LESSON PLAN TEMPLATE

Lesson Title	The Ripple Effect: Analyzing Genetic Mutations
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:** • Use information from secondary sources to explain the beneficial, harmful, and neutral effects of mutations. **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:	• Define mutation and identify different types of genetic mutations through secondary sources. • Evaluate the reliability of various secondary sources (articles, journals, videos) when researching genetic information.	• Explain the beneficial and neutral effects of mutations on organisms using specific examples from the Philippines and abroad. • Describe how neutral mutations contribute to genetic diversity without affecting survival.	• Analyze the harmful effects of mutations on human health and ecosystem stability. • Identify specific genetic disorders caused by mutations using secondary research data.	• Synthesize information from secondary sources to create a comprehensive explanation of the varied effects of mutations. • Argue the importance of genetic diversity (even with mutations) for the long-term survival of Philippine ecosystems.
Learner Context:	• Learners show high engagement with visual media like short documentaries and infographics. • Most students can identify basic DNA structures but struggle with the conceptual leap of how small changes lead to large physical differences. • Some learners have limited internet	• Learners exhibit a strong interest in agriculture and local biodiversity (e.g., unique local crops). • They perform better when scientific concepts are linked to tangible benefits, like food security or crop improvement. • A barrier noted is the misconception that all mutations are	• Students show empathy toward health-related topics but may find the medical terminology daunting. • Visual learners benefit from diagrams of chromosome abnormalities (e.g., Karyotypes). • Barriers include potential sensitivity if a student or family member has a genetic condition.	• Learners are ready for creative expression and respond well to 'Performance Tasks'. • Some struggle with synthesizing large amounts of text into a summary. • Strengths lie in drawing, presenting, and group collaboration.

	access at home, making in-class digital exploration critical. ● A small group of learners requires peer support due to reading comprehension barriers in technical English.	'monstrous' or harmful due to pop culture influences.		
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:	**Spot the Difference:** Show two photos of local Philippine fruits (e.g., a regular mango vs. a carabao mango with distinct traits). Students will list observable differences and guess what caused these variations at a microscopic level.	**The 'Superpower' Poll:** Ask students if they think mutations can ever be good. List local examples like high-yield rice varieties developed through induced mutations (IRRI references).	**Memory Lane:** Quick quiz on the 'Central Dogma' (DNA to Protein) to show how a 'broken' protein causes disease.	**The Diversity Mosaic:** Students contribute one 'trait' (written on a sticky note) to a wall, representing the variety in the classroom as a metaphor for genetic diversity.
Flow:	● **Introduction:** Brief lecture using a PowerPoint on DNA as a 'blueprint' and how a	● **Scaffolding:** Presentation of 'Beneficial Mutations' in nature, such as antibiotic	● **Scaffolding:** Guided analysis of karyotype diagrams to show chromosomal mutations	● **Introduction:** Final overview of the Beneficial, Neutral, and Harmful categories.

	'typo' in the code is a mutation. ● **Scaffolding :** Teacher demonstrates how to use Google Scholar or reputable science websites (e.g., National Geographic, DOST-STII) to find information on mutations. ● **Active Retrieval:** 'Think-Pair-Share' where students recall the relationship between DNA, genes, and chromosomes from previous lessons. ● **Social Learning:** Small groups are assigned a specific 'secondary source' type to critique based on a provided rubric for reliability and relevance to mutations. ● **Check for**	resistance in bacteria or lactose tolerance in humans. ● **Active Retrieval:** Students use a Venn diagram to compare 'Beneficial' vs. 'Neutral' mutations. ● **Social Learning:** 'Jigsaw' activity where groups research different neutral mutations (e.g., free vs. attached earlobes in Filipinos, blood types) and report back. ● **Check for Understanding:** 'Four Corners' game where students move to a corner labeled 'Beneficial,' 'Harmful,' 'Neutral,' or 'Unsure' based on a scenario read by the teacher.	like Down Syndrome or Sickle Cell Anemia. ● **Social Learning:** Collaborative research in the computer lab/library focusing on one harmful mutation and its impact on the individual's quality of life. ● **Active Retrieval:** 'Flashcard Exchange' where students quiz each other on the names and causes of common genetic disorders. ● **Check for Understanding:** 'Stoplight' check—students raise Red (confused), Yellow (needs more examples), or Green (understands) regarding the mechanism of harmful mutations.	● **Active Retrieval:** 'Brainstorming Blizzard' where groups list as many effects of mutations as they can in 2 minutes. ● **Social Learning:** 'Creative Synthesis' project—groups choose between making an Infographic, a Short Skit, or a 'Mutation News Report' summarizing the week's learning. ● **Scaffolding :** Teacher provides a 'Synthesis Checklist' to ensure they cover all three types of effects (Beneficial, Neutral, Harmful). ● **Check for Understanding:** Peer evaluation of the creative projects using a simplified rubric.

	Understanding: Exit ticket asking: 'What is one characteristic of a reliable source for genetic research?'			
Learning Resources:	• Laptop and Projector • Sample printouts of scientific articles • Source Reliability Rubric • Chalkboard for concept mapping	• PowerPoint on IRRI (International Rice Research Institute) success stories • Case study cards on lactose tolerance and polyploidy in plants • Worksheets for Venn diagrams	• Printed Karyotype sets for analysis • Fact sheets on Sickle Cell Anemia, Thalassemia, and Cystic Fibrosis • Projector for video testimonials of people living with genetic conditions	• Art materials (cartolina, markers) • Rubrics for the Performance Task • Mobile phones/Tablets for digital infographics (if available)
Opportunities for integration:	**English/Literacy:** Evaluating the credibility and bias of information sources. **ICT:** Effective use of search engines and digital libraries.	**Araling Panlipunan/Economics:** How beneficial mutations in crops affect the Philippine economy and food supply. **Agriculture:** Selective breeding and genetic variation.	**Health/PE:** Understanding disabilities and promoting inclusive attitudes. **Values Education (EsP):** Developing empathy and respect for persons with disabilities (PWDs).	**Arts:** Graphic design and visual storytelling. **Environmental Science:** Linking genetic diversity to ecosystem resilience against climate change.
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:	A 'Source Audit' worksheet where students list three secondary sources they found and justify why they are reliable for studying mutations.	A short paragraph or 'Quick Write' explaining how a specific mutation helped a Philippine species survive or adapt to its environment.	Creation of a 'Concept Map' linking a specific mutation (cause) to its physical effect on the body and the resulting challenge for the organism.	The 'Mutation Impact Poster/Presentation'—a tangible output where students categorize and explain 3 mutations (one of each type) using evidence from their research.
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:	Learners will create a 'Digital Bookmark' list of at least five reliable science websites they can use for the rest of the week.	Interview a local farmer or gardener about any unique 'freak' plants they have seen and whether those plants were better or worse than the others.	Write a short 'Letter of Encouragement' to a hypothetical peer with a genetic disorder, incorporating facts about how their condition is a biological variation.	Home task: Watch a news clip about climate change and write a 3-sentence reflection on how genetic mutations might help some Philippine species survive rising temperatures.
Reflections:	Reflect on whether students were able to distinguish between 'fake news' and scientific data regarding genetics. Did the visual aids help the lower-readiness group?	Assess if the 'Four Corners' activity effectively cleared the misconception that all mutations are bad. Monitor if the visual examples of local crops increased engagement.	How did the class handle the sensitivity of genetic disorders? Were the karyotype activities accessible to learners with lower numeracy levels?	Did the students successfully link mutations to the broader concept of biodiversity? Which medium (skit vs. poster) best allowed the struggling readers to demonstrate their knowledge?