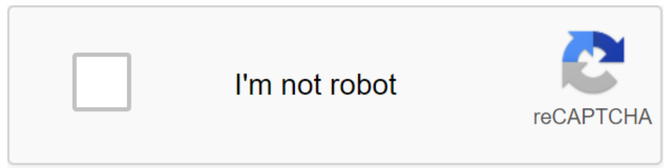

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Conclusion We believe that the data published above regarding APSCERT Class 10 Biology Books PDF will make your exam preparation effective and will help you score maximum points in the biology exam. If you are looking for some other exam resources along with AP Board PDF Tutorials, make sure you visit our website and find more resources like Andhra Pradesh SCERT 10th Class Biology Sample Documents, Sillabus, Sample Solutions, Notes, Bits, Multiple Choice Questions, Objective Issues, Map Pointing, Grammar, etc. Stay tuned to our NCERTBooks.Guru website or bookmark it for warnings about the latest updates on AP SCERT school books, educational materials, notes, and previous document questions. THE AP and TS 10th Grade/SSC Full Study Guide is available here. Find and download Biology Tutorials by SCERT, Work Books, Daily Tests, Previous and Model Documents available here for free PDF Download. 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Respect the law Get the rights grow by education behave humbly Dr. Kamal Mahendroo, Professor, VidyaBhavanEducationalResourceCentre, Udaipur, Rajasthan. Dr. Snigda Das, Professor, VidyaBhavanEducationalResourceCentre, Udaipur, Rajasthan. Coordinator OF BIOLOGYBIOLOGYBIOLOGYBIOLOGYOLOGY CLASS - 10 editors Dr. Jashodara Caneria, Professor, VidyaBhavanEducationalResourceCentre, Udaipur, Rajasthan. Dr. A. Nagamani, Professor, UniversityCollegeofScience, Saifabad, Hyderabad. Dr. N. Weedar Reddy, Professor and Head of CT, SCERT., A.P., Hyderabad. 2. ii © government of Andhra Pradesh, Hyderabad. The new edition is first published 2014 Allrightsreserved. No part of this publication can be reproduced, stored in the search system, or transmitted, in any form or anymeanswithpriorpermissioninwritingofthe publisher, nor otherwise circulate in any form of bindingorcoveротheranthatinichitispublished andwithoutasimilarconditionincludingthiscondition imposed on the subsequent buyer. 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Sudhakar, Director, AP Govt.Textbook Press, Hyderabad. Dr. N. UpendarReddy, Professor and Head of CT, S.C.E.R.T., A.P., Hyderabad. Text Book Committee For the Development of Writers Page Cover, Graphics and Design by Sri Ch. Keshav Rao, Lecturer, DIETHanamkonda, Warangal. Sri Pramod Kumar Padhi, SA, FFHS B.R.K. Puram, Sri Srikakula. Sri S.Taj Babu, SA, FTHS Chilcourt, Rangardi. Sri M. Prasad, SA, SPSAKumalya, Kurnool. Smm K. Uma Rani, SA, GHSAmeerpet-1, Jawaharnagar, Hyderabad. 4. iv Intro ... We believe that class-10 education is a key aspect of schooling and a turning point in a student's life. The current textbook on tenth-grade science in your hands is designed in national and state curriculum and the Right to Education Act. This book helps the student concepts that have been learned from the learning experience provided by the school and gain comprehensive knowledge about these cones. Lessons in textbooks are presented in such a way that they help prepare the student for competitive exams, as well as prepare him for secondary education. New science textbooks are specially designed with suitable pedagogy in harmony with the continuous integrated assessment (CCE), which we are now introducing into schooling. These textbooks help the teacher evaluate students' learning during learning processes. They contribute to the effective study of different concepts of science in a scientific method, in addition to gaining knowledge of concepts. It is important to complete the curriculum within the agreed time frame, as students must write an exam in class-10. But don't forget that completing the curriculum means getting students to understand concepts and trying to achieve competency learning. It is mandatory on the part of the teacher to implement teaching strategies like that that makes the student read the content of the textbook, discussion, analysis, laboratory activities, excursions, presentations, etc. The teacher should take special care to avoid the practice of mechanically memorable scientific information from guides and bank questions. Teaching science in a classroom should be a way to encourage children to think and work scientifically. It should also increase the love of nature. Even this should allow us to understand and appreciate the laws governing nature in building so much diversity all around. Scientific learning is not just about discovering new things. It is also necessary to take a step forward without interrupting interconnection and interdependence, along with an understanding of the inner principles of nature. High school children have a cognitive ability to understand the nature and characteristics of the world around them. And they are able to analyze abstract concepts. At this level, we cannot satisfy their acute ability to think with dry equations and theorists. To do this, we need to create a classroom learning environment that enables them to apply scientific knowledge, explore several alternatives in problem solving, and establish new relationships. Scientific training is not limited to just four walls of the classroom. It has some connection to the lab and field as well. Thus, there is great importance for field experience/experiments in teaching science. 5. vFreedistributionbyA.P.Government There is a great need for mandatory implementation of the instructions of the National Curriculum 2005, which emphasizes the linkage of teaching science with the local environment. The Right to Education Act 2009 also proposed that priority achievement of educational competence among children. Similarly, teaching science should be so that it can help cultivate a new generation with scientific thinking. The key aspect of teaching science is that children understand the thinking process of scientists and their efforts behind each discovery. The 2011 State Curriculum states that children should be able to express their own ideas and opinions on various aspects. These scientific textbooks are ready to meet the established standards of the SCF and thus help children to become independent researchers who are able to think intensively from a scientific point of view. The new textbooks are designed to achieve the desired academic standards. Therefore, teachers need to develop different learning learning strategies to make their students achieve class-specific academic standards. We must avoid mechanical training methods to successfully implement continuous comprehensive assessment (CCE). This is very injecting to know more about the different methods of evaluating student progress by summing up and forming grades. The new textbooks reflect a continuous comprehensive assessment and method of learning about the concepts under discussion. This is very useful for teachers and students. In the new textbooks, the development of concepts and activities helps to achieve these academic standards. Teachers should plan appropriate teaching strategies to improve academic standards among students by the end of the lesson. In order to be effectively implemented, continuous integrated evaluation must move away from the methods of mechanically memorable concept. It is necessary that teachers have a good understanding of the evaluation methods that help them in a constructive and comprehensive assessment of children's progress. The new textbooks are not limited to providing the necessary information on concepts. Instead, they focus on new teaching strategies and assessment methods that are very important for both teachers and students. We thank the VidyaBhavan Society, Rajasthan for their collaboration in developing these new textbooks, writers for preparing lessons, editors for checking text questions and DTP group cute essays tutorial. We invite suggestions from educators, teachers, parents, students and others to make this book more meaningful. Teachers play a key role in children's full use of the textbook. We hope that teachers make every effort to properly use the textbook in order to instill scientific thinking among children and inspire them to be great scientists. Director, SCERT, AP, Hyderabad 6. Vi Dear Teachers... NewScienceTextBooksarepreparedinsuchawayattheydevelopchildren'sobservation worksandtheRightEducationActareaspairingtobringgrossroutechangesinscienceteaching. These textbooks are accepted in accordance with this aspiration. Consequently, science teachers must adapt to a new approach in their learning. In this regard, let's observe some Dos and Don'ts: - Thereisanimmediateneedtodiscardthepracticadoptedintheschoolsonalsebelief that teaching 10th grade means preparing children for the state exam. In the 10th grade, the 10th grade wastingshouldfocusonievingtheacademicstandardsrather winningraceofscoringmarks. Avoid practices such as the use of manuals and bank questions, asking children to read only important things, focussingonlessonswhichhelpinscoringmoremarks. Readthelessonthoroughlybeforeyoustartteachingandaskthechildrentoreadthetext. Theninitiateadiscussiontomakethechildren post-topconception. Encouragechildrentoexpresstheirownviewsandideaswhilewritingtheanswers. Give weightagetosuchtypeofwritinginexamination. - Someinstructionsaregiveninthetextbookregardingthecollectionofcertaininformation bytheteacher. Collects informationimakaitaugetos. During the state exam, weight will be given to all aspects of the curriculum. In addition to the preface to the textbook, everything else should be considered as part of the curriculum. Text concepts are presented in two ways: one as teaching in the classroom and the other as laboratory performance. - Labactivitiesarepartandparcelofalesson.So,teachersmustmakethechildrenconduct allsuchactivitiesduringthelessonitself,butnotseparately. - Teachersareadvisedtofollowfollowteachingstepswhiletransactinglessons-mind mapping, reading lessons and identifying new words by children, performing activities, demonstrating, concluding. Inthetext,somespecialactivitiesarepresentedasboxitems:'thinkanddiscuss,letusdo, conductinterview,prepareреport,displayinwallmagazine,participateinTheatreDay,do fieldobservation,organizespecialdays'. Toperformallofthemiscompulsory. The abbreviation (A.S.) listed at the end of each question in the Learning Improvement section indicates the academymicstandard. - Collectinformationofrelevantwebsiteaddressesandpassontostudentsothattheycan to useinternet services. Planandaexecuteactivitieslikescienceclub, elocution,drawing,writingpoetryonscience, making models etc.to a positive attitude among children about the environment, biodiversity, ecologicalbalanceetc. 7. viiFreedistributionbyA.P.Government - As part of the continuous comprehensive assessment, observation and recording of the education of children in active-office, laboratoryandfield. Webelieve,youmusthaverealizedthelearnofscienceandcientithficthinkingare not just drilling lessons, but, in fact, a valuable exercise in motivating children to Correct. Dear students... Studying science does not mean scoring good scores in this topic. Competencies such as thinking and working are also life's work, and life's work is learnedthroughit, and havetobepracticedindaily life. Toachievethis, instead of mechaunisyrifisorote, onemustbeableto studythemanalytically. Thatmeans,inordertounderstheconceptsofscience,youneed toproceedbydiscussing,describing,conductingexperimentstoverify,makingobservations, confirmingwithyourownideasanddrawingconclusions. This textbook tubgelpsyutolehorn that way. What you need to do to achieve these goals: In the 10th grade, the range of concepts is wide. So go through each lesson carefully before the time. Notice the moments you've encountered to better understand the lesson. Think about the principles of the lesson. Identify the concepts you need to know further to understand the lesson in depth. - Donothesitatetodiscussanalytically aboutthequestionsgivenunderthesub-heading 'ThinkandDiscuss'withyourfriendsorteachers. Youmaygetsomedoubtswhileconductinganexperimentordiscussingaboutalesson. Express-free and nuclear. Plan to conduct experiments/laboratory periods with teachers to understand concepts clearly. By studying experiments, you can learn many things. - Observehoweachlessonishelpfultoconservenature.Putwhatyouleарntintopractice. Analysis of howeachteachingpointhasrelationwithdailylifeanddissthethingsyou learned in your science class with farmers, artisansetc. Work in a group during interviews and excursions. Reporting is mandatory. Discuss the report. Listouttheobservationsregardingeachlessontobecarriedthroughinternet, school library. Livnothukodorexam, to writeanalytic, expressinginopinions. Read books related to your tutorial as much as you can. - YouorganizeyourselfTheScienceClubprogramsinyourschool. - Observeproblemsfacedbythepeopleinyourlocalityandfindoutwhatsolutionsyou cansuggestthroughyourscienceclassroom. 8. VIII ACADEMIC STANDARDS S.No. Academic Standard Explanation 1. 2. 3. 4. 5. 6. 7. Conceptual understanding By asking questions and making hypothesis experiments and field studies. Information skills and communication projects through drawing, model solutions Appreciation and aesthetic meaning, values Application to everyday life, concern for biodiversity. Children can explain, give examples, give reasons, give comparisons and differences, explain the process of the concept in the textbook. Children can develop their own brain maps. Children can ask questions to understand, clarify concepts and participate in discussions. They are able to make hypotheses on this topic. To understand these concepts in the textbook, children can do experiments on their own. can participate in and report on field investigations. Children can collect information (through interviews, the Internet, etc.) and conduct systematic analyses. They can do their own design work. Children can explain their conceptual understanding by drawing shapes and making patterns. The ability to chart with this information or the data collected. Children are able to appreciate the power and nature of man, and have an aesthetic sense of nature. They can also follow constitutional values. Children can use the scientific concept to confront their daily life situation. They are able to be concerned about biodiversity. 9. ixFreedistributionbyA.P.Government 22222 3333 4444 55555 66666 77777 88888 99999 1010101010 Nutrition - Food supply of the respiratory system - Energy-saving system Transport - Highlighting the circulatory system - Coordination of the loss disposal system - Communication of the System Reproduction - Coordination of the generating system in life processes Our Environment - Our Concern Natural Resources Heredity - From Parent to Offspring 10 June 10 June/24 July 10 July 10 August 74 10 September 94 94 October 15 116 10 November 144 December 15 166 January 10 193 February 10 212 Page No.Periods Month INDEX 11111 10. x our NATIONALANTHEM - RabindranathTagore Jana Mana adhinayaka Jaya he Bharat bharaha vidhata! Punjab Sindh Gujarat Maratha, Dravid Utkala Banga! Windhya Himachal Jamun Ganga, Uchchal Jaladhi Taranga! Tawa Shubha name jage! Tawa Shubha asisha magician! Gahe tawa jaya gatha! Yana Gana manga dayaka jaya he! Bharata bhagyya vidhata! Jaya he! Jaya he! Jaya he! Jay Jay Jay Jay Jaya Jaya he! PLEDGE India is my country; all Indians are my brothers and sisters. I love my country and am proud of its rich and diverse heritage. I will always strive to be worthy of it. I will give my parents, teachers and all elders respect, and treat everyone with courtesy. I'll be kind to the animals. I declare my devotion to my country and to my people. It is only in their well-being and prosperity that my happiness lies. 11. FreedistributionbyA.P.Government 1 Nutrition - Food nutrition is needed by all living organisms mainly for growth and repair. Some organisms need food to maintain body temperature as well. Alarge variety of substances are taken as food from single-celled organisms, like amoeba for complex multicellular organisms like the human body. Even with in humans, cells require a wide range of substances as food. The way food is purchased also varies from cell to cell and body to body. You've studied in previous classes how different organisms get food. Let's remember some of them. How do heterotrophs get food? How do autotrophs get food? Consider autotrophic and Ways to power food find out why most plants are called autotrophes. Autotrophic Nutrition We know that autotrophs are organisms capable of using light energy to synthesize chemical compounds. They acquire nutrients such as certain minerals and water from the soil, as well as some gases from the air. They are capable of producing complex compounds such as carbohydrates, proteins, lipids, etc. from these very simple substances. These compounds, produced by them, are used to provide energy to most living organisms and all animals, including humans. Most of the things we eat are derived from plants. Even if we depend on animal products, we find that these animals depend on chapter 12. Nutrition - Food System2 X Class Fig-1: Photosynthesis of oxygen sunlight water carbon dioxide plants for their nutrition. But what plants use to perform their life processes? Scientists have been working for centuries to find out how plants perform these life processes. We know that among all life processes, the process of photosynthesis makes plants a universal food supplier for all living organisms. You studied something about photosynthesis in your previous classes. Von Helmont and other scientists believed that plants get their food material not only from soil, but also from other sources. Can you remember the raw materials needed for photosynthesis? What could be the ultimate product of the photosynthesis process? Let's take a closer look at the photosynthesis process to learn more about it. Photosynthesis Photosynthesis is the process by which plants containing the green pigment chlorophyll build complex organic molecules from relatively simple inorganic, using sunlight as an energy source. The process of photosynthesis is very complex. There are several steps in it and several intermediate connections are formed. Over the past 200 years, scientists have tried to formulate a simple equation for photosynthesis. An equation that was easily accepted and still widely used is one formulated and proposed by C.B. Van Neill in 1931, which is the following. In his opinion, for each molecule of carbohydrates one molecule of water and one molecule of oxygen is formed. This is a very simplistic equation and does not reflect the complexity of the photosynthesis process, but we will use it now. CO2 - 2H2 0 CH2 O and H2 0 - O2 What will be the reaction to show that glucose (C6 H12 O6) is synthesized? Write down a balanced equation to show it. (Refer to chemical equations and reactions, carbon and its compound heads). Light chlorophyll 13. FreedistributionbyA.P.Government 3 Do you know? Van Nile first worked on purple sulfur bacteria and found that light plays a role in photosynthesis. Instead of H2 O, they used the H2 S as the source material. no oxygen is released during photosynthesis photosynthesis elementary sulfur has evolved. Later he foresaw a similar process of plant photosynthesis and proposed the aforementioned equation. Robert Hill later revealed the O2 was being released from the water. The equation was then changed as follows (changes are still made). 6CO2 and 12H2 0 C6 H12 O6 and 6H2 0 6O2 Light Chlorophyll It is known that plants synthesize carbohydrates, the less at first simpler and more simple from them, the more complex plants such as starch and cellulose. Plants are also able to synthesize all other compounds such as proteins, fats, etc. Beasts are not able to synthesize carbohydrates and they must depend on plants for the same. Can we say that photosynthesis is the main source of energy for most of the living world? Why, why not? Consider the presence of carbohydrates in parts of plants. Activity-1 The presence of starch (a type of carbohydrate) in the leaves Let's take a leaf from the plant (we can choose such plants that have soft thin leaves) well exposed to sunlight. Arranage, as shown in the picture. A glass of boiling water sheet methylated alcohol of the oily alcohol of the gauze tripod stand boiling tube bunsen burner Petridish iodine solution fig-2 (a): Leaf boiling in methylated alcohol fig-2 (b): iodine test 14. Nutrition - The 4th class food system boils the sheet in methylated alcohol in a water bath. It turns pale white due to the removal of chlorophyll. Watch the sheet. Take the sheet carefully from the test tube with the help of a brush. Spread the leaves into the petridin and add a few drops of iodine tincture/betadine solution on it. What do you see? The presence of starch will be marked blue-black. Do you think that solar energy turns into chemical energy in the process of photosynthesis? Try to do the same test on a leaf of plant in pots stored in the dark for 10 days to check the effect of sunlight. Materials necessary for the process of photosynthesis What materials do you think will be necessary for the synthesis of carbohydrates during photosynthesis? (Hint: Equation proposed byVan Neil) - Do you think the equation tells us about all the materials? It took scientists more than 300 years to learn about them. We still do not know about several materials involved in this process. Consider how scientists experimented to learn about some of the materials needed for photosynthesis. Water and photosynthesis In Class VII we've already studied howVon Helmont discovered that water is needed to increase plant mass. At the time, he didn't know about photosynthesis. Later it turned out that the increase in body weight or material was due to the process of photosynthesis. We'll learn more about this in the following sections. Read the chapter on Eating in Plants in Class VII to discuss with friends and write a note about von Helmont focusing on how it came to the conclusion that water is essential for plant growth and weight gain. Air and photosynthesis Let's discuss the experiment on photosynthesis. We have studied some experiments in our previous classes. This helps us learn about the role of air in photosynthesis. It is interesting to learn about the experiment, which became one of several majors in the gradual development of our understanding of photosynthesis. Joseph Priestley (1733-1804) conducted a series of experiments 15 in 1770. FreedistributionbyA.P.Government 5, which showed a significant role of air on the growth of green plants (photosynthesis was not yet known to scientists at the time). You may remember, oxygen was invented later by Lavoisier in 1775. The priest noticed that the candle burning in the closed can of the bell was soon extinguished. Similarly, the mouse will soon suffocate in the enclosed space of the bell jar. Heconcludedthata burncandleorananimal, somehow, air damage. When he placed the mint plant in the same cans of the bell, he found that the mouse was alive, and the candle in the outside continued to burn in the presence of the mint plant. The priest suggested: The plants restore the air that the animals breathe and the burning of candles are removed. What did Priestly do to enter the mint plant without breaking the experimental setting? How did he light a candle from the outside? Pristea's experiment confirmed that gas-sonic exchange occurs and plants produce gas that supports burning and is essential for animal survival. But how do plants take in the air and use carbon dioxide for photosynthesis and oxygen for breathing? How do they make choices? A huge amount of gas exchange occurs through the stomat (usually present in the leaves) until they are open. While plants also conduct a gas exchange through loose tissues on stems, roots, etc. Activity-2 Carbon dioxide is needed for photosynthesis We need a destarched plant to begin with. For destarching we need to keep the plant in the dark for almost a week to remove starch (destarching) from the leaves. Arrange the machine, as shown in the picture. Take a wide oral transparent bottle. Fig 3: Sacred Experiment 16. Nutrition - Class 6 X Nutrition System - Put potassium hydroxide or potassium hydroxide solution in a bottle. Potassium hydroxide absorbs carbon dioxide. Insert a broken cork into the mouth of the bottle. Insert one of the leaves of the grated plant (through a cork) into a transparent bottle containing potassium hydroxide dioxide pellets/potassium hydroxide solution. Leave the plant in After a few hours check this leaf and any other leaf of this plant for starch. As mentioned in Activity-1. The leaf exposed to atmospheric air becomes bluish-black, and the one inside the flask containing potassium hydroxide, which absorbs the carbon dioxide in the bottle, turns brown rather than blue-black, showing this caronoxidefortosynthesis. Why was the plant kept in the dark and then in the sunlight? Why did we study the two sheets in this experiment? So far we have discussed the role of water and gases in the process of photosynthesis. The scientist who worked on these lines observed some other factors that affect the process of photosynthesis. Light and photosynthesis in Priestley's time scientists did not understand about energy, but later much was discovered about it. If energy is released when carbon dioxide and water are generated by combining oxygen with carbon and hydrogen, then what about the opposite?. How about forming oxygen again and putting it back in the air. Eventually, the scientists learned that the energy situation would also change. Oxygen formation will use energy. This means that if the plants fig-4: Mole half of the leaves of the experiment KOH wide mouth bull split cork plant blue black (starch formed) no starch 17. FreedistributionbyA.P.Government 7 funnel test tube glass of oxygen water hydroilli plant fig-5: Hydrilla experiment form oxygen they need to get energy to make this possible. Where did the energy come from? The answer was found by Adutz scientist Jan Indgenhush (1730-1799). He made a 200s of how plants form oxygen. In 1779, he noticed that this only happened when there was light. In an experiment with a aquatic plant, Hydrilla, he noticed that in bright sunlight, small bubbles form around green parts while in the dark they do not form. He also found that the gas present in the bubbles was oxygen. This was confirmed when Engelman in the early 20th century ingeniously discovered the point of maximum speed of photosynthesis. He used a strand of algae and exposed it to different colors of light (the colors we see in the rainbow) then he used oxygen-sensitive bacteria and found that they crowded around areas illuminated by red and blue rays of light. This has led to more research on the effects of light on photosynthesis, the role of various colored compounds called pigments in plants and the use of light energy. Oxygen is produced during photosynthesis in the presence of light and streamlined the device, as shown in the picture. Make two identical sets. Place some aquatic plants such as Elodea or Hydrilla in a short stem funnel and keep it in a glass containing water. Turn the test tube, full of water, over the stem of the funnel. Make sure the water level in the glass is higher stem of an inverted funnel. Place one machine in the sun and others in the dark for at least

2-3 hours. You will see that instead of water there is air that fills the created stored in the sun. In fact, it is a gas that will be collected in a test tube. Watch as the other setting is stored in the dark. Is there a difference in the amount of gas collected? Check the gas in the test tube by inserting a glowing match stick or a incense stick that would catch fire. This shows the presence of oxygen. What precautions do you need to remove the test tube from the glass. Discuss with your teacher. LabActivity Bubbles 18. Nutrition - Food System8 X Class Activity-3 Sunlight is needed to form starch in green fig plants-6: Black paper experiment Remember the process of destracting the leaves mentioned in activity-1. Coveroneofitsleaveswithblackpaperonwhichadesigniscut.Fixthe paper on a sheet so that light does not enter the dark part. After a few hours of exposure to bright sunlight, check the sheet that is covered with black paper for starch. Which part of the sheet turns blue black? What about the rest? Observe the color of the leaves stained with iodine. Can you tell why it is painted differently? It will be noted that only parts of the sheet that could get light through the cut-out structure, become blue-black, showing the presence of starch. Chlorophyll and photosynthesis Ingenhush wanted to know more about photosynthesis and conducted several more experiments. He suggested that the process of photosynthesis can be carried out only by green parts of plants. What about plants with colored leaves? How is it that new leaves that look dark red in several plants turn green? Do photosynthesis of plants with reddish or yellowish leaves? What caused the plants to carry out photosynthesis, while even green animals (like some birds) could not? Such questions remained a problem until scientists were able to isolate the green matter from plant parts and study its nature. 19. FreedistributionbyA.P.Government 9 The creation of the Ingenhousz proposal came after several experiments until the mid-20th century, when scientists could also find the place of photosynthesis and even isolate it. About four decades after Ingenhushs was proposed, scientists were only able to isolate the green matter to observe its nature and find out if it was possible to conduct photosynthesis with it. This was made possible in 1817 thanks to the work of two scientists Pelletier and Cavento, who received the extract of the green color of the substance and called it chlorophyll means green leaf. It has also been found that pigments other than green can also help in the process of photosynthesis by transmitting sunlight energy trapped by their chlorophyll. But but chlorophyll and other pigments are present in the plant? Where does photosynthesis take place? Try to name a few parts where you think photosynthesis is happening. Do you think the new reddish leaves of plants also carry out photosynthesis? What could be the role of their color? The exact location of the photosynthetic part or part containing chlorophyll was not known until six decades after Pelletier and Caventou discovered chlorophyll. It was believed that it spreads in the cells of green parts of plants. In 1883, Julius Von Sachs noticed that chlorophyll in plant cells did not spread throughout the cell. It's more likely to be in the organelles inside the cell. Such organelles were called chloroplasts. They are present in large quantities in cells (about 40 - 100) parts such as stomatal guard cells and terrestrial plant tissue. You studied chloroplast in 9th grade. Let's watch the figure. Fig-7 (a): T-S leaf cuticula top epidermis palisade parenchyma xylem phloem air-space cell lower epidermis stomata spongy parenchyma 20. Nutrition - Food System 10 X Class Fig-8: T-S chloroplast membrane stroma pellets of glocooid lipid and starch grainloop DNA - What makes chloroplast appear completely different from other cellular organelles? Do you know? If the cell is broken, chloroplasts are also broken into pieces, so it becomes very difficult to isolate them to study different stages of photosynthesis. It was not until 1954 that Daniel I.Arnon was able to break down plant cells so gently that whole chloroplasts could be obtained that could carry through photosynthesis. It has been found that chloroplast is a membranous structure consisting of 3 membranes. The third layer forms a folded bag-like structure called pellets. It is believed to be a place to capture solar energy. The filled fluid-mediator is called a stroma. It is believed to be responsible for ensimatic reactions leading to glucose synthesis, which in turn combine to form starch. Substances found in chloroplast that capture sunlight are called photosynthesis pigments. There are several types of photosynthetic pigments involved in the production of organic molecules such as glucose in plants. Chlorophyll is a pigment that contains one atom of megnisia. In structure, it looks like haemoglobin. (Iron containing red pigment, which is transported by oxygen in the blood.) The two main types of chlorophyll are associated with tilacole membranes. Chlorophyll 'a' blue-green and chlorophyll 'b'is yellow-green. About 250 to 400 pigment molecules are grouped as a light-cleaning complex or photosynthetic block in each pellet. Such innumerable units function together in green chloroplasts during photosynthesis. During photosynthesis some of them in chloroplast: 1. Conversion of light energy into chemical energy 2. The splitting of the water molecule 3. Reducing carbon dioxide carbohydrates Light is required to initiate several events, and some of them may continue eveninabsenceofit. Thatwouldmean,oncelightenergyhasbeencaptured it can help the reaction continue even in the dark. Light-dependent events 21. FreedistributionbyA.P.Government 11 or reactions are called light reactions, and they have been found to occur in Grana, while the rest are called light independent or dark reactions, and they occur in the strome. Photosynthesis mechanism 1. Light-dependent reactions (photochemical phase) In this reaction light plays a key role. A series of chemical reactions occurs in a very fast sequence initiated by light, and therefore the phase is technically called photochemical phase or light-dependent reactions. The light reaction occurs in chlorophyll containing tilacoids called chloroplasts. Several steps occur in light-dependent reactions. Step-I : chlorophyll is activated by absorbing photons when exposed to light energy. Step-II: Energy is used in dividing the water molecule into two components of ions called hydrogen (H), hydroxyl ion (OH-). H2 O H' OH- Reaction is known as photolysis, which means splitting with light (photo means light, lys means disruption). Hill found out. So it's also called Hill's reaction. Step III: High-reactive water ions undergo rapid changes as described below. OH- ions through a series of steps produce water (H2 0) and oxygen (O2). Water can be used by the plant inside, but O2 is used in the atmosphere. IONS XH undergoes a number of changes in the dark reaction. compounds that can trap energy like ATP (Adenosine Three Phosphate) and NADPH (NicotinamideAdenosine Dinucleotide hydrogen phosphate) are formed at the end of the light reaction. 2. Light independent reaction (biosynthetic phase) This reaction does not require the presence of light and the expansion of phases after daylight time can occur in some plants (the gap in time between them is less than one thousandth of a second) and sometimes even in the dark. It's also called a dark reaction. But the term dark reaction or light independent reaction does not mean that they occur when it is dark at night. This only means that these reactions are not dependent on light. The ions produced in the photolysis are immediately selected by a special NADP compound to form NADPH. In the dark phase, NADPH hydrogen is used to combine it with CO2, using ATP energy and producing glucose 22. Nutrition - Class 12 X (C6 H12 O6). This synthesis occurs in a number of steps using certain special intermediate compounds (mainly RUBP-Ribulose encore phosphate) and enzymes. Finally converted to starch. Plants are able to survive in a variety of situations, from very hot, dry and brightly lit conditions to wet, moist and dimly lit. The need for light and other factors varies from one plant to another. Heterotrophic food Inthelivingworldallorganismsarecapablevivingunderdifferent conditions and acquring their food in different ways. We have studied about organisms that can capture light to produce food. They are autotrophied by nature. While those that may not be heterotrophic. How organisms get their food Depending on the type and availability of food organisms can assort to a number of eating and use strategies. Some organisms break food materials outside the body and then absorb it. For example, bread forms, yeast, mushrooms, etc., which are called saprophytes. Some other organisms are fed from plants or animals without killing them. This type of parasitic nutritional strategy is used by a wide range of organisms like Cuscuta, lice, leaching and tape worms. Others take all the material and smash it inside their body. What can be accepted and broken depends on the body design and its function. Since food and the way it is produced is different, the digestive system is also different in different organisms. In single-celled organisms, such as amoeba, food can be taken across the surface, but as the body becomes more complex, different parts become specialized for different functions. For example, the fig-9(a) amoeba takes food using a temporary finger as an extension (pseudo-under) the surface of cells that merge over the food particles that form the food vacuole. Inside the food wacuole, complex substances are broken down into simpler ones. Then scattered into the cytoplasm. The remaining undigested material is moved to the surface of the cell and discarded. In the fig-9(b) paramoecum, which is also a single-celled organism, the cell has a certain shape. Food is taken in a certain place. The food is moved to the place by the movement of the cilia, which covers the entire surface of the cell where the food gets (cytost). Fig-9 (a): Nutrition in Ameoba fig-9 (b): Nutrition in Paramoecium 23. FreedistributionbyA.P.Government 13 figs-11: Alimentary channel human figs-10: Haustoria's cuscuta absorbs food through haustoria. They are root structures that penetrate into the tissues of the host plant and can kill it. Slender, string-like dodder stalks can be yellow, orange, pink or brown. Its leaves are reduced to tiny scales. Doddder flowers, in nodules like clusters, consists of tiny yellow or white bell-like petals. The dodder seed germinates to form an anchor root, and then sends a thin stem that grows in a spiral until it reaches the host plant. Then he twineed around the stem host the plant and forms a haustoria that penetrate through it. Water stretches through the haustoria from the host plant's xylem, and nutrients are taken from its phloem. Meanwhile, the root rots away after contact of the stem has been made with the host plant. As the dodder grows, it sends out a new haustoria and settles very firmly at the host plant. After growing a few spirals around one master's shoot, the dodder finds his way to another, and he continues the twine and branches until he resembles a fine, tightly tangled network of thin stems enveloping the host plant. Identify plants in your environment that parasitize on other plants. The parasitic diet in Cuscuta Dodder (born Cuscuta) is a leafless, twin, parasitic plant belonging to the family of morning glory (Convolvulaceae). The genus contains about 170 species of twins, which are widespread in all temperate and tropical regions of the world. Thedoddercontainsnochlorophyll (Cuscutareflexahasbeen found that very small amounts of chlorophyll) and instead of feeding in humans the human digestive system is very complex in nature. Different parts are involved and perform different functions using different digestive juices and enzymes. Let's observe the figure of the digestive system and outline the details. The alimentary canal is basically a long tube stretching from the mouth to the anus. We see that this tube has different parts. Different regions specialize in different functions. What happens to food as soon as it enters our body? 24. Nutrition - Nutrition System14 X class We eat different types of food that must pass through the same digestive tract. It also needs to be converted into substances small enough to be used by our body. This requires different processes that can be explored as follows. Passage of food through the alimony channel or intestines Food is cut and crushed by teeth in the mouth and mixed with saliva to make it moist and slippery (also called masting). Saliva is excreted by three pairs of salivary glands. Two pairs are located on the side of the jaw and below the tongue. One couple is located in the room. Saliva mainly contains the enzyme amylase (pthialine), which helps in the breakdown of complex carbohydrates Food in the form of a mild mucous substance, where some proteins are called chyme. Now the food material goes from the stomach to the small intestine. Here the ring is how the muscles are called pyloric spincters relax to open the passage in the small intestine. The spinters are responsible for regulating the opening of the passage so that only a small amount of food material can be transferred to the small intestine at a time. Fig-12: Buccal cavity of the palate salivary ducts of salivary glands Fig-13: Peristaltic movements bolus peristalytic stomach wave esophagus to simple. Language helps in mixing mixing and pushing it into the next part. The lower jaw also helps throughout the process. We can figure out the effect of salivary amilasers on carbohydrates to observe what can happen in the mouth. Activity-4 - Link to activity - 7 saliva action on wheat flour in the chapter Coordination of life processes. This is the way with our body. You can also perform activities using Ganji (boiled rice water) Soft food mixed with saliva running through the esophagus or food pipe wave-like movements called peristalistic movement in the stomach. In the stomach, the food gets foamed with gastric juice and HCl. Now the food is in a semi-solid state. The digestion of food continues, as most proteins are broken down into smaller molecules using the enzyme pepsin acting on them. language 25. FreedistributionbyA.P.Government 15 Thin Bowel is the longest part of the alimony channel. It is a place for further digestion of carbohydrates, proteins and fats. To do this, he receives secretion of the liver and pancreas. These juices have an internalconcy of theoftheintestinegraduallyabasicoralkalineone. Fatsaredigestedbyconvertingthemintosmallglobulelikeformsbythe helpofthebilejuicesecretedfromliver. It's a process of sussymaning. The juice of the pancreas, secreted from the pancreas contains enzymes such as trypsin to conduct the process of digestion of proteins and lipases for fats. The fine bowel wall secretes the intestinal juice, which carries this process further, that small protein molecules are broken down into further smaller molecules. The same condition with fats. Carbohydrate digestion, which started in the mouth and did not occur in the stomach, resumes now as the environment gradually turns into an alkaline one and enzymes become active for the breakdown of carbohydrates. Activity-5 Enzyme Study Chart Let's bekim a diagram showing different enzymes and digestive juices and their function. Table-1: Some Enzymes and Juices Of The Bowel Enzyme / Substance Ptyalin (salivaryamylase) Pepsin Bile (No Enzymes) Amilase Trypsin Lipase Peptidases Sucrose S.No. 1 2 3 4 5 6 7 8 Secreted Salivary Glands of the Pancreas Pancreas Pancreas Pancreas Pancreas Iron Small intestine Small intestine Digestive juice Saliva gastric juice bile juice bile juice of the pancreas juice of the pancreas juice of intestinal juice intestinal juice intestinal juice intestinal juice acting on carbohydrates proteins fat Karbhhydrates proteins peptides peptides sucrose (cane sugar) Products Dextrins and maltose Peptones Emulification breakdown largef. Nutrition - X-class nutrition system - Which juice does not contain enzymes? What the enzymes that act on proteins? The transport of digestive products from the intestines to the bloodstream (through the intestinal wall) is called absorption. Internally, the intestinal wall has a row of fingers, like a projection called a wheelie. Willie increase the surface area for absorption. Blood vessels and lymph vessels are present as a network in the wheelie. Digestive products are absorbed first into the wheely, and hence into the blood vessels and lymph vessels. At the same time, after the maximum absorption of food in the small intestine, the rest are in the colon. Here most of the water is being taken from this material. This material is then banished through the anus, which is the last part of the child support channel. This passage of undigested material from the body by anus is called defecation. Food that comes out of the anus still contains a significant amount of protein, fat and carbohydrates, rough edges or fibers of carbohydrates or proteins. We learn a few more points about coordination about the digestive system with other systems in the chapter of coordination in life processes. Chart of the flow of the human digestive system - What do you think is the process of digestion? What are its main steps? Food Roth Buccal Cavity Pharynx Heart Stomach Piloric Stomach Oesophagus Duodenum Small Gut Anus Pancreatic Pancreatic Health aspects of the alimony channel of the human child support channel usually functions remarkably well, given how poorly we treat it in some cases! Sometimes it's riots and we either feel sick or indigestion. 27. FreedistributionbyA.P.Government 17 Vomiting is a method of the body getting rid of unwanted or harmful substances from the stomach. The peristaltic movements of the stomach and oesophagus change their normal direction and the food is banished. There are many causes of vomiting, but one of the most common is more eating, especially when food contains a high proportion of fat. Vomiting also occurs when we eat something very uncomfortable or poisonous. When we have greenish vomit commonly referred to as bile or live, we get a bitter taste, and this is often the result of being eaten by rich dishes for a few days. The liver is unable to cope with excessive fat and we get a feeling of nausea. Indigestion is a common term used when there are difficulties in digesting food. Healthy people can usually avoid digestive problems: a) having a simple, well-balanced food b) eat them in a leisurely manner in) carefully masticating food d) avoiding taking violent exercise soon after eating e-food) Drinking plenty of water and having regular bowel movements. A more serious form of indigestion and duodenal ulcers. These conditions are more common in people who may be described as hasty or more often found in busy people who get into the habit of hurrying for food and rush from one event to another without enough rest. Those who are able to relax, who do not constantly strain, and who live at a slower pace, rarely get ulcers. You have studied the latest research into ulcers caused by some bacteria in Class IX. Proper functioning of all life processes requires sufficient food in all living organisms. Not only food consumption plays an important role, but also its assimilation and disposal of waste. When taking fiber-rich foods avoid constipation. Diseases due to poor nutrition We know that food is the main source for maintaining biological processes in an ideal manner. Our diet should be balanced, which contains a sufficient amount of carbohydrates, proteins, vitamins, mineral salts and fats. Two thirds of the world's population suffers from food-related diseases. Some of them suffer from consuming high-calorie food. Most of them face a variety of diseases due to lack of a balanced diet. It is very important to discuss food deficiency diseases. 28. Nutrition - The Nutrition System18 X Class Food Nutrition, which does not have one or more of one nutrients in the required amount, is known as poor nutrition. Poor health, will be full of hunger, lack of awareness of eating habits, socio-economic factors all cause of poor nutrition in our country. Mal power of three types 1. Calories of malnutrition, 2. Protein malnutrition, 3. Protein caloric malnutrition. Let's observe the harmful effects of poor nutrition in children. 1. quaciocorcoror disease: This is due to protein deficiency in the diet. Parts of the body are swollen due to the accumulation of water in the intercellular spaces. Very poor muscle development, swollen legs, fluffy face hard to eat, diarrhea, dry skin are symptoms of this disease. 2. Merasm: This is due to a deficiency of both protein and calories. Typically, this disease occurs when there is an immidiate of a second pregnancy or re-birth. Lean and week, swelling of the limbs, less devoloped muscles, dry skin, diarrhea, etc., are symptoms of this disease. 3. Obesity: This is due to excessive eating and excess energy in the take. This is a great health hazard. Obese children when growing, they will be the target of many diseases like diabetes, cardiovascular, kidney, gallbladder problems. Discuss junk food and other eating habits that lead to obesity. Vitamin deficiency vitamins are organic substances. They are micronutrients necessary. In fact, in fact, we don't usually suffer from vitamin deficiency. A source of vitamins for our body through two ways. One of them is and another bacteria present in intestain that synthesizes and supplies vitamins to the body. Vitamins are classified into two groups. One is water water vitamins (complex, vitamin C) and other fat-soluble vitamins (vitamin A, D, E and K). Letusstudythefollowingchartshowvitaminsavailablesources and disease deficits. Fig-14: Kwashiorkor figs-15: Merasmus fig-16: Pellegra 29. FreedistributionA.P.Government 19 Vitamin cereals, oil seeds, vegetables, milk, meat, fish, eggs. Milk, eggs, liver, kidneys, green leafy vegetables. Kidneys, liver, meat, egg, fish, oil seeds. Cereals, oil seeds, vegetables, milk, meat, fish, eggs, liver. Synthesized by bacteria present in the gut. Liver, meat, eggs, milk, fruits, cereals, leafy vegetables. Sweet potatoes, ground nuts, vegetables, liver, kidneys, egg. Pulses, nuts, vegetables, liver, milk, kidneys. Green leafy vegetables, citrus fruits, sprouts. Leafy vegetables, carrots, tomoto, pumpkin, papaya, mango, meat, fish, egg, liver, milk, cod liver oil, shark liver oil. Liver, egg, oil, cod liver oil, shark liver oil, (morning sun rays). Fruits, vegetables, sprouts, meat, egg, sunflower oil. Green leafy vegans, milk. Bury Berry Glossit Pellagra Anemia Paneva anemia Burning feat Nerves disorder Tsingy eyes, skin disease Ricket Fertility disorder blood clotting vomit, seizures, loss of appe-tit, difficulty breathing, paralysis. Mouth cracked in the corners, red and sore tongue, lightphobia, scaly skin. Dermatitis, diarrhea, memory loss, scaly skin. Hyper irritability, nausea, vomiting, seizures. Lean and a week, less appetite. Diarrhea, loss of white blood cells, problems with bowel mucus. Problems with walking, sprains. Fatigue, mental depression, muscle pain. Delay in wound healing, broken bones. Night blindness, xeropthalmia, corneal failure, scaly skin. Improper bone formation, knocknees, swollen wrists, denture delays, weekly bones. Sterility in men, abortion in women. Delayed blood clotting, bleeding. Resources Disease Deficit Symptoms of Thiamine (B1) Riboflavin (B2) Niacin (B3) Pyridoxine (B6) Cyanokobalamin (B12) Folic acid Pantothenic Acid Biotin Ascorbic Acid (C) Retinol (A) Calciferol (D) Tocoferol (E) Phylloquinone (K) 30. Nutrition - Food Nutrition System20 X Class Glucose Keywords, starch, cellulose, chloroplast, grana, strom, light reaction, dark reaction, heterotrophic food, parasitic nutrition, dehydration, alimony canal, salivary glands, peristaltic movement, amylase, ptialine, pepsin, chim, sphincter, digestion, pancreas, enzymes, willis, bile juice, lipa. - Autotrophynutationinvolvestheintakeofsimpleinicmaterialslikesomeminerals, water from the soil. Somegasesfromtheair.ByusinganexternalenergysourcelikeSuntosynthesis complexhighenergyorganicmaterial. Photosynthesis is the process by which living plant cells containing chlorophyll (glucose-starch) fromCarbondioxideandwaterbyusinglightenergy.Plantsrelease oxygen as a waste product product Photosynthesis. The photosynthesis process can be represented as 6CO2 and 12H2 O C6 H12 O6 No6H2 O'6O2 - Thematerialsrequiredforphotosynthesislight:Carbondioxide,Water, photosyntheticpigment chlorophyll. In the storm region there is chloroplastythethotesotosynthesis. Lightreactiontakesplaceinthegranaregionandlight independent reaction. The final products of photosynthesis are glucose water and oxygen. During photosynthesistheumportantevents, which areoccursinthechloroplastare a) Conversionoflightenergyintochemicalenergy b) Splittingmocenumole c) Reducing carbon dioxide on carbohydrates - Heterotrophic Nutricianuconconconcompororial. The form ofofnutritiondiffersdependingonthetypeandavailability of foodmaterialaswellashow it is obtained by the body. In single-celled organisms, food can be taken over the entire surface, but as the complexity of theorganismincreascreasdifferpartsbecomesspecializedtoperformdifferfunctionctionctionctionctionctionctionctions. Large complex food molecules, such as carbohydrates, proteins, lipids, etc., are broken down into simplemolecula pre-ayorbearbedandylized bytealima. It's a process of downofcommoleculesintosimplemlemculeiscalleddigestion. - Inhumanbeingsthefoodeatenisbrokendowninvariousstepswiththehelpofenzymessecreted bydigestiveglandswhichareassociatedwiththealimentarycanalandthedigestedfoodisabsorbed insmallintestinetobesenttoallcellsinthebody. What we learned light Chlorophyll 31. FreedistributionbyA.P.Government 21 Improving your learning - Thedigestivesystemincludesthealimentarytractandseveralassociatedorgans.Thefunctionsof systemareasfollows: a) Eating b) Digestion: Breakingupofcomplexfoodsubstancesintoesimplesimplesesimplesesimplesesimplesesimplesesimplesesses. So they can be used by the body. c) Absorption: Thepassageofdigestedfoodthroughthewallsofalimentarytract (particularly insmallintestine)incirculatorysystem. d) Defecation: the passage of undigested material from the body by anus. 1. Writedifferencesbetween (AS1) (a) autotrophicnutrition-heterotrophicnutrition b) Reception-digestion c) Light reaction - dark reaction d) chlorophyll-chloroplast 2. Give Reasons (AS1) (a) Why is photosynthesis considered the main source of energy for most of the living world? b) Why it is better to call the dark phase of photosynthesis a light independent phase? Why should a plant be deciphered before conducting any experiment on photosynthesis? d) Why is it) Why is it a very practical de-demonstration? 3. Giveexamples (AS1) a)Digestiveenzymes b)Organismshavingheterotrophicnutrition c)Vitamins d) Food Deficiency Diseases 4. Where do plants get every raw material they need for photosynthesis? (AS1) 5. Explain the concentrations of coforatrophy and octaitabybiproducts? (AS1) 6. 7. What are the three final products of photosynthesis? (AS1) 8. What is the binder between light reaction and dark reaction? (AS1) 9. Most leaves have the top surface more green and shiny than the lower ones, why? (AS1) 10. Explain the structure of the structureoflochloroplastitatanateanatlylabelenensk. (AS1) 11. What is the role of acid in the stomach? (AS1) 12. Whatisthefunctionofdigestiveenzyme? (AS1) 13. How the small intestine is designed to absorb overcooked food, explain. (AS1) 14. How are fats digested in our bodies? Where does this process take place? (AS1) 15. What is the role of saliva in food digestion? (AS1) 16. What will happen to the digestion of protein, as the intestinal environment gradually becomes alkaline? (AS1) 17. What is the role of roughness in the child support track? (AS1) 18. Whatismalutritionexplainsomenutritiondeficiencydiseases. (AS1) 19. Howdonongreenplantssuchasfungiandbacteriaobtaintheirnourishment? (AS2) 20. If we continue to increase the concentration of CO2 in the air, what will be the rate of photosynthesis? (AS2) 32. Nutrition - Power System22 X Class 21. Whathappenstoplantiftherateofrespirationbecomesmorethantherateofphotosynthesis? (AS2) 22. Why do you think carbohydrates are not digested in the stomach? (AS2) 23. What process do you follow in your lab to study the presence of starch in the leaves? (AS3) 24. How would you demonstrate that a green plant releases oxygen when exposed to light? (AS3) 25. Visitadoctorandfindoutkeepinginviewofdigestion.Prepareachartanddisplayinyourclassroom. (AS4) i) What condition should the patient become a glucose dropper. (ii) As long as the patient must be given glucose. How glucose helps the patient recover. 26. If there were no green plants, all life on earth would be over! Comment? (AS5) 27. Drawaneatlylabeleddiagramofchloroplastfoundinleaf, andit'sroleinphotosysthesis? (AS5) 28. Draw a diagram of the labels of the human digestive system? List the parts where the perystalise takes place. (AS5) 29. Rahimpreparamodedelspassaphfterfter differentiated parts of the channel? Watch this and mark parts of it. (AS5) 30. Watch the Hebrew-5estes, light-dependent, light-dependents. (AS5) 31. Almost the entire living world depends on plants for food materials. How do you assess the process of cooking green plants? (AS6) 32. Evenahardsolidfoodalsobecomessmoothslurryinthigestestsystembytheenzymesreleased in perticular time. This mechanism is an amazing fact. Prepare a caricature of him. (AS6) 33. What food habits are you going to follow after reading this chapter? Why? (AS7) Calvin Cycle Chloroplast Light Photo Chemical Reaction Of Thermochemical Reaction Thermochemical Reaction 33. FreedistributionbyA.P.Government 23 Fill in the spaces Select correct answer 1. Food synthesized by the plant is stored as 2. - are photosynthesis sites. 3. Pancreaticjuicecontainsenzymesforcarryingtheprocessofdigestionof____________________ and 4. The finger is like projections that increase the surface area of the small intestine called____________________. 5. Gastric juice contains acid. 6. Vitamin sisentus, which is found by bacteria present in the intestines. 7. What notthefollowingorganismtakethefoodbyparasiticnutrition? (a) Yeast (b) Mushrooms c) Cuscuta d) Pies 8. The speed of Photosynthesis does not depend on: (a) LightIntensity b)Humidity C) Temperature d) Carbon dioxide concentration 9. The plant is stored in a dark cupboard for about forty-eight hours before conducting a photosynthesis experiment in order to : (a) Removechorophyllfromleaves b) Remove the starch from the leaves c) Make sure that no photosynthesis has occurred d) Make sure that the leaves are free of starch 10. Thedigestivejuicewithoutenzymeis () a)Bile b)Gastricjuice c)Pancrtaticjuice d)saliva 11. Insinglecelledanimalsthefoodistaken (a) Whole Body Surface b) Roth c) Teeth d) Vacuoles 12. Which part of the plant is taken into carbondioxide from the air for photosynthesis (a) Root hair b) Stomata c)Leafveins d) Sepals 34. Breathing - Energy Release System24 X Class The use of food for life processes is the key to life for all living beings in both multicellular and single-celled. In the chapter, about nutrition we discussed how the body pulls nutrients from food taken in. Thus, breathing leads to the final use of food. When oxygen is abundant breathing usually takes over. The cells of the living body use food constantly to help our body function properly. They require gas, food materials and certain chemicals. The term breathing, derived from the Latin word respire, meaning breathing, refers to the entire chain of processes from air inhalation to the use of oxygen in cells. Let's start with the fact that we will be looking at the connection between gases and the breathing process. The discovery of gases and breathing fig-1: Lavoisier Breath - Energy release system 2 Chapter Thetermrespirationcameintouse, acenturyafterthewordbreathing was used, back in the 14th century. It was used much earlier than people knew that air was a mixture of gases. They knew almost nothing about all the life processes that took place internally in a living body. Breathing, which was used as a medical term, is commonly referred to as a process that involves passing air and producing body heat. It wasn't until the 18th century, when Lavoisier and Priestley did a comprehensive job on the properties of gases, their exchange and breathing, that we learned something about how gasious exchange continues, in our body. You've already studied about 35. FreedistributionbyA.P.Government 25 some of Priestley's experiments in earlier classes (You have a report on this in the nutrition chapter as well). Think about the concepts and answer the following questions. Is it possible to say that Priestley's experiment helped us learn more about the composition of the air? As? Lavoisier also conducted several experiments to understand the properties of gases. In his early experiments, it is clear that Lavoisier thought that the gas released by heating powdered coal in belljar was stored above waterinatroughwaslikefixedair. Inthosedayscarbondioxidewasknown as fixed air. The next series of experiments involved burning phosphorus in a bell. From these studies Lavoisier showed that everything in the atmosphere, which is combined with phosphorus, is not water vapor. His last words are that the substance that is combined with phosphorus is either the air itself, or another elastic fluid present, in a certain proportion, in the air that we breathe. It was the pulpy air, a component of the air, which also helped in the burning. What was produced during the burning according to Lavoisier? What did Lavoisier learn about the air from his experiments? What conclusion can be drawn from Lavoisier's experiments? Lavoisier noted that there is a profound difference between the air in which the metal was burned and the air that served to breathe. The air we exhale is precipitated by lime water while after heating the metal is gone. From this he concluded that there were two processes involved in breathing, and that of them he probably knew only one. He therefore conducted another experiment, which showed that about one-sixth of the volume of vitiefized air (the term used then for air displays from which the component needed for combustion was removed) consists of cretaceous acid gas (fixed air). Thus, to recreate the total air from the florid air, it was not enough simply to add the appropriate amount of air needed to burn or spiral air; existing chalk acid gas should also be removed. He immediately made a logical conclusion about the breathing process. Or highly breathable air in the lungs on the Cretaceous acid air; or there is an exchange, extremely breathable air is absorbed, and almost equal to the amount of cretaceous air given to air from the lungs. He had to admit that there were good reasons to believe that a highly respirable air combined with blood to produce red. Fig 2: Priestley 36. Breathing - Energy-releasing systems26 X class Lavoisier findings lead the way to several other researchers. What kind of gas do you think Lavoisier is talking about when he's talking about chalk acid gas? What gas according to is a respirable air? What steps in the process of breathing Lavoisier mentions as a conclusion about his experiments? A few lines from the human physiology textbook, written by the famous chemist John Daper around the middle of the 19th century, go like this. The main materials that a living being receives are matter that can be burned, water and oxygen gas; and from the action of these on each other, all the physical phenomena of his life arise. What the body expels is water, carbon monoxide, phosphorus, sulfur and others. Thus, we see that the role of the main compounds and elements in the breathing process was known by the mid-19th century. Events related are not very clearly understood, but, people believed that there is some connection of heat produced in the body and the process of breathing. It is a general observation that our breathing is warmer than the air around us; breath has nothing to do with this? Letusstudytheeventsinvolvedinrespirationinhumanbeingstofigure it. Events / Steps in breathing there are no strict demarcations of events involved in the breathing process. Itisaverycomprocessofseveralbiochemicalandphysical processes. But for a general understanding of what's going on, we'll study under the following heads. Air movement in and out of the lungs Exchange gases between alveoli and blood Transport oxygen from the capillaries of blood alveoli into the body's cells and the return of carbon dioxide The exchange of oxygen from the blood into the cells and carbon dioxide from the cells to the blood Using oxygen in cellular processes to produce carbon dioxide and water, releasing the energy that will be used for the life processes of the Breath of Gas-pos exchange at the level of the lungs Gas Transport Blood Gaseous FreedistributionbyA.P.Government 27 Breath In previous classes we did experiments to find out what was in the air, we exhale. We saw that in a set of lime water, it turned milky white quickly as we exhale into it compared to a similar set in which normal air was transmitted by a syringe or pichkari in lime water. (Experimental kit to test the presence of carbon dioxide in exhaled air). Arrange the machine as shown in the picture and try to do the experiment again to find out what is going on. What does this experiment mean? What gas turns lime water into milk? What kind of gas do you think can be present in large quantities in the air we breathe compared to the air around us? We are also aware of the fact that the deposits of water vapor on the mirror if we exhale on it. We will have to study the path of air in our body through our respiratory system and breathing mechanism in the breath to find out how the exhaled air comes out (figure showing respiratory system/pathway). By respiratory system we usually mean passages that transport air to the lungs and into microscopic air bags in them, called alveoli (where gases are exchanged between them and blood vessels) and vice versa. The way of air Let's observe the path of air from the nostrils to the alveoli. nostril nasal cavity epiglottisfarinx trachea larynx of the lungs of bronchodil bronchiol bronchiol capillaries, in which O2 and CO2 exchanges occur fig-4: Human respiratory system fig-3: Respiratory water gases lime water 38. Breathing - Energy Release System28 X Class of Nostrils: Air usually enters the body through the nostrils of the nasal cavity: Air is filtered. The wet surface of the nasal mucosa, as well as the hair growing from the side, remove some of the tiny dirt particles in the air. In addition, as inhaled air passes through the nasal cavity, its temperature is closer to the body and it takes water vapor so that it becomes more humid than before. Pharynx: Warming and hydration continues in this common passage of the digestive and respiratory system. Epiglottis, flap as muscularvalvecontrolsmovementoffoodandairwards their respective passages. Larynx: This tight box contains our vocal cords. When the air passes from the lungs and over the vocal cords, it causes them to vibrate. This produces sounds based on our speech, song, etc. Trachey: Wind pipes channel air into the lungs. Touch your neck to feel the tube-like structure. Bronchus: At the lower end of the trachea or windpipe is divided into two bronchus-one leading to each lung. Bronchiols: Each bronchial is further divided into small and small branches called bronchiols. Alveolus: They finally stop in clusters of air bags called alveoli in the lungs, which are very small and numerous. The carbon exchange occurs here as blood capillaries take oxygen and expel carbon dioxide. The entire transition from nostrils to alveolu is moist and warm. Do you know? The interior of the lungs is divided into millions of small chambers, thereby significantly increasing the wet surface available for the transmission of gases between air and blood. The linings of the lungs are much folded, and therefore their common surface is huge. If all the alveoli of our lungs are distributed they will cover an area of almost 160 m2 . 39. FreedistributionbyA.P.Government 29 Think and discuss : What happens if the airways are not wet? Are both lungs similar in size? Why are the alveoli so small and incalculable in number? Epiglotti and the passage of air from the nasal cavity, the air gets into the throat. There is a complex problem here. From the throat there are two passages, starting with almost the same opening and ending with individual, one in the lungs and one in one food in another. It is also important that the food does not penetrate the tube through which air enters the lungs. Traffic is kept properly directed to a flap like a valve, epiglottis, which protects the tube into the lungs, arresting the entrance of the food. Watch the following numbers and discuss in your class how the epiglottis works while breathing or swallowing This valve is partially closed when we swallow food; It deflects the food down to the stomach and holds it out of the trachea or windpipe, which is the route to the lungs. Epiglotti opens more widely when we take a breath and air enters the lungs. Nervous regulation is essential in guiding the function of epiglottis and passing food and air. Let's try to do the activity to get a feel for what happens when we swallow food. Why are we advised not to talk while eating? Activity-1 Hold your palm an inch from your nose, feel like you're breathing, don't remove it until you're done. Breathe steadily for 1-2 minutes. Now take a piece of any fruit, chew and before swallowing it to hold the fingers of the other palm around your neck, now swallow it. What have you noticed? What happens to your breathing as you try to swallow? Epiglottis diverts air into the lungs of Epiglottis distracting a mass of food from opening the larynx fig-5 (a): Breathing fig-5 (b): Swallowing 40. Breathing - X-Class Energy Release System - What helps you swallow without deflecting it from the windpipe? We know that breathing is the process of inhalation and exhalation. The organs involved are mostly lungs. You can't see your lungs, but it's easy to feel them in action. Put your hands on your chest and breathe very deeply. You will feel that your breasts are getting a little bigger. Now exhale the air and feel your breasts return to their normal size. You just felt the power of your lungs! Thelungsthemselvescanneither draw in the air, nor push it out. Instead, the muscles of the pectoral wall and another flexible flattened muscle, called the diaphragm, help the lungs move the air in and out of them. See how the diaphragm works in the picture. What is the role of the diaphragm and ribs in the breath? Are both men and women active? The chest wall consists of ribs, muscles and skin. The ribs are attached at an angle to the spine (if you run your finger along one of your ribs, you will notice that it extends down from the spine). When we inhale, the chest wall moves up and expands. This leads to an increase in the volume of the thoracic cavity. The aperture can be presented as sex if you consider the chest cavity as a room. When the diaphragm is relaxed, when we exhale, it is in the shape of a dome with the snug side of the dome extending into the chest cavity. When the diaphragm contracts during inhalation it aligns slightly or dome Down. As a result, the volume of the thoracic cavity increases. When the diaphragm is aligned and the volume of the thoracic cavity increases, its internal pressure decreases and air from the outside rushes to the lungs. It's inspiration (inhalation). Then the opposite happens. The chest wall goes down and moves inwards, and the diaphragm relaxes and takes on the shape of a dome. These changes increase the pressures; theyelastictissuecontractsandsqueezes air through the nose to the outer atmosphere. This is the expiration date. Fig-7: The movement of the chest during inhalation, exhalation of the diaphragm of the thoracic wall of the rib bone muscles of the lungs fig-6: The movement of the diaphragm 41. FreedistributionbyA.P.Government 31 Do you know? Our lungs are spongy in nature. They're not the same size. The lung left is a little smaller, making space for your heart! The lungs are protected by two membranes called pleura. Afluid filled between these membranes protects the lungs from injury as well as helping in expanding the spongy and elastic muscles of the lungs as they slide one over the other. arealsoonlyonecellthick. Blood, dark red color flows from the heart through these capillaries and collects oxygen from the alveoli. At the same time, carbon dioxide passes from capillaries and into alveoli. When we exhale, we get rid of this carbondioxide. Thebrightred, oxygen-rich blood returns to the heart and is pumped out into all parts of the body. Fig-8: Diffusion is the way to gas-possive exchange between the lungs and blood capillaries you should notice that your own breathing is slow and shallow when you are at rest. It's deeper and faster when you train hard. Indeed, breathing patterns show a large range because they are coordinated with moment by moment the body needs to supply oxygen and remove carbon dioxide. What other situations affect breathing? It has been found that all breathing movements stop immediately when the nerves leading from the brain to the respiratory muscles are cut. What can be made of this? What happens in the process of breathing? What gas should be removed from our body during exhalation? Where did the extra gas come from? What is the composition of the inhaled air? When exhaled air is compared to inhaled air, is there a difference in composition? Gaseous Exchange (alveoli to capillarams) Gas exchange occurs in the lungs by diffusion from alveoli to blood capillaries and vice versa. Carbon dioxide in the blood is exchanged for oxygen in alveoli. These tiny air bags in the lungs are numerous and only one cell thick. They are surrounded by capillaries that branch alveoli capillary network carbon dioxide oxygen blood cells 42. Breathing - Class32 X energy release system as a result of gas exchange, composition and the exhaled air is different. See the table below. Estimates are given in the table : Why does the amount of oxygen vary between exhaled and inhaled air? Gas % in inhaled air % in exhaled air Oxygen 21 16 Carbon dioxide 0.04 4 Nitrogen 79 79 - What raised the percentage of carbon dioxide in exhaled air? Do you know? The total capacity of human lungs is almost 5800 ml. Usually alone, which inhale or exhale about 500 ml of air. 120 ml of air remains in the lungs after full exhalation. Think of the lung capacity activity you perform in CLASS VII in The Breath in Organisms chapter. Transporting gases We know that air is a mixture of gases that fills the lungs and alveoli when it gets into our body. The relative amount of different gases in the air and their combination of the container with hemoglobin and other substances in the blood determine their transport through the blood in the body. When oxygen is present in the air within the normal range (about 21%) then almost all of this is done in the blood by binding to hemoglobin, a protein (just like chlorophyll, the only major difference is that it has iron instead of magnesium, as in chlorophyll), present in red blood cells. As oxygen is neutralized in the blood, it quickly combines with toformoxyhaemoglobin hemoglobin. Notonlyhaemogincancombinewithoxygen, but the opposite can also occur to give the molecule hemoglobin and oxygen. Carbon dioxide is usually transported as bicarbonate, while a certain amount of it is combined with haemoglobin and rest dissolves in blood plasma. Explore the following equation for better understanding. Hb and O2 HbO2 HbO2 Hb and O2 43. FreedistributionbyA.P.Government 33 increase the pressure on heairoutthroughthenose hofthetrachea. thehairsgrowingfromits Do you know? If hemoglobin is exposed to air at sea level, almost every molecule is combined with oxygen to form oxyhaemoglobin. At an altitude of 13 km (about 8 miles) above sea level, the concentration of oxygen at sea level is much lower by about one-fifth. In these conditions only about half as Gaseous exchange (capillaries to cells and back) In capillaries above tissues, hemoglobin occurs in a very different environment. Tissue cells constantly use oxygen, hence the concentration of oxygen in them is quite low. It can only be one-third of that in the lungs. Because the oxygen concentration is so low, oxyhaemoglobin releases an oxygen molecule that enters the cells. In the reactions that occur in the cells in our body, carbon dioxide and water are produced and energy is released for use for various purposes. Cellular respiration the term cellular respiration refers to the way in which cells release energy from the chemical bonds of the food molecules that enter them. She is this energy for the basic processes of life. Thus, living cells must perform cellular cell It can be in the presence of oxygen, which is aerobic breathing or in its absence, which is anaerobic breathing (fermentation). Cellular respiration in prokaryotic cells, as in bacteria occurs in the cytoplasm. In eukaryotic cells, cytoplasm and mitochondria are places of reaction. The energy produced is stored in the mitochondria in the form of ATP. That's why mitochondria are called cell feeding houses. The exact chemical details of the breakdown of sugar or other foods in a living cell does not occur as a single reaction, but occurs in a series of small steps. How does this affect energy release? Since the change in the chemical nature of the molecule from one stage to another is insignificant, a small amount of energy is released in any step. Complete splitting of the sugar molecule with the release of all its available energy, many oxygen molecules are combined with hemoglobin to form oxygemoglobin. This is important because the blood cannot carry enough oxygen into the tissue if hemoglobin is combined with several oxygen molecules. In fact, human life is impossible at this altitude without additional oxygen supply. Providing such power is built into modern aircraft that have airtight cabins that support enriched air supply. When we go deep into the sea, we will face a different type of problem. figs 9: Mountaner 44. Breathing - The Class34 X Energy Release System includes a number of different chemical reactions. When glucose breaks down, energy is released and stored in a special compound known as ATP (adenosine triphosphate). This is a small parcel of chemical energy. The energy currency of these ATP cells is an energy-rich compound that can supply energy that can be unadematic. Each ATP molecule provides 7,200 calories of energy. This energy is stored in the form of phosphate bonds. If the connection is broken, the stored energy is released. Does alveoli or lungs also require oxygen to conduct cellular respiration? Why/why not? In short, at the cellular level we could have the following pathways, starting with glucose (this is one example, remember that there are other food components as well). Do you know? Glucose is the most commonly used sugar for energy in plants, animals and microorganisms. In all these organisms glucose oxidizes in two stages. In the first stage it is converted into two molecules of pyrowitzic acid. In the second stage, if oxygen is available pyruvikic acid oxidizes to CO2 and water, a large amount of energy is released. If oxygen is insufficient or not used pyruic acid is converted into ethanol or lactic acid and very little energy (almost one tenth of this is produced with enough oxygen) is released. Glucose Piruvate (3 compounds Energy LacicacydEnergy Ex: Ethanol Ethanol Bacteria Ex:Yeast Oxygen Presence (Airbrepiration) Absence or Low Content of Fooxygen (anaerobicrespirone andfermentation) CO2 and H2 O - Energy Ex:Plantsandanimals Can energy be released without oxygen? After the training exercises, we feel pain in the muscles, is oxygen enough to reach the muscles? What is formed in the muscles? Fig-10: Mitochondria outer membrane of the inner membrane criste matrix 45. FreedistributionbyA.P.Government 35 fig-11: Athlete (Strenous exercise) Graph showing the effect of vigorous exercise on the concentration of lactic acid in the blood. When you sprint a hundred yards, you do a significant amount of muscle work. But you don't start the race by standing on the track and gasping for a few minutes to ignite oxygen first. In fact you can run the race with very little extra breath. The fastest sprinters don't breathe at all when they run a hundred yards. Once you have reached your destiny, however, you feel very different. Depending on your training condition, and on how hard you have run, you will be pantsed for a few minutes after the race until your breathing gradually returns to normal. These facts may be related to what we have learned so far about ATP. It is possible that the race was run on energy produced when the AATPalreadypresentiourmusclesbeingconverted toADP. Unfortunately, this nicely simple idea is inadequate because we only carry enough ATP in the muscle to last about half a second when doing vigorous exercise. There has to be some other explanation of how we can produce energy and then use oxygen later. One approach in studying this problem is to analyze a person's blood during and after exercise. For obvious reasons, the athlete, while participating in the experiment, had to stay in the place where the device is located. He pedaled a stationary bike or ran along the tread mill (the belt moves as fast backwards as the athlete moved forward). Some of the results are shown in the graph. The vigorous exercise lasted nine minutes (shown by the bar at the base of the chart) and regular blood samples were taken and analyzed. It has been found that one particular compound in the blood, lactic acid, varies greatly in its concentration, as you can see on the graph. Follow the schedule of accumulation of lactic acid in the muscles of the atelier and answer the following questions. (Graph showing different amounts of lactic acid in the muscles) x - axis - Time in minutes y - axis - Concentration of lactic acid in the blood mg/cm3 46. Breathing - Energy Release System36 X Class A. Where did the concentration of lactic acid in the blood begin? B. What was the greatest concentration achieved during the experiment? C. If the trend between C and D will remain at the same rate, how long can it take for the initial level of lactic acid to be reached again? (Hint: extend the CD line until it reaches reach value.) D. What indicates high levels of lactic acid on respiratory conditions? Accumulation of lactic acid leads to muscle pain. If we go, a quick walk, slow jogging, running at the same distance we feel that there is an increase in pain levels it is due to the accumulation of lactic acid. It seems that lactic acid is produced quickly by active muscles, and then only gradually removed from the blood after exercise. What is surprising is that the athlete needs a lot of time to recover. The simplest explanation we can make at this stage is that the sugar in the working muscles has changed to lactic acid. The energy stored in lactic acid molecules is less than in sugar molecules, and if the acid comes from sugar, the energy released can be used to restore ATPfromADPand phosphates. During the 100m race, a well-trained athlete can hold his breath only after that. In this case, the muscles use the energy released during anaerobic glucose breakdown. It is not until later that the athlete receives the oxygen needed in order to remove lactic acid. So when we don't take strenuous exercise we create what is called oxygen duty, which needs to be repaid later. In a longer race athletes have to breathe all the time, so that some lactic acid is removed while they work and they can continue for longer before becoming exhausted. The presence of lactic acid in the blood is the main cause of muscle fatigue, but if the body is rested long enough, then fatigue goes. Anaerobic Breathing We found that living people produce carbon dioxide and give out energy. If these processes are caused by the oxidation process, what happens if the oxygen supply is interrupted? If human muscles can continue to release energy when they lack oxygen, what can the cells of other living organisms do? Let's find out by doing some experiments. 47. FreedistributionbyA.P.Government 37 figs-12: Testing to produce heat and CO2 under the anaerobic breath of liquid paraffin yeast in boiled and chilled glucose bicorbonate solution thermometer Some experiments with yeast To test this idea we can see whether to detect any increase in temperature and production of carbon dioxide when living organisms are kept away from oxygen supplies. Yeast grow quickly if they come with glucose in the solution. Indeed, wild yeast tends to grow on the skins of fruit, likegraesandapples, fromwhichtheyderive of their food stocks. Our immediate problem is the removal of oxygen from the glucose and yeast solution. 1. You can remove the dissolved oxygen from the glucose solution by heating it for a minute and then cooling no shak-ing. Now put in some yeast; oxygen supply from the air can be cut off by pouring one centimeter of liquid fluid layer To the mixture. 2. If you want to check that oxygen has been removed from the mixture-ture, add a few drops of diazin green (Janus Green B) yeast suspension solution before pouring liquid paraffin (wax) over it. This blue dye turns pink when oxygen is lacking around it. 3. Arrange for any gas produced by yeast to escape through a washing bottle containing bicarbonate/indicator solution (or lime water). We haven't described any control experiments to try to work them out for yourself. You may prefer to produce a carbon dioxide portion of the experiment on a smaller scale using test tubes. If you do, then heat them around 37o C in order to speed up the test. What happens when a baker prepares a dough by mixing yeast in it? Fermentation Let's remember the dough maid and yeast powder activity that you performed in Class VIII in the chapter History of Microorganisms. Why did the volume of the test increase? What gas is released in this reaction? If the yeast and sugar solution are left without oxygen for a few days, they develop a characteristic odor caused by the production of a new compound called ethanol, which was made by yeast from LabActivity 48. Breathing - Energy Release System38 X Class Fig-13: CO2 - a product of the release of glucose energy tubes delivering heat tubes of lime water sugar. The same type of odor you may notice from the surviving idly, dosa dough in your home. But not in the cool. Ethanol can be separated from the yeast glucose mixture by the fractional distillation process, as ethanol boils at a lower temperature (70 degrees Celsius) than a sugar solution. Gather information about fractional distillation with your teacher. Just like aerobic breathing is the process of producing energy when there is no oxygen supply. Breathing is the way to release energy, do you agree? Justify your answer. Breathing against the combustion of Lavoisier around the end of the 18th century, through a series of carefully executed experiments, came to the view that breathing was a process like burning. He wrote in the collection in 1783, breathing is a combustion process. It's a very slow process, and it combines oxygen not only with carbon, but also with hydrogen. Robinson also stated that breathing is a type of combustion and combustion is a source of heat in animals. Activity-2 Observation changes when the sugar machine is burned, as shown in the picture, and heats it over the flame. Is it melting? What happens if you heat up for some time? When glucose burns, carbon dioxide and water are produced and energy is released as heat. We know that burning glucose gives us carbon dioxide, water and energy, whereas from breathing equations we get the same products. But essentially, the processes should be different for the following reasons. 1. must be burned at a high temperature in the laboratory to release energy, if it happened in our cells, all the cells will be burned. 2. Once glucose starts to burn, we can't stop the process easily, but living cells are able to exer-cise control over the kind of glucose burning in the presence of oxygen. 49. FreedistributionbyA.P.Government 39 3. Water usually stops the combustion from occurring while the cells con-tain a lot of water and breathing still continues. What can you draw a conclusion from this? The production of heat by living organisms Thermal production has been a feature of burning glucose or sugar, as you have observed before. As a rule, living animals and plants produce energy in the form of heat. We feel warm when we wear a sweater in the winter season. We know that the sweater prevents the loss of heat energy produced by the body. Does this mean how our bodies lose heat in the surrounding area?

What are the other ways in which our body loses heat? Heat is constantly lost from the surface of the body, so it must be constantly generated in our body to replace what has been lost to keep the body temperature constant. - Is the rate of heat production always the same? More heat is generated during active activity. We know that we feel hot after some form of strenuous exercise such as running. During the molecular breathing, energy is released. Some of the energy is stored in the form of ATP. Some of the energy is used in our lives. And excess energy is released in the form of heat. But in the case of vigorous activity, how it works we need more energy. To do this, the speed of breathing increases. Thus, heat is also released in excess. That's why we feel warm. If oxygen is not enough during vigorous muscle excers, start anerob breath. Therefore, lactic acid is formed. We know that the accumulation of lactic acid causes muscle pain. We reach a normal position after some rest. Taking a deep breath helps us regain energy in our body. Link in the app about YogaAsanas. Evolution in the gas exchange system Exchange gases is a common life process in all living organisms, but it is not the same in all. Single-celled organisms or multicellular organisms such as Hydra and Planarians get oxygen and expel carbon dioxide directly from the body during diffusion. Other multicellular animals developed special organs. Animals, both terrestrial and aquatic, are adapted to different types of breathing and have different types of respiratory organs mainly depending on the habitat in which they live. Body size, water availability and type of blood system 50. Breathing - Energy Release System40 X Class Fig-15: Lenticells on are among the reasons for animals to develop different types of respiratory organs. We'll see the respiratory system's trachea in Like a cockroach, a grashopper, etc. the tracheal respiratory system consists of a series of tubes called trachea. This is divided into thin branches called tracheoles, which carry air directly into the cells in the tissues. Some aquatic animals like fish have developed special breathing organs that are known as gills or branches. Blood supplied the gills through capillaries that have thin walls that gases exchange. It's called branched breathing. The fish keeps its mouth open and lowers the floor of the oral cavity. As a result, water from outside will be sucked into the mouth. Now the mouth is closed and the floor of the mouth rises. Water is pushed into the throat and forced to gill bags through the inner branches of the hole. Gill lamellae bathed with water and gas exchange going on. Breathing through the skin is called skin breathing. The amphibians frog can respire through to cutaneous and pulmonary breathing processes. Ground animals such as reptiles, birds and mammals pass through the lungs. Ask your teacher how crocodiles and dolphins respire? Breathing in plants you already know about the stomat in the leaf where gas exchange occurs in plants. There are other areas on the body of the plant, and through which gaseous exchanges occur as the surface of the roots, the ribbons on the stem, etc. (rice showing stomats and ribbons). Some plants have specialized structures such as breathing the roots of mangrove plants, as well as tissue in orchids that produces oxygen also required by plants to produce energy and carbon dioxide is released. But CO_2 is required even when plants try to identify them. Carrying out the plant Stomatal opinings lead to a number of spaces between the cells inside the plant. Which form a continuous network throughout the plant. The spaces are very large in the leaves, much smaller in other parts of the plant. The air spaces are lined with water, where oxygen dissolves in this and passes fig-14: Leaf as the respiratory organ waterfilm stomata air spaces 51. FreedistributionbyA.P.Government 41 figs-17: Evolution of CO_2 in breathing through porous cell walls into cytoplasm. Here, the sugar is broken down into carbon dioxide and water with energy release. Carbon dioxide is transmitted to the airspace in a similar way. The whole system works by diffusion; as oxygen is used up by cells the gradient develops between cells and air in space. Similarly, between air in spaces and air outside the stomat and tape, so that oxygen passes inches in the same way that more carbon dioxide is released by the cell gradient going backwards and it passes into the environment. Take a handful of moon seeds or bayrs. Soak the seeds in water the day before to do your experiment. Keep these soaked seeds in a cloth bag and tie The string is tight. Keep the cloth bag in the corner of your classroom room. The next day collect sprouts/sprouted seeds from the bag, keep it in a glass bottle/plastic bottle (about 200 ml capacity). Take a small bottle of injection, fill three-quarters of a bottle of fig-16: Air Roots Aeration Roots Most plants can aerate their roots by taking in oxygen through lenticels or through the surface of theirroothairs (astheirwallsareverythin). They are oxygenated from air spaces between soil particles. But plants that have their roots in very humid places, such as ponds or swamps, cannot get oxygen. They are adapted to these wetlands, having much larger air spaces that connect the stems to the roots, making the diffusion of the upper parts much more efficient. The most common adaptation is to have a hollow stem. The next time you are near a pond or swamp cut the stems are some plants that grow there and see how much is hollow compared to a similar number of plant species growing in normal soil. The problem of air transport is more complex for trees and not many survive with their roots permanently in the water. The exception is the mangrove tree of the tropics, which forms air roots above the surface of the soil and takes oxygen through these roots. To learn more about breathing in plants, we need to do the following things. Activity-3 sprouted seeds glass with lime water ap 10th class biology textbook english medium pdf. ap 10th class biology textbook telugu medium pdf. ap 10th class biology textbook english medium. ap 10th class biology textbook telugu medium. ap state 10th class biology textbook