LESSON PLAN TEMPLATE

Lesson Title	The Blueprint of Life: Understanding DNA, Genes, and Chromosomes
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.**				
Learning Competency and Curriculum Standards:	**Learning Competency:** • Explain the role of DNA, genes, and chromosomes in the transmission of traits. **Content Standards:** • 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 **Performance Standards:** 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**

Learning Objectives:	Identify the structure of DNA as the fundamental blueprint of life. Relate physical traits observed in the local community to the genetic information stored in DNA.	Distinguish between genes and chromosomes and their roles in organizing genetic information. Describe how genes are segments of DNA located on chromosomes.	Explain the mechanism of trait transmission from parents to offspring through chromosomes. Model the pairing of chromosomes during the process of inheritance.	Synthesize the role of DNA, genes, and chromosomes in maintaining biodiversity and the survival of Philippine species. Relate genetic variation to the ability of populations to survive environmental changes.
Learner Context:	The learners are predominantly visual and tactile, showing high engagement when activities involve observable physical traits. Many students exhibit a strong sense of family identity, frequently discussing 'kamukha' (resemblance) within their households. However, a significant portion of the class struggles with abstract biological concepts and technical scientific vocabulary, requiring concrete analogies to bridge understanding. There is a noticed gap between students who have stable internet access for supplementary research and those who rely solely on classroom	Learners have shown a growing interest in how minute structures can control large-scale physical features. They are highly responsive to collaborative tasks but tend to lose focus during long lectures. Observations show that students with lower reading proficiency benefit significantly from labeled diagrams and 3D models. A common barrier identified is the confusion between the terms 'gene' and 'chromosome,' which are often used interchangeably in their initial responses.	Students are increasingly curious about why siblings can look different despite having the same parents. They demonstrate strength in logic-based puzzles and games. However, a barrier to learning is the misconception that offspring receive all traits from only one parent. Learners perform best when they can manipulate physical objects to visualize the 'pairing' of genetic material.	The class shows a strong emotional connection to environmental issues and local wildlife conservation. They are motivated by real-world applications of science. A barrier is the difficulty in connecting microscopic genetics to macroscopic ecosystem stability. Students have shown they are more likely to participate when the examples involve iconic Philippine animals like the Philippine Eagle or the Tamaraw.

	discussions.			
Learning Experience. **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 teacher facilitates a 'Family Photo Gallery' activity where students look at provided images of Filipino families and list down recurring physical features such as hair texture, eye shape, and skin tone.	'The Library of Life' Analogy: The teacher presents a stack of books (chromosomes), chapters (genes), and sentences (DNA) to provide a conceptual framework for organization.	'Mix and Match' game: Students are given half-colored circles and must find a partner to create a 'new' color combination, simulating the combination of parental traits.	Video clip or image montage of the diverse flora and fauna in the Philippines (e.g., Chocolate Hills biodiversity, Tubbataha Reef), highlighting the variety within species.
Flow:	1. **Active Retrieval:** Recall the 'Family Photo Gallery' to establish that traits are inherited. 2. **Scaffolding:** Use a ladder analogy to introduce the double helix structure of DNA, comparing the 'rungs' to specific genetic instructions. 3. **Social Learning:** In small groups, students use colored paper or recycled materials to create a basic model of a DNA segment, labeling the components. 4. **Check for Understanding:** The teacher	1. **Active Retrieval:** Quick review of DNA from the previous session using a 'True or False' whiteboard activity. 2. **Social Learning:** 'Human Chromosome' activity where students act as genes lining up to form a chromosome string. 3. **Scaffolding:** The teacher provides a diagram showing the relationship from cell to nucleus to chromosome to gene to DNA. 4. **Check for Understanding:** 'Find the Gene' game where	1. **Active Retrieval:** Review the number of chromosomes in a human cell. 2. **Direct Instruction:** Explanation of how one set of chromosomes comes from the mother and one from the father. 3. **Social Learning:** 'The Inheritance Square' activity. In pairs, students simulate the passing of traits using 'trait chips' representing alleles. 4. **Scaffolding:** Use a simplified Punnett square to show the probability of inheriting a trait,	1. **Active Retrieval:** Quick-fire questions on how traits are passed down. 2. **Scaffolding:** Introduction of the concept of 'Genetic Diversity.' Explain that DNA variation is why some plants survive pests while others don't. 3. **Social Learning:** Case Study Group Work: 'The Tale of the Tamaraw.' Groups analyze how low genetic diversity (due to small population) puts the Tamaraw at risk. 4. **Check for Understanding:** 'Survivor

	circulates and asks groups to explain what happens if one 'rung' of their ladder is missing or changed. 5. **Direct Instruction:** Brief lecture on DNA as the chemical basis of heredity using a localized slide presentation.	students identify specific segments on a paper chromosome model that represent specific traits like 'dimples' or 'earlobe attachment.' 5. **Synthesis:** Class discussion on how many 'chapters' (genes) make up the 'book' of a human being.	using Filipino examples like 'kulot' (curly) vs. 'unat' (straight) hair. 5. **Check for Understanding:** Ask students to explain why they might have a trait that neither parent shows (recessive traits), using their models.	Philippines: Genetic Edition.' A simulation where a 'disease' hits a population; only those with a specific 'gene card' survive. 5. **Synthesis:** Reflection on how human activities that destroy habitats lead to a loss of genetic diversity.
Learning Resources:	● PowerPoint/ Slide Presentation on DNA structure ● Colored paper, scissors, and glue ● Chalkboard/ Whiteboard for diagrams	● Printed Activity Sheets with cell diagrams ● Yarn or string to represent chromosom es ● Projector for visual aids	● Trait chips (colored bottle caps or cardboard circles) ● Worksheets for the 'Inheritance Square' ● Smart TV for short animation on fertilization	● Case study handouts on the Philippine Eagle and Tamaraw ● 'Gene cards' for the survival simulation ● Projector/S mart TV
Opportunitie s for integration:	Integration of **Mathematics** through the study of patterns and symmetry in the double helix structure. Integration of **Social Studies** by discussing ancestry and the diverse genetic heritage of the Filipino people.	Integration of **Literacy/English** by using the 'Library' analogy to explain hierarchy and organization of information.	Integration of **Values Education** by discussing the uniqueness of every individual and the importance of self-acceptance regardless of inherited physical traits.	Integration of **Araling Panlipunan (Geography)** and **Environmental Science** through the discussion of endemic species and habitat conservation in the Philippines.
Assessment. **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:	Individual exit ticket: Students must draw a simple DNA strand and write one sentence explaining its role in why they might look like their parents.	A 'Label-the-Hierarchy' worksheet where students must arrange the following from largest to smallest: Cell, Nucleus, Chromosome, Gene, DNA.	A 'Predict the Trait' scenario where students are given the genetic makeup of two 'parent' characters and must illustrate the possible appearance of the 'offspring.'	A short 'Action Plan' essay or poster where students explain how understanding DNA and genes can help scientists save endangered Philippine animals.
Ways Forward. **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:	Students are encouraged to interview an elder in their family about a specific trait (e.g., a 'balat' or birthmark, or a talent) that seems to run in the family, to be shared in the next session.	Provide a short reading passage about how many chromosomes different organisms have (e.g., rice plants vs. humans) to prepare for the concept of species variation.	Ask students to observe their own family and see if they can identify a 'recessive' trait (one that skips a generation) and write a short paragraph about it.	Encourage students to participate in a local tree-planting activity or a community garden, observing the different varieties of native plants available.
Reflections:	Reflect on whether the ladder analogy effectively minimized the difficulty of the technical vocabulary for the struggling readers in the class.	Evaluate if the 'Library of Life' analogy successfully clarified the hierarchical relationship between DNA, genes, and chromosomes.	Observe if the use of 'trait chips' helped kinesthetic learners understand the 50-50 contribution of parents to genetic makeup.	Assess if the transition from molecular genetics to ecosystem-level biodiversity was clear enough for students to see the 'big picture' of the unit.