <p>Are there any consequences if the waste materials are not sent out of the body?</p> <p>How do cells of an organism produce metabolic wastes?</p> <p>Can you name the biological process that can remove the waste material from the body?</p>		



<p>Explains the structure of excretory system in human beings</p>	<p>How do humans excrete their metabolic wastes? Which organ helps in the process of excretion in humans? What is the location of kidneys in the human body?</p>	<p>State that true are false? The right kidney is placed little higher than the left kidney to adjust in the abdominal cavity? ( ) Main function of the Human</p>	<p>Kidneys specimen</p>
	<p>Which organ makes the arrangement of kidney slightly differ in the abdomen? <b>Activity:</b> Human kidney specimen observation.</p>  <p>Teacher makes the students to demonstrate the internal structure of kidney and discuss about kidney. Why the kidney is in Bean Shape? How does nitrogenous waste are discharged in Human Beings? Can you state the Components of Urine? Do you think any pigment plays a role in the urine formation? Does the urine discharge immediately after it reaches the urinary bladder?</p>	<p>excreted system is to remove the nitrogenous waste from the body? ( ) Kidney produces RBC? ( ) Observe the given diagram and give accurate answer to the parts mentioned in the diagram.</p> 	<p>Byju's Videoor QR Code in the NCERT Text Book <a href="https://diksha.gov.in/play/content/do3130868937705799681191?referrer=utm_source%3Dmobile%26utm_campaign%3Dshare_content">https://diksha.gov.in/play/content/do3130868937705799681191?referrer=utm_source%3Dmobile%26utm_campaign%3Dshare_content</a></p>

	<p>Why the urine is stored in the Urinary Bladder?</p> <p>What is the capacity of Urinary Bladder?</p> <p>How much urine is excreted per day?</p>	<ol style="list-style-type: none"> <li>1. Kidney</li> <li>2. Urinary Bladder</li> <li>3. Ureter</li> <li>4. Urethra</li> </ol>	
		<p>Which part of the above given diagram labelled incorrectly?</p> <p>Why does the urine is formed in kidney, why not in ureter? State the reason?</p> <p>What is Micturition?</p> <p>Which system is co-ordinates the function of the kidney?</p>	
<p>Exhibits in creativity the designing the working model of Excretory System</p>		<p>Prepares working model of kidney and display in the Science Lab.</p>	

Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.



# PERIOD PLAN 17


**Class: X**

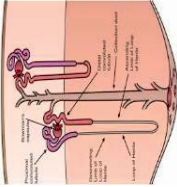

**Chapter: Life processes**

**Period: 17/18**

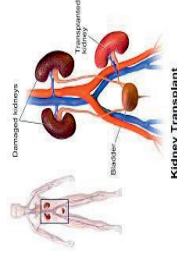
**Total no. of periods: 18**

**Key concepts: Structure of nephron and Haemodialysis**

Learning outcomes	Teaching learning process	Pointers for Assessment	Materials Required
	<p>What are the waste materials to be removed from our body?</p> <p>Why should we get rid of waste materials?</p> <p>What is the function of kidneys?</p>		
	<p>What do we filter water in our houses?</p> <p>Why do we use filters in our houses?</p> 	<p>Why should we take only filtered water for drinking?</p> <p>Why blood should be filtered in our body?</p> <p>What materials are transported by blood to our kidneys?</p> <p>Does the waste materials differ in their composition based on the food material that is consumed?</p>	

<p>Analyses the role of Nephron in the process of urine formation</p>	<p>Elaborates the structure of Nephron and mechanism of urine formation in kidneys</p> 	<p>What are the functional units of kidney?          What is the major component of urine?          Identify the mismatched pair          PCT--Reabsorption          Loop of Henle--Ultrafiltration          DCT--Secretion          Why is urine amber coloured?          Why do we go for frequent urination in winter ?          What happens if vasopressin hormone is not released?          What is Diabetes insipidus?          Collect information about excretory organs in different animals and display it in the class</p>	<p>Chart          Model          Images in IFP          Byju's video  <a href="https://youtu.be/VcvCLDN5K7k?feature=shared">https://youtu.be/VcvCLDN5K7k?feature=shared</a></p>
<p>Differentiates artificial kidney and kidney</p>	<p>What happens if both the kidneys are damaged?          What is the principle involved in dialysis technique?</p> 	<p>If a person has kidney failure whom he will consult?          When do people go for Haemodialysis treatment?          How is artificial kidney different from kidney in our body?</p>	<p>Byjus video</p>

Is there any long term solution for kidney failure?



Is kidney transplantation a better option than dialysis in kidney failure patients.

**Project:**  
Prepare a report on number of hospitals in which dialysis is done and number of people visiting per day and name of the hospitals present in your district. Tabulate the data and discuss it in the class

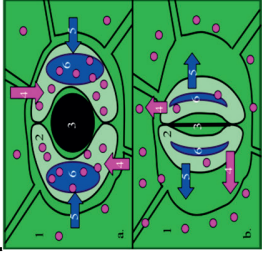
**Teacher's Reflections:**

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

# PERIOD PLAN 18

Class: X  
Chapter: Life processes  
Period: 18/18  
Total no. of periods: 18  
Key concepts: Excretion in plants, Organ donation

Learning outcomes	Teaching learning process	Pointers for Assessment	Material required
	<p>Why do we produce waste products everyday in our body?</p> <p>What kind of waste materials are generated in our body?</p> <p>Are waste materials generated in plants too?</p> <p>How is metabolism connected to production of waste materials?</p>		

<p>Differentiates gaseous, liquid and solid waste products in the plant body</p>	<p>How plants get rid of these waste materials? Do plants produce waste products during its life processes?</p> 	<p>What are the solid, liquid and gaseous wastes that are produced in the plant body?</p>	<p>Chart showing stomata <a href="https://youtu.be/T8KzQQGgk-s?si=9A5frNBf3JapLPeO">https://youtu.be/T8KzQQGgk-s?si=9A5frNBf3JapLPeO</a></p>
<p>What are the solid wastes generated in the plant body? Does vacuoles also play a key role in the process of excretion?</p>	<p>Which process helps in removal of gaseous waste from the plant body? How is excess water removed from the plant body?</p>		

**In which parts of the plant body solid waste materials are stored?**

**How are these wastes removed from the plant body?**



**Images showing organ donation in IFP**

**Project:**

Collect information about secondary metabolites and their economic importance, tabulate the data and display it in the class

Prepare slogans on organ donation and display it in the class

**Student activity in groups**

**Project:** Prepare a report on hospitals where organ transplantation is done and tabulate the data and create awareness among people through campaigning.

**If you friend or neighbour is suffering from malfunctioning or complete kidney failure, what would you suggest him?**



Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.



Assessment – I  
(Nutrition)

Class – X

Lesson: Life Processes

Time: 40 Min

Marks: 20

1 Mark  
(     )

1) Which of these criteria determine a living organism.

- i. Movement
- ii. Respiration
- iii. Nutrition
- iv. Growth and Development

(a) ii & iii      (b) i, ii, iii & iv (c) i & ii      (d) only iv

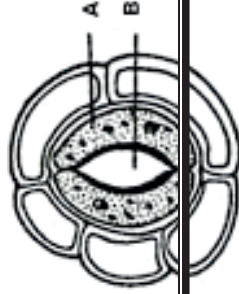
1 Mark

2) What converts, partially digested food which is acidic in stomach into alkaline in the small intestine?

- (a) Bile juice secreted by liver
- (b) Pancreatic juice secreted by pancreas
- (c) Both a & b
- (d) Intestinal juice by Jejunum and Ileum

1 Mark

3) Name the parts labelled 'A' and 'B' of the given diagram



1 Mark

4) Go through the following assertion and reason and pick out the right option from the given choices.

Assertion (A) : Depending on the complexity of the carbon sources, different organism used different kinds of nutritional processes

Reason (R) : Life on earth depends on carbon based molecules, most of these food sources are also carbon based. (    )

- (a) Both (A) and (R) are true and (R) is the correct explanation of (A)
- (b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
- (c) (A) is true and (R) is false
- (d) (A) is false and (R) is true

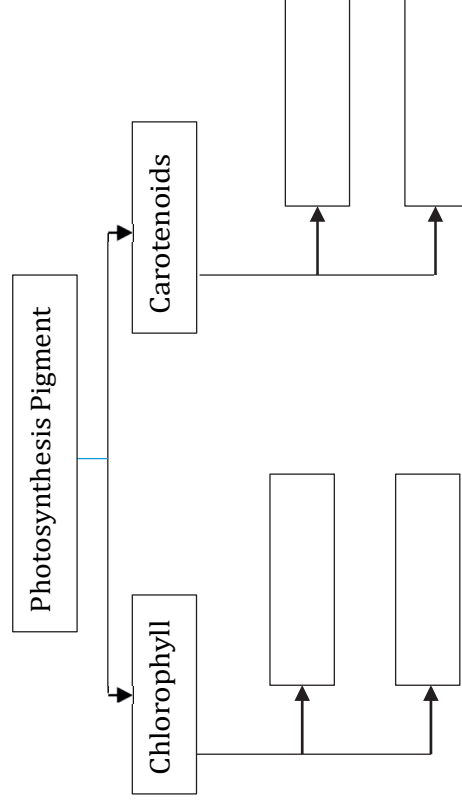
1 Mark

5) Haustoria of parasites are modified (    )

- (a) Roots
- (b) Stem
- (c) Leaves
- (d) None of these

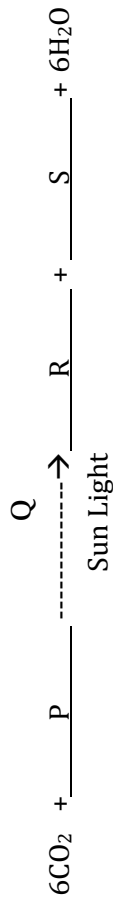
2 Marks

6) Fill the given flow chart with appropriate answer



2 Marks

7) Find out the missing P, Q, R and S substances in the following given equation?



3 Marks

8) Write the events occurring during the process of Photosynthesis

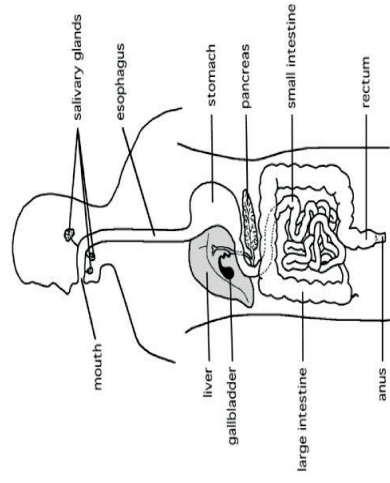
3 Marks

9) Illustrate the mechanism taking place when

- (a) The guard cells swell when water flows in them
- (b) The guard cells shrink when water leaves the cells.

5 Marks

10) Observe the given diagram and answer the following questions



- (a) Acidic medium provided by HCl in the stomach kills harmful microorganism. Which other benefit is facilitated by this acidity?
- (b) Which part of the Small intestine will increase the surface area for absorption?
- (c) Can you name the movement that helps the bolus moves through esophagus to enter into stomach?
- (d) State the role of liver in the digestive system?
- (e) Place the below mentioned process in the correct form

Digestion -----> Ingestion -----> Defecation -----> Absorption

Assessment – II

Class – X

Lesson: Life Processes  
(Respiration)

Time: 40 Min - Marks: 20

1 Mark  
( )

1) Match the Following

A

1	ATP	A	Spiracles
2	Insects	B	Oxygen
3	Haemoglobin	C	Energy Currency

B

a) 1-A,2-B,3-C

b) 1-C,2-A,3-B

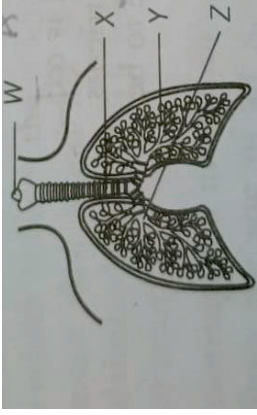
c) 1-B,2-A,3-C

d) 1-C,2-B,3-A

1 Mark

2) The diagram shows part of the human gas exchange system ( )  
what are W,X,Y and Z? Select from the given options.

	Bronchus	Bronchiole	Larynx	Trachea
(a)	W	X	Z	Y
(b)	X	Z	Y	W
(c)	Y	W	X	Z
(d)	Z	Y	W	X



2X ½ = Marks

3) Identify true or false in the following statements

- (a) Hemoglobin has more affinity to bind to carbon monoxide than oxygen
- (b) The build up of ethanol in our muscles causes cramps

1 Mark

4) Observe the following statements and choose the right option given below:

Assertion (A): In the absence of oxygen the muscle cells undergoes anaerobic

respiration

Reason (R): In anaerobic respiration, pyruvate is converted into lactic acid which is also three carbon molecule

- (a) (A) is true and (R) is the correct explanation of (A)
- (b) (A) is true and (R) is not the correct explanation of (A)
- (c) (A) is true and (R) is true
- (d) (A) is false and (R) is false

1 Marks

5) Which of the following animals have a system to provide atmospheric oxygen directly to the body cells ?

- a) Insects
- b) Fishes
- c) Human being
- d) Frogs

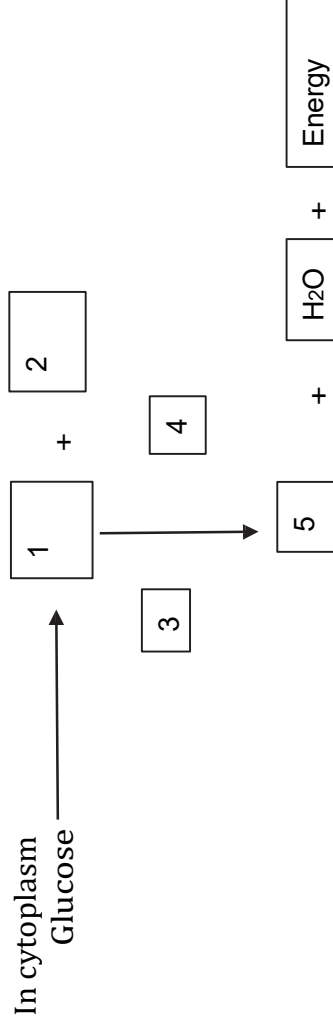
2 Marks

6) Read the given passage and related study concepts answer the following questions.

Lung cancer is the most widely known and most harmful effect of smoking :98% of cases are associated with cigarette smoking. The damaging components of cigarette smoke include tar, carbon monoxide, nitrogen dioxide, and nitric oxide. Many of these harmful chemicals occur in greater concentrations in side-stream smoke (passive smoking) than in mainstream smoke (inhaled) due to the presence of a filter in the cigarette.

- A) Why is passive smoking more dangerous than active smoking?  
 B) What are the diseases caused due to tobacco smoking other than lung cancer?  
 1 Marks
- 7) Why is the rate of breathing in aquatic animals faster than terrestrial animals?  
 2 Marks
- 8) Identify the parts that correctly match with the description given below  
 i) Small pores present in woody plants for gaseous exchange.  
 ii) Cartilaginous flap.  
 iii) Contraction and relaxation of these changes the thoracic volume.  
 3 Marks
- 9) Three organisms ate food in the form of glucose and the end products after respiration are :  
 a) Ethanol + CO<sub>2</sub> b) CO<sub>2</sub> + H<sub>2</sub>O c) Lactic acid + Water  
 b) Explain how is this possible?  
 5 Marks

10) Complete the glucose breakdown pathway in case of aerobic respiration by filling the blanks



Assessment – III  
(Transportation)

Class – X

Lesson: Life Processes

Time: 40 Min

Marks: 20

1 Mark

1) What prevents backward flow of blood inside the heart during contraction ( )

- (a) Valves in Heart
- (b) Thick walls of Ventricles
- (c) Thin walls of Atria
- (d) All the above

1 Mark

2) Which chambers of human heart contains oxygenated blood ( )

- (a) Left Atrium and Left Ventricle
- (b) Left Atrium and Right Ventricle
- (c) Right Atrium and Left Ventricle
- (d) Right Atrium and Right Ventricle

1X2=2 Marks

3) Identify true or false in the following statements

- (a) Blood has platelet cells which form a clot at the side of injury
- (b) Translocation of substances takes place in the sieve tubes in downward direction only

1 Mark

4) Observe the following statements and choose the right option given below:

Assertion (A): All the arteries carry oxygenated blood from the heart to various organs.

Reason (R): Pulmonary vein carries deoxygenated blood to the Heart



- (a) (A) is true and (R) is the correct explanation of (A)
- (b) (A) is true and (R) is not the correct explanation of (A)
- (c) (A) is true and (R) is true
- (d) (A) is false and (R) is false

2 Marks

5) How is double circulation different from single circulation?

2 Marks

6) Veins are thin walled than arteries? Justify.

3 Marks

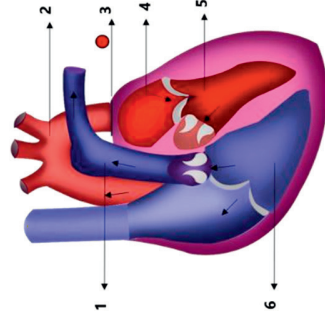
7) Blood is a Fluid Connective tissue. Explain? Give a few examples of blood related disorders.

3 Marks

8) Describe how transpiration supports upward movement of water in plants

5 Marks

9) Identify any five parts in the given diagram and mention their functions?



Assessment – IV  
(Excretion)

Class – X  
Lesson: Life Processes

Time: 40 Min

Marks: 20

1 Mark

( )

1) Structural and Functional units of Kidney

- (a) Neuron (b) Nephridia (c) Nephron (d) Alveoli

1 Mark

2) Choose the incorrect pair

- (a) Ultrafiltration - Glomerulus  
(b) Storage of urine – Urinary Bladder  
(c) Reabsorption – PCT  
(d) Concentration of Urine – Urethra

1 Mark

3) Assertion (A): Artificial kidney is a device used to remove nitrogenous waste products from the blood through dialysis

Reason (R): Reabsorption does not occur in artificial kidney

- (a) (A) is true and (R) is the correct explanation of (A)  
(b) (A) is true and (R) is not the correct explanation of (A)  
(c) (A) is true and (R) is true  
(d) (A) is false and (R) is false

1 Mark

- 4) Choose the correct path of urine in our body
- (a) Kidney – Ureter – Urethra – Urinary Bladder
  - (b) Kidney – Urinary Bladder – Ureter – Urethra
  - (c) Kidney – Ureter – Urinary Bladder – Urethra
  - (d) Kidney – Urethra – Urinary Bladder – Ureter

1 Mark

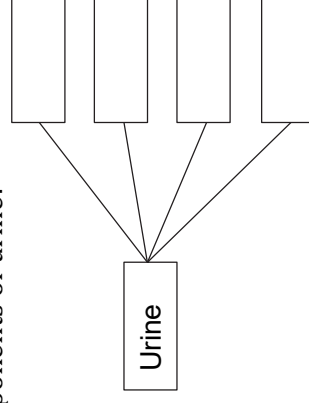
- 5) The bunch of blood capillaries in the nephron is

- 6) How are unicellular organisms different from multicellular organisms in their mode of excretion

2 Marks

- 7) Fill the boxes with components of urine?

2 Marks



- 8) If a person is suffering from kidney failure. Whom he will consult and what does the doctor suggest him?

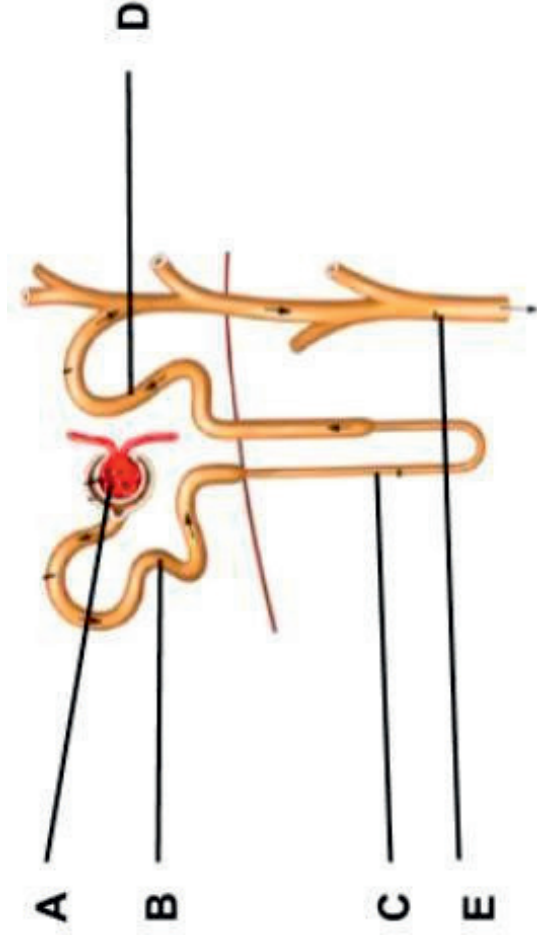
3 Marks

- 9) How do plants get rid of their excretory products?

3 Marks

5 Marks

10) Identify the parts of the given diagram and mention their functions?



## Content resources

[https://diksha.gov.in/play/collection/do\\_31310347523880550411304?referrer=utm\\_source%3Dmobile%26utm\\_campaign%3Dshare\\_content&contentId=do\\_31308040010408755219096](https://diksha.gov.in/play/collection/do_31310347523880550411304?referrer=utm_source%3Dmobile%26utm_campaign%3Dshare_content&contentId=do_31308040010408755219096)

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<https://youtube.com/watch?v=bD7gnzVjD4&feature=shared>

<https://youtube.com/watch?v=kcQBhGFZx90&feature=shared>

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<https://youtu.be/JQvdXX7hGqI?si=xaGunl0ozCvetz0i>

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**CLASS : X**

**CHAPTER : OUR ENVIRONMENT**

**TOTAL NO. OF PERIODS: 9**

**Aims of Education:**

1. Rational thought and Independent thinking
2. Health and wellbeing
3. Democratic and community participation

**Aims of Science Education:**

1. Scientific understanding of the natural and physical world:
  - Student develops scientific understanding through specific observations, questions, experiments, principles and concepts.
2. Capacities for scientific inquiry:
  - Student puts forth hypotheses, predictions and analyses and evaluates situations and draws logical conclusions fundamental to the learning of science.
3. Interdisciplinary understanding between science and other curricular areas:
  - Student understands inter linkages across disciplines.'
4. Creativity:
  - Student develops creativity in designing good experiments and formulating hypothesis.

### Curricular Goals and Competencies

**Curricular Goal – 3:** Explores the structure and function of the living world at the cellular level  
Competency -3.1: Explains the role of cellular components including the muscle cell making tissue the structure basis of living organism and function basis of life process.  
Competency - 3.2: Analyses brain parts and functions in life process involved in control and coordination.  
Competency - 3.3 : Describes mechanism of reflex arc.

**Curricular Goal – 4 :** Explores interconnectedness between organisms and their environment  
Competency - 4.2 : Illustrate different parts of brain organization of living organisms.  
Competency - 4.3 : Analyses different levels of biological organisation from organisms to ecosystems and biomes along with interactions that take place at each level.

**Curricular Goal - 5:** Draws linkages between scientific knowledge and knowledge across other curricular areas  
Competency - 5.1: Explores how literature and arts have influenced science.  
Competency - 5.2 : Examines a case study related to the use of science in human life from the perspective of social science, chemistry.

Competency - 5.3 : Applies scientific principles to explain phenomena in other subjects.

**Curricular Goal - 7:** Develops awareness of the most current discoveries ideas and frontiers in all areas of scientific knowledge in order to appreciate that science is ever evolving in that there are still many un answered questions.

Competency -7.2 : States questions related to matters in the curriculum for which current scientific understanding is well recognised to be inadequate.

**Curricular Goal - 8:** Explores the nature of science by doing science

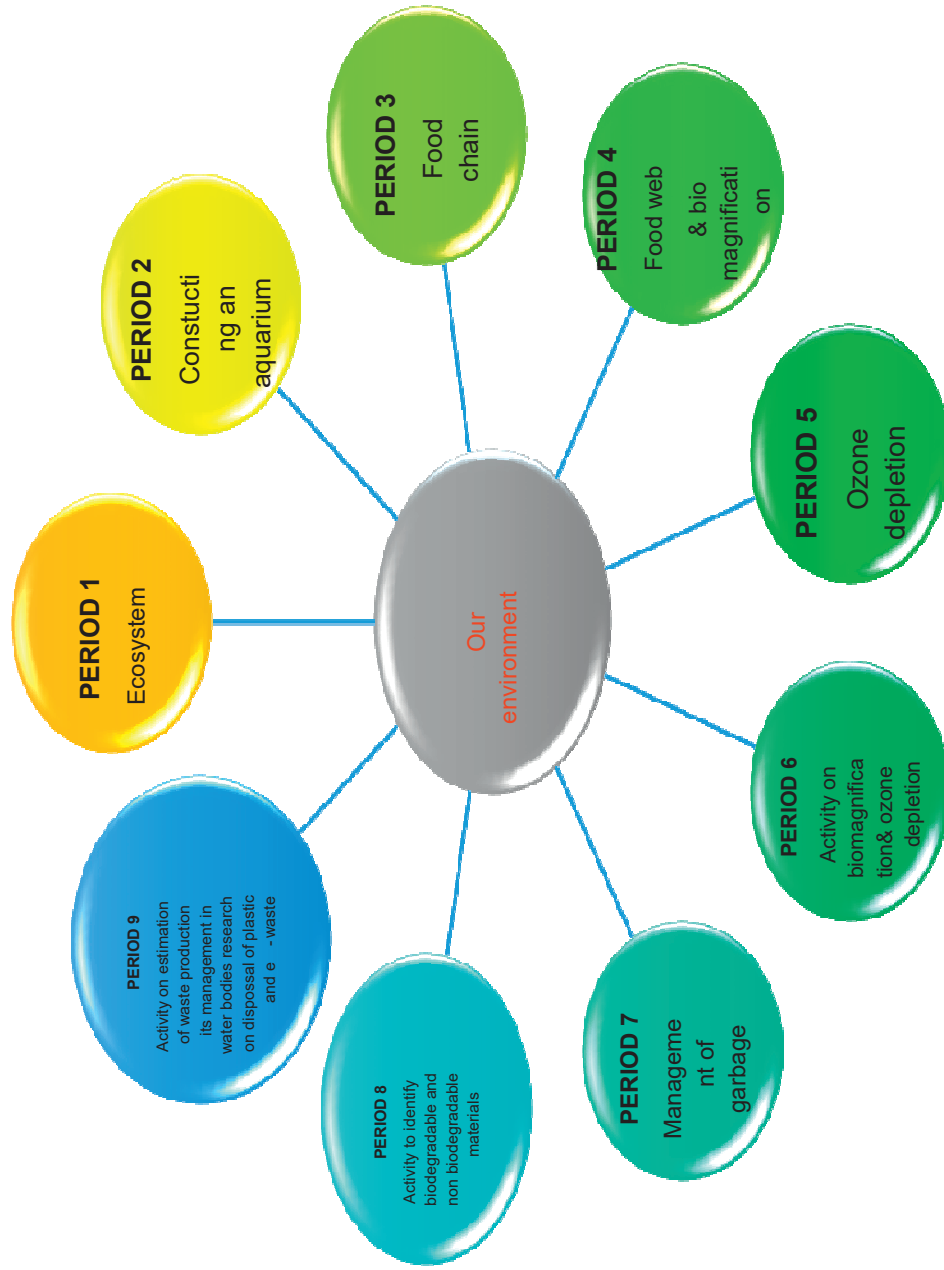
Competency - 8.1: Develops accurate and appropriate models to represent real life events and phenomena using scientific principles and use this models to manipulate variables and predict results.

Competency - 8.2 : Designs and implements a plan for scientific inquiry.

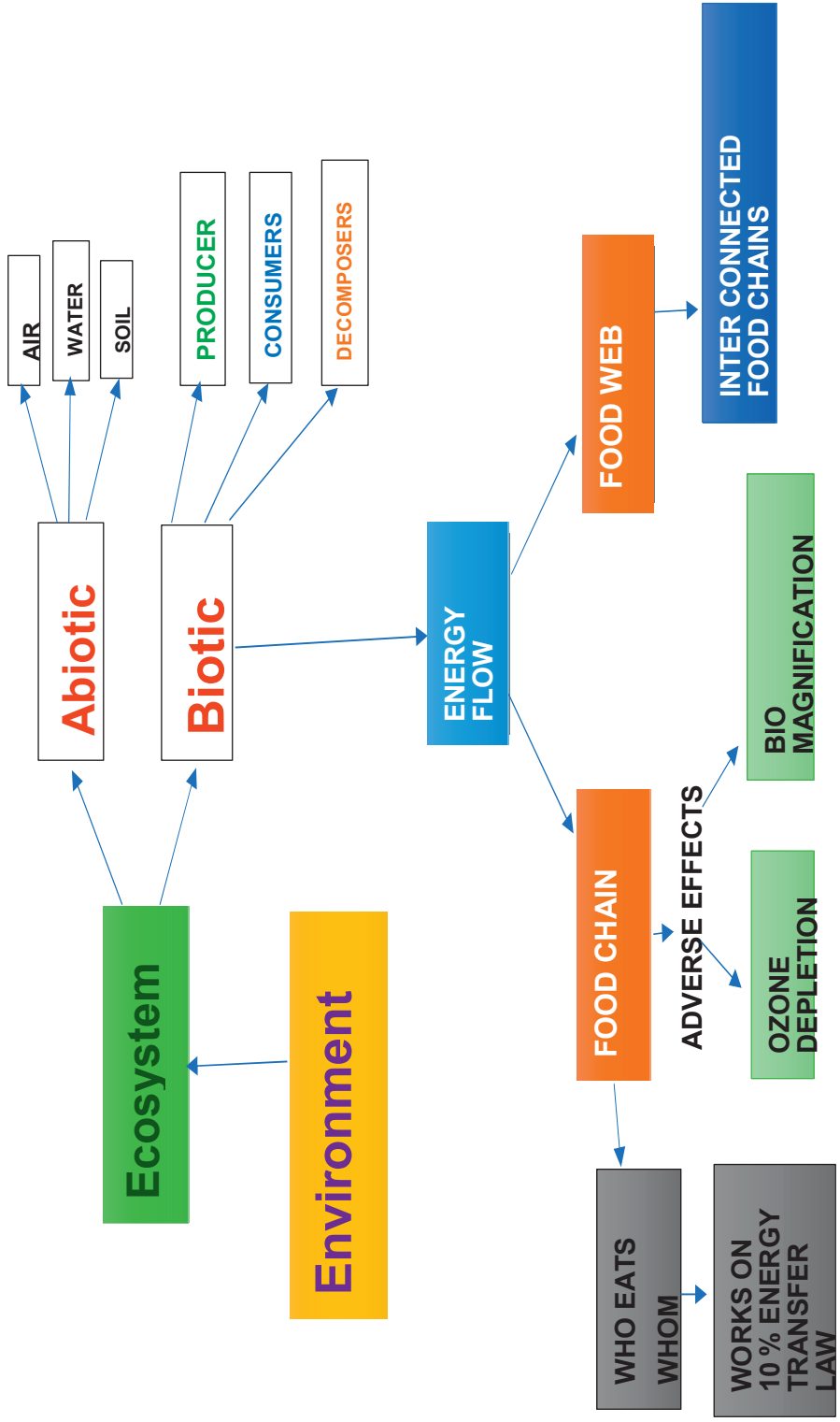
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PERIOD MAP



**CONCEPT MAP**



**TOPIC WISE LEARNING OUTCOMES**

Period No.	Topic	Learning outcomes
1	<b>Introduction to ecosystem</b>	<ul style="list-style-type: none"><li>• Differentiates (i) biotic and abiotic components (ii) terrestrial and aquatic ecosystems</li><li>• Defines ecosystem, biotic and abiotic components of an ecosystem</li><li>• Classifies ecosystems as natural and artificial</li><li>• Applies learning of ecosystem to hypothetical situations</li><li>• Exhibits creativity in designing models using ecofriendly resources</li></ul>
2	<b>Constructing an aquarium</b>	<ul style="list-style-type: none"><li>• Exhibits creativity in designing a model aquarium</li><li>• relates the dependency of organisms on each other</li><li>• Applies learning to hypothetical situations</li></ul>
3	<b>Food chain</b>	<ul style="list-style-type: none"><li>• Classifies organisms according to the manner in which they obtain their sustenance from the environment.</li><li>• Differentiate consumers as primary, secondary and tertiary consumers.</li><li>• Communicates the findings and conclusions of decomposition experiment effectively</li><li>• Applies learning to hypothetical situations</li><li>• Applies scientific concepts in daily life and solving problems.</li></ul>

4	<p><b>Food web and bio magnification</b></p>	<ul style="list-style-type: none"> <li>Analyse and interprets the concept of food chain</li> <li>Applies learning about biomagnification to hypothetical situations.</li> <li>Explains the trophic levels in ecosystem.</li> <li>Draw flowcharts of food chains and trophic levels</li> <li>Take initiative to know about the scientific contributions of Scientist Lindeman in understanding the concept of energy flow</li> </ul>
5	<p><b>Human activities affecting environment-Ozone depletion</b></p>	<ul style="list-style-type: none"> <li>Analyse and interprets the concept of food web</li> <li>Draws the flowchart and diagrams of food web</li> <li>Relates the food chains and the flow of energy in a food web</li> <li>Exhibits creativity in designing the models</li> <li>Relates the process of biomagnification and its effect on organisms.</li> </ul>
6	<p><b>Activity on biomagnification and ozone depletion</b></p>	<ul style="list-style-type: none"> <li><b>Relates the process of biomagnification with its effects on organisms</b></li> <li><b>Applies scientific concepts in daily life and solving problems</b></li> <li>Applies learning to hypothetical situations</li> <li><b>Exhibits values of rational thinking and freedom from myth and sensitise others regarding the harmful effects of pesticides on organisms</b></li> </ul>
7	<p><b>Managing the garbage</b></p>	<ul style="list-style-type: none"> <li><b>Analyse and interprets the figure showing formation of ozone</b></li> </ul>

		<ul style="list-style-type: none"> <li>• Applies learning of ozone depletion and Predict the consequences of ozone depletion</li> <li>• Analyses and interprets data on the impact of usage of harmful chemicals on the environment and the measures taken by UNEP in 1987.</li> <li>• Relates the depletion of ozone layer to the release of synthetic chemicals CFC</li> </ul>
8	Activity to identify biodegradable and non biodegradable materials	<ul style="list-style-type: none"> <li>• Classifies materials based on the time taken to change ( degrade )</li> <li>• Differentiates biodegradable and non-biodegradable materials</li> <li>• Exhibits rational thinking in the usage of biodegradable and non-biodegradable materials</li> </ul>
9	Activity on estimation of waste production its management in water bodies research on disposal of plastic and e-waste through internet and library	<ul style="list-style-type: none"> <li>• Differentiates materials based on properties and characteristics</li> <li>• Explains about the effect of hazardous materials on the environment.</li> <li>• Applies learning to hypothetical situations</li> <li>• Exhibits values of rational thinking and freedom from myth and sensitise others regarding the harmful effects of improper disposal of garbage.</li> </ul>

**PERIOD PLAN 1**

Name of the Chapter: OUR ENVIRONMENT

Class : 10

Total no. of periods : 09

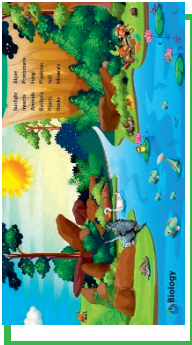
Period plan : 01/09

Time : 40 min

Key Concepts : Eco system and its components Serial number

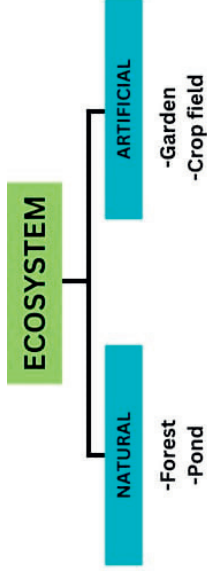


LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
<p><b>Testing prior knowledge</b></p>	<p>The student recalls the previous The knowledge about environment</p> <ul style="list-style-type: none"> <li>● What do we see in our surroundings?</li> <li>● What do you call the things which have life?</li> <li>● How do you differentiate living things from non-living things?</li> <li>● We often come across in news papers, “Environment is changing” what does it mean?</li> <li>● What do you mean by environment?</li> </ul> <p>□ The teacher introduces the concept of environment and illustrates the concept of ecosystem with the help of a chart.</p>		

<p><b>Differentiates biotic and abiotic components</b></p> <p><b>Defines ecosystem, biotic and abiotic components of an ecosystem</b></p>	 <ul style="list-style-type: none"> <li>● What do you find in a garden?</li> <li>● Do we find only living things in the garden?</li> <li>● Name the non-living components which affects the growth and other activities of living things?</li> <li>● Is there any relation between the living and non-living components of the garden?</li> <li>● If living things in the garden constitutes the biotic factors, what are abiotic factors?</li> <li>● Now can you tell what does a garden constitute?</li> <li>● So, garden is an ecosystem. Define ecosystem?</li> <li>● Name the biotic and abiotic components in the garden ecosystem?</li> </ul>	<p><b>Differentiate biotic and abiotic components of an ecosystem.</b></p> <p><b>What is an ecosystem? What are its components?</b>  <b>Biotic components of an ecosystem includes: A) Sunlight and water B) Plants and animals C) Soil and minerals D) Air and temperature</b></p>	<p><b>Picture of a garden</b></p> <p><b>Model of an ecosystem using cardboard</b></p>
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Classifies ecosystems as natural and artificial

The teacher elicits the types of ecosystems



- Who grow and maintain the gardens and crop fields?
- Can we call crop field a natural ecosystem? Why?
- Can you name an ecosystem which develop in the nature without human support?
- What do you call the ecosystem present on land?
- What do you call the ecosystem present in water?

Differentiates terrestrial and aquatic ecosystems

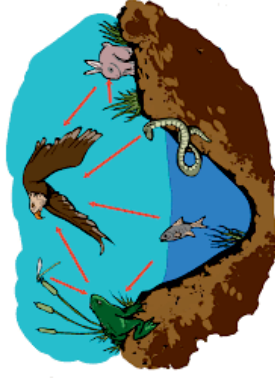
How are ecosystems broadly classified?

Which of the following is a natural ecosystem?

- A Garden B) Crop field C) Pond
- D) Aquarium

Differentiate terrestrial and aquatic ecosystems?

Observe the below picture and name the type of ecosystem. Identify the producers and types of consumers.



Tree is an example of \_\_\_\_\_ ecosystem

Gives examples of ecosystems.

- Give examples of various ecosystems in your surroundings.

AUDIO VISUAL AID  
(For the video on Ecosystem):

<https://diksha.gov.in/play/content/do>

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<p>Applies learning to Hypothetical situations</p> <p>Exhibits creativity in designing models using ecofriendly resources</p>		<p>A rotting piece of wood is a small ecosystem. Justify</p> <p>PROJECT:</p> <p>Construct model of an ecosystem showing all the biotic and abiotic components</p>	
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**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning process.

## PERIOD PLAN 2

Name of the Chapter : OUR ENVIRONMENT

Class : 10

Total no. of periods : 11

Period plan : 02/11

Time : 40 min

Key Concepts : Constructing aquarium Activity



LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
<p>Exhibits creativity in designing a model aquarium</p>	<p>The teacher tests the previous knowledge:</p> <ul style="list-style-type: none"> <li>● What is an ecosystem?</li> <li>● How are ecosystems broadly classified?</li> <li>● Can you give an example of an artificial ecosystem?</li> <li>● Can you give an example of an aquatic ecosystem?</li> <li>● Can aquarium be considered as an ecosystem?</li> </ul> <p>The teacher makes groups and allots them to procure materials for creating an aquarium (Activity 13.1 and 13.2):</p> <ul style="list-style-type: none"> <li>● What materials do we require to make an aquarium?</li> <li>● While creating an aquarium what care do we need to take?</li> </ul>	<ul style="list-style-type: none"> <li>● What will happen if we remove the oxygen pump present in the aquarium?</li> <li>● Imagine if the number of water plants continues increasing in the aquarium. What would be the consequence?</li> </ul>	<p>Materials for making an aquarium: Glass jar, water, water plants (Hydrophytes) and a few water animals, colour pebbles, oxygen pump.</p>

<p>Relates the dependency of organisms on each other</p>	<ul style="list-style-type: none"> <li>• What type of plants and animals do we place in the aquarium?</li> <li>• Do we have the same conditions on land and water ecosystem?</li> <li>• Why is there a difference in the quantity of oxygen on land and in water?</li> <li>• How can we provide oxygen to the organisms in the aquarium?</li> <li>• In the aquarium, why is an electric bulb provided?</li> <li>• We clean the aquarium once in a while but ponds are not cleaned. Why/why not?</li> <li>• Can we put an aquatic animal which would eat other animals in the aquarium?</li> <li>• What would happen if we put those animals?</li> <li>• Place the aquatic organisms in the order of who eats whom and form a chain.</li> </ul>	<p>Fill in the blank</p> <ul style="list-style-type: none"> <li>• In the aquarium, Hydrilla plant → small fish → _____</li> <li>• If an electric bulb is not provided in an aquarium, what will happen to the aquatic plants?</li> <li>• Can you name the biotic and abiotic components in the aquatic ecosystem?</li> <li>• How are aquatic plants useful to aquatic animals?</li> <li>• Why is aquarium considered an ecosystem?</li> <li>• Can aquatic ecosystems change to terrestrial ecosystem?</li> </ul>	
<p>Applies learning to hypothetical situations</p>		<ul style="list-style-type: none"> <li>• What will happen if we remove the aquatic plants from the aquarium?</li> </ul>	

**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning process.

### PERIOD PLAN 3

Name of the Chapter : OUR ENVIRONMENT

Class : 10

Total no. of periods : 09

Period plan : 03/09

Time : 40 min

Key Concepts : **Producers, Consumers, Decomposers, types of consumers, Herbivores, Carnivores, Omnivores, and Parasites**



LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
<p>Classifies organisms according to the manner in which they obtain their sustenance from the environment.</p>	<p>The teacher tests the previous knowledge:</p> <ul style="list-style-type: none"> <li>• Why is aquarium considered as an ecosystem?</li> <li>• What biotic and abiotic components are present in it?</li> <li>• What is the energy source for organisms in the aquarium?</li> <li>• Why do we need to clean the aquarium once in a while?</li> </ul> <p>The teacher introduces the concept of producers and consumers (primary, secondary and tertiary) with the help of an activity:</p> <p><b>ACTIVITY:</b></p> <p>The teacher asks the students to divide into two groups and asks the students of one of the group to write the name of different kinds of living organisms on paper. The second group should categorize the</p>		<p>1 Chart showing pictures of food chain.</p> <p>(Scan the QR code in the lesson and follow the link through diksha app)</p> <p><a href="https://diksha.gov.in/play/content/do_312795716474249216111751">https://diksha.gov.in/play/content/do_312795716474249216111751</a></p>

names of all these living organisms into producers and consumers and discusses

- How do plants get their food?
- Why are they called producers?
- Why are plants important in an ecosystem?



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- Which animals consume plants as food?
- What do we call them?
- Given example of animals which consume other animals as food?

The Teacher enables students to identify and classify primary, secondary and tertiary consumers through an activity and simple questions.

Gives examples of primary secondary and tertiary consumers.

- How can we classify organisms according to the manner in which they obtain their sustenance from the environment?
- To which category do algae belong to in an ecosystem?
- Given examples of producers and consumers that you see in our surroundings?

Identify the primary, secondary and tertiary consumers from the following picture:



- Give examples of consumers

<p>Differentiates consumers as primary, secondary and tertiary consumers.</p> <p>Communicates the findings and conclusions effectively</p> <p>Applies learning to hypothetical situations Applies scientific concepts in daily life and solving problems.</p>	<p><b>Activity:</b> Make a list of consumers that you see in your surroundings and categorise them in the order <b>Who eats Whom</b> as primary secondary and tertiary consumers?</p> <ul style="list-style-type: none"> <li>• Why are herbivores called primary consumers?</li> <li>• Which animals are called secondary consumers? Why?</li> </ul> <p><b>ACTIVITY</b> The teacher setups a decomposition experiment and asks the students to collect kitchen waste, papers and the plastic waste and dump them in a pit and discuss the role of decomposers in breaking down the organic matter. Observing the changes over time will help to findout, how decomposers contribute to nutrient recycling in ecosystems.</p> <ul style="list-style-type: none"> <li>• Give examples of decomposers.</li> <li>• Why are decomposers called microconsumers?</li> <li>• What is the role of decomposers in the environment?</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Categorize the following animals to primary, secondary and tertiary consumers: Deer, goat, cat, rat, dog, hen, eagle, dove, spider, lizard, snake</li> <li>• The microorganisms comprising _____ and _____, break down the dead remains of organisms into simple forms. What conclusions can we draw from the observations made in the decomposition experiment? How does the natural replenishment of the soil take place?</li> <li>• What will happen if we remove the decomposers in the biosphere?</li> <li>• Now a days farmers are making indiscriminate use of fungicides to protect their crops from microbes. This act kills many useful microbes. Suggest ecofriendly methods to save useful microbes.</li> </ul>	
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**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning process.

**PERIOD PLAN 4**

Name of the Chapter : OUR ENVIRONMENT



Class : 10

Total no. of periods : 09

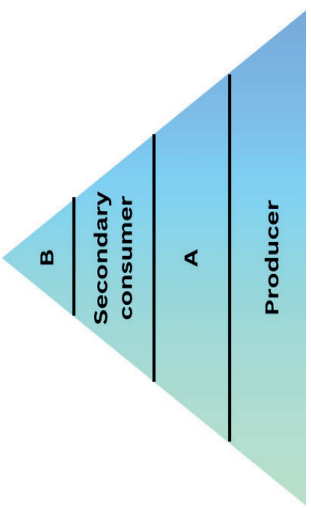
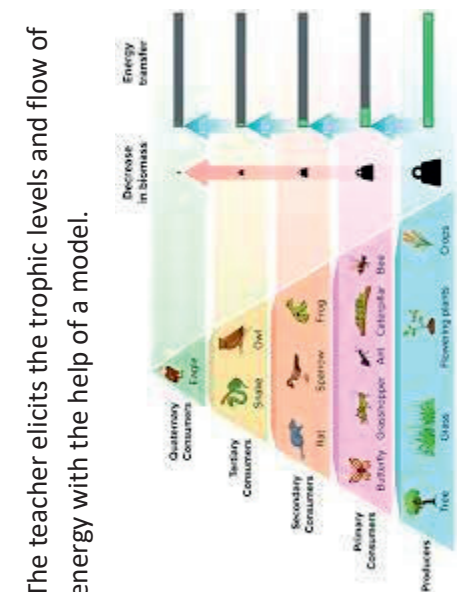
Period plan : 04/09

Time : 40 min

Key Concepts : Food Chain, Trophic levels, Food Web, Flow of energy,

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
<p>Analyse and interprets the concept of food chain</p>	<p>The teacher tests the previous knowledge:</p> <ul style="list-style-type: none"> <li>• What is the primary source of energy in an ecosystem?</li> <li>• Which organisms forms the foundation of the ecosystem?</li> <li>• Why are plants called as producers?</li> <li>• How do you classify the consumers as?</li> <li>• What is the role of decomposers in the ecosystem?</li> </ul> <p>The teacher introduces the concept of food chain with the help of a model and activity</p>  <p>The teacher gives the names of a few animals on cards in a jumbled way and asks the students to tell which animal becomes the food for the other and arrange</p>	<p>Identify the producers and tertiary consumers in the following picture:</p> 	<p>Model of food chain</p> <p>Chart showing pictures of the food chain. (Scan the QR</p>



<p>them in the series of order given below:  <b>PRODUCERS → PRIMARY CONSUMER → SECONDARY CONSUMERS → TERTIARY CONSUMERS</b></p> <ul style="list-style-type: none"> <li>• What do the above series of organisms imply?</li> <li>• As this series of chain is formed by organisms for food. What do we call this chain as?</li> </ul>	<p>code in the lesson and follow the link through diksha app) <a href="https://diksha.gov.in/play/content/do_312795716474249216111751">https://diksha.gov.in/play/content/do_312795716474249216111751</a></p>
<p>Applies learning to hypothetical situations.</p> <p>Explains the trophic levels in ecosystem.</p>	<ul style="list-style-type: none"> <li>• Why do all food chains start with plants?</li> <li>• To which category does fish belong to in a marine food chain?</li> <li>• What will happen if we remove carnivores in an ecosystem?</li> </ul>
<p>How many steps or levels do you observe in the above food chains (a),(b)and (c) respectively?</p> <p>The teacher elicits the trophic levels and flow of energy with the help of a model.</p>	<p>Write the appropriate names of trophic levels A and B in the following figure:</p> 
<p>As each step or level of the food chain forms a</p>	 <ul style="list-style-type: none"> <li>• As each step or level of the food chain forms a</li> </ul>



**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning process.

**PERIOD PLAN 5**

Name of the Chapter : OUR ENVIRONMENT

Class : 10

Total no. of periods : 09

Period plan : 04/09

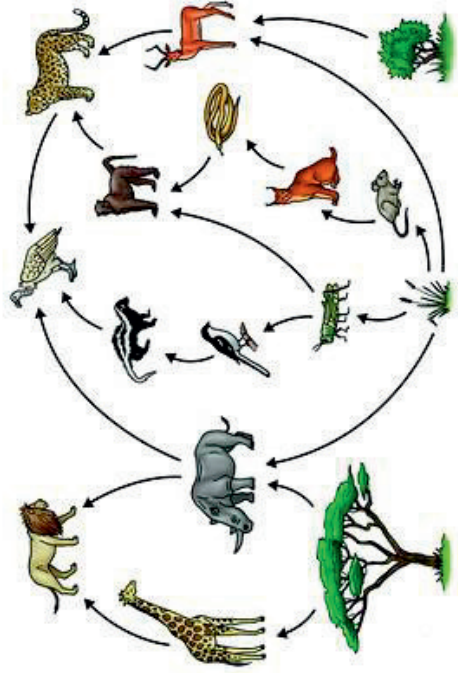
Time : 40 min

Key Concepts : **Food Web, flow of energy and Bio-magnification**



LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
<p>Analyse and interprets the concept of food web</p>	<p>The teacher tests the previous knowledge:</p> <ul style="list-style-type: none"> <li>• What is the primary source of energy in an ecosystem?</li> <li>• Who forms the foundation of the ecosystem?</li> <li>• How are the trophic levels of the food chain graphically represented sequence-wise?</li> <li>• Which trophic level eats nothing and which one is not eaten?</li> <li>• What is a food chain?</li> </ul> <p><u>Activity:</u> The teacher introduces the concept of food web through a group activity with the help of pictures of a food chain on cards and asks to identify the number of steps/ levels in the given food chains: Group 1- Vegetation (producer) → Elephant (herbivore) Group 2- Vegetation (producer) → Rabbit (herbivore) Group 3- Vegetation (producer) → Deer (herbivore) → Lion (Carnivore) Group 4- Grass (producer) → Worms (herbivore) → Small bird (carnivore I) → Hawk (carnivore II) Group 5- Grass (producer) → Flies (herbivore) → Frog (carnivore I) → Snake (carnivore II) → Peacock (carnivore III)</p>	<ul style="list-style-type: none"> <li>• Differentiate between the food habits of organisms belonging to first and second trophic levels.</li> </ul>	<p>Cards showing various food chains.</p>

- How are these food chains interrelated?
  - Can organisms in one food chain be a part of other food chain?
- The teacher further reinforces the concept of food web and interrelationships between the different organisms



Draws the flowchart and diagrams of food web

- How many food chains do you observe?
- Do all the food chains have same length?
- Which animal becomes the food for the other in a food chain?
- Can one animal become the food for many?
- How can we show the relationship of who eats whom in the above diagram?
- What is the relationship between food chains shown as a series of branching lines called?
- What is the direction of energy flow in the food web?
- Does the energy captured by autotrophs revert back to solar input?

Relates the food chains and the flow of energy in a food web

Exhibits creativity in designing the models

- Differentiate food chain and food web. Make a flowchart of food chains using the following organisms in the form of who eats whom:  
Grass, frog, seeds, eagle, cat, insects, snake, rat

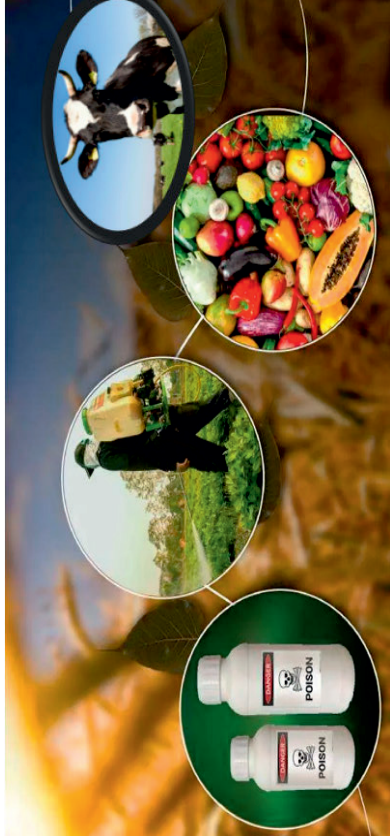
Energy flow is \_\_\_\_\_ while matter is repeatedly \_\_\_\_\_

Prepare an improvised model of an terrestrial food web.

(Scan the QR code in the lesson and follow the link through diksha app) ([https://diksha.gov.in/play/content/do\\_312795716474249216111751](https://diksha.gov.in/play/content/do_312795716474249216111751))

**Relate the process  
Of bio  
magnification and  
its effect on  
organisms.**

- Where do we get our food from?
- What are the requirements in an agricultural field for a farmer?
- What measures are adopted by the farmer to take care of the crop from diseases?

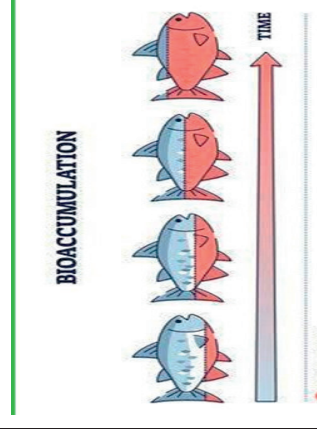


The teacher discusses with the students that different kinds of pesticides are used in the agricultural field.

- What happens to the pesticides after it enters the soil?
- Can pesticides be also found in water bodies?
- What absorbs the pesticides from the soil along with water and minerals?
- How do these pesticides enter the herbivores?
- Are the chemicals in the pesticides degradable?
- To which trophic level do these chemicals accumulate progressively?
- Define bio magnification.

Explain how pesticides enter the food chain.

What do you understand from the below picture?



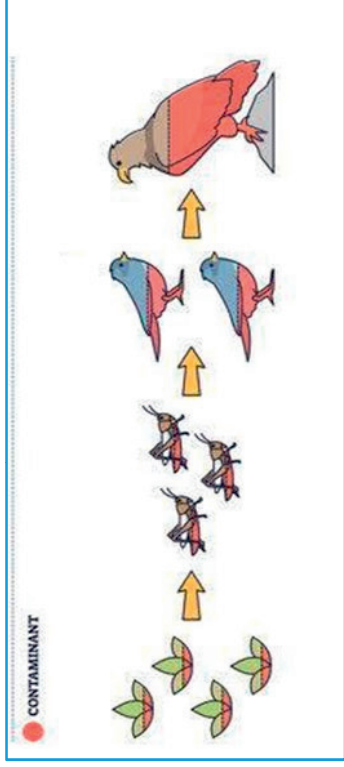
In a village, vultures are found to be dead due to insecticide poisoning after eating dead animals. Vultures are very important for a food chain and their death has become a matter of great concern.

- What do you learn from the death of the vultures?
- What precautions should we take in eating of our food?
- What should the government do to reduce biological magnification?

Pictures of agricultural field and pesticide



The teacher further reinforces the concept of biomagnification through the below diagram.



- Which organism in the food chain will have maximum containment?
- Where do human beings lie in the food chain ?
- How do harmful chemicals enter human bodies?

A geographical area contains organisms like snakes, grasshoppers, peacocks, grass and frogs. If pesticide was used in this area to kill insects, which among the following organisms will have maximum amount of pesticide? Name the phenomenon involved.

Give reason why fruits and vegetables should be washed with plenty of water before consuming them?

The maximum concentration of harmful chemicals accumulates in human beings? State the phenomenon involved and justify this statement.



**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning process.



**PERIOD PLAN 6**

Name of the Chapter : OUR ENVIRONMENT

Class : 10


Total no. of periods : 09

Period plan : 06/09

Time : 40 min

Key Concepts : Activity 13.3 pesticides levels in food items, Bio-magnification ,



LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
	<p>The teacher tests the previous knowledge:</p> <ul style="list-style-type: none"> <li>• What variety of food do we eat?</li> <li>• Why do we wash fruits and vegetables before eating?</li> <li>• Who grows food for us?</li> <li>• How do farmers control these insects which harm the crops?</li> <li>• What is the person in the picture below doing?</li> </ul>  <ul style="list-style-type: none"> <li>• What will happen if we eat these crops?</li> </ul> <p>The teacher conducts Activity 13.3- a debate in groups to give a deeper understanding of the causes and</p>		<p>Model of earth surrounded by ozone layer</p>

**Relates the process of biomagnification with its effects on organisms**

sources of pesticides in food items and the need to reduce it.

The teacher guides to discuss on the Newspaper reports

- [pesticides in our food.jpg](https://aadl.org)  
<https://aadl.org>
- [cocktail of pesticides.jpg](https://encrypted-tbn0.gstatic.com)  
<https://encrypted-tbn0.gstatic.com>
- [foods-most-herbicides-pesticides-6.png](https://personalinjurylawcal.com)  
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- [foods-most-herbicides-pesticides-6\\_thumb.jpg](https://personalinjurylawcal.com)  
<https://personalinjurylawcal.com>
- [Pesticides-in-our-food-FINAL.htm](https://www.scribd.com)  
<https://www.scribd.com>

**Applies scientific concepts in daily life and solving problems**

- What do the newspaper reports convey about the pesticide levels in food?
- Name the states which banned the use of chemical pesticides?
- “There is a dire need to ban the usage of chemical pesticides.” Justify.

The teacher continues the discussion on sources of pesticides in food items:

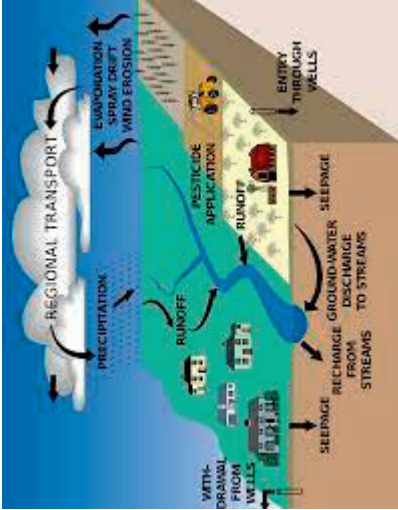
- What would be the source of pesticides in food items?
- Can pesticides enter into our bodies through

- Identify which one the following would have a hazardous impact if they persist in the environment for a long time: Newspaper, vegetable peels, pesticides, waste from cattle shed.

- “Our food items such as wheat, rice, vegetables, fruits and even meat are found to contain varying amounts of pesticide residues” State the reason to explain how and why it happens?

- Ram’s mother always thought that fruits juices are very healthy for everyone. One day she read in the newspaper that some brands of fruit juices have been found to contain certain levels of injurious pesticides in them.
- How would you explain her about fruit juices getting contaminated with pesticides?
- It is said that when harmful pesticides enter our body as well as in the bodies of other organisms, they get accumulated and beyond a limit cause harm and damage our organs. Name

**A V aid (Scan the QR code in the lesson and follow the link through diksha app)**  
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<p>other food products also?</p> <ul style="list-style-type: none"> <li>What the different sources of pesticides in food items</li> </ul> <p>AGRICULTURAL USE- RESIDUAL SOIL CONTAMINATION – POST HARVEST TREATMENT – AIRBORNE DRIFT – STORAGE AND TRANSPORTATION - WATER CONTAMINATION –</p> 	<p>What methods do you suggest to reduce the intake of pesticides?</p> <p>How can you avoid the common pests like cockroach, house flies and mosquitoes in your house without using chemical pesticides?</p> <p>Can we use traditional methods to kill the pests instead of using chemical?</p> <p>Why organic farming preferred to farming using chemicals?</p>	<p>the phenomenon and write about it</p> <ul style="list-style-type: none"> <li>Pesticides like DDT which are sprayed to kill pests on crops are found to be present in the soil, ground water, water bodies etc. Explain how do they reach these places.</li> <li>Accumulation of harmful chemicals in our body can be avoided. Explain how this can be achieved.</li> <li>Suggest some methods to reduce the use of pesticides.</li> <li>How can we continue the crop production without using the pesticides?</li> <li>Usage of crackers during Diwali festival creates huge pollution. Does it have the same effect like that of usage of pesticides on the environment?</li> <li>As per the recent survey microplastics have been found in the human blood. How do you think these have entered the human body?</li> <li>State ways to prevent accumulation of harmful chemicals in our bodies.</li> <li>Prepare slogans, pamphlets and</li> </ul>
<p>Applies learning to hypothetical situations</p>		

**Exhibits values of rational thinking and freedom from myth and sensitise others regarding the harmful effects of pesticides on organisms**

- How will you bring awareness to reduce or ban the use of pesticides?

conduct a rally to bring awareness on harmful effects of pesticides on organisms.


**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning process.

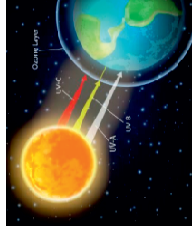
## PERIOD PLAN 7

Name of the Chapter : OUR ENVIRONMENT  
 Class : 10  
 Total no. of periods : 09  
 Period plan : 05/09  
 Time : 40 min  
 Key Concepts : **Ozone depletion, CFC, EFFECT OF HUMAN ACTIVITIES ON THE ENVIRONMENT**



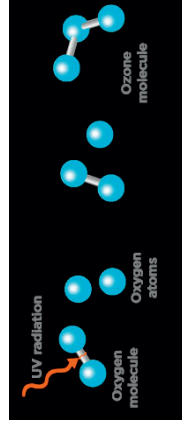
LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
	<p>The teacher tests the previous knowledge:</p> <ul style="list-style-type: none"> <li>● How are we an integral part of the environment?</li> <li>● What brings change in the environment?</li> <li>● How do the changes in the environment affect us?</li> <li>● Why do we often use a sunscreen lotion or an umbrella during a hot sunlight in the mid afternoon?</li> </ul> <div style="text-align: center;">  </div> <ul style="list-style-type: none"> <li>● What changes happen in the skin when we are constantly exposed to the sunlight?</li> </ul> <p>The teacher introduces the concept of ozone layer and its function to shield the earth from harmful UV radiations.</p> <ul style="list-style-type: none"> <li>● Which gas is essential for all aerobic forms of life?</li> </ul>		

- What does O2 refer to?
- When and why is Ozone day celebrated in your school?
- What does O3 refer to?
- How are the living organisms protected from the harmful radiations?



- What is the function of Ozone?
- Why does our skin tan when we are constantly exposed to the sunlight?
- What is the cause for skin cancer in human beings?

The teacher further elaborates the formation of ozone.



- How is Ozone formed?
- The teacher discusses the effect of chlorofluorocarbon on the atmosphere.
- Where do you store the vegetables and fruits for a longer time at your home?

GROUP  
DISCUSSION: TOPIC - Causes and effects of ozone layer depletion

The pigment present in the human body which prevents harm from ultraviolet radiations?

High energy ultraviolet radiations act on oxygen at the higher level of the atmosphere. Analyse

.Model of earth surrounded by ozone layer



AV aid in IFP PANEL:(  
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Analyse and interprets the figure showing formation of ozone

**Applies learning of ozone depletion and Predict the consequences of ozone depletion.**



- How do you think the refrigerator gets cooled? Is it by electricity or by chemicals?
- What chemicals are released by the refrigerators?
- Can these synthetic chemicals be linked to the depletion of ozone layer?
- How is ozone depleted?
- What are the effects of ozone on the atmosphere?
- When did UNEP agreement to freeze the CFC production took place?
- As a result of the agreement what was made mandatory?
- What is being done to recover the ozone depletion?

The teacher further elaborates the topic through activity 13.4

- Which chemicals are responsible for the depletion of ozone?
- Ozone-depleting substances (ODS) are commonly used in products such as refrigerators, air conditioners, fire extinguishers, and aerosols. Which include CFCs, HCFCs, halons, methyl bromide, carbon tetrachloride, and methyl chloroform. ODS are generally very stable in the troposphere and only degrade under intense ultraviolet light in the stratosphere
- What regulations were put in place to control the

Mr. Sam has recently come back from an expedition to Antarctica. After a few days of his return, the doctors have diagnosed his skin problem as skin cancer.

- A) What might be the reason for developing skin cancer immediately after return from Antarctica?
- B) What do we learn from the incident?
- C) How will you carry the message to common people?

Ozone is deadly poisonous. Still it performs an essential function. How?

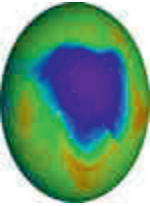
What is the full form of CFC?

Aerosol or room fresheners



Fire extinguishers



<p><b>Relates the depletion of ozone layer to the release of synthetic chemicals CFCs</b></p> <p><b>Makes efforts to conserve environment</b></p>	<p>emissions of ODS?</p> <ul style="list-style-type: none"> <li>The Montreal Protocol, finalized in 1987, is a global agreement to protect the stratospheric ozone layer by phasing out the production and consumption of ozone-depleting substances (ODS).</li> </ul> <p>NEWSPAPER ARTICLE</p> <p>Ozone hole largest on record over past 3 years, new research finds</p> <p><a href="https://economictimes.indiatimes.com/news/science/ozone-hole-largest-on-record-over-past-3-years-new-research-finds/articleshow/105409965.cms">https://economictimes.indiatimes.com/news/science/ozone-hole-largest-on-record-over-past-3-years-new-research-finds/articleshow/105409965.cms</a></p> <p>OCT 26, 2022 Kathryn Cawdrey , Ozone Hole Continues Shrinking in 2022, NASA and NOAA Scientists Say</p> <ul style="list-style-type: none"> <li>Will the ozone layer recover?</li> <li>Can we make more ozone to fill in the hole?</li> </ul> <p>The student groups further discussed to make posters depicting the ozone layer depletion, it's effects on the environment and whether the damaged Ozone layer was reduced or not and what efforts they can put to protect ozone.</p> <ul style="list-style-type: none"> <li>As a student what measures will you take to prevent the ozone layer depletion in your neighbourhood</li> </ul>	<p>Home appliances responsible for CFC Emission -?</p> <p>Which chemical is used as fire extinguisher? How is it harmful?</p> <p>What does the picture indicate?</p>  <p>The depletion of ozone layer is a cause of concern. Why?</p> <p>Suggest any two methods to reduce ozone depletion?</p>	
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**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning pr

**PERIOD PLAN 8**

Name of the Chapter : OUR ENVIRONMENT  
 Class : 10  
 Total no. of periods : 09  
 Period plan : 07/09  
 Time : 40 min  
 Key Concepts : **Managing the Garbage, biodegradable, non-biodegradable**



LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
<p><b>Classifies materials based on the time taken to change ( degrade )</b></p>	<p>The teacher tests the previous knowledge:</p> <ul style="list-style-type: none"> <li>• Give examples of few materials that you have thrown in the dustbin today?</li> <li>• What happens when you do not empty the dustbin for a few days?</li> <li>• Why do you think we get a bad smell from the dustbin which was not emptied for a few days?</li> <li>• What is the function of decomposers?</li> </ul> <p>The teacher performs Activity 13.5 to find answers to the above questions.                      The students are instructed to collect the waste materials of different types from their household or from the dustbin and bury the waste materials in a pit in the school garden (students record their observations)                      The teacher gives the task to classify the materials as those which decompose easily and those which do not and differentiate them as biodegradable and non biodegradable materials.</p>	<p>Mention the basis of classifying substances as biodegradable and non-biodegradable.                      Give two examples of each.                      Why are some substances as biodegradable and non-biodegradable?                      Why do some materials do not change their form and structure?                      Which of the following materials are biodegradable: Glass, leather, GLUCOSE, SILVER FOIL</p>	<p>Different types of plastic materials fruit peels,vegetable peels, paper etc                      (Scan the QR code in the lesson and</p>

**Differentiates biodegradable and non-biodegradable materials**



The teacher reintroduces the concept of enzymes and their action on different kinds of food components. (ENZYMES BIOCHEMICAL KNIFE)

- Why do we need different types of enzymes to digest different components of food?
- Which enzymes help to digest carbohydrates?
- What is the function of the enzyme trypsin?
- Enzymes are specific in action. Clarify?
- Why can't get energy if we eat coal or wood?
- A fruit perishes but a plastic ball doesn't. Why?
- How do non-biodegradable substances harm the various members of the eco-system?

The teacher guides the students to conduct the activity 13.6. Non-biodegradable substances and average time to break down :Glass bottle-500 years, Plastic soda bottle-450 years, Plastic container- 50-8-years, plastic bags-10-20years

- Why should we not use non-biodegradable materials in our day to day life?
- What do you learn from the activity

Which bag will you prefer for shopping?

Can biodegradable waste be hazardous for human health?

Identify the mismatched statement  
 a) Biodegradable materials easily mix in the soil.

Find out the time period required for a plastic bag to degrade?

- b) Bacteria and the saprophytes feed on the man made materials like plastic.
- c) Enzymes are responsible for the breakdown of food materials.

Why should we prefer bioplastics?

We as responsible individuals can contribute by becoming environmental friendly. What practices we can adopt in order to do so?

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	<p>Types of biodegradable plastics include PLA ( POLYLACTIC ACID), PHA ( POLYHYDROXYALKANOATES) and PBS (POLYBUTYLENE SUCCINATE) PLA (POLYLACTIC ACID)</p> <p>Usage of bioplastics helps to conserve the environment. Comment</p>		
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**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning process.

**PERIOD PLAN 8**

Name of the Chapter : OUR ENVIRONMENT

Class : 10

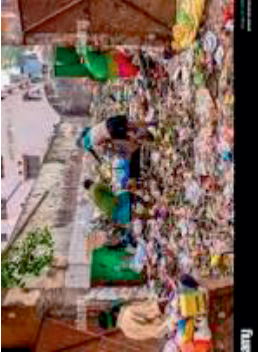
Total no. of periods : 09


Period plan : 08/09

Time : 40 min

Key Concepts : **Activity 13.7 and 13.8 to identify biodegradable and non biodegradablewastes, sewage treatment.**



LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
	<p>The teacher tests the previous knowledge:</p> <ul style="list-style-type: none"> <li>• What will happen if you do not clean your house for a week?</li> <li>• Give examples of a few waste materials that are produced at your home?</li> <li>• How do you differentiate biodegradable and non-biodegradable substances?</li> <li>• Which bag will you prefer for shopping?</li> <li>• What do you observe in the following picture below?</li> </ul> 		

<p><b>Plans and conducts investigations to arrive and verify the facts.</b></p> <p><b>Differentiates materials based on properties and characteristics.</b></p>	<p>The teacher motivates students to conduct the activity 13.7 through Survey and discussion.</p> <p>Garbage management- steps</p> <p>Collection of garbage → Transport of garbage from collection site to disposal site → Segregation of garbage into components ( decomposable/ recyclable/ combustible/ non-combustible) → Disposal of garbage ( Degradable – Pig and cattle feeding, Composting, Biogas and Manure Recyclable – Picked by Rag pickers Combustible – Burning, Incineration and Pyrolysis Non-combustible—Landfilling or Dumping</p> <ul style="list-style-type: none"> <li>• Prepares list of waste items which are generated at our homes.</li> <li>• System to collect the generated wastes</li> <li>• Administrative body in collection and disposal</li> <li>• Location of disposal sites</li> <li>• Mechanism of separating and treatment of garbage</li> <li>• Methods of final disposal</li> <li>• Further information is derived regarding</li> <li>• Weight of the waste generated at home daily for a fortnight</li> <li>• Calculate the average per day per person</li> <li>• Identifies biodegradable and non-</li> </ul>	<ul style="list-style-type: none"> <li>• How do you plan to conduct the survey?</li> <li>• What is meant by garbage?</li> <li>• Mention various methods of garbage disposal?</li> <li>• Estimate the type of waste which is taken away by the rag pickers?</li> <li>• Can we make biodegradable plastic materials?</li> <li>• Why do the municipality people use the different colours dustbin for throwing the waste collected in the street?</li> </ul>  <ul style="list-style-type: none"> <li>• Why should be biodegradable and nonbiodegradable waste discarded into different dustbins?</li> <li>• How do biodegradable substances affect the environment?</li> <li>• Can biodegradable waste be hazardous for human health</li> <li>• Project Report: what conclusions do you draw from the above</li> </ul>	<p>Different kinds of waste materials produced in our home.</p> <p>Pictures of two different kinds of dustbins for a dumping biodegradable and non biodegradable</p> <p><a href="https://diksha.gov.in/play/content/do_31268662103636377615402">https://diksha.gov.in/play/content/do_31268662103636377615402</a></p>
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<p><b>Draws conclusions and communicates the findings and effectively.</b></p> <p><b>Applies learning to hypothetical situations</b></p>	<p>biodegradable wastes</p> <ul style="list-style-type: none"> <li>• Finding out the waste generated in the class</li> <li>• Suggest methods to dispose off</li> </ul> <p>The teacher conducts discussion on Activity 13.8 based on the collected information</p> <ul style="list-style-type: none"> <li>• Study on the mechanism of disposal of sewage by your local Panchayat or Municipal Corporation</li> <li>• Sewage treatment of disposed waste</li> <li>• Mechanism followed to protection of local water bodies from getting polluted</li> <li>• Study on the waste generated by the local industries</li> <li>• Suggests ways of dealing with the waste</li> <li>• Mechanism to ensure that soil and water are not polluted</li> <li>•</li> </ul>	<p>project. Communicate the findings of your survey report</p> <ul style="list-style-type: none"> <li>• Ram and his friends went for a picnic to a park. They carried food packed in plastic materials. After eating the food some of his friends collected the leftover food and plastic materials to dispose them off by burning. Ram immediately stopped and suggested to segregate the leftover food and peels of fruits from plastic materials and respectively dispose them off separately in the green and red dustbins placed there.</li> <li>• (I) In your opinion, is burning plastic an eco-friendly method of waste disposal? Why? State the advantage of method suggested by Ram.</li> <li>• (II) How can we contribute in maintaining the parks and roads neat and clean?</li> </ul>	<p>Different types of biodegradable and non biodegradable wastes available.</p> <p><a href="https://diksha.gov.in/play/content/do_31268662103636377615402">https://diksha.gov.in/play/content/do_31268662103636377615402</a></p>
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**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning process.



**PERIOD PLAN 9**

Name of the Chapter : OUR ENVIRONMENT

Class : 10

Total no. of periods : 09

Period plan : 09/09

Time : 40 min

Key Concepts : Disposable materials, Activity13.9 on estimation of hazardous waste production and management and disposal of e-waste and plastic recycling



LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
	<p>The teacher tests the previous knowledge:</p> <ul style="list-style-type: none"> <li>• What is meant by garbage?</li> <li>• Mention various methods of garbage disposal?</li> <li>• How do biodegradable substances affect the environment?</li> <li>• Why should be biodegradable and nonbiodegradable waste discarded into different dustbins</li> <li>• How can we contribute in maintaining our locality neat and clean?</li> </ul> <p>The teacher elicits from the students</p> <ul style="list-style-type: none"> <li>• In olden days people used to serve food in banana leaves during feast. What type of materials are banana leaves?</li> <li>• What are used now a days to serve food during parties and feasts?</li> <li>• What type of materials are disposable packaging?</li> <li>• What are food packages made up of?</li> </ul>	<p>Improvement in life style often results in increased generation of ----- material.</p> <p>Use of paper is more environment friendly than the use of polythene for packaging.</p>	

<p><b>Differentiates materials based on properties and characteristics</b></p>	<ul style="list-style-type: none"> <li>• What materials do people use to carry and pack materials?</li> <li>• What change in the attitude of people is observed in the usage of materials?</li> <li>• What has changes in the packaging caused?</li> <li>• What will be the impact of non-biodegradable materials on our environment?</li> <li>• How do vendors sell tea/coffee in train now a days?</li> <li>• Some time back, <i>kulhads</i>, disposable clay cups, were used but were stopped. Why?</li> </ul> <p>The teacher discusses on activity 13.9</p> <p>Hazardous Materials to be dealt while disposing electronic items - silicon, nickel, arsenic, beryllium, cadmium, lead, mercury, selenium, chromium, brominated flame retardants, polyvinyl chlorides, etc.)</p> <ul style="list-style-type: none"> <li>• What hazardous material are dealt with while disposing of electronic items?</li> </ul> <p>These materials affect the environment.</p> <p>Recycling process: Reduce, Reuse, Recycle</p> <p>– divert waste from landfills, mitigating soil and water pollution</p> <p>Recycling of plastics emits chemicals - hydrocarbons, toxins like dioxin causing cancers, respiratory and skin problems)</p> <ul style="list-style-type: none"> <li>• How does recycling process impact the environment?</li> <li>• What are the three R's in saving the environment?</li> <li>• What are the problems caused by the nonbiodegradable waste we generate?</li> </ul>	<p>Justify?</p> <p>State the advantage of using disposable paper cups over disposable plastic cups.</p> <p>The disposal of electronic waste creates hazards to the environment. Discuss.</p> <p>How are e-wastes disposed?</p> <p>Recycling is considered as a welcome practice to deal with the environmental problems. Justify.</p> <p>Explain about the process of plastic recycling.</p> <p>Write a few slogans on waste management?</p> <p>Why are landfills environmentally harmful?</p> <p>Students in a school listened to the news in the morning assembly that the mountain of garbage in Delhi suddenly exploded and various vehicles got buried under it. Several people were also injured and there was a traffic jam all around. In the brain storming session the teacher also discussed this issue and asked the students to find out a solution to the problem of garbage. Finally they arrived at two main</p>
<p><b>Applies learning to hypothetical situations</b></p>		

<p><b>Exhibits values of rational thinking and freedom from myth and sensitise others regarding the harmful effects of improper disposal of garbage.</b></p>	<p>How will you sensitize others regarding the harmful effects of improper disposal of garbage.</p>	<p>points – one is self management of the garbage we produce and second is to generate less garbage at individual level</p> <ol style="list-style-type: none"> <li>Suggest two measures to manage the garbage we produce?</li> <li>As an individual what can be done to generate the least garbage?</li> <li>List two values the teacher instilled in his students in this episode?</li> </ol> <p>“Improvement in life style often results in increased generation of waste material” What changes can we incorporate in our life style in order to reduce nonbiodegradable waste?</p>	
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<p><b>Teacher's reflections:</b></p> <ol style="list-style-type: none"> <li>1.How the lesson went?</li> <li>2 Were the teaching learning strategies adequate?</li> <li>3 Were the students engaged?</li> <li>4 Areas of improvement.</li> <li>5 Measures taken to refine teaching learning process.</li> </ol>
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**OUR ENVIRONMENT**  
WORKSHEET (REMEDIAL TEACHING)  
Class X

ANSWER THE FOLLOWING QUESTIONS

**MULTIPLE CHOICE QUESTIONS.**                      **4X1=4M**

1. An example for biotic component  
a) Soil. b) water c) air. d) animals
2. The following organisms are called decomposers  
a) algae. b) bacteria. c) virus d) plants
3. One of the following is a pesticide  
a) DDT    b) O<sub>3</sub>. c) Enzyme d) none of the above
4. Ozone is present in  
a) Troposphere. b) Exosphere.    c) Stratosphere. d) Ionosphere

Match the following. 4x1=4M

- |                     |                     |
|---------------------|---------------------|
| i) Lion.            | a) biodegradable    |
| ii) Banana peel.    | b) carnivore        |
| iii) Sunlight.      | c) CFC              |
| iv) Damage to Ozone | d) source of energy |

**Answer the following.** 2x1=2M

- |                          |   |          |         |
|--------------------------|---|----------|---------|
| i) Air: Abiotic.         | — | Plants : | —-----? |
| j) ii) Plant: Producer — |   | Deer :   | —-----? |

**Answer the given questions**    2x3 = 6

- i) What are the two main components of our environment?
- ii) What is the role of decomposers in the ecosystem?
- iii) Why is aquarium called a manmade ecosystem?

Answer the given question in 60-80 words

1x4= 4

- i) Define environment. Write a note on the producers, consumers and decomposers of the biotic environment with examples of each?

WORK SHEET -2 OUR ENVIRONMENT

Multiple choice questions. 4X1=4M

1. One of the following is an environmental friendly practice
  - A) burning plastic
  - B) using AC in every room
  - C) using car to go to every place
  - D) using CFL at home and office
2. Which of the following is a correct order for arrangement of organisms?
  - A) food web
  - B) trophic level
  - C) ecosystem
  - D) food chain
3. Which of the following statement shows an interaction between biotic and abiotic component in an ecosystem? A) lion chasing a deer
  - B) movement of soil by wind
  - C) rat burrowing the soil
  - D) caterpillar eating a leaf
4. Biodegradable waste include
  - A) vegetable. Peels
  - B) paper
  - C) metal containers
  - D) both A&B

5 Match the following. (6x1/2=3M)

- |                    |                  |
|--------------------|------------------|
| i. Producer.       | a) Ozone         |
| ii. Soil.          | b) herbivore     |
| iii. Goat          | c) abiotic       |
| iv. UV radiations. | d) chlorophyll   |
| v. Vegetable peel. | e) pesticides    |
| vi. DDT.           | f) biodegradable |

Identify the correct statement. 3x2=6M

11.A) Herbivores are known as producer in an ecosystem.

B) An ecosystem is made up of only biotic components

C) Ocean is an example for terrestrial ecosystem.

D) Microorganisms are known as the decomposers of an ecosystem

12. A) All the energy is transferred from one trophic level to another trophic level in an ecosystem

B) Total energy at every level in an ecosystem is known as trophic level .

C) The flow of energy is multi directional in an ecosystem.

D) Energy available at each level of an ecosystem goes on increasing.

13. A) Enzymes are not specific in action.

B) CFC is emitted from appliances like refrigerators

C) An Increase in the amount of ozone in the Stratosphere is known as ozone depletion.

D) Chemical pesticides are biodegradable.

Answer the given questions

2x3=6

- I) What will happen if we remove the decomposers in the biosphere?
- II) Now a days farmers are making indiscriminate use of fungicides to protect their crops from microbes. This act kills many useful microbes. Suggest TWO ecofriendly methods to save useful microbes.
- III) As per the recent survey microplastics have been found in the human blood. How do you think these have entered the human body?

Answer the given question

1X4=4

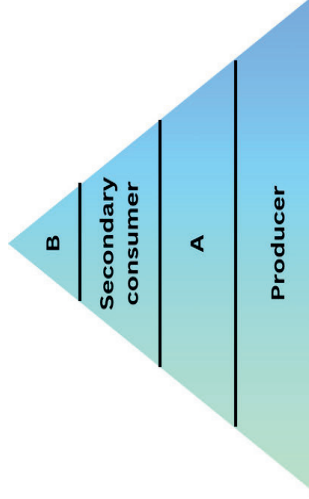
- I) What is meant by food chain? “. The number of trophic levels in a food chain is limited.” Give reasons to justify the statement.



**OUR ENVIRONMENT**  
**WORKSHEET 3 (REMEDIATION TEACHING)**  
Class X

**I ANSWER THE FOLLOWING QUESTIONS X1=M**

- I) What is the full form of CFC?**
- II) Home appliances responsible for CFC emission -?**
- III) Which chemical is used as fire extinguisher?**
- IV) Accumulation of non-biodegradable toxic substance in the increasing order in a food chain is termed as**
- V) Write the appropriate names of trophic levels A and B in the following figure:**



**VI Which of the following materials are biodegradable: Glass, leather, GLUCOSE, SILVER FOIL**

**VII Improvement in the life style often results in increased generation of ----- material.**

VIII Match the following.

(6x1/2=3M)

- |                    |                  |
|--------------------|------------------|
| i. Producer.       | a) Ozone         |
| ii. Soil.          | b) herbivore     |
| iii. Goat          | c) abiotic       |
| iv. UV radiations. | d) chlorophyll   |
| v. Vegetable peel. | e) pesticides    |
| vi. DDT.           | f) biodegradable |

Answer the given questions

2x2=4

X The maximum concentration of harmful chemicals accumulates in human beings? State the phenomenon involved and justify this statement.

XI A geographical area contains organisms like snakes, grasshoppers, peacocks, grass and frogs. If pesticide was used in this area to kill insects, which among the following organisms will have maximum amount of pesticide? Name the phenomenon involved.

Answer the given questions

3x2=6

XII) Ram and his friends went for a picnic to a park. They carried food packed in plastic materials. After eating the food some of his friends collected the leftover food and plastic materials to dispose them off by burning. Ram immediately stopped and suggested to segregate the leftover food and peels of fruits from plastic materials and respectively dispose them off separately in the green and red dustbins placed there.

A) In your opinion, is burning plastic an eco-friendly method of waste disposal?

B) State the advantage of the method suggested by Ram.

C) How can we contribute to maintaining the parks and roads neat and clean?

XIII) Mr. Sam has recently come back from an expedition to Antarctica. After a few days of his return, the doctors have diagnosed his skin problem as skin cancer.

A) What might be the reason for developing skin cancer immediately after return from Antarctica?

B) What do we learn from the incident?

C) How will you carry the message to common people?

Video Links

<http://tinyurl.com/utyb36us>

<http://tinyurl.com/3ptnhruf>

<http://tinyurl.com/4heak4uc>

<http://tinyurl.com/4heak4uc>

<http://tinyurl.com/d96dwwme>

<http://tinyurl.com/yfx4wmw5>

<http://tinyurl.com/yc3sw37r>

<http://tinyurl.com/5bkryh35>

<http://tinyurl.com/5n6pzxwy>

<http://tinyurl.com/2p92zsk6>

<http://tinyurl.com/9cxdef9u>

<http://tinyurl.com/3m5meuv8>

<http://tinyurl.com/24psfzes>

**CLASS : X**

**CHAPTER 7: HOW DO ORGANISMS REPRODUCE**

**TOTAL NO. OF PERIODS: 09**

**Aims of Education:**

1. Rational thought and Independent thinking
2. Health and wellbeing
3. Democratic and community participation

**Aims of Science Education:**

1. Scientific understanding of the natural and physical world:
  - Understanding of reproduction, variations - parts are involved in lower organisms – Uni, Multi - cellular organisms' reproduction - reproductive health
2. Capacities for scientific inquiry:
  - **Hypothesis framed:** how the variation occurs individual
  - **Prediction:** Imagine how physical growth, physiological changes, sexual changes occur
3. Understanding the evolution of scientific knowledge:
  - Scientific knowledge regarding the evolutionary changes in reproduction of lower organisms to higher organisms, unicellular organisms to multi cellular organisms, Asexual to sexual reproduction in animals, human beings, will develop students' understanding of how scientific knowledge and the methods of science evolved and still evolve over time.
4. Interdisciplinary understanding between science and other curricular areas:
  - Students understand the Inter linkages around disciplines....  
Maths: Fission, Multiple fission, n, 2n – chromosome number  
Chemistry: Hormones, enzymes, proteins, DNA, RNA.  
Environment: Temperature, heat, cold, thunders, lighting (Unfavourable condition).

5. Understanding of the relationship between Science, Technology and society:

- Students learn to engage with issues connecting science, technology and society, including the ethical aspects and implications related to In vitro fertilization, Tissue culture, The policies of reproduction, and appreciate the role of science in addressing these challenges.

6. Scientific temper:

- Students will develop the capacity for critical and evidence-based thinking and freedom from fear and prejudice towards Gender bias, inequalities of gender, female fetocides, infanticide.

7. Creativity:

- Child shows creativity in identifying modes of reproduction in different groups of organisms – Vegetative, asexual, sexual. Beauty of images (reproduction process).

## **Curricular Goals and Competencies**

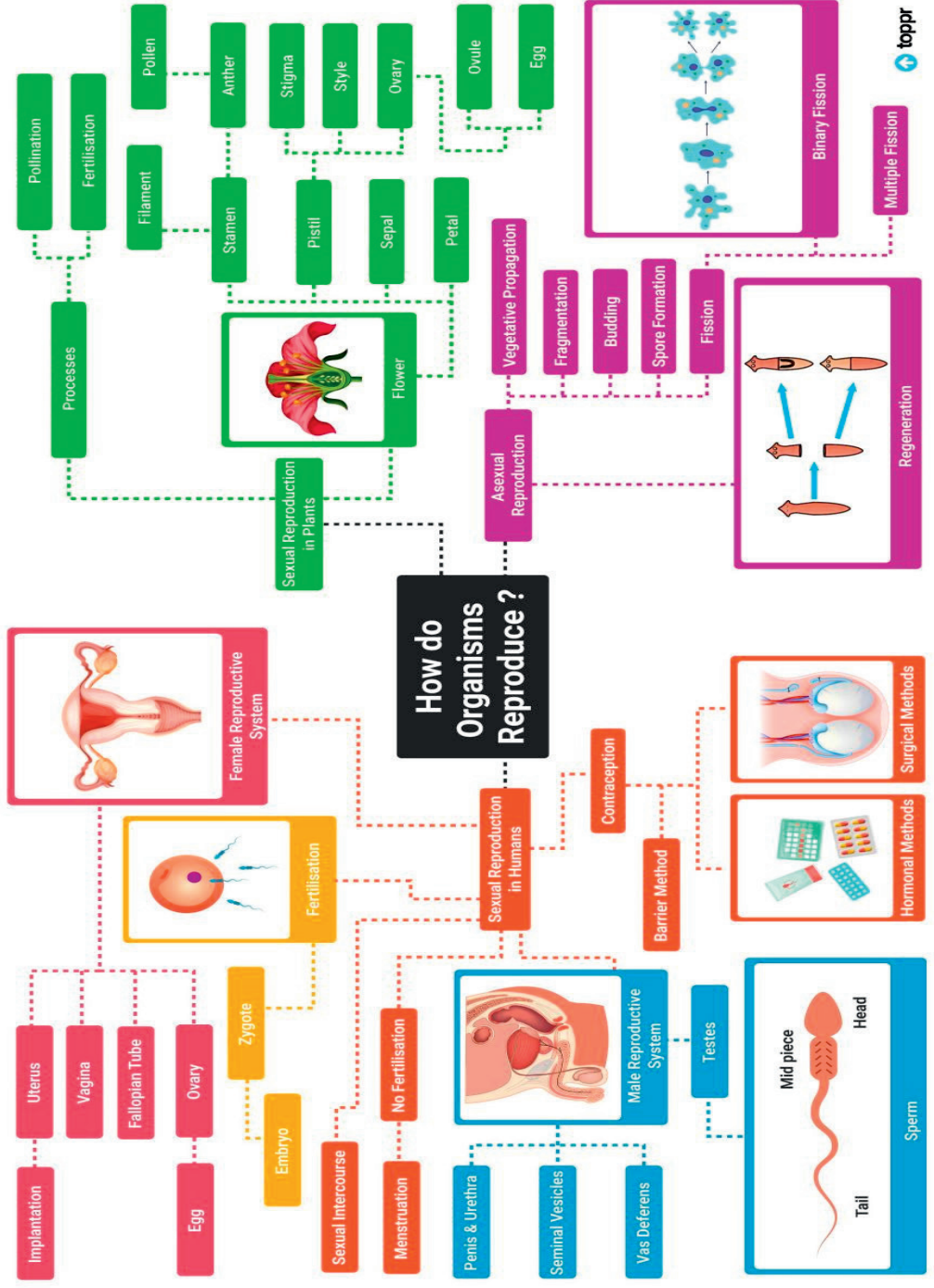
- Curricular Goal – 1:** Explore the reproduction – continuation of life, types of reproduction, characteristics of.
- Competency -1.1:** Classification of reproduction, how lower and higher organisms, unicellular and multi-cellular produces new organisms, Structure of male and female reproductive parts in human beings and plant
- Competency -1.2:** Investigate the nature and properties of chemicals helps i.e. hormones, enzymes Investigate the nature and properties of chemicals help i.e. hormones, enzymes
- Competency -1.3:** Describes and represents symbol in reproduction process
- Curricular Goal – 2:** Explore the Reproduction around the world and understands scientific principals and laws based on observation and analysis
- Competency -2.1:** Applies the Mendal's Laws, Darwin principles to explain the variation in individual organisms
- Competency -2.2:** Explain the relationship to form Variations due to changes or imbalance of hormones, enzymes, temperature and other factors
- Competency -2.4:** Manipulate and analyses different characteristics and advantages of the asexual and sexual reproduction, mitosis and meiosis
- Competency -2.5:** Define the scientific terms in reproduction, relationship between mitosis and meiosis, chromosome numbers in mathematical expression
- Curricular Goal – 3 :** Explore the structure and functions of the living world(reproduction) at the cellular level
- Competency - 3.1 :** Explain the role of cellular components in reproduction ( Nucleus, chromosomes, proteins, hormones, enzymes, genes)
- Curricular Goal – 4 :** Explore interconnectedness between organisms and their environment through reproduction
- Competency - 4.4 :** Analyses patterns of inheritance of traits in terms of mode of reproduction and its consequences at a population (Niche)level
- Curricular Goal - 5:** Draws linkages between scientific knowledge and knowledge across other curricular areas
- Competency - 5.1 :** Examine a case study related to the use of Reproductive sciences to produce different variety of plants
- Curricular Goal - 7:** Develops awareness of the most current discoveries, ideas and frontiers in all areas of reproductive knowledge
- Competency –7.1 :** Tissue culture, IVF, Cloning, Artificial fertilization

**Curricular Goal - 8:** Explores the nature of science by doing science  
Competency - 8.2 : Based on the data and understand of scientific concepts of reproduction , communicating scientific terminologies  
on reproduction

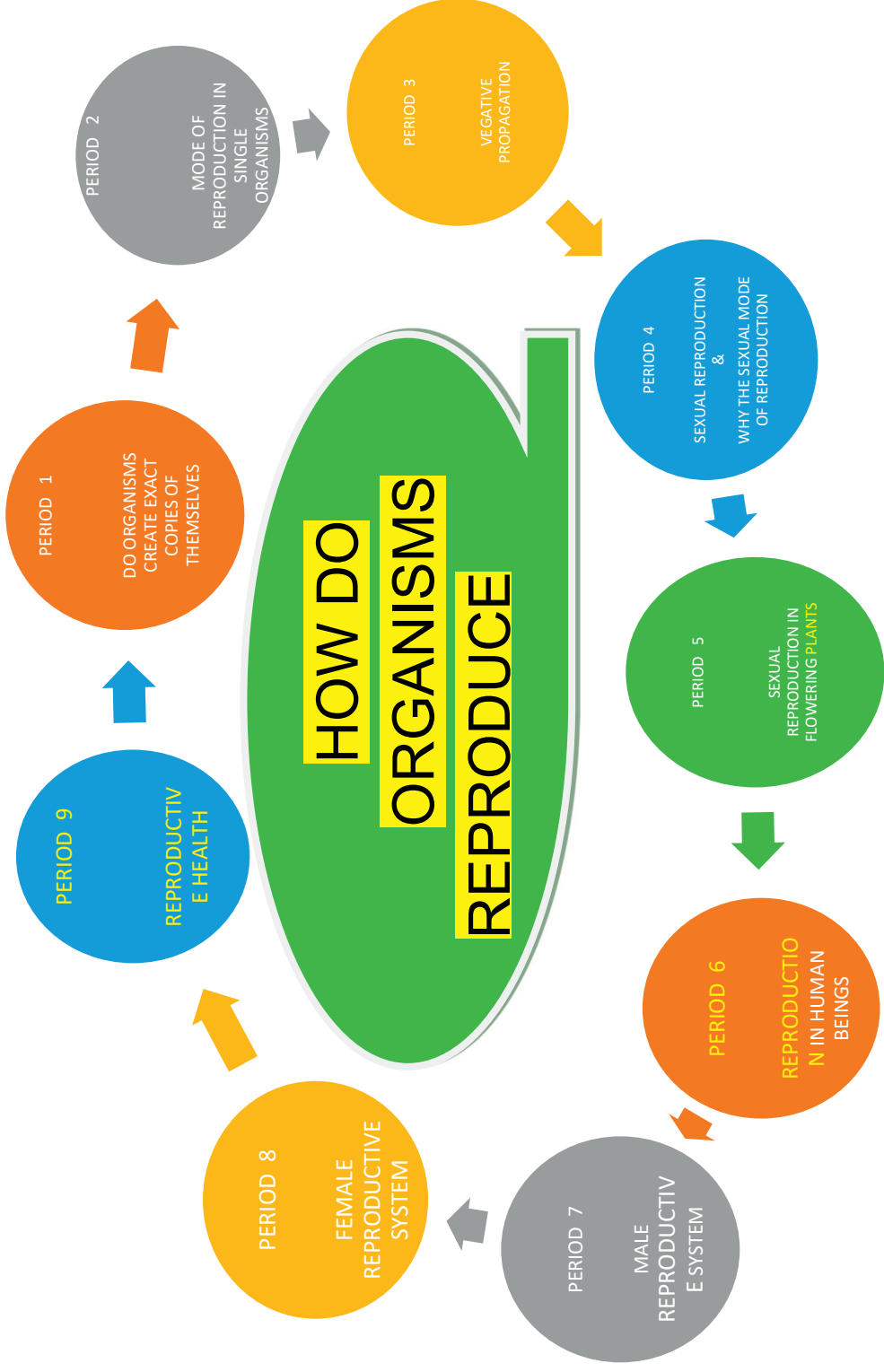
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# HOW DO ORGANISMS REPRODUCE- MIND MAP



# PERIOD MAP



## TOPIC WISE LEARNING OUTCOMES

Period No.	Topic	Learning outcomes
1	Do Organisms create exact copies of themselves? The importance of variation	Explains the role of cellular components in reproduction – Nucleus, chromosomes, proteins, hormones, enzymes, genes Analyses the role of variations in survival of the species.
2	Modes of Reproduction used by single organisms	Differentiates asexual and sexual reproduction Classifies asexual reproduction into different types
3	Vegetative propagation	Explains the methods of vegetative propagation in plants
4	Sexual reproduction, Why the sexual Mode of Reproduction	.Differentiates mitosis and meiosis Explains importance of meiosis in sexual reproduction.
5	Sexual Reproduction in Flowering plants	Classifies unisexual and bisexual flowers Investigates and identifies self-pollinated flowers and cross-pollinated flowers
6	Reproduction in Human Beings	Relates puberty with physiological changes at

		the onset of puberty in male and female
7	Male Reproductive System	Explains the structure and function of Male reproductive system
8	Female Reproductive System, What happens when the egg is not fertilized?	Explains the structure and function of female reproductive system
9	Reproductive Health	Analyses birth control methods and build an awareness towards reproduction and reproductive health.

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# PERIOD PLAN 1

Name of the Chapter : HOW DO ORGANISMS REPRODUCE


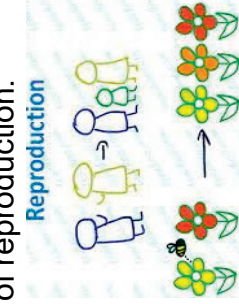
Class : 10



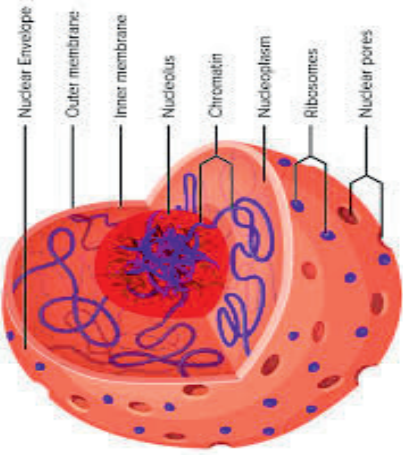
Total no. of periods : 09

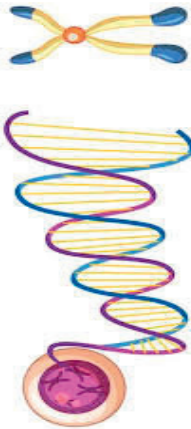
Period plan : 01/09

Time : 40 min

Key Concepts : Cellular components in reproduction; relationship between reproduction and variation

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT	TLM
	<p>Pupils recall their previous knowledge through the open ended questions</p> <ul style="list-style-type: none"> <li>*How are we born?</li> <li>*What is life process?</li> <li>*Which life processes are needed for the survival of an organism?</li> <li>*How do organisms increase their number?</li> <li>*Name the life process by which organisms continue their generation.</li> </ul>		
Explains the importance and necessity of reproduction.	<p>Discusses the importance and necessity of reproduction.</p> 	<ul style="list-style-type: none"> <li>• What happens if the process of reproduction is absent?</li> <li>• Can an organism propagate without reproduction?</li> <li>• What do you think about continuation of species on Earth?</li> </ul>	<p><a href="https://youtu.be/gG7uCskUOrA?si=G7r0dcAR38MwQZeN">https://youtu.be/gG7uCskUOrA?si=G7r0dcAR38MwQZeN</a></p>

	<ul style="list-style-type: none"> <li>Why is reproduction necessary for any species?</li> </ul> 		
	 <ul style="list-style-type: none"> <li>Why is nucleus called as the brain of the cell?</li> <li>Where is the genetic material present?</li> <li>Which part of the nucleus called information source of protein?</li> </ul> <p>Teacher illustrates the mechanism of DNA copying (Replication)</p>	<ul style="list-style-type: none"> <li>What is the basic event in reproduction to create a new organism?</li> <li>What happens when there is no DNA replication during reproduction?</li> <li>How does DNA replication take place?</li> </ul>	<p>Chart showing structure of nucleus</p>
<p>Explain the role of cellular components in reproduction ( Nucleus,</p>	<ul style="list-style-type: none"> <li>What is the functional unit of inheritance?</li> <li>Why is DNA copying an essential part of the process of reproduction?</li> </ul>	<ul style="list-style-type: none"> <li>Which sugar is present in DNA?</li> <li>As the name suggests, is DNA acidic or basic?</li> </ul>	<p>DNA picture on IFP or Chart</p>

<p>chromosomes, proteins, hormones, enzymes, genes )</p>	<ul style="list-style-type: none"> <li>• How do organisms get information sources for making body design?</li> </ul> <p>Teacher discusses the synthetic machinery for DNA replication.</p> <p><b>Cell and Chromosome Structure</b></p> 	<ul style="list-style-type: none"> <li>• How can you differentiate DNA and RNA on the basis of Nitrogen base and sugar?</li> <li>• Elicit the model of DNA by looking at the picture of DNA.</li> <li>• What are the proteins required for DNA replication?</li> <li>• How can you justify that DNA is a polymer?</li> <li>• what can you call the enzyme responsible for DNA replication?</li> </ul>	
<p>Analyses the role of variations in evolution</p>	<ul style="list-style-type: none"> <li>• Do all the members in your family look alike?</li> <li>• Why are they similar but not identical?</li> <li>• How is the consistency of DNA replication related to its niche in an ecosystem?</li> <li>• Can you quote an example of a population that was completely wiped out due to drastic change in its niche?</li> </ul> <p>Teacher stresses the importance of variations in the survival of a species.</p>	<ul style="list-style-type: none"> <li>• How do variations occur in a population?</li> <li>• How do variations in species help them to adapt to a particular environment?</li> <li>• What is the role of variation in the process of evolution?</li> </ul>	

Teacher's Reflections:

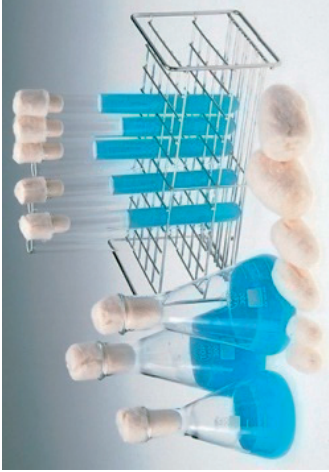
1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

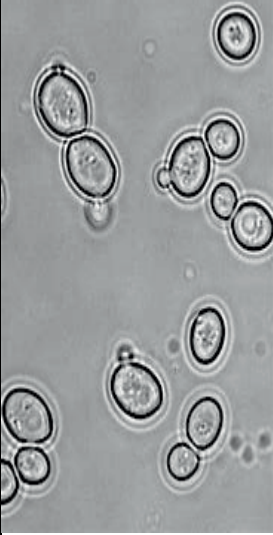


## PERIOD PLAN 2

Name of the Chapter : HOW DO ORGANISMS REPRODUCE  
 Class : 10  
 Total no. of periods : 09  
 Period plan : 02/09  
 Time : 40 min  
 Key Concepts : Modes of Reproduction used by single organisms – Fission –Fragmentation – Regeneration –Budding – spore formation

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT	TLM
Plans and conducts an activity to	Student recalls their previous knowledge 1. Name the life process of an organism that helps in growth of its population? 2. How does reproduction help in providing stability to the population of species? 3. What is the importance of variation in population? 4. Is the process of reproduction same in all living organisms ? 4. Can you find any different modes of reproduction in other organisms?		<a href="https://youtu.be/6Ew6mqwgGR0?si=-myv2BG64xTJ3F54S">https://youtu.be/6Ew6mqwgGR0?si=-myv2BG64xTJ3F54S</a>
	<ul style="list-style-type: none"> <li>Teacher conducts Activity 7.1:</li> </ul>	Pupils Activity Pupils follow the instruction given by the teacher.	

<p>show budding in yeast,</p>	 <ul style="list-style-type: none"> <li>•</li> <li>• Why is sugar solution used for this experiment?</li> <li>• Yeast cells increase in size and multiply in sugar solution, but not in water. Explain the reason?</li> <li>• Figure out why cotton plug is inserted in the mouth of the test tube?</li> <li>• Observation of yeast multiplication under a microscope:</li> </ul>	<p>Class is divided into two groups  Group: 1  Make sugar solution, add pinch of yeast put the cotton plug on the mouth of the test tube. Observe it under microscope in our lab.  Group: 2 Pour water and add pinch of yeast put the cotton plug on the mouth of the test tube. Observe it under microscope in our lab</p> <p>Is yeast a unicellular or multicellular organism?</p>	<p>Byjus video</p> <p>Permanent slides</p>
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<p>Conducts and investigates the multiplication process in bread mold.</p>	 <ul style="list-style-type: none"> <li>Name the changes that you observe</li> <li>Name the outgrowth seen on the wall of the parent cell?</li> <li>What do you call this process of multiplication in yeast?</li> </ul>	<ul style="list-style-type: none"> <li>What happens when yeast is added to dough?</li> <li>Which division occurs in the cell?</li> </ul>	
	<p>Activity 7.2; To show growth of mold in bread</p>		<p>Permanent slide, Microscope Chart</p>

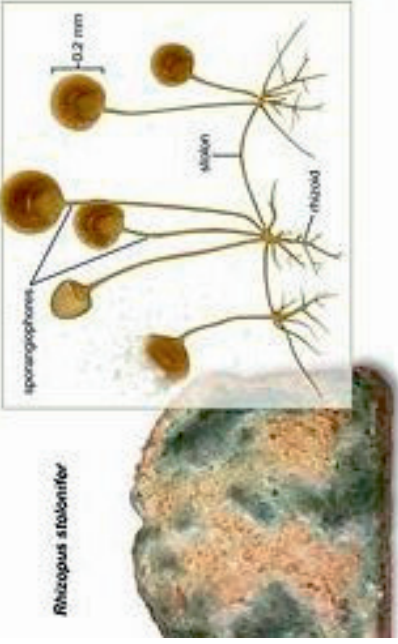
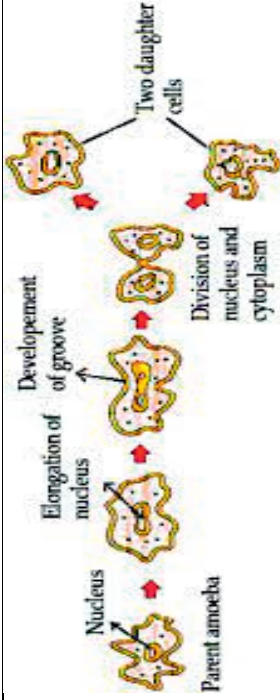
<p>Differentiates binary and Multiple fission</p>	 <p><i>Rhizopus stolonifer</i></p> <ul style="list-style-type: none"> <li>• Why is bread spoiled when kept in moist environment?</li> <li>• What do we call thread like and knob like structures in the slide prepared from bread mold?</li> <li>• Which part of the bread mold consists of spores?</li> </ul> <p>Teacher differentiates mechanism of budding in yeast and sporulation in fungi.</p>	<ul style="list-style-type: none"> <li>• Bread mold is not found on dry bread slices. Explain why?</li> <li>• Why do pickles get spoiled when they are not immersed in oil?</li> <li>• What are the reproductive structures found on bread mold.</li> <li>• Identify the colour of the sporangium for the following fungus...</li> </ul> <p>Rhizopus – Aspergillus – Mucor – Penicillium</p> <ul style="list-style-type: none"> <li>• How are spores dispersed from sporangium?</li> </ul>	
<p>Differentiates binary and Multiple fission</p>	<ul style="list-style-type: none"> <li>• What do we call the process cell division where one cell divides into equal halves, in unicellular organisms?</li> <li>• Which fission leads to the division of one cell into two equal halves?</li> <li>• How can you name the process if cell division leads to a large number of daughter cells?</li> </ul> <p>Activity 7.3:</p>		

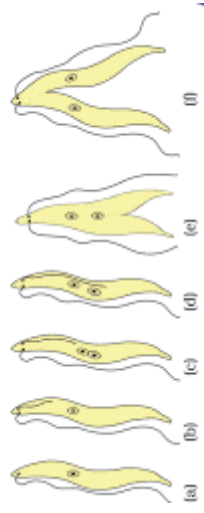
Chart showing binary fission



#### Binary fission in Amoeba

- Of both the slides which one shows multiplication of cells?
- Note down the various stages in the multiplication.
- Nuclear division precedes or succeeds cytoplasmic division?

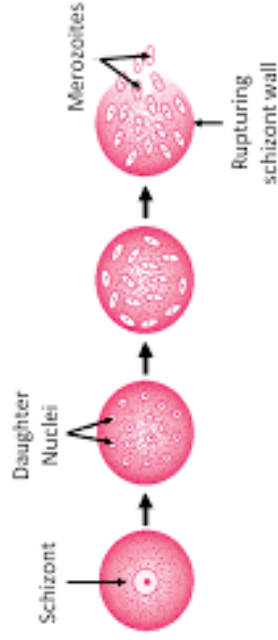
#### BINARY FISSION IN LEISHMANIA



REPLACE IT WITH BRIGHTER PIC

- What is the common factor in the division of amoeba and leishmania?
- Is there any difference in the sequence of division in the examples you have seen?
- Observe the shape if amoeba while division is taking place, and now identify how it differs from Leishmania.
- How is binary fission in Leishmania different from that of amoeba?

### MULTIPLE FISSION IN PLASMODIUM



- In this image how many daughter cells are produced after the fission?
- If the fission giving rise to two daughter cells is binary fission, what can you call the fission with multiple number of daughters?

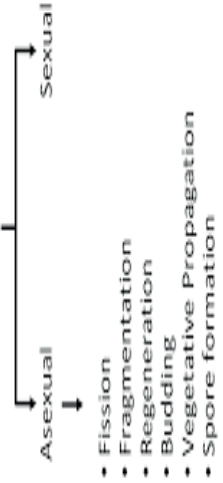
- List out all the differences between binary fission and multiple fission.

Give examples of binary and multiple fission

Type of fission	Examples
Binary	
Longitudinal Binary	
Multiple	

By which mode single and multicellular organisms continues their life?

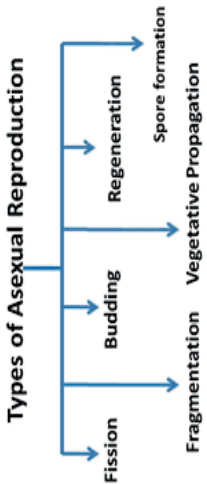
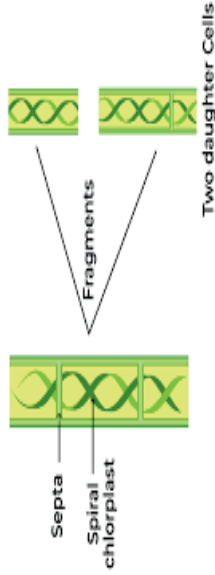
### MODES OF REPRODUCTION



Classifies reproduction into different types in unicellular organisms and multicellular organisms

CHART SHOWING MODES OF REPRODUCTION

- How many types of reproduction are found in living organisms??
- Does a single cell increase in number through Asexual reproduction?

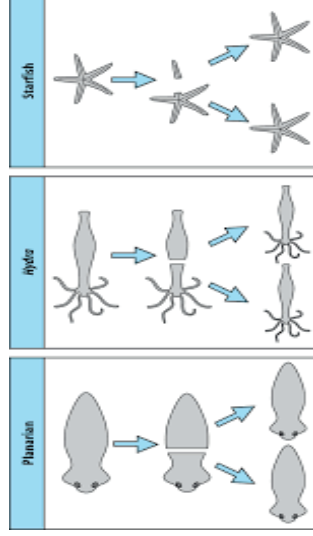
	<p>Depending on their body design how do Single organisms reproduce?</p> <p><b>Types of Asexual Reproduction</b></p> 	<ul style="list-style-type: none"> <li>• Do you know what Asexual reproduction is?</li> <li>• How many types of Asexual Reproduction can you find?</li> </ul>	
r	<p><b>Activity 7.4:</b></p> <p><b>Fragmentation in spirogyra</b></p>  <ul style="list-style-type: none"> <li>• Note down the shape and structure of the filaments.</li> <li>• Is it unicellular or multicellular?</li> <li>• Can you see separate pieces of spirogyra filaments?</li> <li>• What can you call these pieces?</li> </ul>	<p>Is simple multicellular organism follows the asexual reproduction?</p> <ul style="list-style-type: none"> <li>• Why is this reproduction called as fragmentation?</li> <li>• Give examples of other organisms where you can find multiplication by fragmentation?</li> </ul>	<p>Permanent slide</p> <p>Chart</p> <p>Activity</p>
Differentiates regeneration			

and fragmentation

### REGENERATION

- If a part of our body is completely separated or cut off (like a finger), is it possible to grow it again?
- What do you observe when the tail of a lizard is cut?
- If an organism cut into any number of pieces and each piece grows into a complete organism? What is the process called as ?
- Why can't you call the process of regrowth of tail in lizard as regeneration?

- Teacher introduces the concept of regeneration in lower organisms.



- By the mode of regeneration some organisms produce new organism. Name such organisms?

- Is any specialised cell involved in regeneration process?

- Can you think of reason why more complex organisms cannot give rise to new individuals through regeneration?

- What is the difference between regeneration and fragmentation?

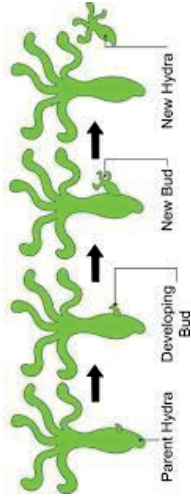
Permanent slide

Chart



Differentiates budding in Yeast and Hydra

## Budding in Hydra



Formation of a daughter individual from a small projection is known as?

- Is there anything called site of budding in an organism?
  - What causes budding in Hydra?
- Choose the correct sequence of budding in Hydra:

A)

- Bud initiation
- Bud maturation
- Bud detachment
- New individual

B)

- Bud initiation
- Bud detachment
- Bud maturation
- New individual

C)

- New individual
- Bud maturation
- Bud detachment
- Bud initiation

D)

- Bud maturation
- Bud initiation
- Bud detachment
- New individual

Permanent slide

Chart

Teacher's Reflections:

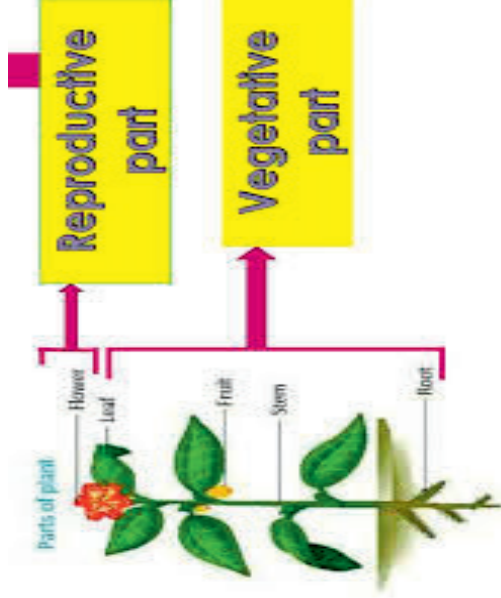
6. How did the lesson go?
7. Were the teaching learning strategies adequate?
8. Were the students engaged?
9. Areas of improvement
10. Measures taken to refine the teaching-learning process.

## PERIOD PLAN 3

Name of the Chapter : HOW DO ORGANISMS REPRODUCE  
 Class : 10  
 Total no. of periods : 09  
 Period plan : 03/09  
 Time : 40 min  
 Key Concepts : Vegetative propagation., Tissue culture., Spore formation

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT	TLM
Differentiates asexual reproduction and vegetative propagation in plants	<p><b>To Check the previous knowledge of the pupils:</b></p> <ul style="list-style-type: none"> <li>• What are the different modes of reproduction?</li> <li>• What is asexual reproduction?</li> <li>• How many types of asexual reproduction do you know?</li> <li>• What are the differences between asexual and sexual reproduction?</li> <li>• Do plants also reproduce through the mode of asexual reproduction?</li> </ul>		
	<ul style="list-style-type: none"> <li>• The reproduction that involves gametes from two parents is called as sexual reproduction. So why reproduction through single parent is called as asexual reproduction in unicellular organisms and vegetative reproduction in higher plants?</li> <li>• What are the parts present in flowering plants?</li> <li>• What are the vegetative parts of a plant?</li> </ul>	<p>Group activity:            Whole class will be divided into three groups:            Group No.1 will be asked to collect different plants and show its different parts.</p>	

- Are all parts of plant capable of reproduction to produce new plants?
- Name the reproductive parts of a plant?
- 



- Do roots, stems, leaves also produce new plants?
- In which reproduction parts other than the flower are involved?
- What do you understand by natural and artificial vegetative propagation?
- 

Do you observe small bud like structures on potato in your kitchen or vegetable market?

Group No. 2 will be asked to identify the plants parts which reproduce sexually.

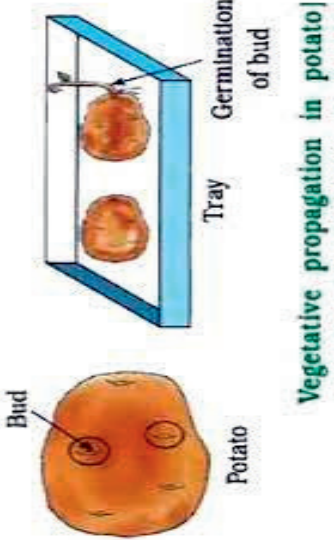
Group No.3 will collect the plants which reproduce through the Root, stem and leaves.

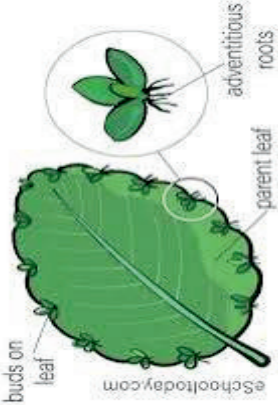

Flowering plant specimen



Chart

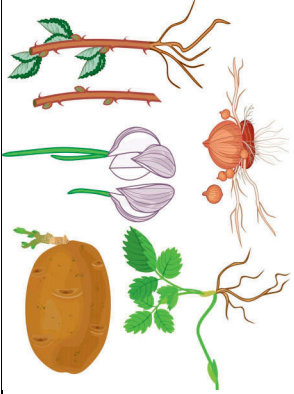
- What are the different natural vegetative propagation methods?
- Which part of the plant helps in sexual reproduction?
- Give some examples of artificial methods of vegetative propagation.

Which part of the potato plant we eat?

<p>Plans and conducts an activity to show vegetative propagation in potato</p>	<p>When it ( bud) detach from the potation is it grown to new one?</p> <ul style="list-style-type: none"> <li>• What happens when you store potatoes for a long time?</li> <li>• When these buds detach from the potato do they grow into new plants?</li> </ul> <p><b>Activity 7.5:</b></p> 	<ul style="list-style-type: none"> <li>• Why potato tuber is called as the underground stem?</li> <li>• Does sweet potato also propagates in the same way?</li> <li>• Why do farmers prefer vegetative propagation to propagation through seeds?</li> </ul>	<p>Specimen of potato</p>
	<ul style="list-style-type: none"> <li>• What do you call the bud like structures on potato?</li> <li>• What do they contain that helps them grow into new plants?</li> <li>• Why didn't the piece without the bud show any growth?</li> </ul>		

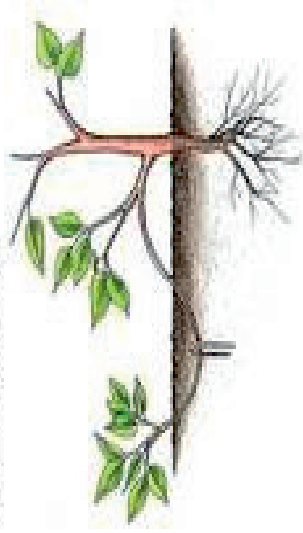
<p>Explains vegetative propagation in bryophyllum leaf</p>	<ul style="list-style-type: none"> <li>  </li> <li>What do you observe in the picture?</li> <li>Where do you find buds in bryophyllum leaf?</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>Can you name some plants that propagates through leaves?</li> <li>What name is given to the buds that are on the leaves?</li> </ul>	<p>Specimen of Bryophyllum</p>
<p>Plans and conducts an activity to demonstrate vegetative propagation in money plant</p>	<p>Activity 7.6:</p>  <ul style="list-style-type: none"> <li>How does money plant reproduce?</li> <li>What is node?</li> </ul>	<p>A small piece of a plant at least having one leaf to emerge into new plant?</p>	<p>Specimen of Money plant</p>

	<ul style="list-style-type: none"> <li>• What is inter node?</li> <li>• Can money plant grow from stem cuttings?</li> <li>• Of the two samples, which one formed new plants?</li> </ul>	<ul style="list-style-type: none"> <li>• Does money plant propagate without nodes?</li> <li>• Which part of the money plant is reproductive in nature?</li> </ul>	
<p>Analyses similarities and differences in the Natural and artificial vegetative propagation</p>	<ul style="list-style-type: none"> <li>• The part of the baby plant that develops into shoot is called _____</li> <li>• As observed in the above activity how many types of vegetative propagation can be seen in plants?</li> </ul> <p><b>NATURAL PROPAGATION ACTIVITY :</b>  <u>Roots:</u> Sweet potato,</p>  <p>The diagram shows a cross-section of a sweet potato tuber. A small green shoot with two leaves is growing from the top surface of the tuber. A dashed white box highlights this shoot, with a label 'Adventitious bud' pointing to it. To the left of the tuber, a label 'Young plant' points to the shoot. The tuber itself is labeled 'Sweet potato' at the bottom right.</p> <p>ROOT PROPAGATION</p>	<ul style="list-style-type: none"> <li>• List out some plants that grow into new plants by vegetative propagation of roots</li> </ul>	<p>DEMONSTRATION SHOWING VEGETATIVE PROPAGATION IN KITCHEN GARDEN</p> <p>CHART PICTURE</p> <p><a href="https://www.youtube.com/live/VaDkFmuKZw?si=ww553M1-atukKqCZ">https://www.youtube.com/live/VaDkFmuKZw?si=ww553M1-atukKqCZ</a></p> 

<p>Draws labelled diagrams of parts of plants showing vegetative propagation</p>	<p>Kiran went to a garden. He said, plants cannot reproduce through roots. Do you agree? Explain?</p>		
<p>Classifies artificial propagation of plants into layering, grafting and cutting to grow new plants in the garden</p>	 <ul style="list-style-type: none"> <li>In the above images of vegetables, how do they produce new individuals? Identify and list the different types of vegetative propagation,</li> </ul>	<ul style="list-style-type: none"> <li>In your kitchen what type of vegetables propagate through by mode of stem propagation?</li> </ul>	<p>CHART PICTURE</p>
<p>Classifies artificial propagation of plants into layering, grafting and cutting to grow new plants in the garden</p>	<ul style="list-style-type: none"> <li>How do you propagate jasmine plant?</li> </ul>	<ul style="list-style-type: none"> <li>What is layering?</li> <li>Which plants are propagated through layering?</li> </ul>	<p>CHART DEMONSTRATION SHOWING VEGETATIVE PROPAGATION IN KITCHEN GARDEN</p>



### SIMPLE LAYERING

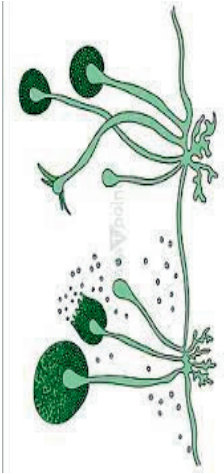


Vicky's father wants to grow a single plant having two desirable characters colourful flowers and big fruits. What method will you suggest him and why?



- The cut stem of a plant having roots is called -----

- How do you get two desirable characters in one plant?
- What is the role of stock in grafting?
- What is the purpose of grafting technique?
- Which plants can be grown by grafting?
- What are the branches to which the graft is tied, called?

<p>Investigates how tissue culture is useful to produce large number of plants</p>	<ul style="list-style-type: none"> <li>• The cut stem of a plant without roots is called -----.</li> <li>• What is a tissue?</li> <li>• What is the ability of the plant cell to develop into an entire plant?</li> <li>• Group of cells which are formed in tissue culture are called?</li> <li>• Which tissue is commonly used in tissue culture?</li> <li>• What is the medium used in tissue culture?</li> <li>• What is the role of hormones in tissue culture?</li> <li>• Explain how the tissue culture helps farmers to produce large number of disease-free plants in short period of time?</li> </ul>	<ul style="list-style-type: none"> <li>• What is Totipotency?</li> <li>• What is callus?</li> <li>• Which plant hormones are used in tissue culture?</li> <li>• Do animals have totipotent cells?</li> <li>• Tissue culture in plants is easier than in animals. Guess the reasons.</li> <li>• Can we produce an entire animal from its tissue?</li> <li>• Undifferentiated mass cells is called _____?</li> <li>• How can you differentiate between invitro and invivo?</li> </ul>	
	 <ul style="list-style-type: none"> <li>• What are the parts present in the image?</li> <li>• What do you call the thread like structure?</li> <li>• What do you call the swollen structure which produces spores?</li> </ul>	<ul style="list-style-type: none"> <li>• List out some organism Which reproduce by spore formation?</li> </ul>	<p>Permanent slide</p> <p>Chart</p>


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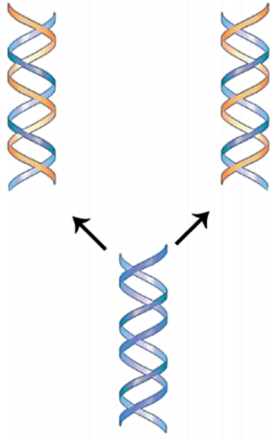
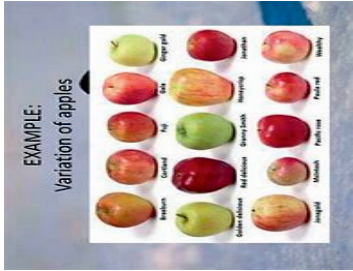
Teacher's Reflections:

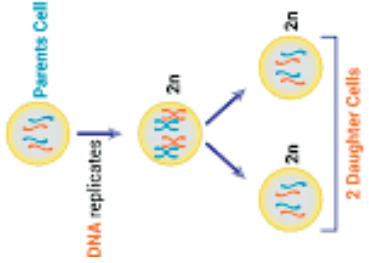
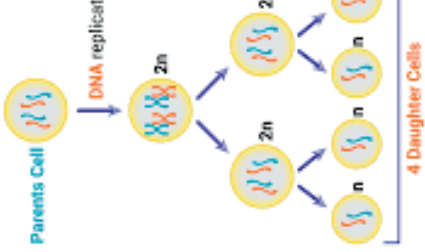
1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

## PERIOD PLAN 4

Name of the Chapter : HOW DO ORGANISMS REPRODUCE  
 Class : 10  
 Total no. of periods : 09  
 Period plan : 03/09  
 Time : 40 min  
 Key Concepts : Sexual Reproduction

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT	TLM
	<ul style="list-style-type: none"> <li>Recalls their previous knowledge</li> <li>What is asexual reproduction?</li> <li>What are the disadvantages of asexual reproduction?</li> <li>In which type of reproduction offsprings look alike?</li> <li>In which type of reproduction offsprings look different?</li> <li>Why is there a need of sexual reproduction?</li> </ul>		
Explains the importance of replication of DNA during reproduction	What are variations? What is DNA copying?	<ul style="list-style-type: none"> <li>How do variations occur in populations?</li> <li>What role does sexual reproduction play in evolution?</li> </ul>	Image showing DNA copying in IFP

	 <p>How are different variants produced?          What is the use of variations?          By which type of reproduction variations occur?</p>  <p>EXAMPLE:          Variation of apples</p>	<ul style="list-style-type: none"> <li>• Why is sexual reproduction more advantageous than asexual reproduction?</li> </ul>	
<ul style="list-style-type: none"> <li>• Differentiates mitosis and meiosis</li> </ul>	<p>How is reproduction linked to variation?          What is the reason behind variation?</p> <ul style="list-style-type: none"> <li>• What are the two types of cell divisions?</li> <li>• By which cell division the daughter cells receive the same number of chromosomes?</li> <li>• In which cell division daughter cells receive half the number of chromosomes?</li> </ul>	<ul style="list-style-type: none"> <li>• How is a constant number of chromosomes maintained through generations?</li> <li>• What happens if there is no meiosis in reproductive cells?</li> </ul>	<ul style="list-style-type: none"> <li>• Images showing mitosis and meiosis cell divisions</li> </ul>


<p>Draws labelled diagrams of mitosis and meiosis</p>	<ul style="list-style-type: none"> <li>Which cell division occurs in reproductive cells?           <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p><b>MITOSIS</b></p>  <p>DNA replicates</p> <p>Parents Cell</p> <p>2n</p> <p>2 Daughter Cells</p> </div> <div style="text-align: center;"> <p><b>MEIOSIS</b></p>  <p>DNA replicates</p> <p>Parents Cell</p> <p>2n</p> <p>4 Daughter Cells</p> </div> </div> </li> <li>How many daughter cells are produced in meiosis?</li> <li>How many chromosomes are received by the daughter cells in meiosis?</li> <li>By which cell division male gametes and female gametes are formed?</li> <li>Explains the role of meiosis in reproductive cells.</li> </ul>	<ul style="list-style-type: none"> <li>What is the source of variation in sexual reproduction?</li> <li>What do you call the production of a haploid cell in a diploid-dominant organism by meiosis?           <ul style="list-style-type: none"> <li>gamete</li> <li>gametophyte</li> <li>spore</li> <li>sporophyte</li> </ul> </li> <li>What is the exchange of genetic material between maternal and paternal chromatids of homologous chromosomes during meiosis called?</li> <li>What is the main difference between haploid and diploid condition?</li> </ul>	<ul style="list-style-type: none"> <li>Permanent slides showing mitosis and meiosis</li> </ul>
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Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

## PERIOD PLAN 5

Name of the Chapter : HOW DO ORGANISMS REPRODUCE  
 Class : 10  
 Total no. of periods : 09  
 Period plan : 05/09  
 Time : 40 min  
 Key Concepts : Sexual Reproduction in flowering plant

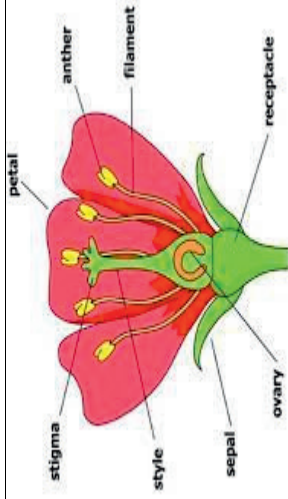
LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT	TLM
<p><b>Explains different parts of a flower</b></p>	<p>Recalls previous knowledge of pupils:</p> <ul style="list-style-type: none"> <li>• What is the reproductive part of a plant?</li> <li>• What are the different types of reproductions you can find in plants?</li> <li>• What do you know about sexual reproduction in plants through flowers?</li> <li>• In what way new characters develop in plants?</li> </ul>	<ul style="list-style-type: none"> <li>• How does the structure of a flower relate to its function?</li> <li>• Which part of the flower protects its internal structures?</li> </ul>	
	<ul style="list-style-type: none"> <li>• Teacher demonstrates the parts of a flower</li> </ul>		<p>Different types of flowers as specimens collected by students</p> <p>Charts and Images in IFP</p>



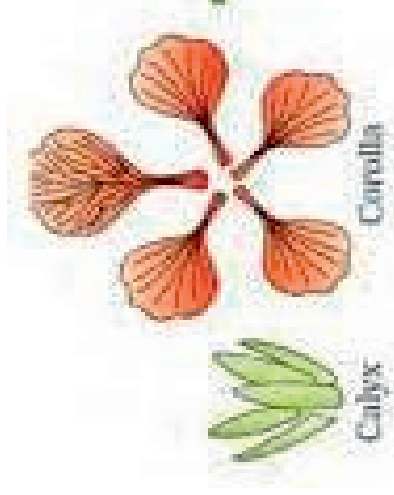
<https://youtu.be/4zCAAtCl-J8w?si=JaNirNLkdLYDsooc>

- Petals are brightly coloured in most plants, but not in all plants. How do such flowers make up for the absence of these bright petals?
- Why are flowers that bloom at night more fragrant and usually white in colour?

- Where do you find the male and


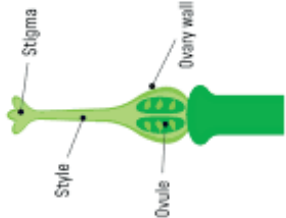
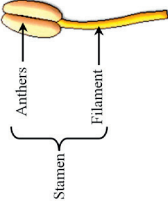
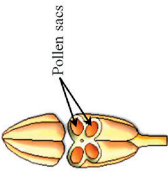


- What is the sexual part of the angiosperm plant?
- Of the different parts of flower shown in the picture, which could be essential for reproduction, and which are not mandatory for reproduction?



- What is the significance of the non-essential parts, calyx and corolla in reproduction?

**Draws  
labelled  
diagram of  
L.s. of  
flower**

	<div style="display: flex; justify-content: space-around;"> <div data-bbox="231 1451 574 1639"> <p>Structure of stamen</p>  </div> <div data-bbox="231 1198 574 1415"> <p>Structure of carpel</p>  </div> </div> <p style="text-align: center;">○</p> <ul style="list-style-type: none"> <li>• Observe different types of flowers and describe and differentiate between androecium and gynoecium.</li> </ul> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div data-bbox="821 1467 989 1668">  </div> <div data-bbox="821 1220 989 1400">  </div> </div> <p style="text-align: center;">○</p> <ul style="list-style-type: none"> <li>• What are the different parts of a stamen?</li> <li>• Observe different flowers and compare the length of filaments in different stamens and justify these differences.</li> <li>• Where are pollen grains present?</li> </ul>	<p>female gametes in a flower?</p> <ul style="list-style-type: none"> <li>• Compare and contrast the arrangement of androecium and gynoecium in different types of flowers. Justify it.</li> <li>• What is the formation of male and female gametes in a flower called?</li> <li>• How is filament helpful in dehiscence of pollen grains?</li> </ul>	
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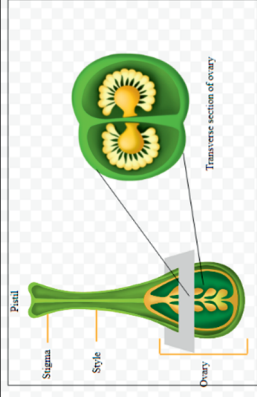


Fig. Ovary of Flower

- What do you call the female reproductive part of the flower?
- What is the swollen part of the pistil?
- What is the sticky part of the pistil? Why is it sticky?

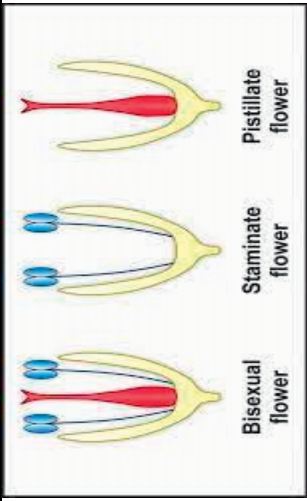
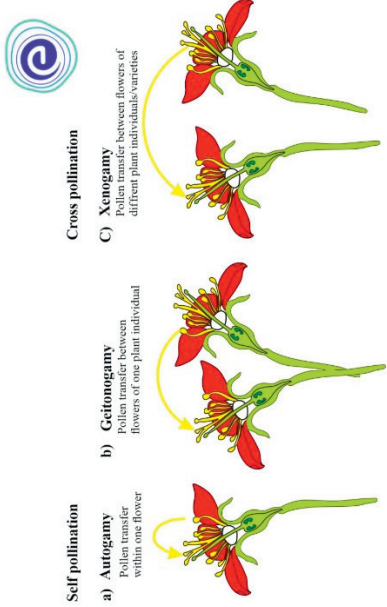

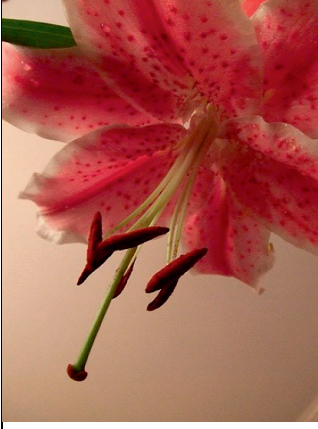
**Differentiate  
s unisexual  
and  
bisexual  
flowers**

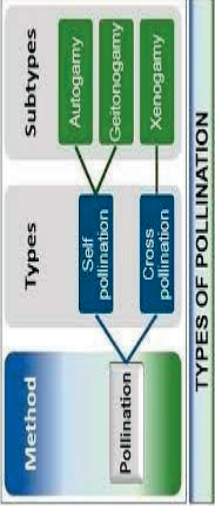

- How do you identify a male flower?
- Which part of the flower will identify it as a female flower?
- Collect different flowers from your locality and identify them as unisexual or bisexual.

- What is the need of having separate male and female flowers?
- What is the advantage of a unisexual flower over a bisexual flower and vice versa?
- List out the examples as per the table

**Hibiscus , Datura, Cucumber, Papaya  
flowers**

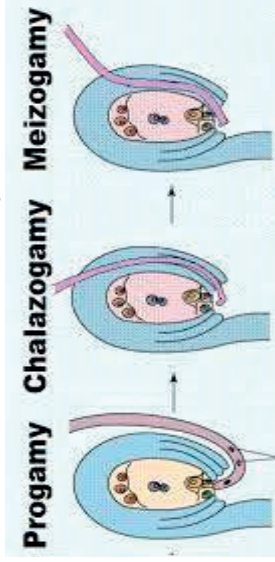


<p>Investigates and identifies self-pollinated flowers and cross-pollinated flowers</p>	 <ul style="list-style-type: none"> <li>• A gardener observes that pollen grains of the flower did not reach the same flower, as the stamens were shorter than the pistil. But the plant produced fruits and seed. How is it possible?</li> <li>• How can you define pollination?</li> </ul> <p>Teacher discusses the various types of pollination with examples.</p> 	<table border="1"> <thead> <tr> <th>FLOWER</th> <th>EXAMPLE</th> </tr> </thead> <tbody> <tr> <td>Bi sexual</td> <td></td> </tr> <tr> <td>Staminate</td> <td></td> </tr> <tr> <td>Pistillate flower</td> <td></td> </tr> </tbody> </table>	FLOWER	EXAMPLE	Bi sexual		Staminate		Pistillate flower		
FLOWER	EXAMPLE										
Bi sexual											
Staminate											
Pistillate flower											
		<ul style="list-style-type: none"> <li>• Why is fertilization in flowering plants not possible without pollination?</li> <li>• After understanding the pollination, which type of pollination do you think is better for producing new varieties?</li> <li>• Can cross pollination occur in the same plant?</li> </ul>									

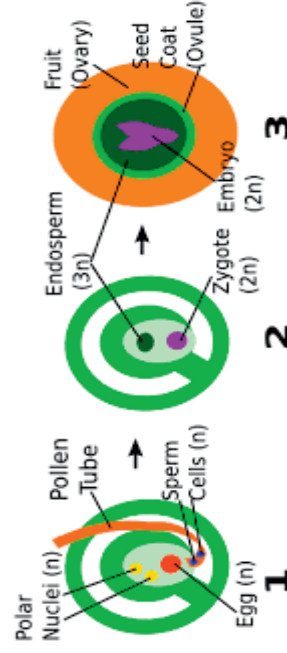
		<ul style="list-style-type: none"> <li>• Which flowers carry out self pollination?</li> </ul>	
<p>Classifies pollinating agents into different types including biotic and abiotic</p>	<ul style="list-style-type: none"> <li>• Pollen grains are not motile. How do they reach the stigma?</li> </ul>  <ul style="list-style-type: none"> <li>• Observe the different pollinating agents, discuss their roles and guess the plants in which these agents bring about pollination.</li> </ul>	<ul style="list-style-type: none"> <li>• List out the different agents of pollination.</li> <li>• Mention some unique and fascinating pollination strategies.</li> <li>• What is the name given to pollination by humans.</li> <li>• How do aquatic plants undergo pollination?</li> </ul>	

Explains the mechanism of sexual reproduction in flowering plants

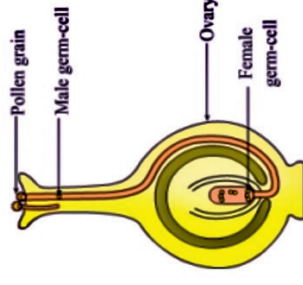
- What happens to the pollen grain after it reaches the stigma?
  - How is pollen tube formed and how does it reach the ovule (Embryo sac)?
- Teacher discusses various types of entry of pollen tube into the ovary.



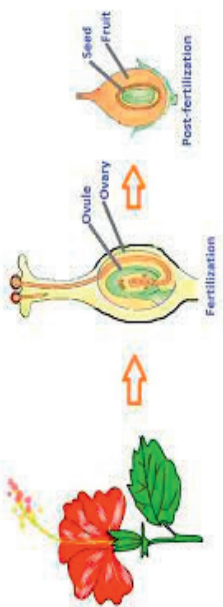
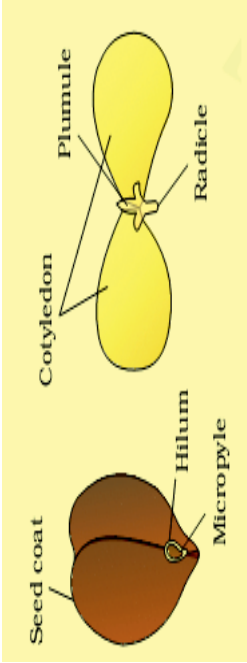
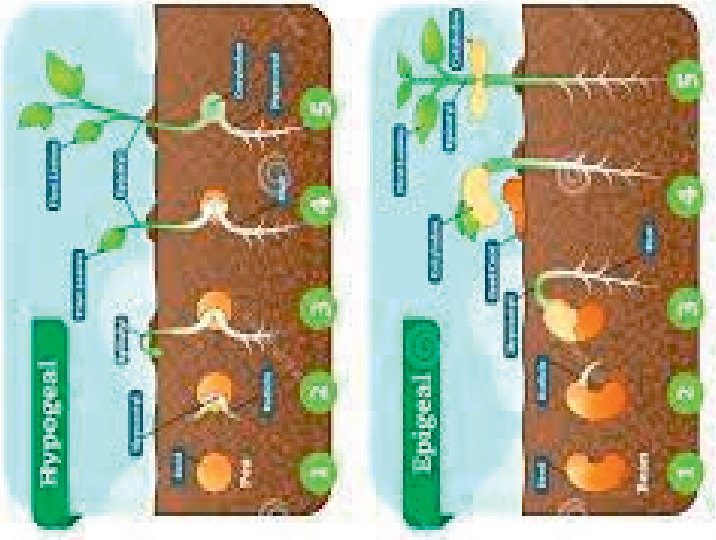
What is the main characteristic feature of angiosperm plant?  
 Teacher introduces the concept of Double fertilization and Triple Fusion.



- Give examples of plants performing porogamy, chalazogamy and Misogamy.

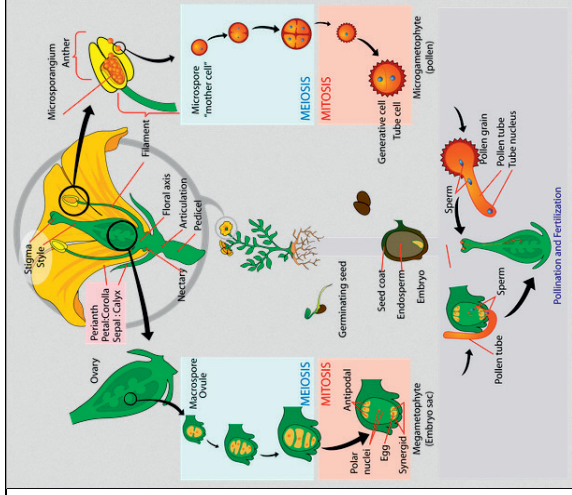


- How do you differentiate between Syngamy and double fertilization?

<p>Analyses post fertilization changes in plants</p>	<p>Post fertilization changes in flowering plant?</p>  <p>What is the future of the seed</p>  <p>What are the types of seed.</p> <p>From which part root system develops from the seed?</p> <p>If seed germinate what will be the fate of cotyledon?</p> <p>Teacher helps students to conduct an activity to show the germination of seeds.</p>	<ul style="list-style-type: none"> <li>• What is the fate of these parts after fertilization - petals, sepals, style stamens, style and stigma?</li> <li>• Give some example of persistence of the calyx after fertilization.</li> <li>• Give some example of dicotyledons seed plants?</li> <li>• Which type of seeds are Rice, wheat, jowar and ragi?</li> <li>• What happens to the sepals, petals and stamens of flowers after fertilization?</li> </ul>	<h3>SEED GERMINATION</h3>  <p>© 2019 by Pearson Education, Inc. All rights reserved. Pearson Education, Inc. is the publisher of this book.</p>
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	<p>Identify the parts of a plantlet arising from a germinating seed.</p>	<ul style="list-style-type: none"> <li>• Which part of the flower will change into a fruit?</li> <li>• What are the events that take place between pollination and fertilisation process?</li> <li>• What are the favourable conditions required for seed germination?</li> <li>• Differentiate hypogeal and epigeal with examples.</li> <li>• What factors influence the germination of seed?</li> </ul>	
	<p>Draws the life cycle of a flowering plant highlighting the events in sexual reproduction</p>	<p>Is there any resemble of the life cycle of flowering</p>	





plant with the human reproductive cycle?  
Discuss in groups.

Chart showing life cycle of a flowering plant


Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

# PERIOD PLAN 6

Class: 10  
 Total no. of periods: 09  
 Period plan : 06/09  
 Time : 40 min  
 KEY CONCEPTS: REPRODUCTION IN HUMAN BEINGS

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT	TLM
	<ul style="list-style-type: none"> <li>• Recalls their previous knowledge.</li> <li>• What are the different modes of reproduction in animals?</li> <li>• How do human beings reproduce?</li> <li>• What are the reproductive organs in male and female?</li> <li>• What are the different ways of reproduction in single cell organisms and in plants?</li> </ul>		
	<ul style="list-style-type: none"> <li>• What are the different stages of life?</li> <li>• What are the changes observed in childhood?</li> <li>• When do baby teeth start falling out?</li> <li>• What are the general changes in growth that can occur from infancy to childhood?</li> <li>• What are the new changes you observe in early teenage?</li> </ul>	<p>When did your dental formula change and you developed wisdom teeth?            what changes have you gone through from your childhood?</p>	

<p>Explains changes that occur in boys and girls during Adolescence</p>	<ul style="list-style-type: none"> <li>• What are the changes you observed as your age increased?</li> </ul> <p>When new changes appear in humans? Are the changes as same as boys and girls</p>  <p>Observe your appearance in the mirror and note down the changes.</p>		
	<p>What gland causes puberty in boys?</p> <p>List out some physical and sexual changes in boys that you see in the picture?</p>		<p>pictures</p> <p>Images in IFP</p> <p><a href="https://youtube.com/shorts/za3j03QPTOI?si=f-pNQjvpdNPIwdC">https://youtube.com/shorts/za3j03QPTOI?si=f-pNQjvpdNPIwdC</a></p>

	<p>How do you explain puberty in girls? When puberty ends?</p>	<p>What are some physical changes of a girls?</p> <p>What physical and sexual changes do you find in girls?</p>	
	<ul style="list-style-type: none"> <li>• What are the different stages of life?</li> <li>• What are the changes observed in childhood?</li> <li>• When do baby teeth start falling out?</li> <li>• What are the general changes in growth that can occur from infancy to childhood?</li> <li>• What are the new changes you observe in early teenage?</li> </ul>	<ul style="list-style-type: none"> <li>• what changes have you gone through from your childhood?</li> </ul>	<p>Chart showing different stages of growth</p>
	<ul style="list-style-type: none"> <li>• Which age is known as adolescence?</li> <li>• What are the changes you observe in skin during adolescence?</li> </ul>	<ul style="list-style-type: none"> <li>• How is adolescence different from childhood?</li> <li>• Why is adolescence also called teenage?</li> </ul>	

	<ul style="list-style-type: none"> <li>• What are the physical changes observed in males?</li> <li>• What are the changes observed in females?</li> <li>• What is puberty?</li> <li>• What are the changes observed in puberty?</li> </ul>	<ul style="list-style-type: none"> <li>• Puberty ends when adolescent reaches reproductive maturity. Do you agree with this or not?</li> </ul>	
	<ul style="list-style-type: none"> <li>• Why do these changes occur in puberty?</li> <li>• What hormones are responsible for these changes?</li> <li>• How do these changes are related to reproductive process?</li> <li>• Explains how these changes leads to the formation of germ cells.</li> </ul>	<ul style="list-style-type: none"> <li>• How hormones control the changes at adolescence?</li> </ul>	

Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

# PERIOD PLAN 7


Name of the Chapter: HOW DO ORGANISMS REPRODUCE

Class:10

Total no. of periods :09

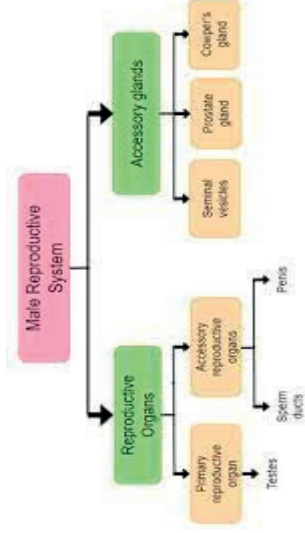
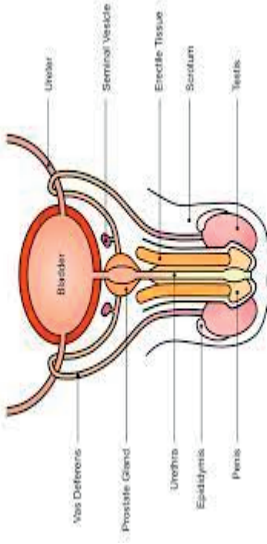
Key concepts: Male reproductive System

Period Plan-7/9

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	Assessment	TLM
<p>Explains the structure of male reproductive system</p>	<ul style="list-style-type: none"> <li>○ To check the previous knowledge of the pupil</li> <li>• How do humans reproduce?</li> <li>• What are the changes observed in adolescent males?</li> <li>• What is puberty?</li> </ul>	<p>Observe the picture and identify the different parts</p> <p>Where the sperms are produced?</p> <p>How the sperm are passed from testes to ejaculatory duct?</p>	
	<ul style="list-style-type: none"> <li>• Teacher explains the parts of male reproductive system by showing the picture</li> <li>• What are the male reproductive organs?</li> <li>• Where the testes are present?</li> </ul>		<p>Chart showing male reproductive system</p> <p>Pictures</p>



Draws labelled diagram of Male reproductive system



- Explains the structure of male reproductive system
- What are the male gametes?
- Name the tube which arises from the testes.
- What is the common passage for both urine and sperms?
- where the sperms are stored?
- Name the glands which secrete seminal fluid



PPT

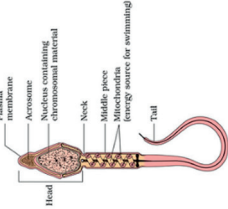
Draw a neat labelled diagram of sperm

Name the accessory gland found in male reproductive system and state its function

Name the organ that produces sperms and also secretes a hormone. Write the function of the hormone

What is semen?




	<table border="1"> <thead> <tr> <th>Component</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>Testes</td> <td>Produce sperm and male sex steroids</td> </tr> <tr> <td>Epididymis</td> <td>Store sperm</td> </tr> <tr> <td>Vasa deferentia</td> <td>Conduct sperm to urethra</td> </tr> <tr> <td>Sex accessory glands</td> <td>Produce seminal fluid that nourishes sperm</td> </tr> <tr> <td>Urethra</td> <td>Conducts sperm to outside</td> </tr> <tr> <td>Penis</td> <td>Organ of copulation</td> </tr> <tr> <td>Scrotum</td> <td>Provides proper temperature for testes</td> </tr> </tbody> </table>	Component	Function	Testes	Produce sperm and male sex steroids	Epididymis	Store sperm	Vasa deferentia	Conduct sperm to urethra	Sex accessory glands	Produce seminal fluid that nourishes sperm	Urethra	Conducts sperm to outside	Penis	Organ of copulation	Scrotum	Provides proper temperature for testes		
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Urethra	Conducts sperm to outside																		
Penis	Organ of copulation																		
Scrotum	Provides proper temperature for testes																		
<p>Analyses the role of sperm in sexual reproduction</p>	<p><b>Structure of sperm</b></p>  <p>What are the different parts of sperm? Which structure of sperm help to penetrate sperm? What is the function of tail in sperm? Name the fluid which nourishes the sperms.</p>	<p>What is the function of acrosome? What is the role of mitochondria in middle piece of sperm?</p>	<p>Chart</p>																

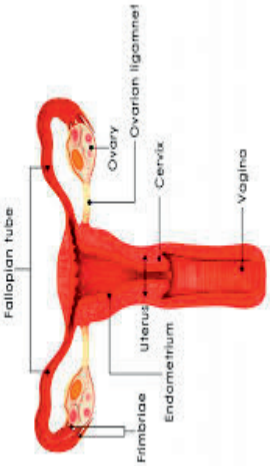
Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

## PERIOD PLAN 8

Name of the Chapter : HOW DO ORGANISMS REPRODUCE  
 Class : 10  
 Total no. of periods : 09  
 Period plan : 08/09  
 Time : 40 min  
 Key Concepts : Female Reproductive system --- what happens when the egg is not fertilized

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT	TLM
	<ul style="list-style-type: none"> <li>Students recall their previous knowledge through open-ended questions</li> <li>What are the changes observed in adolescent females?</li> <li>What are the female reproductive organs?</li> </ul>		
Explains the structure of	<ul style="list-style-type: none"> <li>Where female germ cells are produced?</li> <li>Where the ovaries are located?</li> </ul>	Draw a neat labelled diagram of female reproductive system	

<p>female reproductive system</p> <p>Draws labelled diagram of female reproductive system</p>	<ul style="list-style-type: none"> <li>Teacher explains the parts of a female reproductive system by showing the picture</li> </ul>  <ul style="list-style-type: none"> <li>Name the duct which arises from the ovaries.</li> <li>Oviducts opens into a bag like structure known as _____</li> <li>Where the uterus opens into?</li> <li>Cervix opens into which part?</li> <li>Rupture of graffian follicle and release of ovum is called _____</li> <li>Where does fertilization take place in female?</li> </ul>	<ul style="list-style-type: none"> <li>Where is the female reproductive system located?</li> <li>what are the hormones secreted by ovaries?</li> </ul>	<p><a href="https://youtu.be/RFDatCchpus?si=eUWuoTpQnkPp3Qij">https://youtu.be/RFDatCchpus?si=eUWuoTpQnkPp3Qij</a></p> <p>Chart</p> <p>Pictures</p>

The Female Reproductive System

Component	Function
Ovary	Site of storage and development of oocytes.
Oviduct	Duct for transporting oocyte from ovary to uterus; also site of fertilization if it occurs.
Uterus	Hollow chamber in which embryos develop.
Cervix	Lower part of the uterus that opens into the vagina.
Vagina	Organ of sexual intercourse. Produces lubricating fluids; also the birth canal.
Clitoris	Organ of sexual arousal.

[https://youtu.be/UAa-B3pqAZw?si=CZR\\_fCDxzM-0\\_J](https://youtu.be/UAa-B3pqAZw?si=CZR_fCDxzM-0_J)



Relates embryo development with fertilization

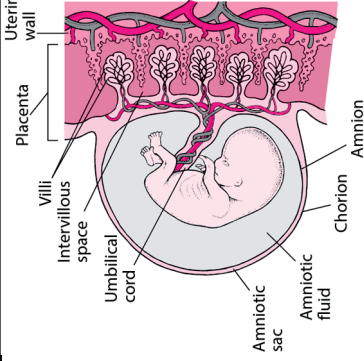
- What happens to the zygote after fertilization?
- Mass of cells formed from the zygote is called \_\_\_\_\_
- Name the structure formed between the foetus and mother
- Fixing of developing embryo in the uterine wall is called \_\_\_\_\_
- How the embryo gets nutrition from the mother's blood?
- What is gestation period in human beings?
- What happens if egg is not fertilized?
- What is menstrual cycle?

- What is implantation? Where does it take place?
- What is the role of placenta in human embryo development?
- Rewrite the correct order
- Implantation, ovulation, child birth, gestation period, fertilization
- What is the fate of unfertilized ovum?
- What are the changes that endometrium undergoes during menstruation?

Chart

Byjus videos

Stages of embryonic development in IFP

	 <p>The diagram illustrates the fetal development within the uterus. It shows a fetus curled in the center, surrounded by the amniotic sac containing amniotic fluid. The chorion is the outer layer, and the placenta is attached to the uterine wall. The umbilical cord connects the fetus to the placenta. Labels include: Uterine wall, Placenta, Villi, Intervillous space, Umbilical cord, Amniotic sac, Amniotic fluid, Chorion, and Amnion.</p>	<ul style="list-style-type: none"> <li>• What are the precautions should be taken during menstruation?</li> <li>• What is female foeticide?</li> <li>• Why there is gender discrimination existing in many countries till today?</li> <li>• Prepare some slogans on save girl child and display it in the class.</li> </ul>	
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Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.


# PERIOD PLAN 9

Name of the Chapter : HOW DO ORGANISMS REPRODUCE  
 Class : 10  
 Total no. of periods : 09  
 Period plan : 09/09  
 Time : 40 min  
 Key Concepts : Reproductive Health

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT	TLM
Explains the importance of reproductive	<ul style="list-style-type: none"> <li>○</li> <li>• Recalls their previous knowledge</li> <li>• What is sexual reproduction?</li> <li>• What are the male reproductive organs?</li> <li>• What are the female reproductive organs?</li> </ul>	<ul style="list-style-type: none"> <li>• Why is it important to study or understand our reproductive system?</li> </ul>	Image showing HIV virus

<p>health in human beings</p>	<ul style="list-style-type: none"> <li>• How sexually transmitted diseases occur?</li> <li>• Name some sexually transmitted viral diseases.</li> <li>• What is AIDS?</li> <li>• Which virus causes AIDS?</li> <li>• Name some bacterial diseases which are transmitted sexually.</li> <li>• How the sexually transmitted diseases can be prevented?</li> </ul> 	<ul style="list-style-type: none"> <li>• What are the measures one has to take to prevent from STD's?</li> <li>• When do we celebrate AIDS day?</li> <li>• Why do we wear red ribbon on AIDS day?</li> <li>• Give some examples of sexually transmitted diseases.</li> <li>• Are all reproductive tract infections are considered as sexually transmitted diseases?</li> </ul>	<p>Pictures of different contraceptive methods</p>
<p>Relates family planning with birth control methods</p>	<ul style="list-style-type: none"> <li>• Why there is a need of birth control methods?</li> <li>• What are the different contraceptive methods?</li> <li>• What is vasectomy?</li> <li>• What is tubectomy?</li> </ul>	<ul style="list-style-type: none"> <li>• Why is it important to control population growth?</li> <li>• What are the factors responsible for population explosion in India?</li> <li>• What are the important features of an ideal contraceptive?</li> </ul>	



	<ul style="list-style-type: none"> <li>• Why is it important to control population growth?</li> <li>• What is the legal age for marriage in India?</li> <li>• Why contraceptive methods are necessary for controlling population?</li> <li>• What are the laws related to prevent female foeticide?</li> </ul>	<ul style="list-style-type: none"> <li>• What is the legal age for marriage in India?</li> <li>• Why contraceptive methods are necessary for controlling population?</li> <li>• Why doctors refuse to determine the sex of the baby?</li> </ul>	<a href="https://youtu.be/CEsHQExeEQo?si=Lif7wT6euVPYCbct">https://youtu.be/CEsHQExeEQo?si=Lif7wT6euVPYCbct</a>
		<ul style="list-style-type: none"> <li>• What are the laws related to prevent female foeticide?</li> <li>• Why should sex education be introduced to school going children?</li> <li>• What is reproductive health?</li> <li>• What is the significance of reproductive health?</li> <li>• What are the common health issues associated with reproductive health?</li> </ul>	

		<ul style="list-style-type: none"> <li>• What are the components of reproductive health?</li> <li>• List some important steps for improving standards of reproductive health in India.</li> <li>• When do we celebrate Sexual reproductive Health awareness day?</li> </ul>	
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Teacher's Reflections:

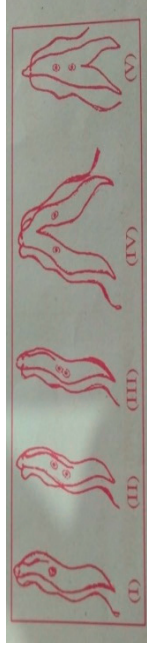
11. How did the lesson go?
12. Were the teaching learning strategies adequate?
13. Were the students engaged?
14. Areas of improvement
15. Measures taken to refine the teaching-learning process.

## ASSESSMENT – 01

1. The thread like structure that develop on a moist slice of bread in Rhizopus are : [1 Mark]

- a. Sporangia
- b. Filaments
- c. Rhizoids
- d. Hyphae

2. Choose the correct order of the stages of binary fission in Leishmania. [1Mark]



- a. I, II, III, IV, V
- b. I, III, II, V, IV
- c. I, III, V, II, IV
- d. I, II, III, V, IV

3. **Assertion (A)** : Testes in human males are located outside the abdominal cavity in scrotum. [1Mark]  
**Reason (R)** : scrotum provides a lower temperature than the normal body temperature for sperm formation.  
Answer the question selecting appropriate options given below :

- a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of (A).
- b. Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of (A).
- c. Assertion (A) is true, but Reason (R) is false.
- d. Assertion (A) is false, but Reason (R) is true

4. When you study a slide showing different stages of budding in yeast, you observe the following stages:  
[1Mark]

- 1. The bud may get separated from the parent body and develop into a new individual.
- 2. The body of the bud develops and gives rise to another baby bud.
- 3. A bud comes out in any direction from the body of the parent cell.
- 4. Thus they may form a colony.

The proper sequence of the above stages is

- A) 2, 1, 3, 4
- B) 2, 3, 1, 4
- C) 3, 2, 1, 4
- D) 3, 1, 2, 4
- E)

5. A student while observing an embryo of a pea seed in the laboratory listed various parts of the embryo as given below : [2Marks]

Testa, Tegmen, Radicle, Plumule, Micropyle, Cotyledon.

On examining the list the teacher remarked that only three parts are correct.  
Select three correct parts from the above list:

- 1. Testa, Radicle, Cotyledon
- 2. Tegmen, Radicle, Micropyle
- 3. Cotyledon, Plumule, Testa
- 4. Radicle, Cotyledon, Plumule

6. Name the type of asexual reproduction demonstrated by the following organisms: [3Marks]

1. Amoeba 2 Rhizopus 3. Planaria 4. Plasmodium 5. Spirogyra 6. Bryophyllum

7. Explain the role of gametes in sexual reproduction. How fertilization subsequently results in a individual [3 Marks]

8. List four methods of contraception used by humans. [3 Marks]

9. Justify the following statement:

“The use of contraceptive methods has a direct effect on the health and prosperity of a family.”

- (a) Draw a sectional view of human female reproductive system and label the part where [5 Marks]

1. Eggs develop. 2. Fertilisation take place. 3. Fertilised egg gets implanted

- (b) Describe, in brief, the changes the uterus undergoes

1. to receive the zygote. 2. If zygote is not formed

**ASSESSMENT -2**

1. What is the most basic event in reproduction? 1 Mark
  
2. Assertion: The gamete formed in males determines the sex of the offspring. **1Mark**  
Reason: Sex determination in human depend upon cumulative effect of some genes of X and Y chromosomes.
  - a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of (A).
  - b. Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of (A).
  - c. Assertion (A) is true, but Reason (R) is false.
  - d. Assertion (A) is false, but Reason (R) is true
  
3. Name two sex hormones 1 Mark
  
4. Select the correct sequence of acts that leads to pregnancy in a female 1 Mark  
A) Fertilisation of egg B) ovulation C) Formation of zygote D)implantation  
1. D, C, B, A (2) B, A, C, D (3) A, B, C, D (4) D, C, A, B
  
5. Sita is very fond of gardening. She has different flowering plants in her garden. One day few naughty children entered her garden and plucked many leaves of Bryophyllum plant and threw them here in the garden. After few days, Sita observed that new Bryophyllum plants were coming out from the leaves which fell on the ground.  
What does the incident sited in the paragraph indicate? 1 Mark
  
6. A planaria worm is cut horizontally in the middle into two halves P and Q such that part P contains the whole head of the worm. Another planaria worm is cut vertically into two halves R and S in such a way that the cut pieces R and S contain half head each. Which of the pieces of the two planaria worms could regenerate to form complete respective worms? 1 Mark
  
7. Read the table and fill the where “? “ present 3 Marks

Plant/ animal	Reproduction type
Amoeba	?
?	Multiple fission
<b>Hibiscus, Strawberry</b>	?
?	Regeneration
Budding	?
?	<b>mango, apples,</b>
Spore formation	<b>peas</b>
?	<b>Rose, Chrysanthum, Grapes</b>

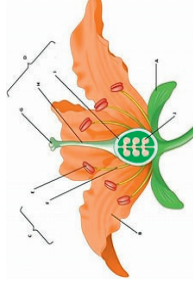
8. Why sexual reproduction is more effective than asexual reproduction. Justify it?

3Marks

9. Observe the diagram answer the following questions

5 marks

- What are the essential and non-essential parts of the flower
- Where the pollengrains developed?
- How many parts present carpel.
- Which parts produced fruit and seed



9. The chromosomal number of the sexually producing parents and their offspring is the same". Justify this statement

4Marks

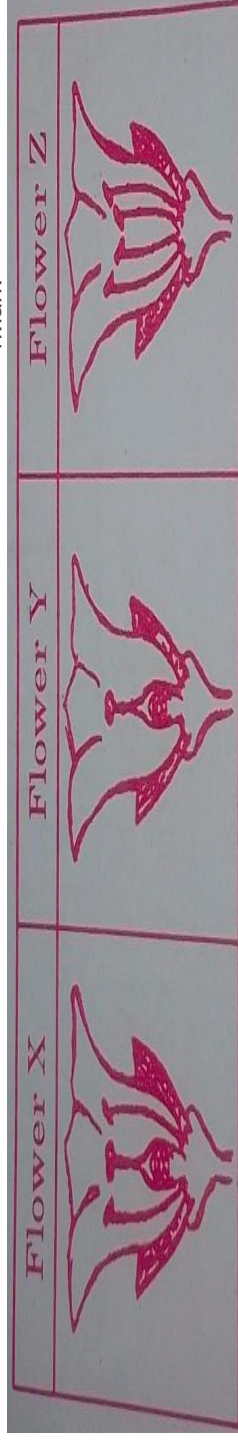
10. List three techniques that have been developed to prevent pregnancy. Which one of these techniques is not meant for males? How does the use of these techniques have a direct impact on the health and prosperity of a family?

5 Marks

### ASSESSMENT-3

1. Consider the following three flowers namely X, Y and Z. Which flowers would develop into a fruit ?

1Mark



- X only
- Z only
- X and Y only
- Y and Z only

2. **Assertion (A)** : Amoeba takes in food using finger like extensions of the cell surface. 1Mark

**Reason (R)** : In all unicellular organism the food is taken in by the entire cell surface.

Answer the question selecting appropriate options given below :

- Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of (A).
- Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of (A).
- Assertion (A) is true, but Reason (R) is false.
- Assertion (A) is false, but Reason (R) is true

3. A student has to focus his compound microscope to observe a prepared slide showing different stages of binary fission in Amoeba. The steps he is likely to follow are listed below in a haphazard manner:

1 Mark

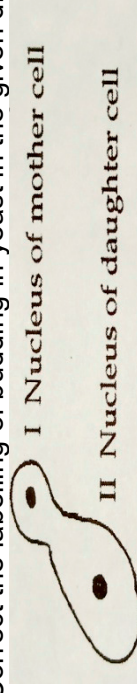
- Adjust the diaphragm and the mirror of the microscope so that sufficient light may enter to illuminate the slide.
- Fix the slide on the stage carefully.
- Adjust the microscope to high power and focus.
- Adjust the microscope to low power and focus.

The correct sequence of the above steps to observe the slide under the microscope is

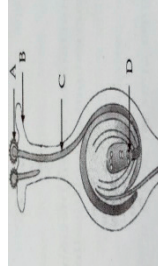
- 1, 2, 4, 3
- 2, 1, 4, 3
- 2, 4, 1, 3
- 1, 4, 2, 3

4. Correct the labelling of budding in yeast in the given diagram:

[2 Marks]



5. List two reasons for the appearance of variations among the progeny formed by sexual Reproduction [2Marks]



- 1. How does 'A' reaches part 'B'?
- 2. What happens to the part marked 'D' after fertilisation is over?

[2Marks}



## **E CONTENT RESOURCES**

<https://youtube.com/shorts/za3i03QPTOI?si=f-pNQjvpdNPIwdC>

<https://youtu.be/6Ew6mqwgGR0?si=myv2BG64xTJ3F54S>

<https://youtu.be/4zCAtCl-J8w?si=JaNirNLkdLYDsooc>

<https://youtu.be/CEsHQExeEQo?si=Ljf7wT6euVPYCbct>

<https://youtu.be/ktWirmb6rQw?si=WddWhKD60EY6N0vV>

**CLASS : X**

**CHAPTER : HEREDITY**

**TOTAL NO. OF PERIODS: 06**

**Aims of Education:**

1. Rational thought and independent thinking.
2. Health and wellbeing.

**Aims of Science Education:**

1. Scientific understanding of the natural and physical world.
2. Capacities for scientific inquiry.
3. Understanding the evolution of scientific knowledge.
4. Interdisciplinary understanding between science and other curricular areas.
5. Understanding of the relationship between Science, Technology and society.
6. To create scientific temper and creativity.

## **Curricular Goals and Competencies**

**Curricular Goal – 3:** Explores the structure and function of the living world at the cellular level.

Competency - 3.3 : Describes mechanisms of heredity (in terms of DNA, genes, chromosomes) and variation (as change in the ~~structure~~ of DNA, Mendel performed hybridization experiments to bring out new varieties of plants).

**Curricular Goal – 4:** Explore interconnectedness between organisms and their environment through reproduction.

Competency - 4.4 : Analyses patterns of inheritance of traits in terms of Mendel's laws and its consequences at population level. (Using models and/ or simulations).

Competency - 4.5 : Analyses evidences of biological evolution demonstrating the consequences of the process of natural selection in terms of changes- in allele frequency in population, structure, and function of organisms.

**Curricular Goal – 5:** Draws linkages between scientific knowledge and knowledge across other curricular areas.

Competency - 5.1 : Explores how literature and the arts have influenced science.

Competency -5.3 : Applies scientific principles to explain phenomena in other subjects like mathematical and statistical knowledge to understand the ratios of monohybrid and di hybrid cross and the probability of finding the recombinant traits in next generation.

**Curricular Goal - 7:** Develops awareness of the most current discoveries, ideas and frontiers in all areas of scientific knowledge in order to appreciate that science is ever evolving, and that there are still many unanswered questions.

Competency – 7.1: States concepts that represent the most current understanding of the matter being Studied- using the knowledge obtained from stem cell research to solve many genetic related health complications.

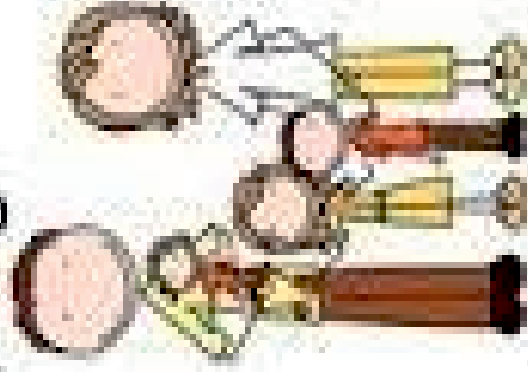
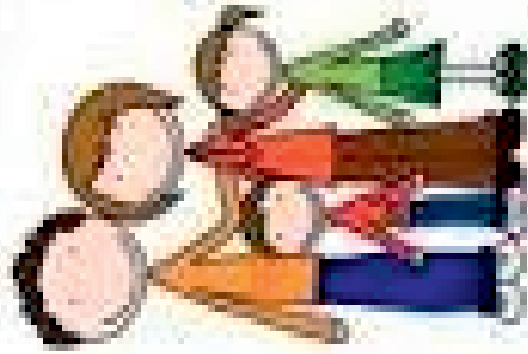
**Curricular Goal - 8:** Explores the nature of science by doing science.

Competency - 8.2 : Designs and implements a plan for scientific inquiry (formulates hypotheses, makes predictions, identified variables, accurately uses scientific instruments, represents data- primary and secondary- in multiple modes, draws inferences based on data and understanding of scientific concepts theories, laws, and principles of monohybrid and di hybrid cross, law of dominance, law of segregation, law of independent assortment, homologous and analogous organs etc.

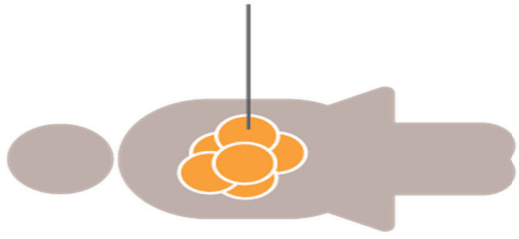
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# HEREDITY

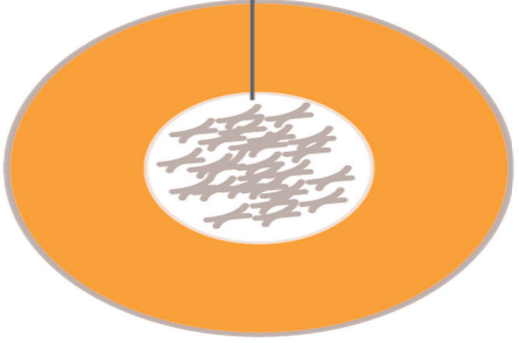
the passing of genetic traits  
from parent to offspring



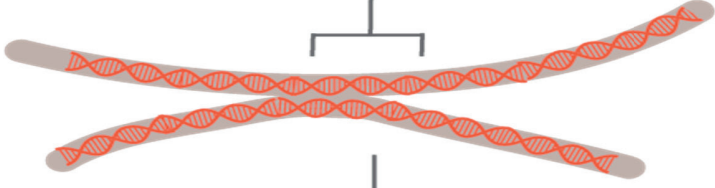
Children look similar to their parents because of the traits they inherit.



Your body is  
made of cells



Each cell has your  
chromosomes



Every chromosome  
contains your DNA

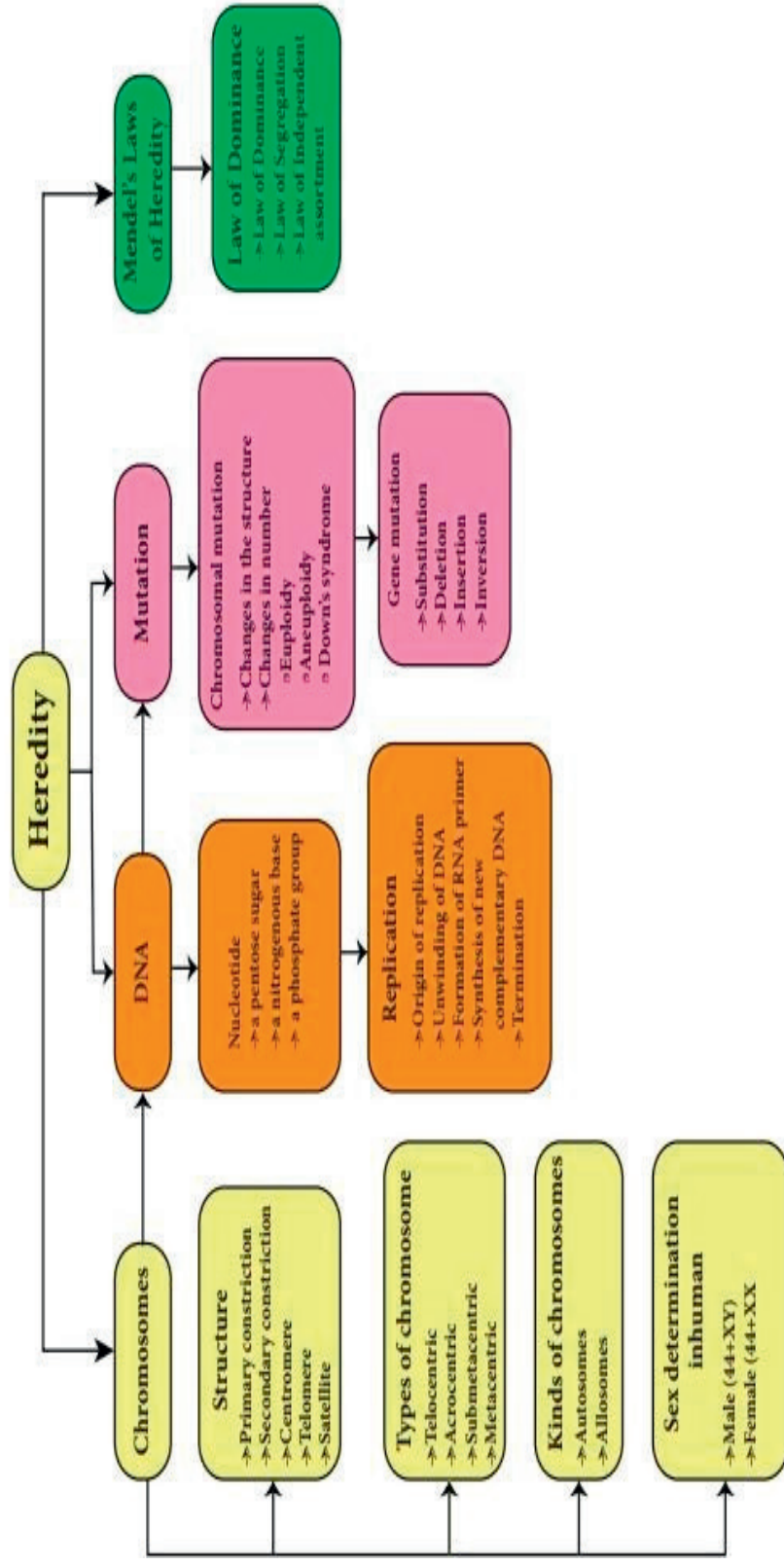


In your DNA are  
your genes

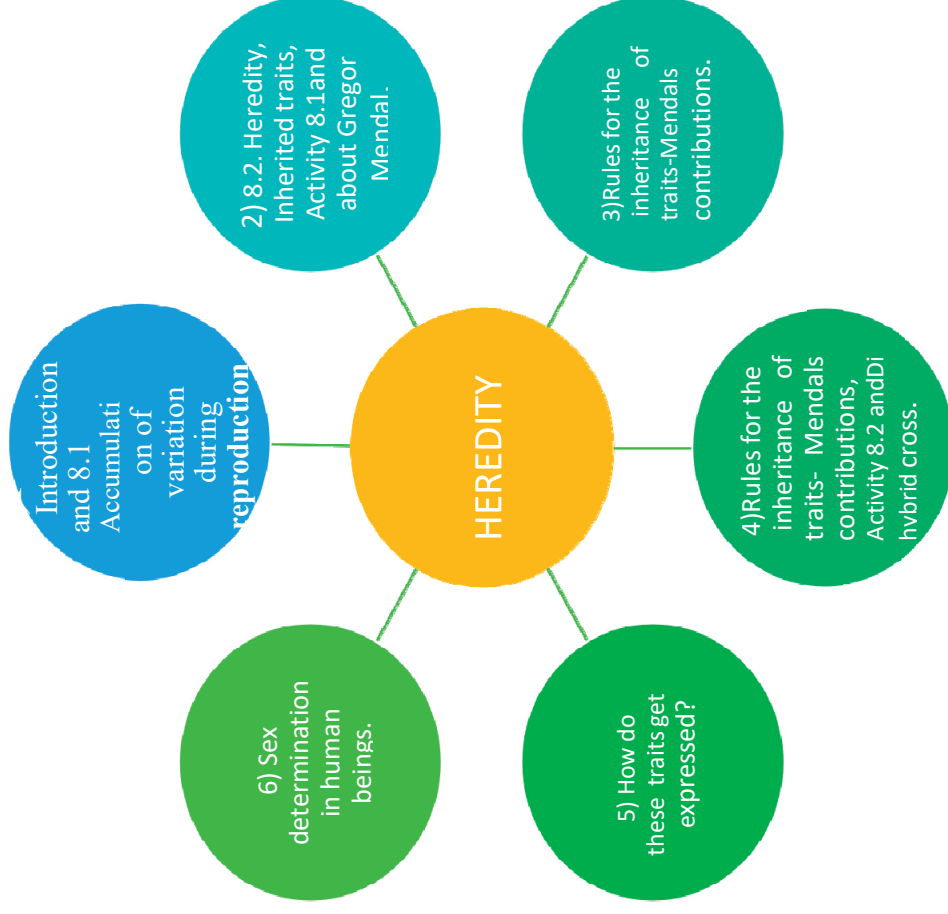


Your genes carry  
your traits

# Concept Map



# PERIOD MAP



## **TOPIC WISE LEARNING OUTCOMES**

<b>Period No.</b>	<b>Topic</b>	<b>Learning outcomes</b>
1	Introduction and 8.1 Accumulation of variation during reproduction.	<ol style="list-style-type: none"><li>1) Applies knowledge in understanding the scientific principles of heredity.</li><li>2) Explains how variations contribute to the formation of new species.</li><li>3) Differentiates sexual and asexual reproduction.</li><li>4) Relates variations to the process of evolution.</li></ol>
2	8.2. Heredity, Inherited traits, Activity 8.1 and about Gregor Mendel.	<ol style="list-style-type: none"><li>1) Differentiates between heredity and inheritance.</li><li>2) Plans and conducts investigation on ear lobe activity and draw conclusions .</li><li>3) Takes initiative to know about Mendel discoveries</li></ol>
3	Rules for the inheritance of traits- Mendel's contributions.	<ol style="list-style-type: none"><li>1) Analyses the monohybrid cross and its results.</li><li>2) Relates Monohybrid cross to the law of dominance</li></ol>




4	Rules for the inheritance of traits Mendel's contributions, Activity 8.2 and Di hybrid cross.	1) Applies the knowledge of dihybrid cross and its results in plant breeding technique or hybridization
5	How do these traits get expressed?	1) Differentiates between Mitosis and Meiosis. 2) Explains the mode of inheritance in sexual reproducing organisms and asexual reproducing organisms.
6	Sex determination in human beings.	1) Relates chromosomes to the process of sex determination in different organisms. 2) Analyses the role of sex chromosomes and its misconceptions in human beings

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# PERIOD PLAN 1

Name of the Chapter : **HEREDITY**  
 Class : 10  
 Total no. of periods : 06  
 Period plan : 01/06  
 Time : 40 min  
 Key Concepts : Accumulation of Variations during Reproduction.

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT	TLM
	Recalls previous knowledge:  <p>*Observe the above picture. Do all of them appear similar?            *Why are they different from each other?</p>		



\* Do you find all the sugar cane plants similar to each other?

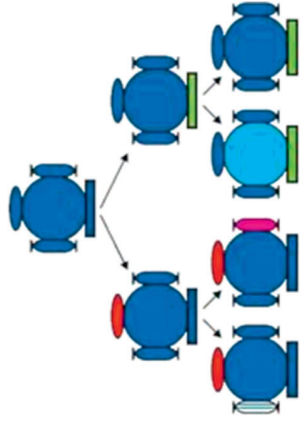


\*Why are kittens different from each other?  
\*Of the two examples in which case do you find differences to be more prominent and in which case the differences are very subtle? Why?

Applies knowledge in understanding the scientific principles of heredity.

- Teacher reinforces students' response connecting the variations to the modes of reproduction.

**Case study- I**



- \*In the above picture can you see two generations?
- Note down the difference between parent and the first generation?
- List out the differences between the second and first generation?
- Case study-II
- \*Find out differences between you and your parents. You and your siblings and your grandparents. Note down the list of differences you observed for the three generations.
- \*Now compare your observations from Case study I and II. In which case study do you find more differences between the generations?
- \*Can you give reasons for your observation? Teacher elaborates that the minute differences between the generations is due to asexual mode of reproduction.

Differentiates sexual and asexual reproduction

- \*What is responsible for these minute differences in bacteria during asexual mode of reproduction?
- \*Prepare a table showing the difference in characters in you, parents, siblings, and grandparents.

Characters	Parents	Siblings	Grandparents

IFPS Panel Board  
You tube videos  
Related pictures  
QR code for NCERT e-content



<https://byjus.com/biology/heredity-and-evolution/>



[https://diksha.gov.in/pla/collection/do\\_31307360979544473611859?contentId=do\\_3131042](https://diksha.gov.in/pla/collection/do_31307360979544473611859?contentId=do_3131042)

What forms the basis for variations?  
Exchange of genetic material takes place in a) vegetative reproduction

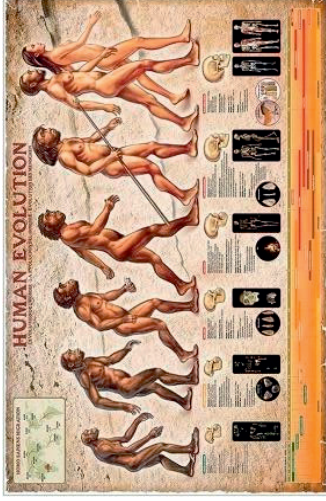
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- b) asexual reproduction
- c) sexual reproduction
- d) budding

- What is the cause of variation in asexually reproducing organisms?
- What makes sexual reproduction more advantageous than asexual reproduction?
- Do all these variations in a species have equal chances of surviving in the environment?
- How does the creation of variations in a species promote survival?
- Identify bacteria with respect to their environmental conditions

Bacteria	Environment
Cryophiles	
Acidophiles	
Halophiles	
Thermophiles	

reproduction and major differences are due to sexual reproduction. Teacher introduces the term variations.



- \*From the pic list out the variations
- Observed at every level of evolution.
- \*Explain how some bacteria are able to
- survive in habitats with high temperature?
- What could be their possible adaptations?

Relates variations to the process of evolution.

Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

## PERIOD PLAN 2

Name of the Chapter : **HEREDITY**  
 Class : 10  
 Total no. of periods : 06  
 Period plan : 02/06  
 Time : 40 min  
 Key Concepts : Heredity, Inherited Traits and Mendel.

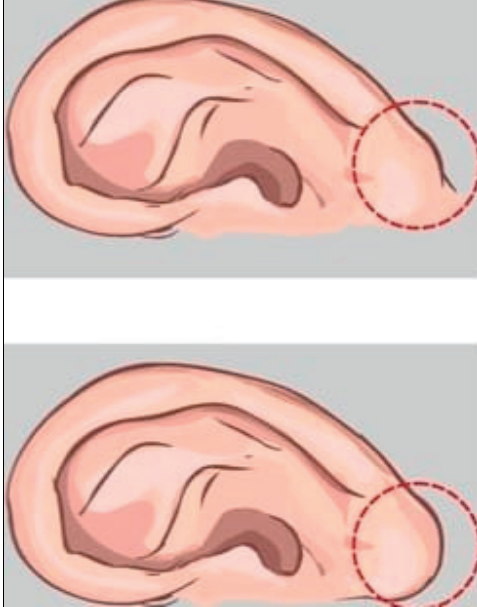
LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT	TLM
	<ul style="list-style-type: none"> <li>• Recalls previous knowledge:</li> <li>• *What is the most obvious outcome of reproduction?</li> <li>• *In which type of reproduction can you see variations?</li> <li>• *What is the term used to denote the production of individuals of similar design over generations.</li> </ul>		
Differentiates heredity and inheritance	<ul style="list-style-type: none"> <li>• Teacher defines the term heredity.</li> <li>• *What is the term used to denote passing on the characters or traits from parents to the offspring? Teacher distinguishes between Heredity and inheritance.</li> <li>• What do we call the traits that are passed on from the parent to the offspring?</li> </ul>	<ul style="list-style-type: none"> <li>• *Is heredity and inheritance similar?</li> <li>• *What are inherited traits?</li> <li>• *The inheritance of characters or traits from parents to progeny over generations is called .....</li> <li>• *All human beings are similar with common physical features. Yet they are different from each other, What might be the reason?</li> </ul>	IFP Panel board. You Tube videos.

<https://www.youtube.com/watch?app=desktop&v=3l4aazBYQPE>

- List out such common and different features. What do we call these differences?

- \*What do we call the traits that are present in the offspring but are not inherited from the parent?
- \*Are all variations occurring in organisms inherited to its progeny?
- Why do we exhibit similarities though we are different from each other?
- Teacher directs students in executing Activity 8.1 to study variations in Ear lobes among students and their parents.


Plans and conducts investigation to know variations in Ear lobes among different people



Name of the person	F/A Earlobe	Mother F/A	Father F/A

- What is the possible rule of inheritance in the ear lobe activity?



	<ul style="list-style-type: none"> <li>• What percentage of students has free earlobes and what percentage has attached earlobes?</li> <li>• Correlate students earlobes with their mother and father. Using the data predict the rule of inheritance for the earlobe type.</li> <li>• From the data can you guess which trait free or attached is dominant.</li> <li>• What is the probability of the progeny having free earlobes when both the parents have attached earlobes?</li> </ul>	<ul style="list-style-type: none"> <li>• Students are assigned a group project to study the rules of inheritance with respect to hair texture i. e. soft or curly.</li> </ul> <table border="1" data-bbox="300 528 576 1084"> <thead> <tr> <th>Name of the person</th> <th>Soft hair</th> <th>Curly hair</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	Name of the person	Soft hair	Curly hair																									
Name of the person	Soft hair	Curly hair																												
<p>Takes initiative in finding Mendel discoveries</p>	<p>Teacher discusses the contribution of Mendel in the field of Genetics.</p> 																													
	<ul style="list-style-type: none"> <li>*On which plant Mendel conducted his experiments?</li> </ul>	<ul style="list-style-type: none"> <li>• *Why do we call Mendel as father of genetics?</li> <li>• *What are the three laws of inheritance proposed by Mendel?</li> <li>• Why Mendel has selected pea plant for his experiments?</li> <li>• In which place Mendel has done experiments on pea plants?</li> </ul>	<p>Picture of Mendel and pea plant.</p>																											

Teacher's Reflections:

- 1) How did the lesson go?
- 2) Were the teaching learning strategies adequate?
- 3) Were the students engaged?
- 4) Areas of improvement
- 5) Measures taken to refine the teaching-learning process.

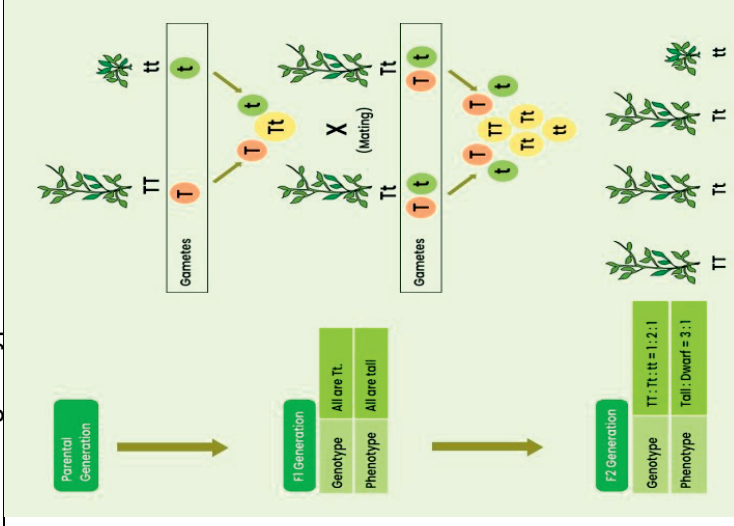
## PERIOD PLAN 3

Name of the Chapter : **HEREDITY**  
 Class : 10  
 Total no. of periods : 06  
 Period plan : 03/06  
 Time : 40 min  
 Key Concepts : Mendel's Laws of inheritance. Monohybrid crosses. F1 & F2 Progeny.

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT	TLM
<p>Explains Monohybrid cross with an example</p>	<ul style="list-style-type: none"> <li>• Recalls previous knowledge:</li> <li>• *Who contributes towards formation of genetic material in the offsprings?</li> <li>• *Can each trait be influenced by both paternal and maternal DNA?</li> <li>• *How are traits expressed in the child?</li> <li>• Let's observe the experiments conducted by Mendel a century ago.</li> <li>• *How many contrasting characters are selected by Mendel in Pea plant?</li> <li>• *What are they?</li> <li>• *What can we call the cross made for single contrasting character?</li> <li>• Each character is controlled by a pair of factors according to Mendel</li> <li>• When both the factors are similar, it is considered as homozygous and when both the factors are dissimilar it is called as heterozygous</li> <li>• *When we cross homozygous tall and dwarf plants we get the trait expressed in</li> </ul>	<ul style="list-style-type: none"> <li>• How many contrasting characters Mendel chose in pea plant? What are they?</li> <li>• Why Mendel selected pea plant for his experiments?</li> <li>• Why Mendel has selected homozygous plants as parents?</li> </ul>	<p>IFP Panel board            You Tube videos.            Charts showing monohybrid cross.</p>

**F1 generation?**

- \*Were the tall plants in the F1 generation exactly the same as the tall plants of the parent generation?
- Teacher introduces the terms phenotype and genotype
- Externally visible characters is termed as phenotype
- Genetic makeup of the organism is called as genotype



\*What will be the appearance of (a) F1 and (b) F2 progenies when a pure (homozygous) tall pea plant is crossed with a pure (homozygous) dwarf pea plant?

<https://byjus.com/question-answer/in-his-classical-monohybrid-cross-mendel-took-two-pure-line-homozygous-variant-plants-for-stem-1/>



<p>Analyses the phenotypic and genotypic ratios in Monohybrid cross</p>	<ul style="list-style-type: none"> <li>• *When we self-pollinate this heterozygous F1 (Tt) generation plant, which traits will be expressed in F2 generation plants?</li> <li>• *Are all plants in F2 generation tall or dwarf or medium?</li> <li>• *What is the ratio of F2 generation?</li> <li>• *We saw that only tall trait is expressed in F1 generation, then what happened to the short trait?</li> </ul> <ul style="list-style-type: none"> <li>• Teacher confirms that as per Mendel two copies of factor controlling traits are present in sexually reproducing organism.</li> <li>• *Are these two copies identical or different?</li> </ul>	<p>Based on observations in monohybrid cross, Mendel postulated which laws?</p> <p>What is law of dominance?</p> <p>What are the phenotypes observed in F1 and F2 generations?</p> <p>What are the genotypes observed in F1 and F2 generations?</p>	
	<ul style="list-style-type: none"> <li>• *What is the name given to the expression of physical traits? What is its monohybrid ratio?</li> <li>• *What is the genetic makeup of an organism? What is its monohybrid ratio?</li> <li>• <b>Activity 8.3:</b></li> <li>• To confirm that the F2 generation did in fact have a 1:2:1 ratio of TT, Tt and tt trait combinations.</li> </ul>	<p>In monohybrid cross if we self-pollinate the F1 generation, what are the phenotypic and genotypic ratios?</p> <p>How are factors (alleles) segregated at the time of gamete formation from the parents?</p> <p>What are the two laws proposed by Mendel based on Monohybrid cross?</p>	

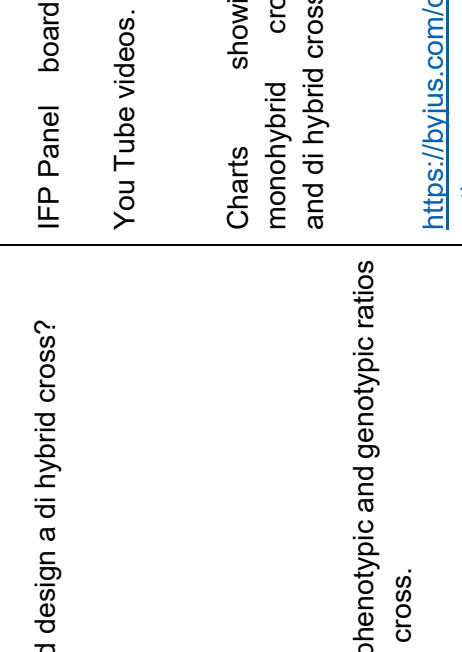
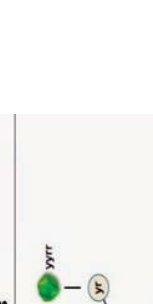
Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

## PERIOD PLAN 4

Name of the Chapter : **HEREDITY**  
 Class : 10  
 Total no. of periods : 06  
 Period plan : 04/06  
 Time : 40 min  
 Key Concepts : Rules for the inheritance of traits – Mendel's contributions, Di hybrid cross.

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT	TLM
	<ul style="list-style-type: none"> <li>• Recalls previous knowledge:</li> <li>• *Monohybrid cross resulting in 1:2:1 ratio is _____ expression and 3:1 is _____ expression.</li> <li>• Which term did Mendel use for Genes?</li> <li>• How many characters did Mendel choose for his experiments?</li> </ul>		
Explains dihybrid cross with an example	<ul style="list-style-type: none"> <li>• What happens when pea plant showing two different characters, rather than one, are bred with each other?</li> <li>• *What is the cross made between plants with two contrasting characters called?</li> <li>• Teacher explains about di hybrid cross with tall plant round seeds and short plant with wrinkled seeds and its ratios.</li> </ul>	How many characters are taken to study dihybrid cross?	

	<ul style="list-style-type: none"> <li>• *What are the dominant traits in the di hybrid cross?</li> <li>• *What happens when these F1 progeny are used to generate F2 progeny by self-pollination?</li> <li>• *What are the combinations in F2 generation?</li> <li>• *Do these characters resemble parental generation or F1 generation?</li> <li>• *Is there any new combination?</li> <li>• *Does one character control the other character? Quote the example from the experiment.</li> <li>• *What is phenotypic ratio of di hybrid cross?</li> <li>• *What is the genotypic ratio of di hybrid cross?</li> </ul>	<p>*Define and design a di hybrid cross?</p> <p>*What are phenotypic and genotypic ratios of di hybrid cross.</p> <p>*Which Mendel experiment denotes that traits are inherited independently?</p> <p>*What is law of independent assortment?</p>	<p>IFP Panel board</p> <p>You Tube videos.</p> <p>Charts showing monohybrid cross and di hybrid cross.</p> <p><a href="https://byjus.com/question-answer/explanation-of-mendel-s-dihybrid-cross/">https://byjus.com/question-answer/explanation-of-mendel-s-dihybrid-cross/</a></p> 
<p>Relates dihybrid cross to law of independent assortment</p>	<ul style="list-style-type: none"> <li>• *Which law of inheritance was given by the Mendel through the di hybrid cross?</li> <li>• *How are alleles segregated in a di-hybrid cross?</li> <li>• *What are the gametes obtained from a di-hybrid heterozygote from the pea plant experiment</li> </ul>		

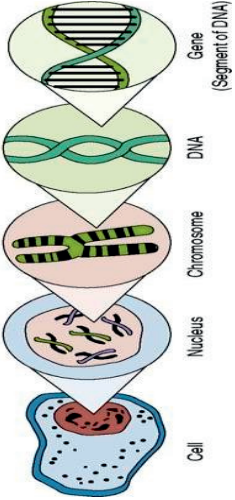



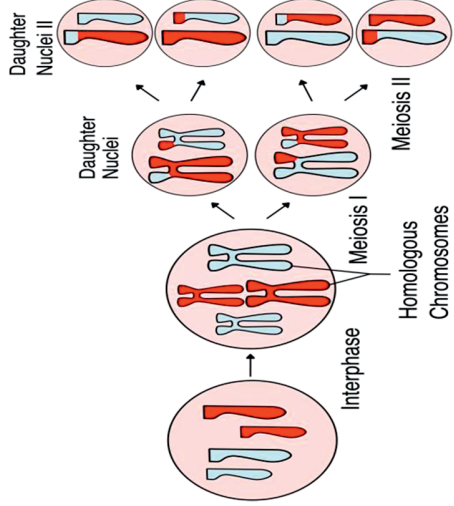

Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

# PERIOD PLAN 5

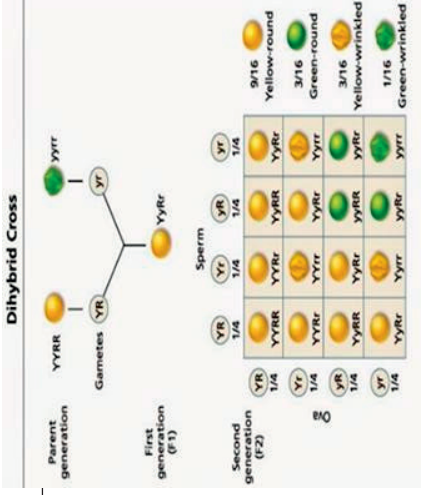
Name of the Chapter : **HEREDITY**  
 Class : 10  
 Total no. of periods : 06  
 Period plan : 05/06  
 Time : 40 min  
 Key Concepts : Mechanism of heredity. genetic expression., Mitosis and Meiosis

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT	TLM
	<ul style="list-style-type: none"> <li>Recalls previous learning:</li> <li>*According to Mendel what controls characters in living organism?</li> <li>*When you cross two plants which character is expressed in the F1 generation?</li> <li>*How do the traits get expressed?</li> <li>*What decides the height of a plant?</li> </ul>		
<p>Applies knowledge in understanding gene expression.</p>	 <ul style="list-style-type: none"> <li>A section of DNA that provides information for one protein is called as gene for that protein</li> <li>*What triggers the height of a plant?</li> </ul>	<ul style="list-style-type: none"> <li>*How does the mechanism of heredity works? How do the traits get expressed?</li> <li>*How are genes expressed?</li> <li>*How do proteins control the characteristics?</li> <li>*All enzymes are proteins but all proteins are not enzymes. Justify.</li> <li>*Do offspring and their parents have the same traits?</li> </ul>	<p>IFP Panel board You Tube videos.</p>

	 <p>shutterstock.com · 2182185255</p> <ul style="list-style-type: none"> <li>• *What is the chemical nature of hormone?</li> <li>• *Which substance acts as biocatalysts?</li> <li>• *How enzymes control the synthesis of these hormones?</li> <li>• *Which division plays a key role during the process of sexual reproduction?</li> <li>• Teacher discusses Mitotic and Meiotic divisions.</li> </ul>	<ul style="list-style-type: none"> <li>• How does hormone triggers plant growth?</li> <li>• The amount of plant hormone depends on the efficiency of the enzyme .Do you agree?</li> <li>• Genes control characteristics .Justify.</li> </ul>	
<p>Differentiates Mitosis and Meiosis.</p>	 <ul style="list-style-type: none"> <li>• *How are gametes formed during sexualreproduction?</li> <li>• *What happens to the number of chromosomesduring meiosis?</li> </ul>	<ul style="list-style-type: none"> <li>*How many chromosomes do we find in germ cells (gametes) formed during reproduction?</li> <li>*How many copies of genes are received by progeny from each parent?</li> <li>*Where do you find threads of DNA in the nucleus?</li> <li>*What are chromosomes and how are they segregated during sexual reproduction?</li> </ul>	 <p>Permanent slides of Mitosis and Meiosis</p> <p>Charts showing concept of nucleus, chromosome, DNA and gene.</p>

		<ul style="list-style-type: none"> <li>• Which division restores the same number of chromosomes in the body cells?</li> <li>• Which division is responsible for maintaining same number of chromosomes through generations?</li> <li>• What is the mode of inheritance in asexually reproducing organisms?</li> <li>• How does Mendel's experiment show that traits are inherited independently?</li> <li>• Can genetic inheritance produce traits different from the parents?</li> </ul>	
	<ul style="list-style-type: none"> <li>• *What is the name given to meiotic division?</li> <li>• *Which division leads to the formation of cells with two sets of genes (chromosomes)?</li> <li>• *How many sets of chromosomes are found in gametes?</li> <li>• *Do you think there will be deviation in Mendel ratios when R &amp; r are linked on the same chromosome?</li> </ul>	<p>While doing an experiment in plants which differ in two characters, will there be any</p>	

Explains the mode of inheritance in sexual reproducing organisms and asexual reproducing organisms.



deviation in Mendel ratios if the genes of the two characters are located on the same chromosome.s

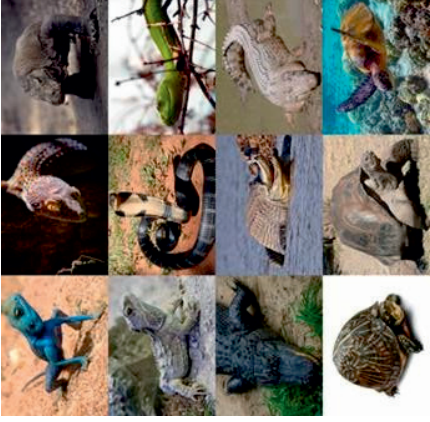
- Explain that in Mendel's experiment the two genesets are located on the different chromosomes.
- \*How do gametes restore the original number of chromosomes in the progeny during sexual reproduction?

Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

# PERIOD PLAN 6

Name of the Chapter : **HEREDITY**  
 Class : 10  
 Total no. of periods : 06  
 Period plan : 06/06  
 Time : 40 min  
 Key Concepts : Sex Determination.

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT	TLM
<p>Explains the process of sex determination in different organisms.</p>	<p>Recalls previous knowledge.</p> <ul style="list-style-type: none"> <li>*What is sexual reproduction?</li> <li>*How many organisms are involved in it?</li> <li>*How is the sex of new born individual determined?</li> <li>*Do all the organisms follow the same strategy for sexdetermination?</li> <li>*Have you heard of any organism in which environment plays a role in sex determination?</li> </ul> 	<p>*Explain how the environmental factors play an important role in sex determination in some organisms?</p> <p>*Which animal is a sequential hermaphrodite?</p> <p>*Why does snail change its sex?</p> <p>*Give some examples of animals in which sex is not determined by genes.</p>	<p>IFP panel board</p> <p>You Tube videos.</p>

\*Do you know of any animal in which neither genetics nor environment determines the sex? In this case the animal itself determines its own sex.



\*Do you know of any animal which is bisexual and acts as male and female?

\*How is sex determined in human beings?

\*Are similar gene sets inherited from both parents?

\*How can genetic inheritance determine sex?

\*How many chromosomes have human beings?

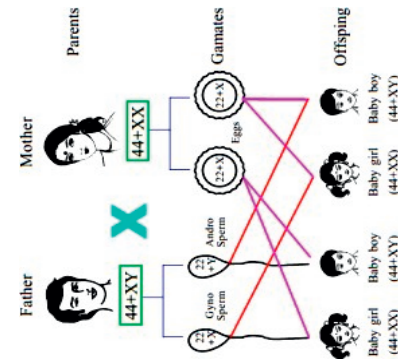


\*Are all the human chromosomes perfectly paired?  
How many chromosomes are not perfectly paired?

\*What are these perfectly paired chromosomes called?

- What is the number of paternal and maternal chromosomes in human beings?

- How many pairs of chromosomes are called as autosomes?

- What are allosomes? How are they different in males and females?

<p>Analyses the role of sex chromosomes in determination of sex in human beings</p>	<p>*What we call the mismatched pair of chromosomes.</p> <p>*Teacher describes the process of sex determination in human beings by working out the inheritance pattern of X and Y.</p>  <p>*What is the probability of giving birth to baby girl and baby boy?</p>	<p>*What is the probability to get male and female baby in humans during fertilization?</p> <p>*Do you think sex determination in human beings follow Mendelian inheritance? If not justify your answer.</p> <p>*A woman in your neighborhood is blamed for giving birth to a baby girl. Is the sex of the baby determined by her? Conduct a debate on who determines sex in human beings. Remove the misconception through your argument.</p>	<p>Sex determination chart.</p> <p><a href="https://diksha.gov.in/play/collection/do_31307360979544473">https://diksha.gov.in/play/collection/do_31307360979544473</a></p> <p><a href="https://ncert.nic.in/hcerts//jeep109.pdf">https://ncert.nic.in/hcerts//jeep109.pdf</a></p>  
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Teacher's Reflections:

1. How did the lesson go?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine the teaching-learning process.

## **E-Content**

1. <https://byjus.com/biology/heredity-and-evolution/>
2. [https://diksha.gov.in/play/collection/do\\_31307360979544473611859?contentId=do\\_31310426134328934412489](https://diksha.gov.in/play/collection/do_31307360979544473611859?contentId=do_31310426134328934412489)
3. [https://www.youtube.com/watch?app=desktophttps://ncert.nic.in/hcerts//jeeep109.pdf  
&v=3I4aazBYQPE](https://www.youtube.com/watch?app=desktophttps://ncert.nic.in/hcerts//jeeep109.pdf&v=3I4aazBYQPE)
4. <https://byjus.com/question-answer/in-his-classical-monoybrid-cross-mendel-took-two-pure-line-homozygous-variant-plants-for-stem-1/>
5. <https://byjus.com/question-answer/explanation-of-mendel-s-di-hybrid-cross/>
6. [https://diksha.gov.in/play/collection/do\\_31307360979544473611859?contentId=do\\_3129911292792258561228](https://diksha.gov.in/play/collection/do_31307360979544473611859?contentId=do_3129911292792258561228)
7. <https://ncert.nic.in/hcerts//jeeep109.pdf>

## WORK SHEET- 1

(20 MARKS)

1) Mendel conducted his famous breeding experiments by working on the following organism.

(1MARK)

- (a) Drosophila
- (b) Escherichia Coli
- (c) Pisum Sativum
- (d) All of these

2) Which of the following is an example of genetic variation?

(1MARK)

- (a) One person has a scar, but his friend doesn't.
- (b) One person is older than the other.
- (c) Reeta eats meat, but her sister Geeta is a vegetarian.
- (d) Two children have different eye colour.

Go through the assertion and reason given below and choose the correct option:

3) Assertion: Accumulation of variation in a species increases the chances of its survival in changing environment.

Reason: Accumulation of heat resistance in some bacteria ensures their survival even when temperature in environment rises too much.

(1MARK)

- (a) Both A and R is true and R is the correct explanation of A.
- (b) Both A and R is true but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

4) Assertion (A): Mendel selected the pea plant for his experiments.

Reason (R): Pea plant is cross-pollinating and has unisexual flowers.

- (a) Both A and R is true and R is the correct explanation of A.
- (b) Both A and R is true but R is not the correct explanation of A.

(1MARK)

- (c) A is true but R is false.
- (d) A is false but R is true.

5) In pea plants, the gene for dwarfism is.... Whereas that for tallness is....

(1MARK)

6) Mendel's second law of inheritance is called.....

(1MARK)

- 7) What are the genotypic and phenotypic ratios of monohybrid cross?  
(1MARK)
- 8) Why did Mendel select pea plant for his experiments?  
(2MARKS)
- 9) Define and design monohybrid cross.  
(2 MARKS)
- 10) How do Mendel's experiments show that traits are inherited independently?  
(2MARKS)
- 11) "Only variations that confer an advantage to an individual organism will survive in a population." Justify this statement.  
(3MARKS)
- 12) Give the basic features of the mechanism of inheritance.  
(4MARKS)

## WORK SHEET-2

(20MARKS)

- 1) A human gamete contains .....chromosomes whereas a normal body cell has ..... chromosomes in it. (1MARK)
- 2) Male and female gametes are \_\_\_\_\_(diploid/haploid). (1MARK)
- 3) Humans have two different sex chromosomes, X and Y. Based on Mendel's laws; a male offspring will inherit which combination of chromosomes? (1MARK)
  - (a) Both the X chromosomes from one of its parents.
  - (b) Both the Y chromosomes from one of its parents.
  - (c) A combination of X chromosomes from either of its parents.
  - (d) A combination of X and Y chromosomes from either of its parents.
- 4) Exchange of genetic material takes place in. (1MARK)
  - (a) Vegetative reproduction
  - (b) Asexual reproduction
  - (c) Sexual reproduction
  - (d) Budding
- 5) Assertion: Genes present in every cell of an organism control the traits of the organisms. Reason: Gene is specific segment of DNA occupying specific position on a chromosome. (1MARK)
  - (a) Both A and R is true and R is the correct explanation of A.
  - (b) Both A and R is true but R is not the correct explanation of A.
  - (c) A is true but R is false.
  - (d) A is false but R is true.
- 6) Assertion (A): The sex of a child is determined by the mother. Reason (R): Humans have two types of sex chromosomes: XX and XY. (1MARK)
  - (a) Both A and R is true and R is the correct explanation of A.

(b) Both A and R is true but R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

7) Assertion (A): Mutation is sudden change in the genetic material.

(1MARK)

Reason (R): Variation is useful for the survival of species over time.

(a) Both A and R is true and R is the correct explanation of A.

(b) Both A and R is true but R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

8) Which section of DNA provides information for one protein?

(1MARK)

(a) Nucleus

(c) Trait

(b) Chromosome

(d) Gene

9) Define what is inheritance?

(1MARK)

10) Who decide the sex in human being? Mother or father justify.

(2MARKS)

11) How traits are inherited .How are they expressed?

(4MARKS)

12) Match the terms in column I with their explanations in column II.

(5MARKS)

Column I

(a) Genetics

(b) Autosomes

(c) Recessive

(d) Allele pair

(e) Homologous chromosomes

Column II

(i) Chromosomes similar in size and shape.

(ii) the alternative forms of a gene.

(iii) Study of laws of inheritance of characters.

(IV) A gene that can express only when in a Similar

(v) Chromosomes other than the pair of sex Chromosomes

**CLASS : X**

**CHAPTER : CONTROL AND COORDINATION**

**TOTAL NO. OF PERIODS: 11**



**Aims of Education:**

1. Rational thought and Independent thinking
2. Health and wellbeing
3. Democratic and community participation

**Aims of Science Education:**

1. Scientific understanding of the natural and physical world:
  - Student develops scientific understanding through specific observations, questions, experiments, principles and concepts.
2. Capacities for scientific inquiry:
  - Student puts forth hypotheses, predictions and analyses and evaluates situations and draws logical conclusions fundamental to the learning of science.
3. Interdisciplinary understanding between science and other curricular areas:
  - Student understands inter linkages across disciplines.’
4. Creativity:
  - Student develops creativity in designing good experiments and formulating hypothesis.

### Curricular Goals and Competencies

**Curricular Goal – 3:** Explores the structure and function of the living world at the cellular level  
Competency - 3.1: Explains the role of cellular components including the muscle cell making tissue the structure basis of living organism and function basis of life process.

Competency - 3.2: Analysis brain parts and functions in life process involved in control and coordination.

Competency - 3.3: Describes mechanism of reflex arc.

**Curricular Goal – 4 :** Explores interconnectedness between organisms and their environment

Competency - 4.1: A place the knowledge of brain and harmony functions.

Competency - 4.2: Illustrate different parts of brain organization of living organisms.

Competency - 4.3 : Analysis different actions (voluntary and involuntary) from organisms to ecosystem.

**Curricular Goal - 5:** Draws linkages between scientific knowledge and knowledge across other curricular areas

Competency - 5.3: Supply the scientific principles at explain phenomena in other subjects

**Curricular Goal - 8:** Explores the nature of science by doing science

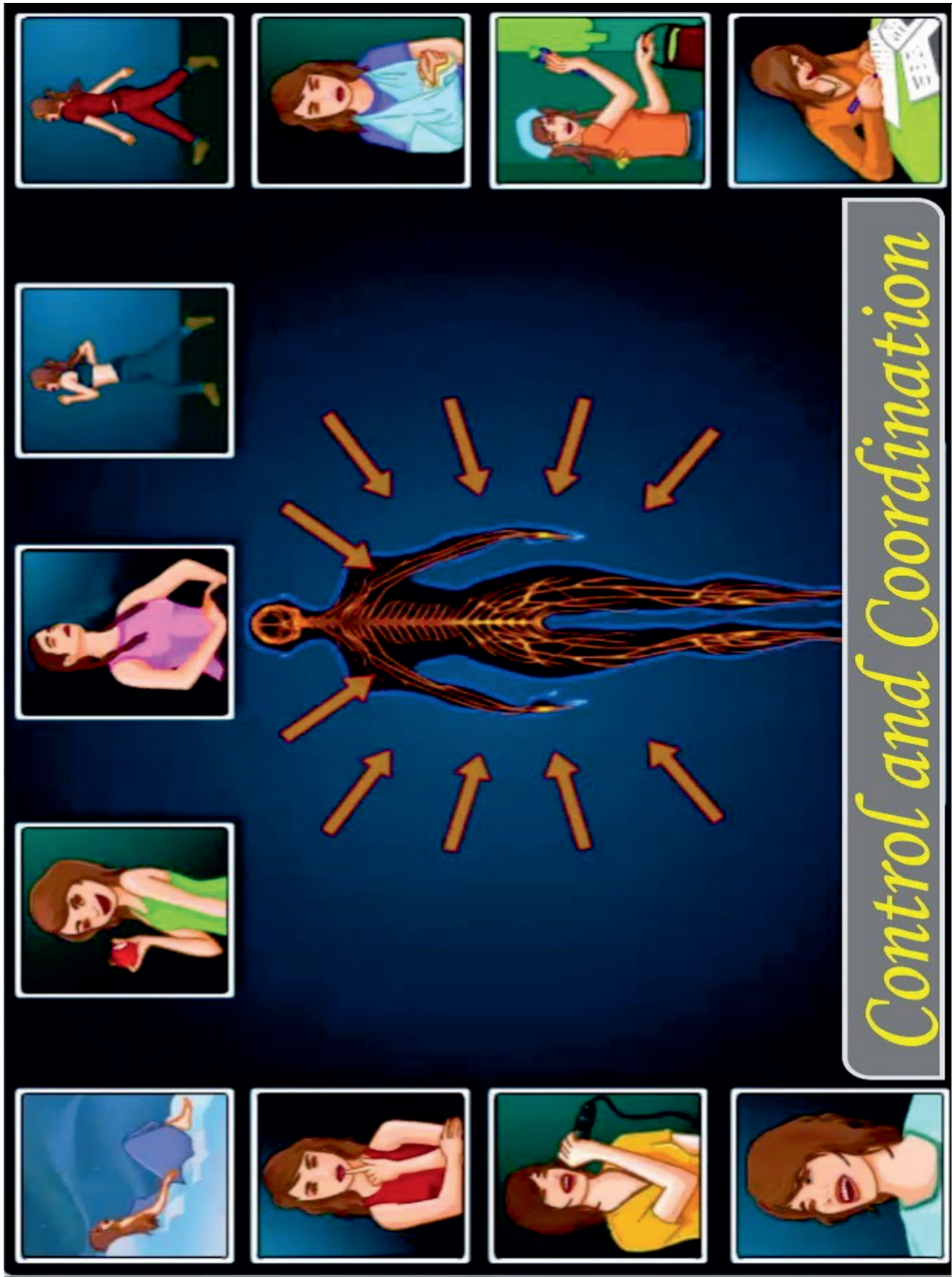
Competency - 8.1: Develops accurate and appropriate models to represent real life events.

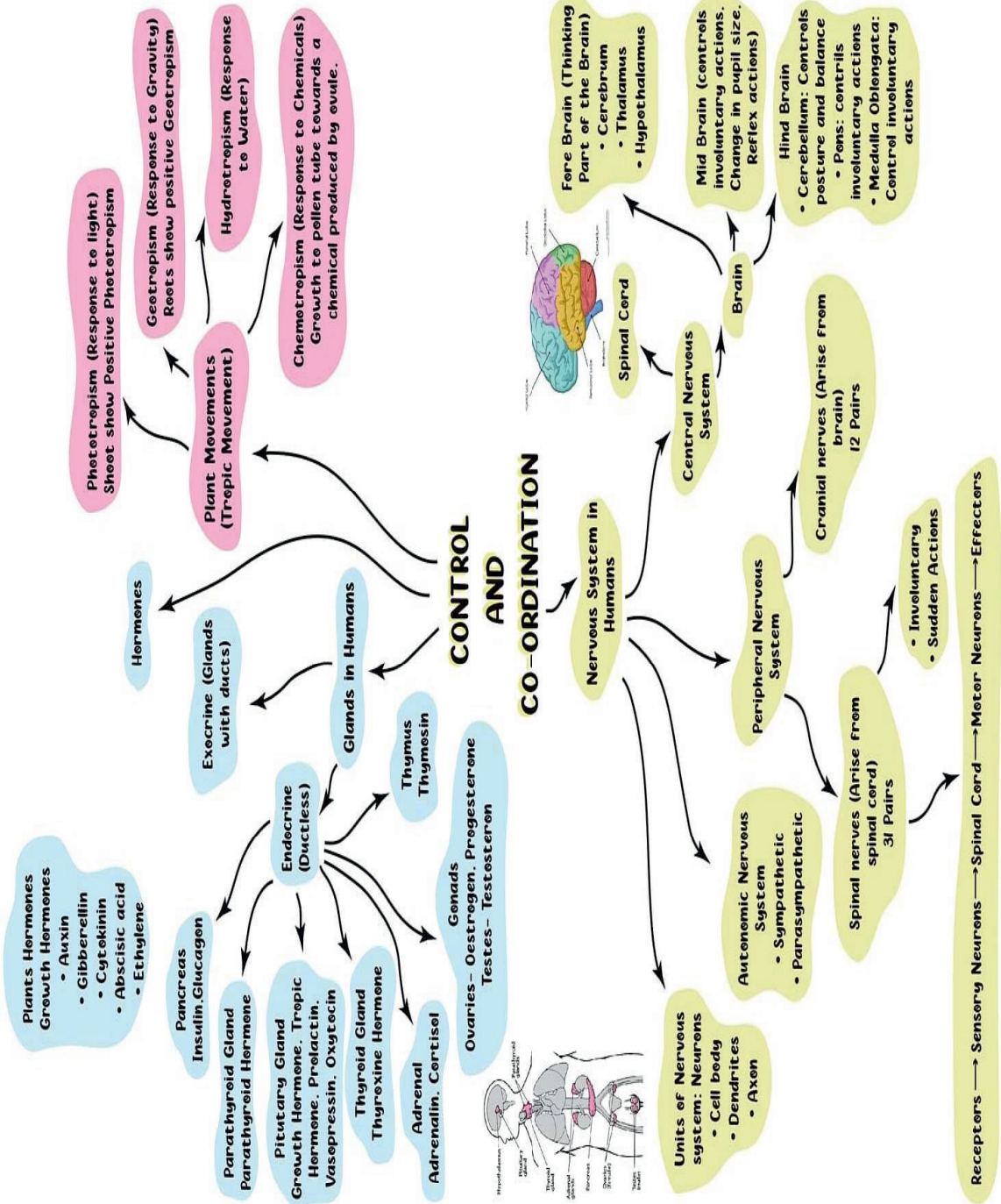
Competency - 8.2 : Designs experiments formulates hypothesis and represent data.

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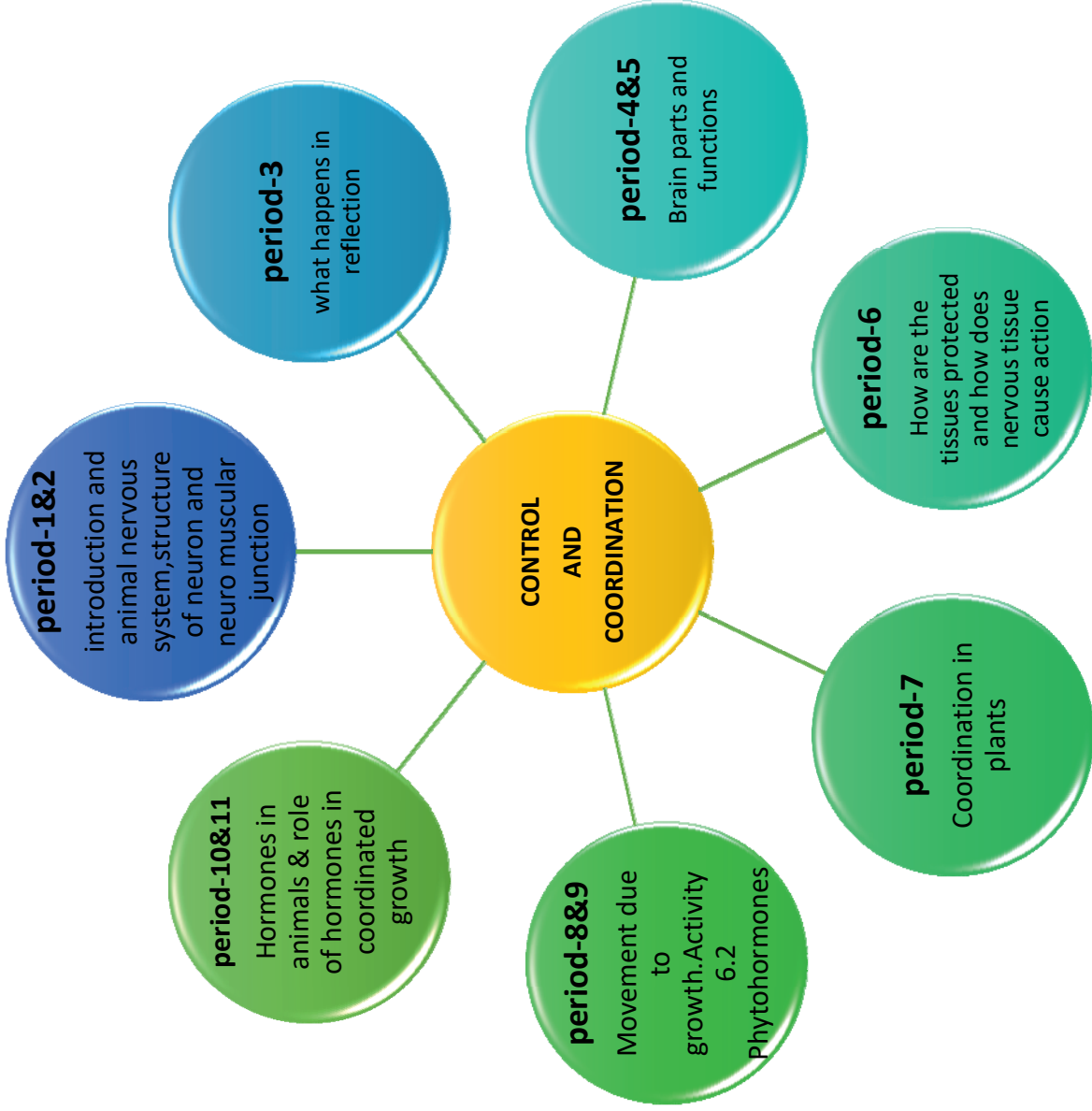


# Control and Coordination





PERIOD MAP



### TOPIC WISE LEARNING OUTCOMES

Period No.	Topic	Learning outcomes
1	introduction and animal nervous system, sense organs and receptors	<ul style="list-style-type: none"><li>• Relates the function of sense organs with respect to stimuli.</li><li>• identifies the various receptors located in the sense organs</li><li>• Differentiates various receptors located in the sense organs.</li><li>• Relates receptors with their function in sense organs</li><li>• Classifies sensory receptors based on their functions</li><li>• Exhibits values of respect for life towards organ donation</li></ul>
2	continue the receptors in sense organs topic, neuron and Neuro muscular junction	<ul style="list-style-type: none"><li>• Explains the process of control and coordination in animals with reference to nervous system</li><li>• Analyses and interprets the flowchart of the electric impulse formation.</li><li>• Investigates to arrive at and verify the phenomena.</li></ul>

		<ul style="list-style-type: none"><li>Exhibits creativity in designing static model of neuron.</li></ul>
3	what happens in reflex action	<ul style="list-style-type: none"><li>Analyses the situations to predict how do people respond to Sudden changes in the environment?</li><li>Analyses the actions in the situation when a person touches a hot object</li><li>Distinguishes between the actions coordinated by brain and spinal cord</li><li>Draws a labelled diagram of Reflex arc.</li><li>Explains the process of reflex arc.</li><li>Applies the learning of reflex arc in hypothetical situation</li></ul>

4	human brain and parts	<ul style="list-style-type: none"> <li>• Identifies the location of brain and spinal cord in human body.</li> <li>• Differentiates central nervous system and peripheral nervous system</li> <li>• Distinguishes cranial nerves and spinal nerves.</li> <li>• Describes the function of fore brain.</li> <li>• Describes the function of fore brain.</li> <li>• Applies the learning relating to fore brain functioning to hypothetical situation</li> </ul>
5	continue the functions of different parts of brain	<ul style="list-style-type: none"> <li>• Draws labelled diagram of human brain and its parts.</li> <li>• Differentiates between voluntary and involuntary movements controlled by brain.</li> <li>• Relates the cause of involuntary actions by the hind brain.</li> <li>• Categorises the functions performed by various parts of the brain</li> <li>• Exhibits creativity in designing static model of brain parts using eco- friendly resources.</li> <li>• Take initiatives to know about scientific discoveries related to brain and its structure.</li> </ul>
6	How are these tissues protected?	<ul style="list-style-type: none"> <li>• Exhibits creativity in making an improvised model of brain in a bony box</li> </ul>

		<ul style="list-style-type: none"> <li>• Differentiates voluntary and involuntary muscles.</li> <li>• Explains the concept of muscle contraction.</li> </ul>
7	coordination in plants.	<ul style="list-style-type: none"> <li>• Identifies the types of movements in plants.</li> <li>• Explains the process of immediate response to stimulus in <i>Mimosapudica</i>.</li> <li>• Relates cause and effect between touch and movement in <i>Mimosapudica</i>.</li> <li>• Compares the movements in plants and animal cells.</li> </ul>
8	movement due to growth and 6.2.2	<ul style="list-style-type: none"> <li>• Identifies different types of movements in plants.</li> <li>• Relates the bending in plants to differential growth.</li> <li>• Relates the tropic movement in plants with the stimulus.</li> <li>• Investigates about the stimulus and resulting movements across variety of plants</li> <li>• Distinguishes the different tropic movements in plants.</li> <li>• Exhibits value of –respect for life by appreciating the chemotropism in plant reproduction.</li> </ul>

9	Phytohormones	<ul style="list-style-type: none"> <li>• Compares and differentiates the different movements shown by plants</li> <li>• Analyse the flowchart showing action of phytohormone in plants</li> <li>• Interprets the table showing the functions of Phytohormones</li> </ul>
10	hormones in animals and activity 6.3	<ul style="list-style-type: none"> <li>• Identifies the hormonal controls in animals.</li> <li>• Relates the hormone adrenalin with its function in animal.</li> <li>• Describes the changes brought in human body systems by hormone adrenalin.</li> </ul>
11	continue the role of hormones topic	<ul style="list-style-type: none"> <li>• Identifies various endocrine glands present in human body</li> <li>• Draws a labelled diagram of endocrine glands present in human body.</li> <li>• Relates various hormones with their functions in the body.</li> <li>• Applies the learnt knowledge to hypothetical situations.</li> <li>• Describes the concept of feedback mechanism for hormonal regulation.</li> </ul>



**PERIOD PLAN 1**

Name of the Chapter: CONTROL AND COORDINATION

: 10 Total no. of periods : 11

plan : 01/11

: 40 min

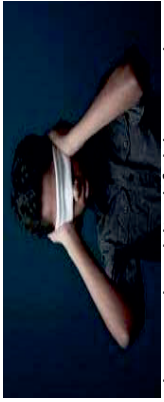
Key Concepts : Sense organs, Receptors.

Class

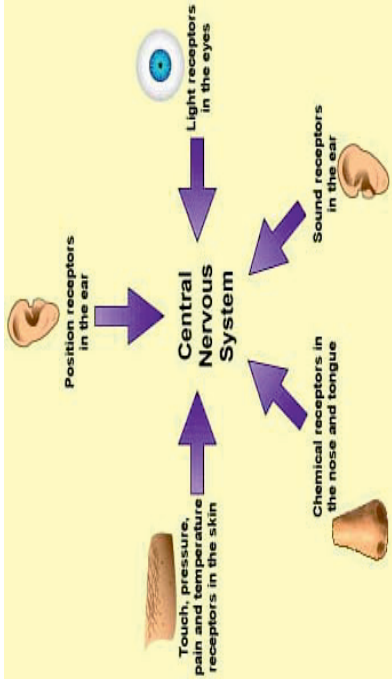
Period

Time

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
	<p>➤ Recalls previous knowledge about life processes</p> <ul style="list-style-type: none"> <li>• What are living things?</li> <li>• What takes place in living organisms for proper maintenance of body functions?</li> <li>• How can you say that seed is a living thing?</li> <li>• “plants show movement” justify.</li> <li>• Why do animals move from one place to another?</li> <li>• What do you call the power of restrain and regulation?</li> <li>• What do you mean by harmonious working of different but inter related parts?</li> </ul>		
	<ul style="list-style-type: none"> <li>• What are the different body system?</li> </ul>		

<p>Relates the function of sense organs with respect to stimuli.</p> <p>identifies the various receptors located in the sense organs.</p>	<ul style="list-style-type: none"> <li>• Can you name various sense organs in our body?</li> <li>• Which tissues in animals help to control and coordinate?</li> <li>• Can you name the sense organ which helps to receive the sense of hotness?</li> </ul>  <p>The teacher blindfolds a student and conducts the activity with the help of different items.</p> <ul style="list-style-type: none"> <li>• When pricked on his arm, he pulls his arm back and asked what is he pricked with ?</li> <li>• He is made to taste a food item (bitter guard) and the teacher asks, what its taste is?</li> <li>• Which sense organ helps you to know the taste?</li> <li>• How do you come to know that its taste is bitter?</li> <li>• Can you identify what flower is this?</li> <li>• Which sense organ helps you to get the smell?</li> <li>• Teacher claps and asks what sound is that?</li> <li>• Which sense organ helps you to recognize the sound?</li> <li>• Which sense organ provides the sense of vision?</li> <li>• How are our sense organs able to receive different senses?</li> </ul>	<p>Which organs allow us to react to our surroundings?</p> <ul style="list-style-type: none"> <li>• Where are the receptors located?</li> </ul>	<p>Materials to conduct the activity Pointed object Bitter guard, Jasmine flower</p>
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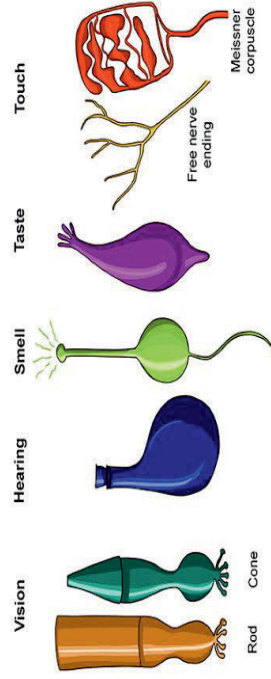
[Receptors In Sense Organs Figure](#)



The teacher shows the picture and ask

- Where are the sensory receptors located?
- Our body consists various receptors namely photoreceptors, thermoreceptors,, stat receptors, tango receptors, gustatory receptors, olfactory receptors.

Sense Organ Receptors



Relates receptors with their sensory function in sense organs

Where are thermoreceptors, tango receptors and pain and pressure receptors located?  
 What will happen if photoreceptors don't work?  
 Which receptors are located in the inner ear?

How do we detect the smell of an agarbatti (Incense stick)?

- Where are the gustatory receptors which detect taste located?

<p>Classifies sensory receptors based on their functions</p> <p>Exhibits values of respect for life towards organ donation</p>	<ul style="list-style-type: none"> <li>• What is the function of olfactory receptors located in the nose?</li> <li>• How different receptors help organisms in control and coordination?</li> </ul> <p>SARVENDRIYANAM NAYANAM PRADHANAM – Eye is the prime sense organ. Why?</p> <p>Do you know that we can live our life only once but our sense organ- eye, can serve two persons, if we donate them. Hence it will be a great service if we donate our organs</p>	<p>How can we classify various receptors present in human beings based on their functions?</p> <p>Match the following</p> <p>(i)Gustatory :: smell  (ii)Photoreceptor:: taste  (iii)Olfactory :: sound  (iv)Phonoreceptor :: vision</p> <p>How can we motivate others to donate our organs?</p>	
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**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement
5. Measures taken to refine teaching learning process

**PERIOD PLAN 2**

Name of the Chapter : CONTROL AND COORDINATION

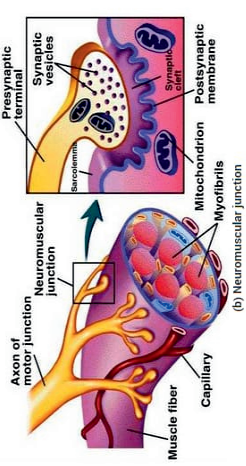
Class : 10

Total no. of periods : 11

Period plan : 02/11

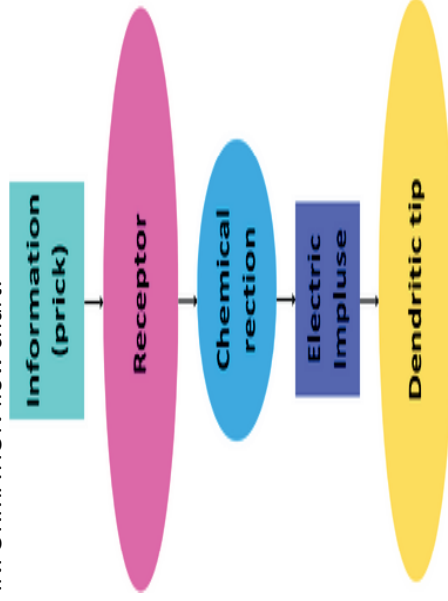
Time : 40 min

Key Concepts : SYNAPSE, ELECTRICAL IMPULSE, DENDRITES, CHEMICAL SIGNALS.

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
	<p>➤ Teacher checks previous knowledge by posing questions</p> <ul style="list-style-type: none"> <li>• Which receptors detect the sense of taste?</li> <li>• Which receptors detect the sense of smell?</li> <li>• Which tissues are highly specialized to detect information from the environment?</li> <li>• Which cells transmit the stimulus very rapidly from one place to another with in the body?</li> </ul>		
<p>Identifies the areas in the body where neural transfer takes place?</p>	<ul style="list-style-type: none"> <li>• In the blind fold activity, why did the person moved his hand when pricked?</li> </ul> 	<ul style="list-style-type: none"> <li>• What do you mean by neuromuscular junction?</li> </ul>	<p>Chart of neuromuscular junction.</p>

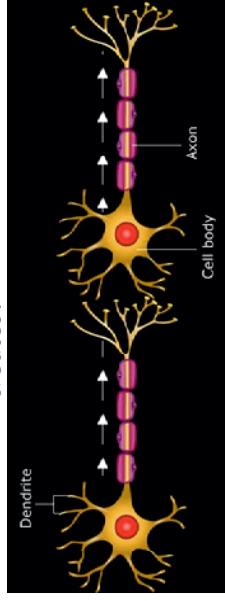
- Was he pricked on the nerve or muscle?
- What are the nerve endings of a nerve called?
- Which part of the nerve endings of a neuron called?
- Which part of neuron acquires the information?

INFORMATION flow chart:



Analyses and interprets the flowchart of the electric impulse formation.

- What does the acquired information at the end of a nerve sets off?
- What does the chemical reaction creates?



- ✓ Read both the statements carefully and choose the correct alternative.
  - Assertion (A): A nerve impulse is a electrochemical event..
  - Reason (R): In a nerve impulse there are changes in the resting potential which spread down then nerve fibre.
- A) Both A & R are correct and R is the correct explanation of A.  
 B) Both A & R are correct but R is not the correct explanation of A.  
 C) A is true but R is false.  
 D) A is false but R is true.

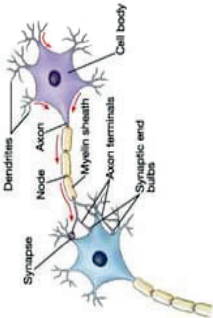
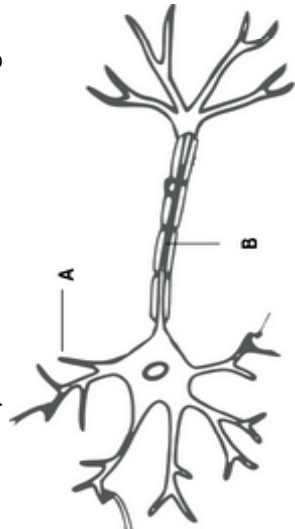
- What transmits nerve impulse across the synapse?

Arrange the travel of electrical impulse in a neuron in correct order-

Dendrite → axon → axonal end → cell body

The chemical that cross the synapse to start a similar electrical impulse in the next neuron are released from (a) the dendritic tip (b) the cell body (c) end of the axon (d) the axon

Flow chart. M

<p>Exhibits creativity in designing static model of neuron.</p>	<ul style="list-style-type: none"> <li>Where does this impulse travel from dendrite?</li> <li>What the electric impulse (formed from chemical reaction) at the end of axon, sets off the release of?</li> <li>What do you observe between two axon?</li> <li>What is this gap between neurons called?</li> <li>While crossing the gap, what will these chemicals reach and cause?</li> </ul> <p>Can you know explain the general scheme of how nervous impulses travel in the body?</p>		
<p>NERVE CELL FIGURE:</p>  <p>✓ Observe the figure carefully and answer the given questions:</p> <ol style="list-style-type: none"> <li>1. What is nervous tissue made up of?</li> <li>2. Which part of neuron acquires the information?</li> <li>3. Through which part does the information travels as an electrical impulse?</li> <li>4. Where is this electric impulse again converted into a chemical signal for onward transmission? In a similar way, can you describe how synapse finally allows delivery of impulse from neurons to other cells.</li> </ol>	<p>Chart of neuron</p> <p><a href="https://youtu.be/j2zgvYbr13c?si=75ue3u_KL3bjbp5-">https://youtu.be/j2zgvYbr13c?si=75ue3u_KL3bjbp5-</a></p>	<ul style="list-style-type: none"> <li>Name the parts labelled A&amp;B in the diagram</li> </ul>  <p>Junctions of two neurons is called-----</p> <p>Prepare a static model of neuron -----.</p>	

<p>Investigates to arrive at and verify the phenomena.</p>	<p>✓ What do you infer from the activity 6.1? Apart for nose, what other organs are effected during cold</p>	<p>➤ When a person is suffering from severe cold, he/she cannot-</p> <ul style="list-style-type: none"> <li>a) Differentiates the taste of an apple from that of an ice-cream.</li> <li>b) Differentiates red light from green light.</li> <li>c) Differentiate a hot object from a cold object</li> <li>d) Differentiate the smell of a perfume from that of an agarbatti.</li> </ul>
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**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning process.



### PERIOD PLAN 3

Name of the Chapter : CONTROL AND COORDINATION

Class : 10

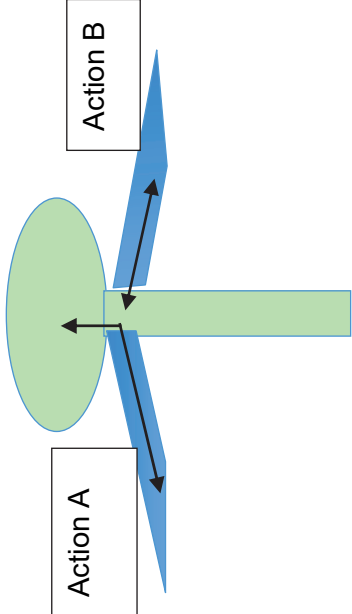
Total no. of periods : 11

Period plan : 03/11

Time : 40 min

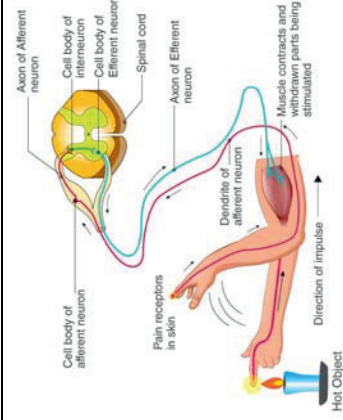
Key Concepts : REFLEX ARC, SENSORY NEURON, MOTOR NEURON, RECEPTORS.

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
	<p>➤ Recall the previous knowledge based on questions.</p> <ul style="list-style-type: none"> <li>• Where are receptors located?</li> <li>• How are electric impulses created?</li> <li>• What is nervous tissue made up of?</li> <li>• What are the parts of a neuron?</li> <li>• Where is the impulse converted into a chemical signal for onward transmission?</li> </ul>		
<p>Analyses the situations to predict how do people respond to sudden changes in the environment?</p>	<p>➤ How would you respond in the below situations:</p> <ul style="list-style-type: none"> <li>• “I jumped out of the way of the bus reflexly”</li> <li>• “I pulled my hand back from the flame reflexly”.</li> <li>• “I was so hungry my mouth started watering reflexly”.</li> <li>• What does the term “reflexly” mean in the above situations?</li> <li>• Does a person think about the action before doing it?</li> <li>• Does he control his feelings while doing these actions?</li> <li>• How do we responding in such situation to bring change in the environment?</li> </ul>	<p>Make a list of activities which are done reflexly.</p>	

<p>Distinguishes between the actions coordinated by brain and spinal cord</p>	<p>➤ The teacher shows a chart and elicits</p>  <p>Action A : To write with hand Action B: To pull the hand when we touch hot object.</p> <ul style="list-style-type: none"> <li>• What is action A ?</li> <li>• Where is it coordinated from and to?</li> <li>• What is action B?</li> <li>• Where is it coordinated from and to?</li> <li>• Which activity involves thinking?</li> <li>• In which action does the impulse move longer distance?</li> <li>• Which action shows quick response? Why?</li> </ul>	<p>The teacher further assesses</p> <ul style="list-style-type: none"> <li>• which part of the body is involved in Action A?</li> <li>• How is Action B different from Action A in terms of response?</li> <li>• Identify the organs involved in the coordination of pulling the hand away (Action B).</li> <li>• Discuss the advantage of a quick response in certain situations.</li> </ul>	<p>CHART</p>
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Analyses the actions in the situation when a person touches a hot object

**Illustrates the process of reflex arc.**



- Let us consider further, Ram's mother touches a hot object, how would she respond to it?
- Will she think consciously about the pain?
- Will she think out the possibility of getting burnt?
- Will she remove her hand?
- How long will she take to think?
- How much time would she take to remove her hand?
- Where does the thinking process takes place?
- Is thinking a simple activity?
- As brain is bound to get complicated interaction of...How many neurons may our brain continue?
- How will be the interactions from many neuron?
- What does the thinking tissue present in our body consists?
- Where does the thinking tissue in the skull sits?

**Draws a labelled diagram of Reflex arc.**

Imagine a situation where a person steps on a sharp object but does not immediately feel pain. How might this delay affect the functioning of the reflex arc? Discuss the potential consequences on the body's response.

CHART

**Draw a labelled diagram of Reflex arc .**

<p>Explains the process of reflex arc.</p> <p>Applies the learning of reflex arc in hypothetical situation for instance Sneeze reflex</p> <p>Exhibit creativity in illustrating the journey of a nerve impulse through a reflex arc</p>	<p>The teacher explains with the help of a flow chart</p> <p>Let us consider the action when we touch a hot object, In the above action what is the sensation of heat? What detect the stimulus heat? What are the receptors connected to? Where does the receptors connected to?</p> <p>Where does the nerves from all our body meet on their way to the brain? Where does the output signal comes from? What carries the output signal? Where does the output signal reach? Stimulus -&gt; Receptor organ -&gt; Sensory neurons -&gt; Spinal cord -&gt; Motor neurons -&gt; Effector Organ -&gt; Response</p> <p>So, can you now tell, the starting and ending part of the stimulus and response in reflex arc?</p>	<p><b>Explain how are reflex arcs formed?</b></p> <p>What is the significance of reflex action?</p> <p>Reflex arc formed in spinal cord also sends information to _____.</p> <p>Make a sequence of events which occur during sneezing.</p> <p>Create a storyboard or a comic strip illustrating the journey of a nerve impulse through a reflex arc, including all the key components.</p>	<p><b>FLOW CHART</b></p>
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**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine

### PERIOD PLAN 4

Name of the Chapter : CONTROL AND COORDINATION

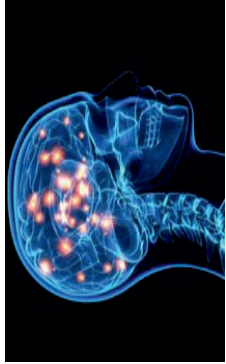
Class : 10



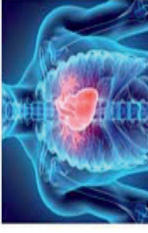

Total no. of periods : 11

Period plan : 04/11

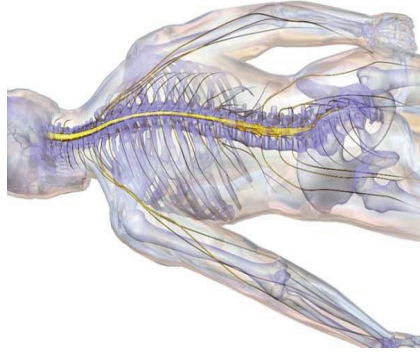
Time : 40 min

Key Concepts : Human brain, spinal cord, central nervous system, peripherally nervous system

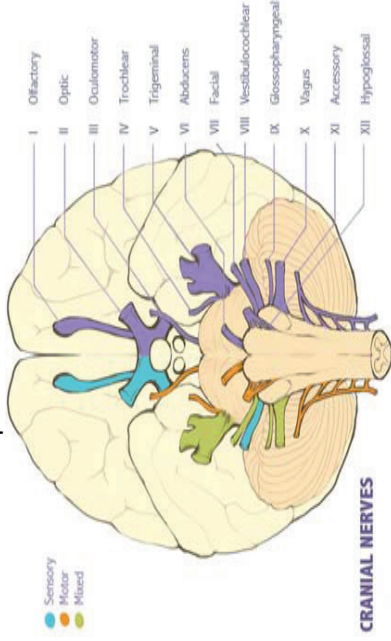
LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
	<p>Recall the previous knowledge posing questions:</p> <ul style="list-style-type: none"> <li>• Which tissue in our body helps communicate the information?</li> <li>• Where does nervous tissue transfer the information?</li> <li>• Why are human beings superior than other organism?</li> <li>• What is the thinking organ in our body? What is the function of spinal cord?</li> </ul>	<p>Identifies the location of brain and spinal cord in human body.</p>	
<p>Identifies the location of brain and spinal cord in human body.</p>	<p>The teacher elicits the answers showing a chart of brain</p> <ul style="list-style-type: none"> <li>• As thinking is a complex process, how will be the neural connections in brain?</li> <li>• Where are the neural connections concentrated?</li> </ul>  <ul style="list-style-type: none"> <li>• What makes brain the main coordinating centre of the body?</li> </ul>	<p>Where are the brain and spinal cord located?</p> <p>The spinal cord primarily functions as a: A. Centre for storing memories B. Pathway for neural signals between the</p>	<p>CHART</p>

<p>Differentiate the voluntary and involuntary actions of brain</p>	<ul style="list-style-type: none"> <li>• Where does the spinal cord arise from?</li> <li>• What constitutes central nervous system?</li> <li>• Which organ receives information from all parts of the body and integrate it?</li> </ul> <p>Showing a chart the teacher asks</p> <p><b>TYPES OF NERVOUS ACTIONS</b></p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p><b>Writing</b></p> </div> <div style="text-align: center;">  <p><b>Dancing</b></p> </div> <div style="text-align: center;">  <p><b>Heart Beating</b></p> </div> <div style="text-align: center;">  <p><b>Breath /Exhalation</b></p> </div> </div> <ul style="list-style-type: none"> <li>• How do you differentiate the actions of voluntary and involuntary muscles?</li> <li>• What is reflex arc?</li> <li>• How are we able to do actions such as writings?</li> <li>• So, now can you tell the functions of brain?</li> </ul>	<p>brain and the rest of the body</p> <p>C. Organ for sensory perception</p> <p>D. Gland that secretes hormones</p>	<p>CHART</p>
		<p>What are voluntary and involuntary actions? Give one example of each?</p>	

The teacher exhibits a model and asks,



- What constitutes the central nervous system?
- What are the functional units of nervous system?
- Apart from brain and spinal cord, where are neurons present?



- What do you call the nerves arising from cranium.
- How many pairs of cranial nerves arise from the cranium?

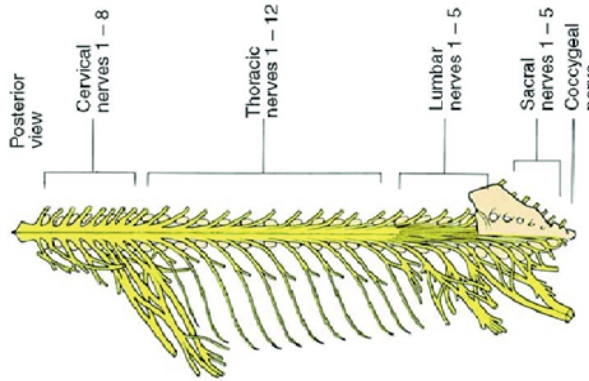
Model/Chart

Name the two main organs of the central nervous system.

CHART

Which of the following statements accurately describes a difference between

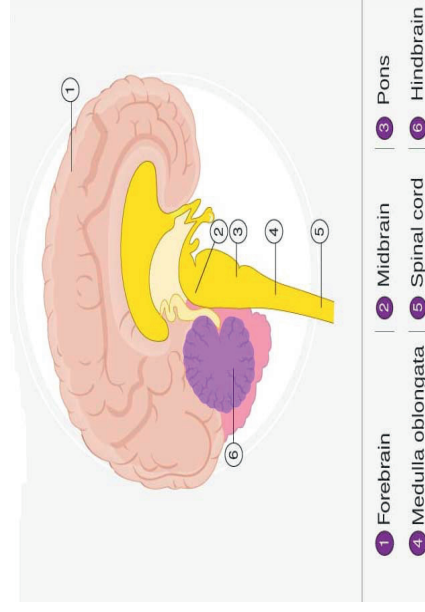


<p>Distinguishes cranial nerves and spinal nerves.</p> <p>Differentiates central nervous system and peripheral nervous system</p>	 <ul style="list-style-type: none"> <li>• Where do spinal nerves arise from?</li> <li>• How many pairs of spinal nerves arise from the cranium?</li> <li>• What do these nerves arising from the brain and spinal cord connect to?</li> </ul> <p>If the network of nerves in the brain and spinal cord constitute Central Nervous System, What do these nerves in the peripheral region constitute?</p>	<p>cranial nerves and spinal nerves?</p> <p>A. Cranial nerves emerge from the brain and are involved in sensory and motor functions of the head and neck, while spinal nerves emerge from the spinal cord and carry impulses to and from the rest of the body.</p> <p>B. Cranial nerves are part of the peripheral nervous system, while spinal nerves are part of the central nervous system.</p> <p>C. Spinal nerves are involved in sensory perception, while cranial nerves are solely responsible for motor control.</p> <p>D. There are 31 pairs of cranial nerves and 12 pairs of spinal nerves in the human body.</p> <p>"The central nervous system differs from the peripheral nervous system in that it:"</p> <p>A. Consists only of nerves</p> <p>B. Is located outside the skull and spine</p> <p>C. Includes the brain and spinal cord</p> <p>D. Controls only involuntary actions</p>	<p>CHART</p>
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Identifies the location of fore brain in the brain

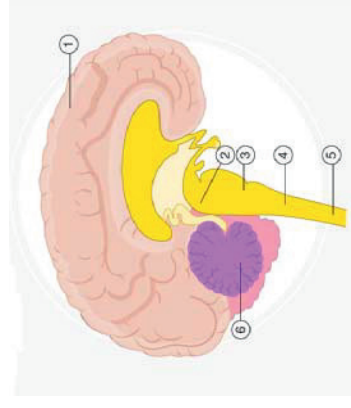
- Which system regulates the communication between body and the central nervous system?
- Which organ allows us to think and take actions based on that thinking?
- As brain do many functions, how will be its structure?

The teacher presents a chart of Brain



- How many parts does brain has?
- Which is the thinking part of the brain?
- Where are the areas for senses located?

What are the parts of the forebrain?



"Which of the following is a part of the forebrain?"

- A. Medulla
- B. Cerebellum
- C. Thalamus
- D. Spinal Cord

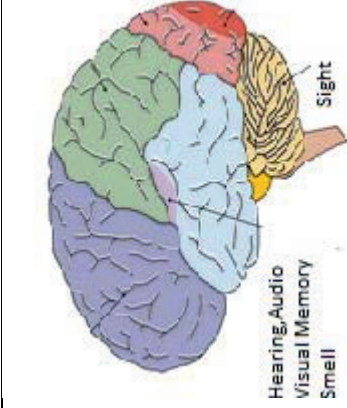
Describes the function of

The forebrain is primarily responsible for:  
A. Reflex actions

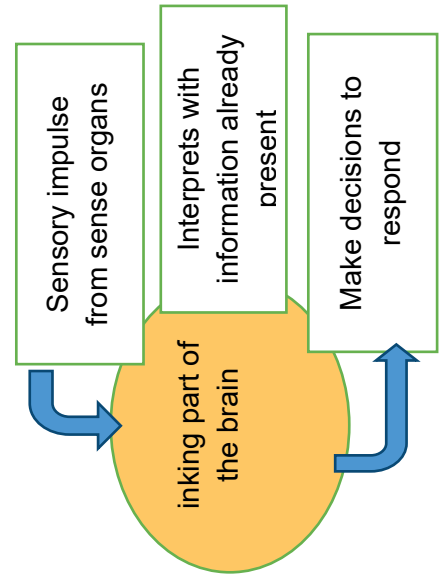
CHART

<https://www.youtube.com/live/B0Q-dPQBYgk?si=DhftOm4zwbGELH0n>

fore brain.



- Are the areas for various sense located at the same place in the fore brain?



Applies the learning relating to fore brain functioning to hypothetical situation

- Which part of the brain receives sensory impulses (information)?
- What does the information interprets with?
- What is made based on the interpreted information?

- B. Regulating balance and posture
- C. Higher cognitive functions such as thinking, decision-making, and planning
- D. Controlling heart rate and breathing

CHART

FLOWCHART

**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning process.

**PERIOD PLAN 5**

Name of the Chapter : CONTROL AND COORDINATION

Class : 10

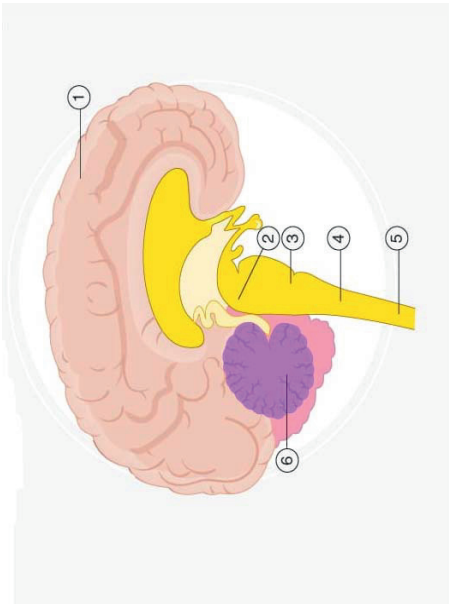
Total no. of periods : 11

Period plan : 05/11

Time : 40 min

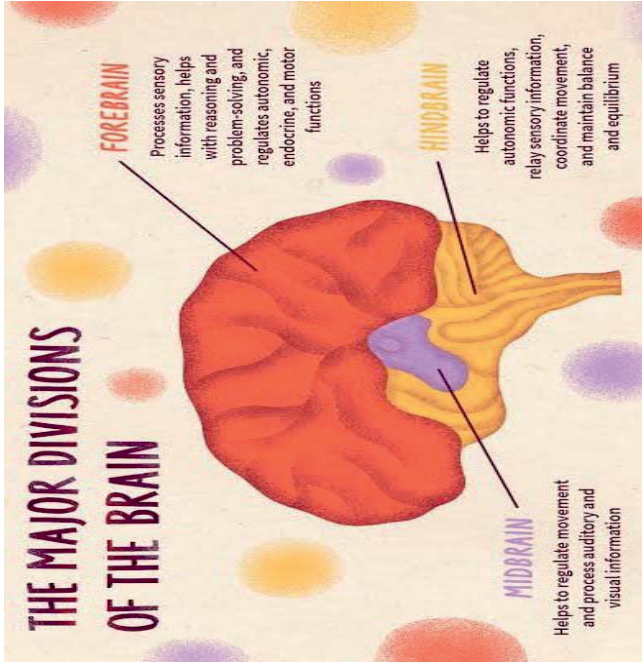
Key Concepts : Human brain, spinal cord, central nervous system, peripherally nervous system

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
	<p>Recall the previous knowledge:</p> <ul style="list-style-type: none"> <li>• Which organ controls all the activities in the human body?</li> <li>• Which organ continues from brain?</li> <li>• What are the brain and spinal cord made up of?</li> <li>• What are the major parts of brain?</li> <li>• Which part is the main thinking part of brain?</li> <li>• Apart from thinking does brain has any other function?</li> </ul>		

<p>Draws labelled diagram of human brain and its parts.</p> <p>Discusses about the functions of brain</p> <p>Exhibits creativity in designing static model of brain parts using eco-friendly resources.</p> <p>Differentiates between voluntary and involuntary movements controlled by brain.</p> <p>Relates the cause of</p>	<p><b>FIGURE 6.3</b></p>  <p>1 Forebrain   2 Midbrain   3 Pons 4 Medulla oblongata   5 Spinal cord   6 Hindbrain</p> <p>The teacher elicits answers from students through discussion:</p> <ul style="list-style-type: none"> <li>• What happens when we see our favourite food?</li> <li>• Why does our heart beat when we see a horror scene, without thinking about it?</li> <li>• Can we control these actions easily by thinking them?</li> <li>• Do we think about how to digest our food or breathe?</li> <li>• What changes takes place in the size of pupil in dark and bright light?</li> <li>• Do we have control over muscle when we move a chair?</li> </ul>	<p>Draw a neat labelled diagram showing parts of human brain.</p> <p>What are the major parts of the brain.? Mention their functions?</p> <p>If the hindbrain were a power plant, the medulla oblongata, which controls vital autonomic functions like breathing and heart rate, would be most similar to the plant's _____.</p> <p>A) Control room    B) Electrical grid C) Fuel storage    D) Turbines</p> <p>Prepare a static model of brain parts.</p> <p>Ram, a teenager, experienced a head injury during a sports event. Following the injury, he began having difficulty with balance and coordination, especially in activities requiring fine motor skills, which he previously excelled at. Considering the functions of different parts of the brain, which area do you think was affected by Ram's injury? Discuss how this area is involved in the control and coordination of movements</p> <p>Which of the following statement is true</p>	<p>Chart/Diagram</p> <p>Chart/Diagram</p>
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involuntary actions by the hind brain  
 Categorises the functions performed by various parts of the brain

**FUNCTIONS OF BRAIN - CHART:**



- Do we have control over our heart beat, (blood pressure), salivation and vomiting?
- Why do you call these action?
- Which parts of the brain controls these involuntary action?
- Which part of the hind brain, connects to the spinal cord?
- Which part of hind brain is responsible for precision of voluntary action?
- Which part of hind brain is responsible for maintaining the posture?
- Which part of hind brain is responsible for balance of the body?
- What happens if cerebellum in the brain damages?

Take initiatives to know about scientific discoveries related to brain and its structure.

about the brain.

i)The main thinking part of the brain is hind brain.

ii) The centres of hearing, smell memory, sight etc., are located in the fore brain.

iii) Involuntary actions like salivation, vomiting and blood pressure are controlled by the medulla in the hind brain.

iv) Cerebellum does not controlled the posture and balance of the body.

A. i) &ii)

B .i),ii),ii)i

C. ii) & iii)

D.iii) & iv)

Ram is unable to walk in a straight line and ride a bicycle. Which part of his brain might have damaged?

**PROJECT WQRK:**

Consult a doctor and prepare a project report about brain imaging technologies, such as MRI scans, and how they have revolutionized our understanding of the brain's structure and function.

**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning process



**PERIOD PLAN 6**

Name of the Chapter : CONTROL AND COORDINATION


Class : 10

Total no. of periods : 11

Period plan : 06/11

Time : 40 min

Key Concepts : Bony box(Cranium), Spinal cord, chemistry of cellular components, special proteins in Muscles.

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
Exhibits	<p>The teacher checks previous knowledge by posing questions.....</p> <ul style="list-style-type: none"> <li>• If the midbrain is damaged which actions of the body are effected?</li> <li>• “Our heart beats without our thinking about it” Can you give a term for the above statement?</li> <li>• Why don’t we remember to breathe or digested food?</li> <li>• Can you give examples of some involuntary actions?</li> <li>• What constitute the central nervous system?</li> <li>• What are the brain and spinal cord made up of?</li> </ul>		
	<p>The teacher shows a picture and asks: What do you observe in the picture?</p>  <ul style="list-style-type: none"> <li>• What is he wearing and why should we wear it while driving?</li> <li>• The teacher asks the students to touch their heads and feel.</li> </ul>		Picture  Improved model of

creativity in making an improvised model of brain in a bony box



The teacher demonstrates a small activity using a coconut shell, transparent water-filled balloon, and a large potato and ask questions.

- If potato is assumed as brain, where it contained?
- If the fluid filled balloon is assumed as cerebrospinal fluid, what is its function?
- The nerves which arise from brain are called cranial nerves, based on that what will you call the bony box in which the brain sits?
- What protects the brain from mechanical injury?
- Which part helps to absorb the shocks?

The teacher ask the pupils to feel by running their hand down the middle of their back.

- What is that hard, bumpy structure called?
- What does it cover and protect?

What precautions will you take to protect you're your head from injury?

The teacher further recapitulates

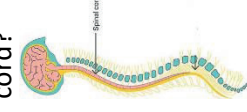
- What is the function of nervous tissue?
- How does it collect information?
- How does it send the information around the body?
- How is the information processed?
- Where is the decision conveyed for action on?

cranium

"Cerebrospinal fluid (CSF) in the CNS primarily functions to:"

- A. Transmit neural signals
- B. Nourish the brain and spinal cord
- C. Protect the brain and spinal cord by acting as a shock absorber
- D. Produce hormones

Identify the part which protects the spinal cord?

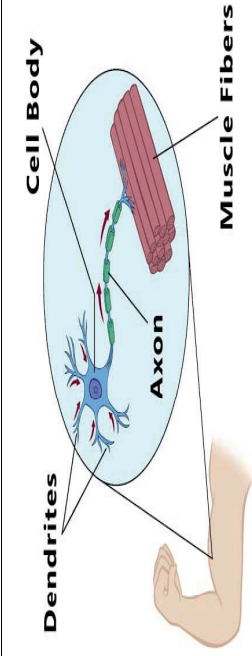


Chart

Why should one wear helmet while riding?

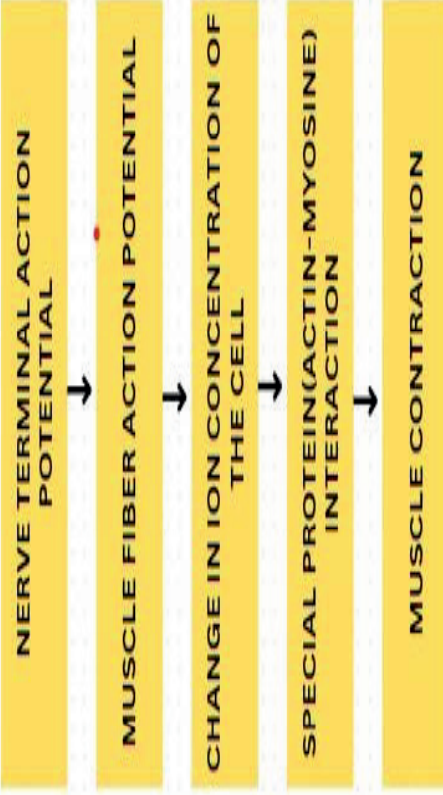
How do muscles help in performing movement?

Chart



In class 9 we have discussed about muscles. How do you differentiate voluntary and involuntary muscles?

Teacher elicits the mechanism of muscle movement.

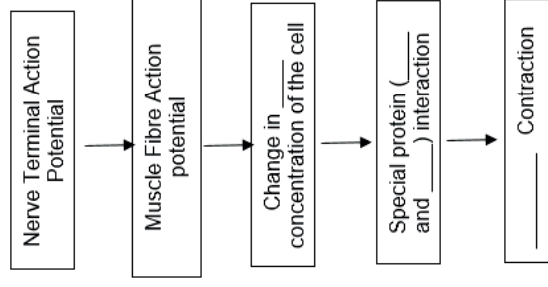


Explains the concept, how the Nervous tissue cause action

- what could be the percent of water in a cell?
- Apart from water what are the other components of a cell?
- Which component of food is considered as the building block of muscles?
- What special proteins do cells have that help them change, both their shape and arrangements?

The teacher explains about the role of special proteins Actin and Myosin in

Fill in the blanks in the flowchart:



Flowchart

	muscle contraction.  What works together in the neuromuscular system to make the body move as we want it?	If muscle contraction in animal cells were compared to a machine, actin and myosin would be most similar to:" A. Gears interlocking B. Electricity powering the machine C. The outer casing of the machine D. The control switch	
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**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning process

## PERIOD PLAN 7

Name of the Chapter : CONTROL AND COORDINATION

Class : 10 Total no. of periods : 11

Period plan : 07/11

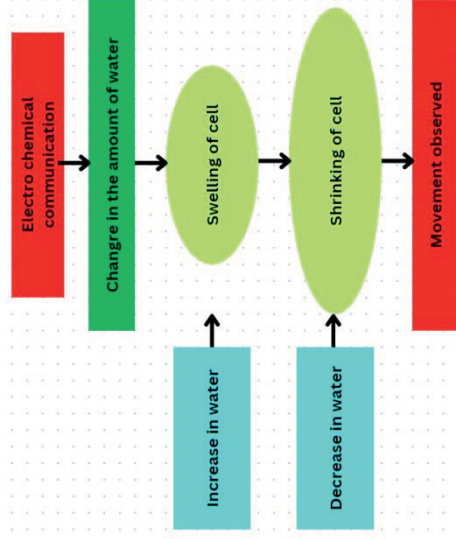
Time : 40 min

Key Concepts : **Coordination in plants , movement independent of growth, Immediate response to stimuli.**

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
	<p>Teacher checks previous knowledge by posing questions</p> <ul style="list-style-type: none"><li>• Which system helps animals to control and coordinate?</li><li>• Do plants show quick movements as animals?</li><li>• How do plants respond to stimuli?</li><li>• What type of movements do you observe in plants?</li><li>• In a germinating chick gram seed which part grows down and which grows up into the air?</li><li>• In a germinating chick gram what movement do you observe?</li></ul>		
	<p>The teacher shows a flowchart and elaborates</p> <ul style="list-style-type: none"><li>• How many types of movements do plants mainly show?</li><li>• What are the movements in plants based upon?</li></ul>		

<p>Identifies the types of movements in plants.</p>	<div data-bbox="219 1270 568 1795" data-label="Diagram"> <pre> graph TD     A[Types of Movements in] --&gt; B[Dependent on growth Eg: Germinating Chick gram]     A --&gt; C[Independent of growth Eg: Sunflower's response to sun]           </pre> </div> <p>Teacher takes students to a field trip and observe the response to stimuli in Mimosa pudica plant (touch me not) .</p> <ul style="list-style-type: none"> <li>• What do you do immediately when you touch hot object?</li> <li>• Which system helps you to respond to stimuli?</li> <li>• Do plants have nervous and muscle tissues to respond to stimuli?</li> <li>• When you touch the Mimosa pudica plant, what do you observe?</li> <li>• Which part of the plant shows movement?</li> <li>• Does the movement in plant occurs at the same point of touch?</li> </ul> <div data-bbox="1088 1323 1299 1648" data-label="Image"> </div>	<p>How many types of movements are observed in plants?</p>	<p>FLOWCHART</p>
<p>Explains the process of immediate response to stimulus in Mymosa pudica.</p>	<p>The leaves of Mimosa pudica are sensitive to</p> <ol style="list-style-type: none"> <li>Heat</li> <li>Light</li> <li>Smell</li> <li>Touch</li> </ol>	<p>Explain how Mimosa pudica a shows immediate response to stimuli?</p>	<p>Flowchart</p> <p>Picture</p>

How does the plant respond to stimuli?



Relates cause and effect between touch and movement in Mimosa pudica.

- How is information communicated from cell to cell in animals?
- What happens to shape of the animal cells in order for movement to happen?
- What specialised proteins are found in animal muscle cells which help to change their shapes?
- Do plants also have specialised proteins to change their shape?
- how do plants cells change their shapes?

Read both the statements carefully and choose the correct alternative.

Assertion (A): When we touch the leaves of Mimosa pudica they began to fold up and droop.

Reason (R): To communicate the information of touch plant uses electrical-chemical signals to transfer information from cell to cell.

- Both A & R are correct and R is the correct explanation of A.
- Both A & R are correct but R is not the correct explanation of A.
- A is true but R is false.
- A is false but R is true.

Which of the following is a key difference between the movement in plant cells and animal cells?

- Plant cells move by changing their shape, while animal cells move by growing towards or away from stimuli.
- Plant cells typically show movements in response to external stimuli like light and gravity, while animal cells often move by internal structures like cilia and flagella.
- Animal cells are stationary and do not show movement, while plant cells exhibit various types of movements.
- Plant and animal cells both use muscle fibers for movement.

Flowchart

**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning process



**PERIOD PLAN 8**

Name of the Chapter : CONTROL AND COORDINATION


Class : 10

Total no. of periods : 11

Period plan : 08/11

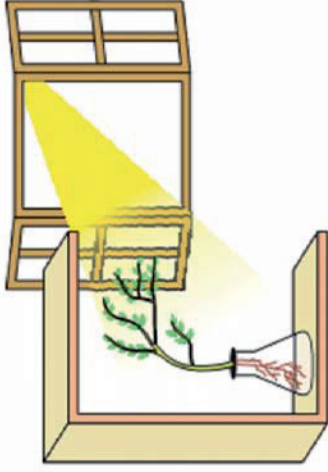
Time : 40 min

Key Concepts : Tropism, phototropism, Hydrotropism, Geotropism, Chemotropism

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
<p>Identifies different types of movements in plants.</p>	<p>Teacher checks previous knowledge by posing questions,</p> <p>How do animals move?            How is movement observed in plants?            How many types of movements do plants show?            In a germinating chick gram seed which part grows down and which grows up into the air?            In a germinating chick gram what movement do you observe?            Showing a plant with tendrils the teacher asks ....</p>  <ul style="list-style-type: none"> <li>• Which plants are called climbers?</li> <li>• Can you give some examples of creepers?</li> <li>• What does the tendril do when it comes in contact with any support?</li> </ul>		<p>Picture</p> <p>Diagram</p>

The teacher demonstrates the type of movement shown by germinated bean seeds through Activity 6.2

**DIAGRAM PLANT SHOWING PHOTOTROPISM.**



In the activity, why are the freshly germinated bean seeds kept on the wire mesh?

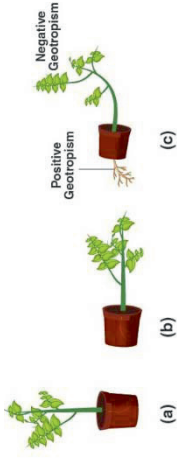
- What do the germinated bean seeds develop?
- Which tissue helps in the growth of the root and shoot in plants?
- Why is the cardboard opened from one side, is used in the activity?
- What do you notice after 2-3 days?
- What happened when the direction of flash light of changed?
- Which environmental trigger has brought change in the direction of plant parts?
- What do the terms photo and tropic means?
- What difference do you observe in the growth of root and shoot?
- What do you understand from this activity?

How can understanding phototropism be beneficial in agricultural practices?

- A. By helping to design better irrigation systems
- B. By informing how to arrange plants for optimal light exposure
- C. By aiding in the development of pest-resistant crops
- D. By improving soil nutrient composition

Relates the bending in plants to differential growth.

The teacher demonstrates geotropism exhibited by a potted plant.



- How do the root and shoot of a plant grow towards?
- Why did the root show downward and shoot upward growth respectively?
- What do you mean by the terms geo and tropic?
- What do you call the upward and downwards growth of shoots and roots, respectively, in response to the pull of earth?

The teacher guides the students to conduct an activity and make observations.



- What difference do you observe in two diagrams?
- Where is the root growing towards?

A group of students conducted an experiment where they planted bean seeds in different orientations (right side up, on their side, and upside down) in a dark room. After a week, they observed the direction of root and shoot growth in each seed. What geotropic responses would you expect the students to have observed in these seeds?  
Explain how geotropism influences the growth direction of roots and shoots in plants.

In an experiment to observe hydrotropism, what change in the plant's growth would indicate a hydrotropic response?  
A. The plant's roots grow towards the water source.  
B. The plant's stems bend towards the light.  
C. The plant's leaves change colour due to water exposure.  
D. The plant's flowers bloom more rapidly.

A potted plant

Two small potted plants of similar size and species.  
A container with water for the second plant.

Communicates the finding and conclusions effectively

Relates the tropic movement in plants with the stimulus.

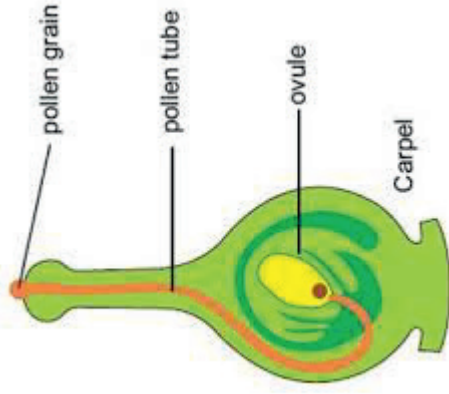
Exhibits value of –respect for life by appreciating the chemotropism in plant reproduction.

Distinguishes between tropic movements in plants

Communicates the findings and conclusion effectively about tropism in plants.

- What do the terms hydro and tropic means?
- How do you define this tropism?

DIAGRAM PLANT SHOWING CHEMOTROPISM



- In the above picture due to the chemical effect, what grows from the pollen grain towards the ovule?
- If chemical means chemo and tropic means direction, what do you call this movement?

What will be the consequences if chemotropism does not happen in flowers?

How do you distinguish various tropic movements in plants.

Conduct a project by collecting information on how plant tropisms could be utilized in innovative agricultural practices and be manipulated to maximize crop yields and resource efficiency?

**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning process

**PERIOD PLAN 9**

Name of the Chapter : CONTROL AND COORDINATION


Class : 10

Total no. of periods : 11

Period plan : 09/11

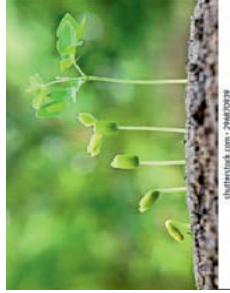
Time : 40 min

Key Concepts : Chemical communication, Auxins, Cytokines, Gibberellins, Abscise acid

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
<p>Compares and differentiate the different movements shown by plants</p>	<p>Recalls the previous knowledge by posing questions</p> <ul style="list-style-type: none"> <li>• How do pea plants climb up other plants?</li> <li>• How do plants respond to stimuli?</li> <li>• Can you name some environmental triggers that change the directions that plant parts grow in?</li> <li>• What do you mean by phototropism?</li> <li>• What type of tropism is the growth of pollen tubes towards ovules indicates?</li> <li>• Why are multicellular organisms called so?</li> </ul> <p>The teacher shows some pictures and asks</p>  <ul style="list-style-type: none"> <li>• How does Mimosa plant respond to touch?</li> <li>• When compared to Mimosa plant how does sunflower respond to sun?</li> </ul>	<p>How do plants respond to different stimuli?</p> <p>Differentiate various movements shown by plants</p>	<p>Picture</p>

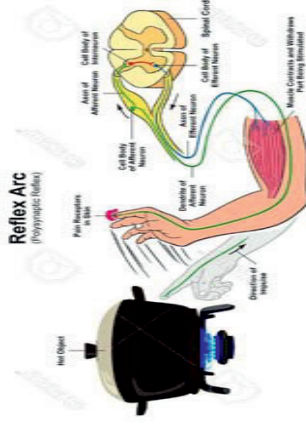


- How would be the growth in plant parts take place, when compared to movements in Mimosa and sunflower?



- What can we infer from the above instances?
- As parts of plants show directional growth, how do animal bodies grow?

The teacher displays a chart and elicits:



- If you touch a hot object, how do you respond to that stimuli?
- So if fast responses to stimuli are to be made, how must be the information transferred?
- How does the rapid information transfer take place?

Illustrate different movements shown by plants?

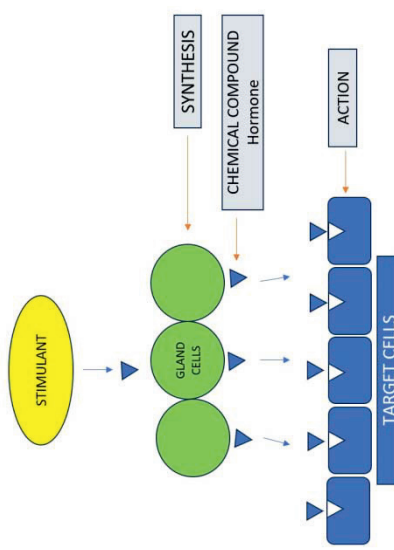
Picture

Why is electric impulse not used for communication in plants?

Picture

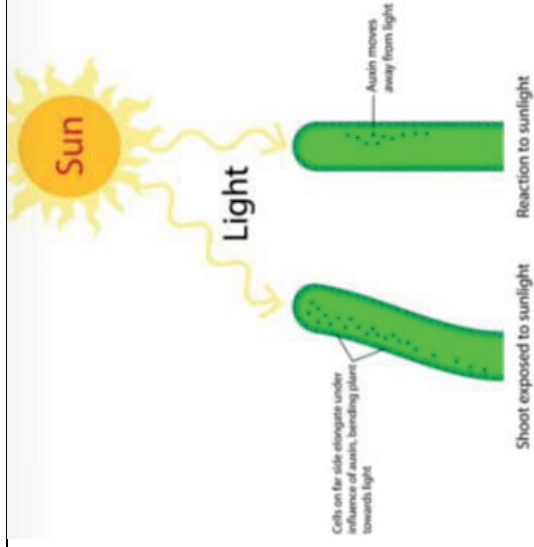
Write two differences between the response of plants and response of animals.

Chart/picture

<p>Analyse the flowchart showing action of hormones in plants</p>	<ul style="list-style-type: none"> <li>• Suppose a girl's long hair touches a hot object, will it respond quickly to the stimulus?</li> <li>• Are all the tissues in the body connected by nervous tissues?</li> <li>• How are electric impulses generated?</li> <li>• Can electric impulses be created and transmitted continuously?</li> <li>• So, what do the above situations imply?</li> <li>• How is the information in tissues which are not connected to nervous tissue communicated?</li> <li>• How are the triggers for the processes which takes place slowly given?</li> <li>• In multicellular organisms, apart from electrical communication, in the communication takes place through chemicals, what do you call it?</li> </ul>	<p>Analyse how does a stimulant signal transduction contribute to the formation of hormones in plants?</p>	<p>Flowchart</p>
<p>The teacher presents a flowchart and analyse:</p>		<p>In chemical communication what does a stimulant do?</p>	



	<ul style="list-style-type: none"> <li>• What do the stimulated cells (glands) release?</li> <li>• Where would this chemical compound (hormone) diffuse?</li> <li>• Which cells have special molecules on their surface to recognise the chemical compound?</li> <li>• Does chemical communication need any nervous connections?</li> <li>• Will it be a slow process?</li> <li>• As nervous connection is not necessary can these chemical compounds potentially reach all cells?</li> <li>• How many types of tissues and do multi cellular organism?</li> <li>• Can a single type of chemical compound (hormone) helps the plants to coordinate?</li> </ul> <p>The teacher exhibits a chart and elaborates:</p> <ul style="list-style-type: none"> <li>• How do different plant hormones help the plants?</li> <li>• Where are hormones synthesised and where do they act?</li> </ul> <p>Let us recall activity 6.2</p>	<p>Why is Chemical communication needed in plants?</p>	
		<p>How are chemical stimulants helpful in plant growth?</p>	



- Which tissue helps in the growth of germinating seedlings?
- What do the growing plant detect in the activity 6.2.
- When growing plant detect light where is the hormone-auxin synthesised?
- When light falls only on one side of the plant, where does the, auxin diffuse towards?
- How is the concentration of auxin in the shady side of the shoot?
- How does the concentration of auxin stimulate the cells of the shoot which is away from the light?
- How does the plant appears?

Name the part of a plant that exhibits  
 (i) positive phototropism  
 (ii) negative phototropism

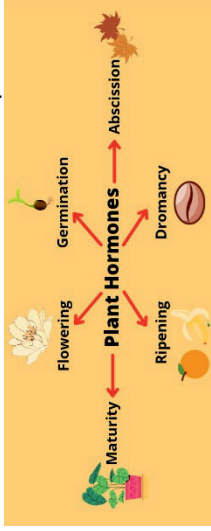
State how concentration of auxin stimulates the cells to grow longer on the side of shoot which is away from light?

Chart/Picture

<https://youtu.be/MBP8QWas-M4?feature=shared>

Interprets the table showing the functions of Phytohormones

The teacher shows a table and interprets:



Phytohormone	Primary Functions
<b>Auxins</b>	Promote cell elongation, root initiation, and fruit development; involved in phototropism and gravitropism.
<b>Gibberellins</b>	Stimulate stem elongation, seed germination, and flowering; promote fruit development.
<b>Cytokinins</b>	Promote cell division, influence nutrient mobilization, delay/leaf senescence, and enhance shoot formation.
<b>Ethylene</b>	Involved in fruit ripening, flower wilting, leaf fall, and aging processes; mediates stress responses.
<b>Abscisic Acid (ABA)</b>	Induces seed dormancy, regulates stomatal closure, and mediates plant responses to environmental stress like drought.

What is the function of auxins?  
 Along with auxins which other plant hormone help in the growth of the stem?  
 What are the areas of rapid cell division in plants?  
 What is the function of cytokinin?  
 Where are they present in greater concentration?  
 Can you give some examples of plant hormones that help in promoting growth?  
 Can you give examples of plant hormone which inhibits growth?  
 Which hormone is responsible for wilting of leaves?

Chart/Tabular form

Give one example each of a plant hormone that

- (i) promotes growth
- (ii) inhibits growth
- (iii) promotes cell division
- (iii) promotes growth of a tendril around a support

Gibberellins in a plant can be analogized to a school's public announcement system because they:

- A. Only work in one specific area
- B. Relay important messages (signals) that affect the entire school (plant)
- C. Are used only in emergency situations
- D. Are only active at the beginning of the school year

A farmer notices that certain crops are not bearing as much fruit as expected. Upon testing, it's found that there's a deficiency in a particular phytohormone known to stimulate fruiting. Which phytohormone might be deficient, and what could be a potential solution to increase its levels in plants?

**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning process

**PERIOD PLAN 10**

Name of the Chapter : CONTROL AND COORDINATION


Class : 10

Total no. of periods : 11

Period plan : 10/11

Time : 40 min

Key Concepts :Hormone, Adrenalin, Endocrine glands

LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
<p>Identifies the hormonal controls in animals.</p>	<p>Teacher checks previous knowledge.....</p> <ul style="list-style-type: none"> <li>• Give the alternative name for chemical compound which helps in coordination?</li> <li>• State the main function of abscisic acid in plants?</li> <li>• Which hormone diffuses towards the shady side of the shoot?</li> <li>• Name the plant hormone inhibits growth the plants?</li> <li>• Does chemical coordination take place in animals also?</li> <li>• How is chemical means of information transmission used in animals?</li> </ul> 		<p>Picture</p>

The teacher asks questions on the displayed picture:

- Have you ever seen two squirrels fighting?
- Do both the squirrel fight continuously?
- What difference in the behaviour of two fighting squirrel did you observe?
- What does the looser squirrel do?
- What does the looser squirrel need to run away?
- Are the activities fighting and running away same?
- What common preparations do their bodies make to do above activities?
- Do their bodies make preparations for such activities in near future?

The teacher further elaborates

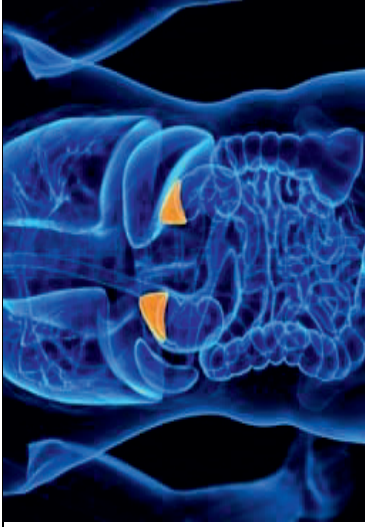
- How are electric impulses sent via in the bodies of animals?
- Are all the body tissues connected with nerve cells?
- As all the body tissues are not connected via nerve cells, can the electrical impulses reach a range of tissues?
- What other means to their body needs to get wide ranging signals to body tissues?
- Can you name the chemical compounds which would reach all cells of the body and provide wide ranging change?
- In the above instance of squirrels fighting, are these hormones happen to be secreted only in squirrels?
- Can you guess the hormone which causes fight and flight in the two squirrels?

FIGURE 6.7 DIAGRAM ADRENALIN GLAND

Identifies the position of adrenal glands in human body.

Why is adrenalin known as emergency hormone?

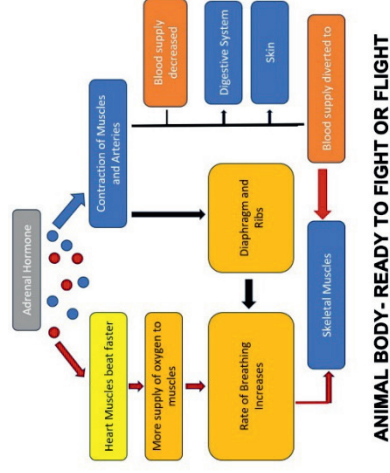
Relates the hormone  
adrenalin with its function  
in animal.



- Which glands secrete the hormone- adrenalin?
- As endocrine glands don't have ducts how is adrenalin secreted and carried to different parts of the body?
- Where do the carried hormone act on?
- Can you guess the target organ on which the hormone - adrenal acts?
- In the above instance of squirrels fighting, are the squirrels happy or angry?

Describes the changes  
brought in human body  
systems by hormone  
adrenalin.

The teacher describes with the help of a flowchart



In animals, an adrenaline surge typically results in which behavioural response?

- Increased social and grooming behaviour
- Enhanced digestion and nutrient absorption
- Immediate 'fight or flight' response to perceived threats
- Long-term nesting and territorial behaviours

Name the hormone secreted in scary situation by animals. Mention the gland that secretes it. Give any three responses which enable the animal body to deal with it?

Analyze the role of adrenaline in the 'fight or flight' response. Discuss how this hormone prepares the body for rapid physical action and the physiological changes that occur

	<ul style="list-style-type: none"> <li>• When we get angry how does our heart beats?</li> <li>• When heart beats faster what happens to the supply of oxygen to our muscles?</li> <li>• What happens to the blood supply to digestive system and skin due to contraction of muscles?</li> <li>• Where does the blood supply divert to?</li> <li>• What does the contraction of diaphragm and the rib muscles increases?</li> <li>• What do all these responses together unable the animal body?</li> <li>• A part from nervous system which other system constitutes a second way of control and coordination in our body?</li> </ul>	<p>During the 'fight or flight' response triggered by adrenaline, which of the following physiological changes does NOT typically occur?</p> <p>A. Dilation of air passages in the lungs  B. Increased blood flow to skeletal muscles  C. Slowing down of the digestive process  D. Decrease in heart rate and blood pressure</p> <p>Describe how our body responds when adrenaline is secreted into the blood?  A squirrel is in a scary situation. Its body has to prepare for either fighting or fighting, State the immediate changes that take place in the body of the squirrel, is able to either fight or flight?</p>	
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**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning process



## PERIOD PLAN 11

Name of the Chapter : CONTROL AND COORDINATION

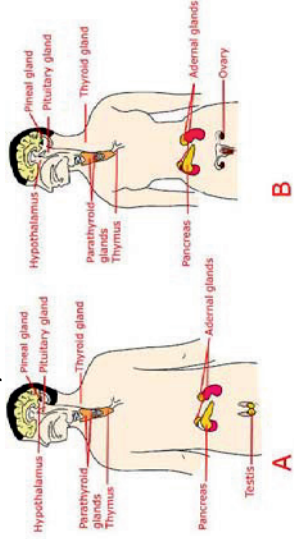
Class : 10

Total no. of periods : 11

Period plan : 11/11

Time : 40 min

Key Concepts : Adrenalin, feedback mechanism, Growth hormone, Insulin, Hypothalamus, thyroxine

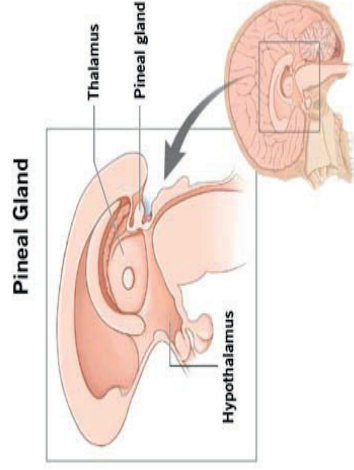
LEARNING OUTCOMES	TEACHING - LEARNING PROCESS	ASSESSMENT STRATEGIES	TLM
<p>Identifies various endocrine glands present in human body.</p>	<p>Teacher checks previous knowledge by posing question</p> <ul style="list-style-type: none"> <li>• What do plants have that control their directional growth?</li> <li>• How do plants respond to light?</li> <li>• Which hormone helps plants in responding to light?</li> <li>• Which hormone helps the root to show geotropism?</li> <li>• Do hormones cause directional growth also in animals and humans?</li> </ul> <p>Activity 6.3 Let us see and identify the endocrine glands in human body.</p> 	<p>Name the endocrine glands associated with brain?</p>	<p>Chart/Picture</p>

Draws a labelled diagram of endocrine glands present in human body.

Relates various hormones with their functions in the body.

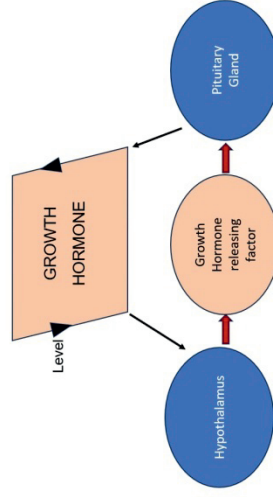
- Which endocrine glands do you identify in the head region?
- Can you identify the glands in neck and thorax region?
- Which glands are located in the abdomen region?

The teacher further elicits the functions of hormones in humans with the help of chart.



- Where is pineal gland and hypothalamus located?

The teacher further elaborates the function of hypothalamus with the help of flowchart:



Chart/Picture

Read both the statements carefully and choose the correct alternative.  
Assertion (A): Pituitary gland is called the master gland of the body.  
Reason (R): The hypothalamus controls over the master gland.  
A) Both A & R are correct and R is the correct explanation of A.  
B) Both A & R are correct but R is not the correct explanation of A.  
C) A is true but R is false.  
D) A is false but R is true.

Flowchart

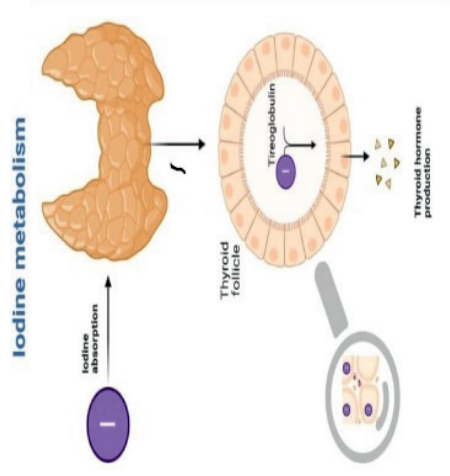
- What do hypothalamus release when the level of growth hormone is low?
- What does the growth hormone releasing factor do?
- What does the stimulated pituitary gland released?
- Where is the thyroid gland located?

The teacher shows a picture -packet of iodised salt and ask



- Why is it important for us to have iodised salt in our diet?

A picture is shown and the teacher explains



- Absorption of which mineral is necessary for the thyroid gland to produce thyroid hormone -thyroxine?

Why is the use of iodized salt advisable?

Picture

Picture

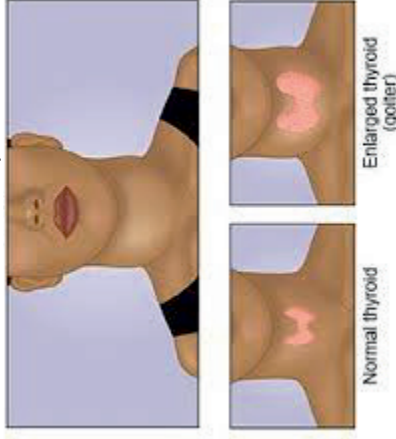
The teacher shows a chart and elicits

**Importance of Thyroid Hormones**

- Helps in regulating metabolic rate
- Important function of T3 and T4 is controlling the heart rate
- Thyroid hormones play a role in raising or lowering the body temperature
- Thyroid hormones influence digestive tract function
- Thyroid hormone also affects the body's immune system

lybrate

• What are the functions of thyroid hormone?  
The teacher shows the picture and asks



- In case, our diet is deficient in iodine which hormone will not be synthesised by the thyroid gland?
- In the above picture which gland is enlarged? Why?
- If the thyroid gland enlarge what symptoms do you observe?
- What is the disease caused due to the above symptoms?

A health clinic in a remote mountainous region reports an increased number of cases with common symptoms include fatigue, weight gain. A survey of the local diet reveals a low consumption of seafood and a reliance on crops grown in iodine-deficient soil.

Based on the symptoms and dietary habits, what health condition do you think is prevalent in this population? Discuss the role of iodine in the body and why its deficiency might lead to these symptoms.

Chart

Picture

Applies the learnt knowledge to hypothetical situations.

The teacher shows the picture and elaborates

- What do you observe in the above picture?
- Which gland secretes growth hormone?
- As the name indicates can you guess what do growth hormone regulates?
- If too much secretion of growth hormone leads to extremely tall(giants), how are dwarfs formed?

The teacher expands upon it with further details

- What changes have you observed in your appearance when you approached 10 to 12 years of age(puberty)?
- Which hormone is responsible for the development of male sex organs in males?
- What is the function of oestrogen secreted by ovaries in females?
- You might know some elder persons, who has been advised by the doctors not to take sweets. Can you guess the reason?
- Which hormone is produced by the pancreas to regulate the blood sugar levels?
- What happens to the sugar levels in the blood if, insulin is not secreted?

The presence of adequate thyroxine levels is vital for child development. Its deficiency can lead to which of the following conditions in children?

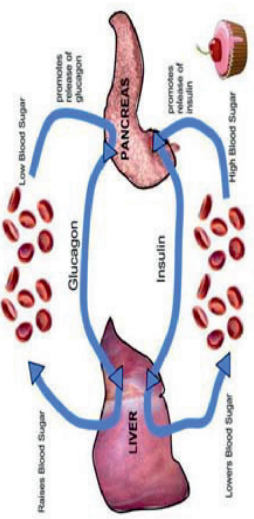
- Hyperactivity and attention deficit
- Accelerated growth and early puberty
- Dwarfism, characterized by stunted physical and mental growth
- Enhanced cognitive abilities and advanced language skills

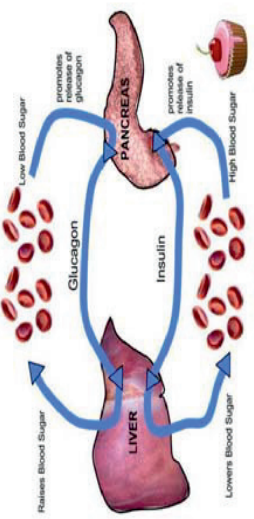
A boy was not able to gain weight. The doctor diagnosed that it is due to deficiency of a hormone. Name the hormone and the gland which secretes this hormone. Which disease is he suffering from?

Which hormone is crucial for the development and maintenance of the female reproductive system and menstrual cycle?

- Testosterone
- Insulin
- Estrogen
- Adrenaline

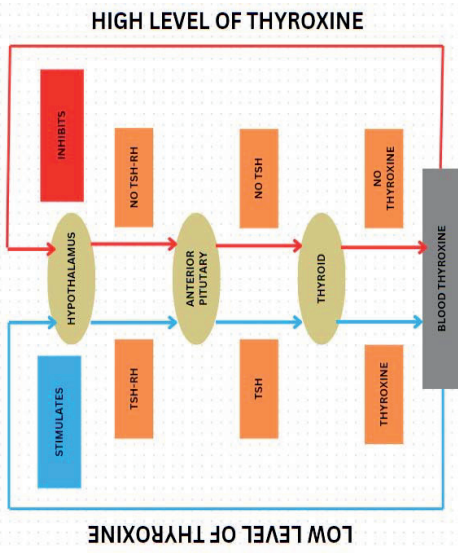
Picture

<p>Describes the concept of feedback mechanism for hormonal regulation.</p>	 <ul style="list-style-type: none"> <li>• If the sugar level increases how do the cells of pancreas respond?</li> <li>• If the sugar level lowers what happen to the secretion of insulin?</li> <li>• Based on the above, what quantity of hormones should be secreted in the body?</li> <li>• How are the timing and amount of hormone release regulated?</li> </ul> <p>Can you now explain the feedback mechanism for regulation of hormones in your own words?  <b>FEEDBACK MECHANISM PICTURE</b></p>	<p>How does the insulin feedback mechanism regulate blood sugar levels in the body?  A. By increasing glucose production when blood sugar is high  B. By promoting glucose uptake into cells when blood sugar is high  C. By reducing insulin production when blood sugar is low  D. Both B and C</p> <p>Describe the feedback mechanism involved in the regulation of thyroxine production.  How does this mechanism ensure the balance of thyroxine levels in the body?</p> <p>In the context of sex hormone regulation, which gland plays a central role in the feedback mechanism?  A. Thyroid gland B. Adrenal gland  C. Pituitary gland D. Pancreas</p>	<p>Chart</p> <p>Flowchart</p>
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- If the sugar level increases how do the cells of pancreas respond?
- If the sugar level lowers what happen to the secretion of insulin?
- Based on the above, what quantity of hormones should be secreted in the body?
- How are the timing and amount of hormone release regulated?

Can you now explain the feedback mechanism for regulation of hormones in your own words?  
**FEEDBACK MECHANISM PICTURE**



Chart

Flowchart

**Teacher's reflections:**

1. How the lesson went?
2. Were the teaching learning strategies adequate?
3. Were the students engaged?
4. Areas of improvement.
5. Measures taken to refine teaching learning process

**Assessment 1**

class x

Control and coordination

Topic : anima nervous system

Time 40 Mns

Marks 20.

1 mark

1). In a neurons conversion of electrical signal to a chemical signal occurs at/ in

- A). cell body. B). Axonal end
- C). dendritic end. D). Axon.

1 mark

2. Walking in a straight line and riding a bicycle are that activities which are possible due to a part of brain, Choose the correct location and name of this part from the given table.

PART OF BRAIN	NAME
a).Fore brain	Cerebrum
b). Mid brain	Hypothalamus
c). hind brain	Cerebellum
d). hind brain	Medulla

1 mark

- ✓ 3. Read both the statements carefully and choose the correct alternative.
- Assertion (A): A nerve impulse is a electrochemical event..
- Reason (R): In a nerve impulse there are changes in the resting potential which spread down then nerve fibre.



- i. Both A & R are correct and R is the correct explanation of A.
- ii. Both A & R are correct but R is not the correct explanation of A.
- iii. A is true but R is false.
- iv. A is false but R is true.

1 mark

4. Following are certain reflex actions occurring in our body.

- i. Moving to the side of road when a speeding car approaches.
- ii. Closing of eyes in response to a sudden bright light.
- iii. Shouting when we are suddenly disturbed or get scared.
- iv. Withdrawing hands on touching a hot surface. The reflex arc given below, will be occurring for,
- v. Receptors ( sense organs) -----spinal cord----- Targets/ effectors

a). i and ii

b). i, ii, and iii

c). i, ii, iii, and iv

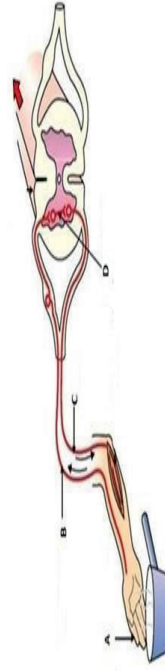
d). ii and iv

1 mark

5). Which signals will get disrupted in case of a spinal cord injury?

2 marks

6). Write the name and function of parts in the diagram given below



2 marks

7) why the flow of signals in a synapse from axonal end of one neuron to dendritic end of the another neuron but not the reverse?

3 marks

8). Draw a neat diagram of neuron and label the following.

- i). Part where information is first received.
- ii). Part through which its travels.
- iii). Part through which it is released.

3 marks

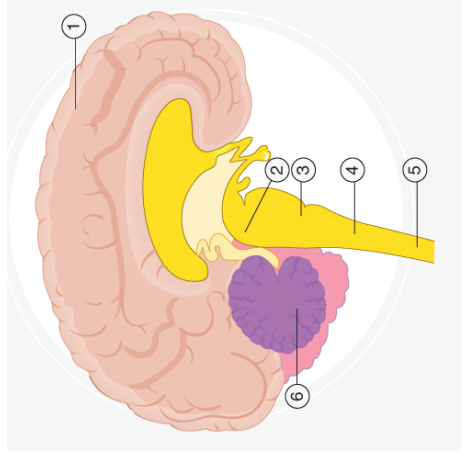
Case-based questions:

9). When we eat food, our eyes, hands and mouth works in perfect coordination. The eyes focus on the food, the hands pick it up and take it to the mouth where it is chewed. All these actions are completed in a particular sequence. Similarly internal functions of our body are carried out by the nervous system in a particular sequence.

- a). What is a reflex arc?
- b). How is the spinal cord protected?
- c). How does an impulse travel in a nerve cell?

5 marks

10 Observe the below diagram and answer the following questions



- i. Label the numbered parts of the brain in the above diagram.
- ii. Which part is indicated by label '1' and what is its primary function?
- iii. Which part receives and integrates visual and auditory inputs?
- iv. The part responsible for maintaining the posture and balance of the body.

## Assessment 2

Control and coordination

Class x

Coordination in plants & hormones in plants

Case based questions. ( 4 marks)

Plants respond to the environment they show sensitivity (irritability). Plant responses are rather slow compared with those of animals. Plant responses are rather slow compared with those of animals. Plants respond to stimuli (to changes in their environment) by changing their growth patterns. These growth responses enable a plant to make the most of the resources available in its environment.

Plants respond to many stimuli but two are of particular importance. Light (the photo stimulus) and gravity (the geo-stimulus). A growth response carried out by a plant in response to the direction of a stimulus is called a tropism.

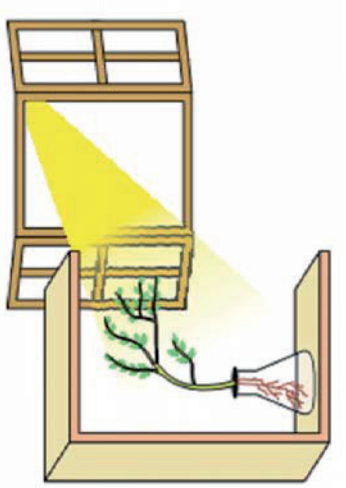
1. When a response of plant or its part can be called a positive response?
2. Why roots are positively geotropic?
3. Define chemotropism?
4. Give an example where hydrotropic moments can be seen.  
(1 mark)
5. Go through the following Assertion and Reason and pick out the right option from the given choices
  - a). Both A and R are true and R is the correct explanation of A.
  - b). Both A and R are true and R is the correct explanation of A.
  - c). A is true and R is false.
  - d). A is false and R is true.

ASSERTION : cytokinins are present in highest concentration in fruits and seeds.

REASON : cytokinins are a responsible for promoting cell division.

1 mark

6). What does the given experimental setup demonstrate?



(2marks)

7). State the function of the following plant hormones:

a). Abscisic acid b). Cytokinins

(2marks)

8). Why is tropism necessary for coordination in plants?

(3 marks)

9) How do control and coordination in plants differ from the animals? give any two points of difference.

(2 marks)

10). A plant in the laboratory is given increased dose of a hormone, which promote the development of seedless fruits. Identify the hormone and write its other two function.

(5 marks)

11). Name various plant hormones. Also give their physiological effects on plant growth and development.

**Assessment -3**

Class x

**CONTROL AND COORDINATION  
ANIMAL HORMONES**

TIME: 40 MINS.                      MARKS - 20

1 mark

- 1). Deficiency of which hormone causes diabetes?  
a). Insulin.   b). Thyroxine  
c). Relaxin.   d). Oestrogen

1 mark

- 2). Chemically hormones are derivatives of  
a).fat.   b). Protein   c) steroid   d). All of the above

1 mark

- 3). State the consequences of low TSH level?

1 mark

- 4). The hormone responsible for changes during puberty in male is  
a). Oestrogen   b). Testosterone  
c). Insulin   d). Growth hormone

1 mark

- 5). Why adrenaline is known as emergency hormone?

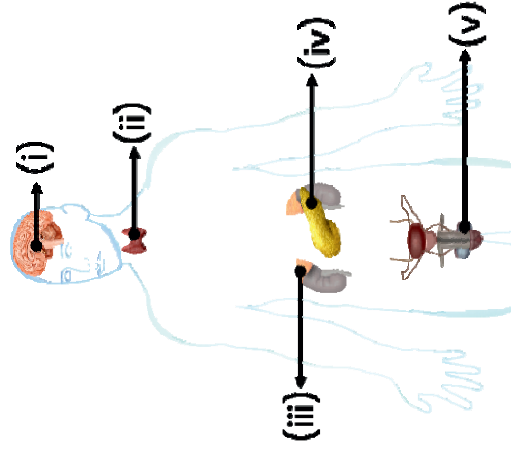
2 marks

- 6). Hormone affect only specific target cells. Justify.

2 marks

7). Name the hormone which regulates sugar level in our body. Also name the part of gland it is secreted from.

3 marks



8)

a). Identify the endocrine glands 1, 2, and 3, in the given diagram.

b). Name the hormones secreted by part 3, 4 and 5.

3 marks

9) What will happen if intake of iodine in our diet is low? Why is the use of iodised salt is advisable?

5 marks

10) Define hormones. What do you understand by target organ? Where is hypothalamus gland located? What does it produce? State the function of hypothalamus.

**Video links**

Period 1

Eye donation

<https://youtu.be/uWr6QZV0wTA?feature=shared>

Video links

Period 2

Structure of a Neuron

[https://youtu.be/Ta\\_vWUjriho?si=ZJSZfigFkhaqPmMS](https://youtu.be/Ta_vWUjriho?si=ZJSZfigFkhaqPmMS)

Video links

Period 3

Reflex action

<https://youtu.be/EG5PWWw5YN4?si=66YYhH5XoaCOBBTA>

Video links

Period 4

Human brain

<https://youtu.be/0vkiyE066QI?si=iYally4w72bbUpQQ>

Video links

Period 5

Human brain & spinal cord

<https://youtu.be/RNLceV18jcc?si=anSkzfdk2cVbxASv>

Video links

Period 6



Video links

Period 7

Coordination in plants

[https://play.google.com/store/apps/details?id=in.gov.diksha.app&pcampaignid=web\\_share](https://play.google.com/store/apps/details?id=in.gov.diksha.app&pcampaignid=web_share)

Video links

Period 8

Tropic movement in plants

[https://youtu.be/UF2DydE2m\\_Q?si=ul\\_7OA4rMIDbP3ns](https://youtu.be/UF2DydE2m_Q?si=ul_7OA4rMIDbP3ns)

Video links

Period 9

plant hormones

<https://youtu.be/dV9QcGs58l0?si=MILbkJTJbpYQ3EQu>

Video links

Period 10

Hormones in Animals

<https://www.youtube.com/live/IVy2Ihm5Bgo?si=1bz0Y0cQYwvWYTfs>

Video links

Period 11

The Endocrine System

<https://youtu.be/Riy2d5F37Rl?si=psvd9rG9ZlQR3i2e>

<https://youtu.be/PvuHB9XYENQ?si=CjomUcivs5eT9qH4>

**control and coordination full chapter video link**

[https://youtu.be/6GQqmzap6Aw?si=At7jcgT1\\_zS8r5uA](https://youtu.be/6GQqmzap6Aw?si=At7jcgT1_zS8r5uA)



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