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| **Teacher: Lyudmila Boyadzhieva** | **Class: 9th Grade** | |
| **Lesson Topic: DNA & RNA** | | | |
| **Lesson objectives:** By the end of the lesson students will have learned the term nucleic acid and the differences between DNA and RNA. | | | |
| Main skill / system objective: | | * Defines the term nucleic acid * To indicate differences between DNA and RNA | |
| Secondary skill / system objective: | | * Defines the term nucleotide. * Defines the term polynucleotide chain. * Recognizes nitrogen bases. * Defines deoxyribonucleic acid. * Defines ribonucleic acids. * Defines a gene. * Defines the genome. | |
| Textbook pages / Worksheets / etc. | | * e-textbook <https://cnx.org/contents/5ZI71dr1@3.2:EMFkmORW@1/DNA-and-RNA> * presentation <https://prezi.com/view/65CiiHQFjheXTK18ADQF/> | |
| Materials / Resources / Supplies / Flashcards / etc. | | * Google meets * Internet * Headset with microphone | |
| Songs / Listening / etc. | | * kahoot game <https://kahoot.it/> * mind map <https://miro.com/welcomeonboard/ZTZxakhPYVlOM3lNdUN1U0ZHSFZrc1N3eWZWR3hJdEkyb1VBYzNxZ05ENnZaT0VMOEFrQWpVVjBib25uWkdmSHwzMDc0NDU3MzY2NzkzOTkzOTYx?invite_link_id=102017479939> * video <https://www.youtube.com/watch?v=gG7uCskUOrA> | |

**Board Plans:**



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| Stage | Procedure | Resources / Page No. | Time |
| **Preparation for the lesson**  **Introduction of the topic**  **4. Introduction and interpretation of the new material**  **Nucleotides**   1. **Nucleotides**   **1.1. Structure**  **1.2.**  **Nitrogen bases**  **2. Polynucleotide chain**  **DNA**  **3. DNA**  **3.1. Construction**  **3.2. Location**  **3.3.**  **Establishment of a three-dimensional structure**  **3.4. Shape**  **3.5. Complementarity**  **RNA**  **4. RNA**  **4.1. Construction**  **4.2. Different kinds of**  **Genetic information**  **5. Genetic information**  **6. Summary**  **7. H/W** | * Check attendance. Share your presentation on your screen. * Question 1 to check knowledge. * "What is an enzyme?" * resp. These are proteins with catalytic function. * Question 2: * "Now that we understand what an enzyme is, can you tell me what you think ribozymes are?" * resp. These are nucleic acids that perform catalytic functions in the cell. * Question 3: * "Now, tell me, do you know what nucleic acids are?" (show gif if no one responds)   The answer to the above question:  This is what we are going to learn in today's lecture, our topic is "Nucleic Acids".  **Aim**: Intrigue their curiosity  “N.A. are the molecules through which the cellular program for the synthesis of proteins in the cell is stored and transmitted. ”  "The monomers they are made of are called nucleotides."  1.1. Structure: nitrogen base, pentose, phosphoric acid  1.2. Nitrogen bases (teacher shows according to the scheme): cytosine, thymine (DNA), Uracil (RNA), adenine, guanine   1. Structure and features of a polynucleotide chain. The teacher explains in the given scheme the way of building polynucleotide chains and their features   3. The teacher explains that this is the first type of nucleic acid.  3.1. Structure (teacher explains the structure of DNA): from 4 types of nucleotides - deoxyribose (pentose), phosphoric acid residue and nitrogen base (A, G, C or T)  3.2. Location: in the nucleus and in the mitochondria.  3.3. Establishment of a three - dimensional structure: By Watson and Crick in 1953.  3.4. Shape: Two polynucleotide chains that form a double helix.  3.5. Complementarity (the teacher uses the scheme to explain the rule of complementarity of the bases): A and T, G and C  4. The teacher explains that this is the second type of nucleic acid.  4.1. Structure: the teacher explains the differences between DNA and RNA. The RNA sticker is used  4.2. Different kinds: informational, transport, ribosomal. The diagram explains the differences.  5. Genetic information  The nucleotide sequence of a DNA molecule that carries information about the synthesis of a single RNA molecule or protein is called a gene.  The complete set of genes or genetic material in a cell represents its genome.  -The teacher asks the students if they have any questions  -Teacher sends the PIN code for the game to www.kahoot.it to consolidate knowledge  - How do RNA and DNA differ?  -What is a gene?  Open the file, look at the questions, write them down in your notebook, take a picture and send it to my email. | List of students on screen | (2 min)  (5 sec) |
|  | **The Script**  "If you have any questions during class, I will ask you to turn on the microphone. Are you ready to start? ”  Knowledge update:  "You had some homework from the last time, did anyone do it?" "Choose a field (honey, pharmacy) which enzymes are used in which way."  Question 1: "What is an enzyme?"  resp. These are proteins with catalytic function.  Answer: "This is to be learned in today's lecture, what are the Nucleic acids."  Introduction and interpretation of the new material  “N.A. are the molecules through which the cellular program for the synthesis of proteins in the cell is stored and transmitted.  There are two types of NK - DNA and RNA. "  5m\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  a) Nucleotides  "The monomers that make up nucleic acids are called nucleotides."  Question 4: "Do you remember what protein monomers are?"  Answer: Amino acids  STRUCTURE:  "Nucleotides are made up of bound nitrogenous base, pentose and phosphoric acid, which gives acidic properties to NK"  NITROGEN BASES:  We have 5 types of nitrogen bases:  "Let's remember what a nucleotide from the scheme was"  Two large (purines) and three small (pyrimidines)  Adenine, Guanine, Cytosine, Thymine (DNA), Uracil (RNA)  b) Polynucleotide chain:  Structure:  "Let's see again what was the nucleotide of the scheme"  Phosphoric acid + pentose of another nucleotide -> H2O.  Multiple alternations form poly (many) nucleotide strands  FEATURES:  Linear, unbranched. Question: "What were the proteins like?" resp. Linear, unbranched.  Home: phosphate group  End: hydroxyl group of pentose  Limited length  5min \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  c) DNA  STRUCTURE:  4 types of nucleotides - pentose (deoxyribose), phosphoric acid residue and nitrogen base (A, G, C or T)  LOCATION:  in the nucleus and in the mitochondria  ESTABLISHMENT OF THREE-DIMENSIONAL STRUCTURE:  Their three-dimensional structure was established by Watson and Crick in 1953.  Double molecule  Polynucleotide chains form a double helix structure connected and have opposite directions.  COMPLEMENTARITY:  This is the rule that a large base of a polynucleotide chain binds to a small base of the opposite chain. That is, for DNA GC, AT  5min \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  d) RNA  STRUCTURE:  4 types of nucleotides - pentose (ribose), phosphoric acid residue and nitrogen base (A, G, C or U)  Single-chain molecules, some of which have double-stranded regions.  G-C, A-U  3 MAIN TYPES: \* OPEN the scheme \*  Information: Carries information about protein synthesis. Each trio of nucleotides that correspond to an amino acid is called a codon.  Transport: They look like a three-leaf clover. They contain both linear and double-spiral sections. They have two specific regions - one recognizes the codon, the other carries a specific amino acid. The area that recognizes the codon is called the anticodon.  Ribosomes: They are about 80% of cellular RNA. They form complexes with proteins and build ribosomes. Transport RNA carries amino acids to ribosomes, where ribosomes bind the ordered amino acids to form proteins.  5min \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  VIDEO + MIND MAP:  "Now we will watch a short video so we can imagine everything we have learned so far. Keep in mind that there are additional things we haven't learned, but you will learn more, so you can go back to this video again if it helps you visualize it.  f) Genetic information  The nucleotide sequence of a DNA molecule that carries information about the synthesis of a single RNA molecule or protein is called a gene.  The complete set of genes or genetic material in a cell represents its genome.  e) Homework:  What is the difference between RNA and DNA?  What is a gene?  f) If there is still time: Game kahoot |  |  |