LESSON PLAN TEMPLATE

Lesson Title	Unveiling Earth's Dynamic Crust: Plate Tectonics and Measurement
Learning Area/s	Science
Name of Teacher/s	DEPED TAMBAYAN PH (Visit www.depedtambayanph.net)
Grade Level and Section	Grade 10
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:** • Identify modern scientific processes used to detect and measure the displacement of tectonic plates. • Describe the structures, movements and events that occur at each type of plate boundary. **Content Standards:** • Population growth influences the carrying capacity of an ecosystem • The products and processes of biotechnology can have both beneficial and harmful effects on society and the environment. • Current models explain tectonic plate movement as part of a gravity - driven convection system that pushes young hot plates away from spreading ridges and pulls old cold plates down into subduction zones. • Plate movements and continental evolution account for the major surface features of the Earth. • Climate change and its impacts on the environment and people pose serious challenges which require solutions and action at local and global levels. • The rich natural resources of the Philippines require sustainable management. **Performance Standards:** By the end of the term, learners describe homeostasis as a process that allows an organism to maintain stability and discuss the factors that limit the ecosystem's carrying capacity and the role of population growth. They describe and discuss in small groups that natural selection is the driving mechanism of evolutionary change,

	use information from secondary sources to explain lines of evidence that support the occurrence of evolution, and explain the meaning of the term biotechnology and debate the societal, environmental, and ethical implications of utilizing biotechnological products and methods. Also, learners describe and explain the geologically dynamic nature of the Philippine Archipelago by using models to explain tectonic plate movement and continental evolution, gather information from secondary sources to identify evidence of global warming and climate change and suggest ways individuals can reduce impacts and how increased societal uses of renewable energies could mitigate climate change, and use Newton's laws to explain projectile motion and collisions and gather information from secondary sources to evaluate how renewable and non - renewable electricity generation in the Philippines impacts human activities and the environment.			
	Session 1	**Session 2**	**Session 3**	**Session 4**
Learning Objectives:	● Identify modern scientific processes used to detect and measure the displacement of tectonic plates, specifically GPS (Global Positioning System) and VLBI (Very Long Baseline Interferometry). ● Calculate plate movement rates using simulated data from satellite measurements.	● Describe the structures, movements, and events that occur at divergent plate boundaries. ● Explain the process of seafloor spreading and the formation of rift valleys using the 'gravity-driven convection' model.	● Describe the structures, movements, and events that occur at convergent plate boundaries (Oceanic-Continental, Oceanic-Oceanic, and Continental-Continental). ● Identify specific examples of convergent boundaries within the Philippine Archipelago.	● Describe the structures, movements, and events that occur at transform fault boundaries. ● Synthesize the role of plate tectonics in shaping the Philippine landscape and its implications for safety and resource management.
Learner Context:	Learners demonstrate high engagement when using digital tools and visual simulations. While most show	The class enjoys hands-on modeling. Some learners with lower literacy levels struggle with technical	Learners are highly aware of the volcanic and seismic activity in the Philippines (e.g., Mt. Mayon, Mt. Pinatubo).	Students are particularly sensitive to the topic of the 'Big One' (the West Valley Fault). This creates a high level

	proficiency in basic mapping, a significant group struggles with the abstract nature of plate speed (centimeters per year). They are highly interested in how scientists predict natural disasters like earthquakes in the Philippines.	terminology like 'lithosphere' and 'asthenosphere,' requiring visual aids and localized analogies. They show a strong interest in underwater exploration and volcanoes.	They respond well to real-world examples but can be overwhelmed by the three different types of convergence. Barriers include confusing 'subduction' with 'induction'.	of relevance but also potential anxiety. They are proficient in identifying local landmarks but need support in connecting small-scale faults to global plate movements.
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:	● **Photo Analysis:** Display images of GPS stations installed in remote Philippine mountains and coastal areas. Ask: 'Why are these instruments placed here?'	● **The 'Cracked Shell' Analogy:** Students observe a hard-boiled egg with a cracked shell and try to move the pieces apart, observing what happens to the 'yolk' (mantle) beneath.	● **Video Montage:** Show short clips of famous Philippine volcanic eruptions and mountain ranges like the Sierra Madre. Ask: 'How did these giants form?'	● **Local Map Zoom-in:** Use a digital map (Google Earth) to zoom into the Marikina Valley Fault System or the Philippine Fault Zone.
Flow:	● **Scaffolding :** Briefly review the layers of the Earth to set the stage for plate movement.	● **Modeling:** Using clay or playdough, students simulate two oceanic plates	● **Scaffolding :** Use a density demonstration (oil vs. water) to explain why oceanic	● **Active Retrieval:** Review Divergent and Convergent boundaries through a

	• **Active Retrieval:** Quick poll on the direction of tectonic movement based on prior knowledge. • **Instruction:** Present a video clip on how GPS and VLBI measure millimetric changes in crustal position. • **Hands-on Activity:** Using printed 'Satellite Tracking Maps,' students plot the yearly positions of three different Philippine islands to see how they are moving relative to each other. • **Check for Understanding:** Peer-pair discussion on why 'Very Long Baseline Interferometry' is necessary for	moving apart. They insert 'lava' (red paper strips) to represent the creation of new crust. • **Social Learning:** Group discussion on why the youngest rocks are always found at the center of the ridge. • **Checks for Understanding:** 'Stop and Draw' activity where students sketch a cross-section of a mid-ocean ridge. • **Instruction:** Direct instruction on how convection currents act as the engine for this movement.	crust always sinks beneath continental crust. • **Social Learning:** 'Expert Groups' - Divide the class into three; each group studies one type of convergence and teaches it to the others. • **Contextualization:** Mapping the Philippine Trench and the formation of the Philippine Mobile Belt. • **Active Retrieval:** A 'True or False' flashcard game regarding which features (trenches, volcanoes, mountains) form at which convergence.	quick 'gesture game' (hands moving apart vs. hands colliding). • **Instruction:** Explain the sliding motion of transform faults using the San Andreas Fault and the Philippine Fault Zone as primary examples. • **Social Learning:** Small group 'Community Planning' - Based on a fault map, where should we build schools and hospitals? • **Check for Understanding:** Comparison table: Divergent vs. Convergent vs. Transform (Movement, Feature, Philippine Example).

	accuracy.			
Learning Resources:	● Laptop and Projector ● PowerPoint presentation on Geodetic techniques ● Printed 'Philippine Plate Tracking' worksheets	● Modeling clay or playdough ● Red construction paper strips ● Diagrams of the Mid-Atlantic Ridge	● Large map of the Philippine Fault Lines and Trenches ● Density demonstration materials (beakers, liquids) ● Graphic organizers for convergence types	● Google Earth or printed Topographic Maps of the Philippines ● Projector ● Hazard Maps from PHIVOLCS
Opportunities for integration:	Mathematics: Calculating rates of change (Distance = Rate x Time).	Geography: Identifying the location of the East African Rift and the Mid-Atlantic Ridge on a world map.	Araling Panlipunan (Social Studies): Discussing how the Sierra Madre protects parts of Luzon from typhoons, linking geology to disaster risk reduction.	Disaster Risk Reduction Management (DRRM): Analyzing hazard maps to identify safe zones in the local community.
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 short exit slip requiring students to name two modern scientific processes and explain how they prove that the ground beneath our feet is moving.	● 'Predict and Explain' prompt: If plates continue to move apart in the Atlantic Ocean, what will happen to the distance between the Americas and Africa in	● Labeling Activity: Students must correctly label a diagram of a subduction zone, identifying the trench, volcanic arc, and subducting slab.	● Final Synthesis Worksheet: Students must match 5 Philippine geological features (e.g., Chocolate Hills, Mt. Apo, Manila Trench) to their correspondi

		1 million years?		ng plate boundary types and movements.
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 tasked to research the location of the nearest PAGASA or PHIVOLCS monitoring station in their region.	● Watch a short documentary clip on hydrothermal vents found at divergent boundaries and write a one-paragraph summary.	● Interview an elder in the community about their experience during a major earthquake or volcanic eruption and relate it to the plate movements discussed.	● Create a 'Tectonic Safety Poster' that explains to their family why the Philippines is geologically active and what precautions to take.
Reflections:	● Reflect on whether students were able to visualize the slow pace of tectonic movement versus the sudden release of energy during earthquakes.	● Evaluate if the clay model effectively addressed the misconception that 'empty space' is left behind when plates move apart.	● Assess if the 'Expert Groups' strategy effectively helped learners distinguish between the three types of convergence.	● Reflect on whether the lesson successfully balanced scientific concepts with practical safety applications for the Filipino context.