

LESSON PLAN TEMPLATE

Lesson Title	Chemical Reactions and the Nature of Acids, Bases, and Salts
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: • Describe the indicators for a chemical reaction as color change, the formation of a precipitate, the release of gas, and or odor, or a change in temperature. • Identify common acids, bases, and salts (e.g., hydrochloric acid, sodium hydroxide, and saline solution) using different indicators. Content Standards: • Several simple observations indicate if a chemical reaction has taken place. • Chemical indicators produce color changes with acids, bases, and salts. • Valid and reliable scientific investigations identify the dependent and independent variables and control other variables. • Many types of chemical reactions are important in our daily lives and in the biotic and abiotic parts of the environment. • Atoms rearrange during chemical reactions but abide by the principle of conservation of mass as illustrated in balanced chemical equations. • Rates of chemical reactions are critical in production and preservation of many useful materials. • Homeostasis is a self - regulating process that allows an organism to maintain stability. • Several theories provide lines of evidence about how organisms evolve. Performance Standards: By the end of the term, learners use household products as indicators to identify acids, bases, and salts and describe indicators that a chemical reaction has occurred.
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	They describe important types of chemical reactions, use chemical equations and conservation of mass to represent and balance reactions, and explain impacts on the natural and built environments using secondary sources. Also, learners explain factors affecting reaction rates and exothermic and endothermic reactions, demonstrate valid and reliable investigations, describe homeostasis and feedback mechanisms, and explain biotechnology by identifying traditional and modern examples and debating societal, environmental, and ethical implications.			
	Session 1	Session 2	Session 3	Session 4
Learning Objectives:	- Describe color change and temperature change as indicators of a chemical reaction. - Relate these indicators to common household and environmental phenomena.	- Describe the formation of a precipitate and the release of gas as indicators of a chemical reaction. - Differentiate between boiling (physical) and gas evolution (chemical).	- Identify common acids, bases, and salts found in the household (e.g., Muriatic acid, Liquid Sosa, Table salt). - Describe the general properties of acids and bases using relatable examples.	- Use natural and commercial indicators (e.g., red cabbage, litmus paper) to identify acids, bases, and salts. - Analyze the reliability of different indicators in a controlled investigation.
Learner Context:	Learners in this Grade 10 section are predominantly visual and kinesthetic. They show high interest when observing physical changes in their environment, such as the ripening of mangoes or the rusting of iron gates in their coastal community. However, some learners struggle with connecting these observations to formal scientific terminology. Mixed	The class enjoys 'magic-like' demonstrations but tends to overlook subtle changes like small bubbles or faint odors. A barrier identified is the misconception that all bubbles indicate boiling. Strengths include strong peer-to-peer communication when working in small groups.	Learners are familiar with household cleaners and condiments but are unaware of their chemical nature. They have a strong interest in 'useful' science. A potential barrier is the safety risk; some learners might be over-eager to touch or smell substances without supervision.	Learners have shown they can categorize items by property; now they are ready for experimental verification. They respond well to color-changing activities. Barriers include limited supply of commercial litmus paper, requiring the use of indigenous materials.

	readiness levels are observed, with a group needing more scaffolding in explaining the 'why' behind the changes.			
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:	● Show-and-Tell: Present a fresh piece of kamote (sweet potato) vs. a cooked/oxidized one. ● Active Retrieval: Students list three things they saw change 'permanently' this morning (e.g., fried egg, burnt toast).	● Review: Quick recap of Session 1 indicators (color/temp) using a 3-question slide quiz. ● Predict: Show a bottle of vinegar and baking soda; ask what will happen when mixed.	● Gallery Walk: Images of common Filipino household items (Kalamansi, Suka, Muriatic Acid, Sabon, Asin) are posted around the room. Students tag them as 'Sour', 'Bitter/Slippery', or 'Salty'.	● Demonstration: Dip a strip of blue litmus paper into kalamansi juice. Ask: 'What happened to the color?' ● Recall: Quick review of the 4 indicators of a chemical reaction from Sessions 1 and 2.
Flow:	● Scaffolding : Begin with a demonstration of mixing potassium permanganate with water and sugar (color change). Ask: 'What	● Scaffolding : Mix vinegar and baking soda. Explain that the 'fizzing' is the release of Carbon Dioxide (gas evolution).	● Scaffolding : Introduce the terms 'Acid', 'Base', and 'Salt' by linking them to the 'Sour', 'Bitter', and 'Salty' tags from the gallery walk.	● Scaffolding : Explain how pH indicators work through color change. Introduce the 'Red Cabbage Indicator' as

	changed? Can we get the original color back?' • Checks for Understanding: Use 'Thumb-Up/Thumb-Down' to identify if a scenario (e.g., melting ice vs. burning paper) is a chemical reaction. • Social Learning: In pairs, students touch the side of a container where detergent powder is mixed with a little water to feel the temperature increase (exothermic). • Active Retrieval: Quick-fire round where students identify if 'heat' or 'color' was the primary indicator in provided local examples like 'pagluluto ng kanin' (cooking rice).	• Social Learning: Small groups mix saltwater with a silver nitrate substitute (or a simulated precipitate reaction using Epsom salt and ammonia) to observe 'cloudiness' (precipitate). • Checks for Understanding: 'Think-Pair-Share' on why the water becomes cloudy even if no solid was added initially. • Active Retrieval: Compare 'boiling water' vs 'vinegar+baking soda' - which one is a chemical reaction and why?	• Active Retrieval: Categorization activity: Students use flashcards of Hydrochloric Acid (Muriatic), Sodium Hydroxide (Sosa), and Saline Solution to match with their common uses (cleaning, unclogging, medical). • Checks for Understanding: Use a Venn Diagram on the board to compare Acids and Bases based on their properties. • Social Learning: Group discussion on safety labels found on household chemicals (e.g., 'Corrosive' symbols).	a local alternative. • Social Learning: Lab Station Rotation. Station 1: Blue/Red Litmus paper with various liquids. Station 2: Red Cabbage Juice (Mayana or Red Cabbage) with household items. Station 3: Identification of 'Unknown' liquids. • Checks for Understanding: During the lab, ask: 'If the cabbage juice turns green/yellow, is it an acid or a base?' • Active Retrieval: Students summarize their findings: 'Acids turn litmus [Color], Bases turn litmus [Color].'
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Learning Resources:	- Laptop and Projector - PowerPoint: 'Visible Signs of Chemistry' - Detergent powder, water, clear plastic cups - Worksheet on Observation Skills	- Vinegar (puti), Baking Soda, Epsom Salt, Clear jars - Printed Activity Sheets for 'The Cloudy Mystery' - Smart TV for slow-motion videos of precipitate formation	- Household product labels or empty containers (safely cleaned) - Manipulatives: Flashcards with chemical names and formulas (HCl, NaOH, NaCl) - Projector for safety protocol videos	- Red cabbage extract (or Mayana leaf extract), Litmus paper, Kalamansi, Vinegar, Soap solution, Saline solution - Test tubes or clear plastic cups, droppers - Activity Sheet: 'The Color Spectrum of Chemistry'
Opportunities for integration:	Integration with TLE (Home Economics) by discussing how heat changes the chemical structure of food during cooking, and Environmental Science regarding the oxidation of local minerals.	Integration with Earth Science: Discussing how stalactites and stalagmites are formed through precipitation reactions in caves (e.g., Puerto Princesa Underground River).	Integration with Health: Discussing the use of saline solution (salt) in rehydration and the acidity of the stomach (HCl) in digestion.	Integration with Arts: Using the color changes from natural indicators to create 'pH art' or 'invisible ink' messages.
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:	Exit Ticket: Students must write down one local example of a chemical reaction and	Drawing Task: Learners draw a 'Before' and 'After' diagram of the gas	Classification Table: A worksheet where students list 5 household items and classify	Laboratory Report: A structured table showing the substance, the indicator used, the

	identify whether it involves color change, temperature change, or both. ● Observation Checklist during the 'warm detergent' activity.	release and precipitate experiments , labeling the specific indicators. ● Peer Feedback: Groups swap observations to check for accuracy.	them as Acid, Base, or Salt based on their properties and common uses. ● Oral Questioning: 'Why is it dangerous to mix Muriatic acid with other cleaners?'	color change observed, and the final classification (Acid, Base, or Salt). ● Performance Task Rubric: Assessing the learners' ability to handle materials and record data accurately.
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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:	● Home Task: Observe a rusty nail or a fading t-shirt at home. Document the changes and bring the notes to the next session.	● Advanced Task: Research why a 'patis' (fish sauce) bottle sometimes develops crystals at the bottom over time.	● Interview: Ask parents or guardians what they use 'Muriatic Acid' or 'Lye/Sosa' for at home and how they store them safely.	● Actionable Task: Create a 'Natural Indicator Kit' at home using boiled purple yam (ube) or red onion skin and test one safe household liquid. Share the result via a photo or a short description.
Reflections:	Reflect on: Did the use of local examples (cooking rice/kamote) help the lower-readiness group bridge the	Reflect on: Were the learners able to distinguish between 'dissolving' and 'forming a precipitate'? How	Reflect on: Did the classification task reveal any misconceptions about 'Salts' (i.e., thinking salt only refers to table	Reflect on: How effective was the use of natural indicators in demonstrating the concept? Did this increase the

	gap between observation and theory?	can I clarify this further using local condiments?	salt)?	learners' appreciation for science in their local environment?
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