**LESSON PLAN TEMPLATE**

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| **Lesson Title** | Unveiling the Blueprint of Life: The DNA Double Helix Structure |
| **Learning Area/s** | Science |
| **Name of Teacher/s** | DEPED TAMBAYAN PH (Visit www.depedtambayanph.net for more doenloads.) |
| **Grade Level and Section** | Grade 9 |
| **No. of Sessions** | 4 Sessions |
| **References** | None specified |
| **Declaration of AI use** | This lesson plan was co-created using Gemini AI to assist with unpacking competencies into a 4-session learning design, structuring activities, and assessment formulation. |

**Intentions.**

**Meaningful learning experiences are anchored in how we frame them. Start by deciding what you want learners to master by the end of the lesson – keep it clear and simple.**

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| **Learning Competency and Curriculum Standards:** | **Learning Competency:**<br>• Use models and labeled diagrams to represent the double helix structure of DNA (deoxyribonucleic acid).<br><br>**Content Standards:**<br>• Transmission of traits is determined by DNA, genes, and chromosomes. • High biodiversity means populations are more likely to overcome adverse conditions. • Human activities can adversely affect animals and plants in a variety of ecosystems<br><br>**Performance Standards:**<br>By the end of the Quarter, learners describe that the transmission of traits is determined by DNA, genes, and chromosomes. They explain that high levels of diversity help to maintain stability of an ecosystem. They research to classify critically endangere d plants and animals of the Philippines and to identify strategies to protect and conserve them. They use drawings and diagrams to describe features of typical Philippine ecosystems and they conduct a survey to explore possibilities to minimize the impact of human activities. | | | |
| | **Session 1** | **Session 2** | **Session 3** | **Session 4** |

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| **Learning Objectives:** | By the end of the session, learners should be able to:<br>● Identify the three chemical components of a DNA nucleotide.<br>● Explain how nucleotides serve as the building blocks of DNA.<br>● Diagram a single nucleotide with its correspondi ng labels (phosphate group, deoxyribose sugar, and nitrogenous base). | By the end of the session, learners should be able to:<br>● State Chargaff's Rule of base pairing.<br>● Demonstrat e how nitrogenous bases (Adenine, Thymine, Cytosine, Guanine) pair specifically.<br>● Apply base-pairing rules to complete a complement ary DNA strand. | By the end of the session, learners should be able to:<br>● Describe the 'twisted ladder' or double helix shape of DNA.<br>● Identify the sugar-phosp hate backbone and the base-pair rungs in a DNA model.<br>● Relate the role of hydrogen bonds to the stability of the DNA structure. | By the end of the session, learners should be able to:<br>● Construct a 3D model or a detailed labeled diagram of the DNA double helix.<br>● Explain how the structure of DNA allows it to carry genetic information.<br>● Communicat e the importance of DNA in determining the traits of Philippine biodiversity. |
| **Learner Context:** | The class consists of learners with mixed academic readiness. A majority are visual and kinesthetic learners who respond well to hands-on activities. Some learners struggle with abstract scientific terminology, while others show high interest in how physical traits like hair texture or eye color are inherited. Potential barriers include limited vocabulary in biochemistry and varying speeds of | Learners are becoming more comfortable with the term 'nucleotide' but may find the four nitrogenous bases confusing to memorize. They enjoy mnemonic devices and competitive group activities. A barrier for some is the rote memorization of which letter pairs with which. | Learners can now identify the parts and the pairs, but they struggle to visualize how these flat components become a 3D twisted structure. They are highly responsive to visual metaphors. Barriers include spatial reasoning for some learners who find 2D diagrams of 3D objects difficult to interpret. | Learners are excited for the culminating activity. Strengths include creativity and collaborative spirit. Barriers include potential lack of materials for some or difficulty in following multi-step assembly instructions. Some learners with fine motor challenges may need simplified modeling options. |

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| | fine motor skills during drawing activities. | | | |
| **Learning Experience.**<br><br>**A learning experience is like a thoughtfully designed journey. Each activity and interaction builds towards meaningful understanding and growth. Identify activities and interactions to help learners gain knowledge, skills, or understanding in a purposeful way.** | | | | |
| **Pre-Lesson:** | **The 'Who Am I?' Photo Gallery:** Display photos of Filipino celebrities or local community members showing distinct traits (e.g., dimples, widow's peak). Ask: 'Where is the instruction manual for these traits hidden in our bodies?' Introduce the term DNA as the blueprint. | **Active Retrieval (The Nucleotide Toss):** Throw a soft ball to a student; they must name one part of a nucleotide. If correct, they toss it to another peer until all parts are named. **Review:** Briefly recap the 4 types of bases (A, T, C, G). | **Visual Analogy:** Show a picture of a traditional Filipino bamboo ladder (hagdan). Ask: 'What happens if we take the top and bottom and twist them in opposite directions?' | **The Blueprint Challenge:** Show a picture of a Philippine Eagle and a Maya bird. Ask: 'If they both have wings, why do they look different?' (Answer: Different DNA sequences/blueprints). |
| **Flow:** | **1. Scaffolding (Introduction):** Present a large-scale diagram of a DNA strand. Zoom into a single nucleotide. Use the analogy of a 'Lego brick' to explain that DNA is a polymer made of repeating units. **2. Check for Understanding (CFU):** Provide a 'Label-it' activity on the board where students must place the names 'Phosphate', 'Sugar', and 'Base' on a blank diagram. **3. Active** | **1. Discovery (Chargaff's Rule):** Present data showing the percentages of A, T, C, and G in different organisms. Ask learners to spot the pattern (A≈T, C≈G). **2. Scaffolding (Mnemonics):** Introduce the 'Apples in the Tree' (A-T) and 'Cars in the Garage' (C-G) mnemonic to help with pairing. **3. Social Learning:** 'Find Your Match' game. Half the class gets cards | **1. Modeling (The Twisted Ladder):** Use a flexible ladder model or a ribbon to demonstrate the double helix. **2. Scaffolding (Structural Identification):** Point out the 'rails' (sugar-phosphate) and 'steps' (nitrogenous bases). **3. CFU:** Ask learners to point to the 'backbone' on a 3D projected image. **4. Active Retrieval:** Sketching the double helix in three steps: (a) two | **1. Synthesis (The Modeling Workshop):** Using recycled local materials (e.g., candy wrappers, straws, or colored paper), learners work in small groups to build their DNA models. **2. Scaffolding:** Provide a 'Model Checklist' to ensure they include all 4 bases, the backbone, and the twist. **3. Social Learning:** 'Gallery Walk' where groups explain their models to each other. **4. CFU** |

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| | **Retrieval:** Have students draw three nucleotides from memory in their notebooks. **4. Social Learning:** In pairs, learners compare their drawings and check if the phosphate is correctly attached to the sugar. **5. Guided Practice:** Use the 'Nucleotide Puzzle' where students assemble cut-out shapes representing the three parts. | with 'A' or 'C', the other half gets 'T' or 'G'. Students must find their correct base pair partner in the room. **4. CFU:** Display a single strand of DNA (e.g., AGGTCA) and have the class choral-respond with the complementary strand. **5. Practice:** Worksheet containing various DNA sequences for learners to complete. | parallel lines, (b) adding the rungs, (c) twisting the perspective. **5. Social Learning:** In groups of 4, learners act as a 'Human DNA Strand' where arms represent the backbone and clasped hands represent hydrogen bonds between bases. | **(Oral):** Ask groups: 'If we change the order of your rungs, does the message change?' **5. Inclusion Support:** Provide pre-cut templates for learners who struggle with manual dexterity. |
| **Learning Resources:** | ● Projector/Smart TV for visual aids.<br>● Printed nucleotide puzzle pieces.<br>● Whiteboard and markers.<br>● Science 9 Learner's Module. | ● Letter cards (A, T, C, G).<br>● PowerPoint presentation on Chargaff's Rule.<br>● Printed worksheets with DNA sequences. | ● Flexible ladder model or ribbons.<br>● Smart TV for 3D DNA animations.<br>● Chalkboard for step-by-step drawing. | ● Recycled materials (straws, strings, paper).<br>● Glue/Tape.<br>● Printed 'Model Checklist' and Rubrics. |
| **Opportunities for integration:** | **Mathematics:** Recognizing geometric shapes (circle, pentagon, rectangle) in the molecular structure. **Health:** Brief mention of how DNA determines physical health traits common in Filipino families. | **English/Literacy:** Using mnemonics and decoding 'coded' messages. **Values Education:** Discussion on how 'complementary' pairs work together, much like members of a community or family. | **Arts:** Exploring 3D perspective and structural design. **Physical Education:** Using body movement to represent molecular bonds and structures. | **Environmental Science/Biodiversity:** Connecting DNA to the unique traits of Philippine endemic species. **Araling Panlipunan:** Discussing the importance of preserving local biodiversity as part of national heritage. |

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| **Assessment.**<br><br>**Assessments reveal what learners have gained and what they still need help with. These are helpful in providing you with information to guide your future instruction throughout the entire session.** | | | | |
| **Formative Assessment:** | **Exit Ticket:** On a small slip of paper, learners must draw one nucleotide and label its three parts without looking at their notes. This provides tangible evidence of individual mastery of the building blocks. | **Sequence Completion:** A short 5-item quiz where students must write the complementary strand for given DNA sequences. This serves as evidence of their understanding of base-pairing logic. | **Labeling Task:** A diagram of a double helix is provided; learners must color-code and label the 'sugar-phosphate backbone', 'nitrogenous bases', and 'hydrogen bonds'. This produces tangible evidence of structural recognition. | **Performance Task (Product):** The completed 3D model or detailed diagram, graded against a rubric focusing on accuracy of base pairing, presence of the double helix twist, and correct labeling. This is the ultimate evidence of competency achievement. |
| **Ways Forward.**<br><br>**Meaningful learning can also happen beyond the classroom – for both the learners and the teacher. Pause and reflect on what happened today.** | | | | |
| **Extended learning opportunities:** | Learners are asked to find one household item that resembles a 'chain' or 'repeating unit' (e.g., a bead necklace or a bike chain) to discuss in the next meeting. | Challenge learners to create their own Filipino-themed mnemonic for A-T and C-G (e.g., Adobo-Talong, Calamansi-Gabi). | Ask learners to look for 'helical' shapes in nature or at home (e.g., snail shells, screw threads, or fusilli pasta) to bring as examples for the final modeling session. | Learners write a short 'Thank You' letter to their parents, mentioning one specific physical trait they 'inherited' through the DNA structure they studied. |
| **Reflections:** | ● How many learners correctly identified all three parts of the nucleotide?<br>● Did the Lego analogy | ● Did the 'Find Your Match' activity effectively engage the kinesthetic learners?<br>● Are students still confusing | ● Did the 'Human DNA' activity clarify the concept of hydrogen bonds?<br>● Which learners | ● How many groups successfully incorporated the double helix twist?<br>● Did the use of recycled materials encourage |

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| | help the visual learners grasp the concept of a 'building block'?<br>● Which students required additional one-on-one scaffolding during the puzzle activity? | the pairs despite the mnemonics?<br>● How did the learners respond to the data-driven discovery of Chargaff's rule? | struggled with the 3D drawing?<br>● Was the bamboo ladder analogy culturally relevant and helpful? | environmental consciousness?<br>● What modifications are needed for next time to better support learners with slower processing speeds during construction? |