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Status of Common Salt in Seawater: Students' Misconceptions Unlocked

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Abstract: This study investigated chemistry students' misconceptions about common salt in seawater and their implications for the chemistry education curriculum. Using a phenomenological design within the Model of Educational Reconstruction framework, the research engaged forty-five (45) first-year chemistry students at the University of Education, Winneba (UEW), Ghana. Participants were organized into nine groups of five students each and observed over a six-week period. Findings revealed that students frequently expressed misconceptions, inconsistent reasoning, and unscientific ideas about oceanic chemical processes. These misconceptions highlighted significant conceptual gaps in their understanding of solutions and seawater chemistry. The study underscores the need to reconceptualize curriculum content to address these misconceptions, offering valuable insights into achieving conceptual balance and strengthening the teaching of solution chemistry and marine science education.

Keywords: *Misconceptions, Common Salt, Educational Reconstruction, Seawater, Marine Science.*

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I. INTRODUCTION

Students often mistakenly believe that "Common Salt (CS)" in seawater exists as visible crystals or undissolved particles, rather than recognizing that sodium chloride dissociates into ions (Na^+ and Cl^-) when dissolved. This misconception is widespread because learners tend to equate the saltiness of seawater with the solid grains of table salt, they encounter in everyday life [1]. Research has shown that many students fail to represent dissolution at the microscopic level, assuming neutral molecules or undissolved particles remain in solution [2];[3]. Such misunderstandings are reinforced by oversimplified textbook explanations and everyday analogies, which obscure the ionic nature of salinity [4]. Instructional strategies such as the Predict-Observe-Explain (POE) approach has been found effective in challenging these misconceptions, helping students visualize ions surrounded by water molecules and thereby correcting their conceptual errors [5]. Ultimately, clarifying that seawater salinity being ion-based rather than particle-based is essential for building accurate chemical understanding and connecting classroom learning to real-world ocean processes.

Salt is more than just the white crystals in the shaker at the dinner table that we add to food to make it tastier. In the ocean, 97% of the salt is made up of ions (electrically charged atoms or molecules) such as sodium (Na^+), chloride (Cl^-), sulfate (SO_4^{2-}), and magnesium (Mg^{2+}) [6]. The ocean receives most of its salt from a process called chemical rock weathering and the combination of water from rain, plus oxygen (O_2) and carbon dioxide (CO_2) from the air, which acts to react with and dissolve the minerals that rocks are composed. This process is observed in places where rainwater has smoothed rock surfaces, or on statues or stone building decorations that have lost their original shapes [6]; [7].

Water molecules consist of hydrogen and oxygen atoms, arranged so that the hydrogen end carries a slight positive charge while the oxygen end carries a slight negative charge. This polarity makes water an exceptionally effective solvent, allowing it to surround and separate ions such as sodium (Na^+) and chloride (Cl^-), which explains why salts dissolve so readily in the ocean [8]. The same property enables seawater to contain not only sodium and chloride but also other ions like sulfate (SO_4^{2-}) and magnesium (Mg^{2+}), which together account for the majority of ocean salinity [6]. Understanding this ionic dissolution is essential for teaching students that seawater salinity is ion-based rather than particle-based, thereby connecting classroom chemistry to real-world ocean processes. By connecting this experience to the coast of Winneba and its sea highlights how global ocean chemistry is lived locally. The salt in seawater is also formed through chemical weathering of rocks which is subsequently transported by the Ayensu river, that ultimately reaches coastal areas of Winneba. Here, the water from the Ayensu River carry dissolved ions such as sodium (Na^+), chloride (Cl^-), sulfate (SO_4^{2-}), and magnesium (Mg^{2+}), which make up the majority of salinity [6].

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For Winneba, this ion-based salinity interacts with seasonal phenomena like the Harmattan haze and valley inversions**,** compounding local air and water quality issues. Students often perceive salt as visible particles, but in reality, the coast's "saltiness" is a product of invisible ions dissolved in the water. This distinction is crucial because it explains why Winneba's seawater tastes salty, and the reason why desalination is complex, and why marine ecosystems depend on ionic balances rather than solid salt grains [7]. By linking the science of ionic salinity to Winneba's coastal environment, educators can help students see that the chemistry they learn in class is not abstract, and directly shaping their lived experiences of the sea, fishing, and even local climate conditions. This connection will make the lesson both scientifically accurate and personally meaningful. Although there exists relationship between CS in seawater in literature, these studies have generally been limited to their chemical processes. However, students' misconceptions about common salt in the seawater of Winneba hasn't been explored. In this study, the researcher sought to fill this research gap by analysing qualitative data from students' misconceptions and their correspondences from a Ghanaian Tertiary classroom in Winneba-Ghana and use such to enrich curriculum. The research questions that guided the study were: (1) Where does the CS in Winneba's seawater come from? (2) What instructional approach was adapted to remediate the misconceptions identified from the students?

II. METHODOLOGY

The study was a phenomenological design using the Model of Educational Reconstruction (MER), approach as proposed by Niebert and Gropengiesser [9]. This approach was adapted in this study because it is a widely used research approach which seeks to improve content-specific learning and teaching. Moreover, the research design was based on the MER due to its inherent ability to improve science teaching from the secondary to higher education when adopted. Finally, the interpretive-qualitative methodology was used in this study to ascertain the depth of students' misconceptions about common salt in seawater from the coast of Winneba.

➢ *Study Area*

Winneba is a coastal town in the Central Region of Ghana, situated along the Gulf of Guinea at approximately latitude 5°21′N and longitude 0°37′W. Located about 60 kilometers west of Accra, Winneba's geography is defined by sandy beaches, fishing harbours, and a shallow coastal basin bordered by low hills. This unique topography influences local atmospheric and oceanic conditions, including temperature inversions and the trapping of haze during the Harmattan season [10]. The Atlantic waters along Winneba's coast are moderately saline, shaped by global ocean currents and local river inflows, with dissolved ions such as sodium, chloride, sulfate, and magnesium forming the bulk of seawater salinity [6]. Seasonal winds and coastal erosion further highlight the dynamic interaction between land and sea, making Winneba's coast both a vital economic hub for artisanal fishing and a natural laboratory for studying ocean chemistry and environmental processes [11].

➢ *Population*

Participants in the study were all first-year chemistry students in the University of Education, Winneba (UEW), who took a General Chemistry course in the first semester of the 2025/2026 academic year. There were Forty-five (45) students involved. The 45 comprised thirty-five (35) males and ten (10) females in the study.

➢ *Sample Selection Procedure*

Purposive sampling was used to select 45 first-year chemistry students for the study. According to Creswell and Plano-Clark [12] in this type of sampling, the researcher determines the type of participants who are appropriate for the study and select them. Based on this, the first-year chemistry students of the University of Education, Winneba were the accessible population for this study. They were randomly assigned to groups. The simple random technique was adopted by urging the participants one at a time to pick a coloured-ball in an enclosed envelope. Each participant was to one of the balls and show it to the class. All those with same coloured-balls were put in one group. Members in each group were then given the diagnostic tasks designed by the researcher, who served as the facilitator for the course. The relationship enhanced easy administration and the collection of data for the study. In a class, students were exposed to and given a two-tier diagnostic tasks of seven (7) test items aligned to the requirements in the research questions.

➢ *Research Instruments*

With the research questions in mind, data was collected through:

- The Common Salt in Seawater diagnostic Test (CSST) using pen and paper, found in Appendix A.

✓ *Quality Assurances of the Instrument*

The instrument was the Common Salt in Seawater diagnostic Test (CSST). To ensure the quality of the data analysis, all data were externally and consensually validated [13] through discussions in the study group and crosschecked with other studies in the field of chemistry education. Two (2) experts in the field of inorganic and chemistry education validated the students' tasks and the worksheet independently. In this round of activity, the student-group worksheet write-ups were read several times, analysed and summarised independently by the two researchers. The agreement between their assessments was 86% and with few cases of discrepancies, the researches made a common evaluation after discussions.

III. RESULTS AND DISCUSSION

➢ *Research Question One: Where does the CS in Winneba Sea Water Come from?*

This research question sought to unearth students' misconception about the existence of common salt in the sea water. All the representatives from the nine (5) groups gave their write-ups, with seven (7) of them captured as examples here. For example, a member from one of the groups, narrated that:

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"The sea is salty because salt is poured from rocks at the beach". The reason is that the "Sea waves break rocks at the shore and the salt inside comes out." [Student T, Group 1]

The statement, *"The sea is salty because salt is poured from rocks at the beach. The reason is that sea waves break rocks at the shore and the salt inside comes out,"* reflects a common misconception among students. This view assumes that visible rocks at the shoreline directly release salt into seawater when waves strike them. Scientifically, however, seawater salinity is not produced by mechanical breaking of rocks at the beach. Instead, the primary source of ocean salt is chemical weathering of rocks inland, where rainwater, oxygen, and carbon dioxide react with minerals to form dissolved ions. These ions such as sodium (Na^+), chloride (Cl^-), sulfate (SO_4^{2-}), and magnesium (Mg^{2+}) are transported by rivers (Ayensu River) into the ocean, where they accumulate over millions of years [6]. The misconception arises because students often equate everyday experiences of salt crystals with the ocean's saltiness, failing to recognize that seawater salinity is ion-based rather than particle-based. Breaking rocks at the shore may release sediments, but it does not account for the vast ionic composition of seawater. In fact, the persistence of salinity is explained by the balance between inputs from weathering and outputs through processes like mineral deposition and biological uptake [11]. In the educational settings, this misconception highlights the need for curriculum reconceptualization in chemistry and environmental science. Teachers should emphasize the invisible ionic processes rather than visible mechanical ones, using models and experiments to show how salts dissolve and persist in solution. By linking these explanations to local coastal contexts such as Winneba, students can better appreciate that the ocean's saltiness is a product of long-term geochemical cycles, not immediate physical erosion at the beach.

Another group member said:

"*Seawater has solid NaCl crystals floating in it*". "*After taking a look closely at the sea water we fetched from the beach, we saw salt grains in the water." [Student, G, Group 3]*

The claim, *"Seawater has solid NaCl crystals floating in it"* and *"After taking a look closely at the seawater we fetched from the beach, we saw salt grains in the water"* reflects a persistent misconception among students. This view assumes that the saltiness of seawater comes from visible grains of sodium chloride (NaCl) suspended in water. Scientifically, however, seawater salinity is not due to undissolved crystals but to ions dissolved in solution. When NaCl dissolves, it dissociates into sodium (Na^+) and chloride (Cl^-) ions according to equation one:

$$NaCl(s) \rightarrow Na^+_{(aq)} + Cl^-_{(aq)} \quad \text{..........(1)}$$

From equation one, this process means that salt grains disappear as discrete particles and instead exist as ions surrounded by water molecules. The polarity of water is its partial positive hydrogen end and partial negative oxygen end. This enables it to act as an excellent solvent, stabilizing ions in solution [8]. Students may misinterpret suspended sediments, organic matter, or air bubbles in seawater as "salt grains". In reality, the majority of seawater salinity (circa. 97%) is composed of dissolved ions such as sodium, chloride, sulfate (SO_4^{2-}), and magnesium (Mg^{2+}), not visible crystals [6]. This misconception highlights the need for chemistry education to emphasize ionic dissolution and the invisibility of salts in solution. Correcting this misconception is crucial for teaching concepts of solutions, desalination, and marine chemistry, ensuring students connect classroom theory with real-world ocean processes.

The next group member had this to write:

"*NaCl is formed in the sea by Na + Cl → NaCl". We have a thought that "Sodium metal will combine with Chlorine gas and react in the sea to form sodium chloride" [Student F, Group 4]*

The statement, *"NaCl is formed in the sea by Na + Cl → NaCl"* and the idea that *"sodium metal will combine with chlorine gas and react in the sea to form sodium chloride"* reflects a fundamental misconception about chemical processes in seawater. This reasoning assumed that elemental sodium (Na) and chlorine (Cl_2) exist freely in the ocean and directly combine to form salt crystals. Scientifically, however, sodium metal is highly reactive and cannot exist in its elemental form in water; it reacts violently with water to produce sodium hydroxide and hydrogen gas:

$$2Na_{(s)} + 2H_2O_{(l)} \rightarrow 2NaOH_{(aq)} + H_{2(g)} \quad \text{..........(2)}$$

In similar environment, chlorine gas is not present in seawater in free form but exists as chloride ions (Cl^-) already dissolved. The correct representation of salt in seawater is the dissociation of sodium chloride into ions as represented in equation (1).

Thus, seawater salinity arises not from ongoing reactions between sodium metal and chlorine gas but from long-term geochemical cycles. Chemical weathering of rocks releases ions such as sodium, chloride, sulfate, and magnesium, which rivers transport to the ocean where they accumulate over millions of years [6]. Misconceptions like this highlight the need for chemistry education to emphasize ionic dissolution and the absence of elemental sodium or chlorine in seawater. Addressing these misunderstandings helps students build accurate conceptual models of solutions and ocean chemistry, linking classroom learning to real-world processes [11].

A representative from the next group, wrote this: *"Evaporation makes sea salt, so sea salt is created by the sun". Actually the "*Sun makes seawater salty." *[Student H, Group 5].*

The narrative that, *"Evaporation makes sea salt, so sea salt is created by the sun"* and *"The sun makes seawater salty"* reflects a misconception that confuses the role of

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evaporation with the origin of salinity. Students assumed that the sun directly produces salt in seawater by "creating" crystals during heating. However, the sun does not generate salt; instead, it drives evaporation, which removes pure water molecules from the ocean surface while leaving dissolved ions behind. This process increases the concentration of salts but does not create them. The salts themselves originate from chemical weathering of rocks on land and hydrothermal processes at the seafloor, which release ions such as sodium (Na^+), chloride (Cl^-), sulfate (SO_4^{2-}), and magnesium (Mg^{2+}) into rivers and oceans [6]. The misconception arises because students equate the visible crystallization of salt in salt pans or tidal pools with the idea that the sun "makes" salt. This is a concentration effect, not a creation of new salt. The ocean's baseline salinity is maintained by long-term geochemical cycles, not solar radiation. According to Amoako, Osei, and Mensah, [11] coastal dynamics in Ghana including Winneba, demonstrate how evaporation intensifies salinity locally but does not explain its origin. In an educational set-up, this misconception highlights the importance of distinguishing between processes that concentrate salts (evaporation) and those that produce salts (rock weathering and hydrothermal activity). Clarifying this difference helps students build accurate models of ocean chemistry and understand the environmental significance of salinity. Boiling soup provides a useful everyday example of how evaporation affects salt concentration. As the soup boils, water molecules escape as vapour, reducing the overall liquid volume. Even though no additional salt is added, the remaining soup tastes saltier because the dissolved ions (Na^+ and Cl^-) become more concentrated. This mirrors the ocean process in that, the sun's heat drives evaporation, removing pure water but leaving salts behind, thereby increasing salinity without "creating" new salt [6].

A group member also had this to inscribe: *"Sea is salty because of dead sea animals". For us, in this group, we believe* "Fish *urine and dead bodies make it salty." [Student G, Group 6].*

The belief that *"the sea is salty because of dead sea animals"* or that *"fish urine and dead bodies make it salty"* reflects a misconception rooted in everyday observations of marine life rather than geochemical processes. While marine organisms do contribute organic matter and waste products to seawater, these inputs are minor and localized compared to the global sources of salinity. Scientifically, the ocean's saltiness is explained by long-term geochemical cycles; that is chemical weathering of rocks on land releases ions such as sodium (Na^+), chloride (Cl^-), sulfate (SO_4^{2-}), and magnesium (Mg^{2+}), which rivers transport to the sea. Hydrothermal vents at the ocean floor also contribute dissolved minerals. Over millions of years, these processes have accumulated salts in seawater, maintaining its average salinity at about 35% [6].

The misconception arises because students now equate visible decomposition or waste with the "saltiness" they taste in seawater. In reality, the breakdown of organic matter produces nutrients like nitrates and phosphates, not the dominant ions responsible for salinity. Fish excretion and decaying bodies may slightly alter local water chemistry, but they do not explain the ocean's pervasive salt content. As Amoako, Osei and Mensah [11] iterated that, Ghana's coastal dynamics, salinity variations are driven primarily by evaporation, river inflows, and ocean currents and not biological waste. In this study, this highlights the importance of distinguishing between biological contributions (nutrients, organic matter) and geochemical origins (ionic salts). Correcting this misconception helps students understand that seawater salinity is fundamentally an ion-based phenomenon, shaped by Earth's long-term chemical cycles rather than short-term biological processes.

The next representative narrated that: *"All salt in sea is table salt (NaCl) only". We are certain that* "*Sea salt is 100% of NaCl and the rest of the salts are negligible" [Student K & Y, Group 7 & 8].*

The belief that *"all salt in the sea is table salt (NaCl) only"* and that *"sea salt is 100% NaCl while the rest are negligible"* reflects a misconception that oversimplifies the chemical composition of seawater. While sodium chloride is indeed the dominant salt, making up about 86% of dissolved salts, seawater contains a diverse mixture of ions including sulfate (SO_4^{2-}), magnesium (Mg^{2+}), calcium (Ca^{2+}), and potassium (K^+), which together account for the remaining 14% of salinity [6]. These ions play critical roles in marine ecosystems, buffering pH, supporting biological processes, and influencing ocean circulation. The misconception likely arises because students equate the taste of seawater with table salt and assume NaCl is the sole contributor. The dissolution of salts follows ionic dissociation equations as in equation one (1). But similar processes occur for other salts, for example:

$$MgSO_{4(s)} \rightarrow Mg^{2+}_{(aq)} + SO_4^{2-}{}_{(aq)} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

From equation three (3), this equation demonstrates that seawater salinity is a multi-ion system, not a single compound. As Amoako, Osei, and Mensah [11] noted in their studies of Ghana's coastal waters, salinity variations are influenced by evaporation, river inflows, and ocean currents, all of which affect the balance of multiple ions. This misconception underscores the need for chemistry curricula to highlight the ionic diversity of seawater. Teaching students that NaCl dominates but does not exclusively define salinity helps them build accurate conceptual models of ocean chemistry and understand its environmental significance. The reality is the Seawater is a cocktail.

The last group member wrote this: *"If the seawater is desalinated, it is possible we should get Chlorine gas and Sodium metal" [Student L & D, Groups 2 & 9].*

The idea that *"if seawater is desalinated, we should get chlorine gas and sodium metal"* reflects a misconception about the chemical nature of salts in solution. Students often assume that removing salt from seawater means reversing its formation into elemental sodium (Na) and chlorine (Cl_2). Scientifically, however, desalination does not produce elemental forms of these substances. Instead, seawater contains dissolved ions which is primarily sodium (Na^+) and

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chloride (Cl^-) separated from water during desalination. The correct dissociation process is in equation one (1).

When desalination occurs, methods such as reverse osmosis or distillation remove water molecules, leaving salts behind or separating them into brine streams. These processes do not reduce ions back to sodium metal or chlorine gas because such transformations require electrolysis under controlled laboratory conditions, not natural desalination. For example, the electrolysis of molten NaCl produces sodium metal and chlorine gas, as stated:

$$2NaCl_{(l)} \rightarrow 2Na_{(s)} + Cl_{2(g)} \quad \text{.....(4)}$$

From equation 4, this reaction requires high temperatures and electrical energy; conditions absent in seawater desalination plants. In reality, desalination yields fresh water and concentrated brine, not elemental sodium or chlorine. As Stedmon and Visser [6] explained, seawater salinity is maintained by dissolved ions from geochemical cycles, not by free elements. Similarly, Amoako, Osei and Mensah [11] emphasized that coastal salinity variations in Ghana are shaped by evaporation and inflows, not elemental reactions. There is the need to distinguish between ionic dissociation in aqueous solutions and elemental production through electrolysis**.** Clarifying this difference helps students understand why desalination provides potable water rather than dangerous elemental substances.

➢ *Research Question Two: What Instructional Approach was Adapted to Remediate the Misconceptions Identified from the Students?*

This question sought to assess the instructional approach adapted to remediate the misconceptions narrated by these students. The instructional approach was the Predict-Observe-Explain (POE). The POE approach was carried out in the study by engaging the students in experiments where they predicted outcomes, observed dissolving salts, and explained results to reduce their misconceptions. These were done through:

- *The use of Microscopic Models: Visualizing Ions Surrounded by Water Molecules Helping Students Grasp Dissolution*

Microscopic models that depict ions surrounded by water molecules are invaluable in teaching dissolution because they make abstract chemical processes visible at the particle level. When ionic compounds dissolve, water molecules orient themselves around ions due to polarity. The oxygen end of water molecules faces cations, while the hydrogen end faces anions. This hydration reduces electrostatic forces, stabilizes ions, and allows them to disperse freely in solution. Students often hold misconceptions, such as believing salts dissolve as intact molecules or visible grains. By visualizing hydrated ions, learners reconciled macroscopic observations such as the salt "disappearing" in the microscopic reality [14]; [6]. Current educational research confirms that such models enhance conceptual understanding and reduce misconceptions. For example, Hall, Smith and Patel [14] demonstrated that simple ion models improved comprehension of gradients and equilibrium potentials, while virtual simulations of cluster solution structures have been shown to strengthen students' ability to connect symbolic equations with particle-level processes. Chemistry education resources also emphasize that hydration models illustrate the disorder increase driving dissolution, making the process clearer to learners [15]. Thus, microscopic models are not merely illustrative; they are pedagogical tools that transform abstract chemistry into accessible knowledge, bridging the gap between theory and perception.

- *Comparative Experiments: Testing River Water and Seawater Salinity Demonstrating the Variability and Challenges of the "Uniform Saltiness" Belief.*

Comparative experiments that test river water against seawater salinity are powerful teaching strategies because they provide direct evidence of variability and challenge the misconception that oceans are uniformly salty. River water, with its negligible salinity, contrasts sharply with seawater's average of 35%, and this difference becomes even more pronounced in estuarine zones where freshwater inflows dilute ocean salinity. Experimental studies using sand-tank models and estuarine simulations have shown that tidal mixing, groundwater interactions, and seasonal changes create dynamic salinity gradients [16]. For the students, observing these differences through hands-on testing reinforces the idea that salinity is not a fixed property but a variable influenced by environmental conditions. Classroom activities, such as comparing freshwater and saltwater tanks, further demonstrated how density and mixing processes shaped salinity patterns [6]. By engaging in such comparative experiments, learners moved beyond simplistic notions of "uniform saltiness" and begun to appreciate the complexity of aquatic chemistry and its ecological implications [17].

- *Contextual Learning: Linking Local Experiences (For Example, Winneba's Coastal Environment) to Global Ocean Chemistry Making Lessons Relatable and Tangible.*

Contextual learning that linked local experiences, such as Winneba's coastal environment, to global ocean chemistry made lessons more relatable and impactful. Winneba's traditions, like the sacred Tuesday no-fishing practice, embody indigenous conservation principles that modern science now validates, showing how cultural heritage aligns with ecological sustainability [18]; [19]. At the Ayensu Estuary for example, students engaged in hands-on experiment through testing of salinity, pH, and water mixing; that connected classroom chemistry to real-world ecological processes [20]. Such contextual approaches helped learners understand that salinity variability, ion dissolution, and nutrient cycles are not abstract phenomena but realities shaping their community's fishing, livelihoods, and environment. Moreover, research on the Muni-Pomadze Lagoon also demonstrated how human activities alter chemical balances, reinforcing the importance of teaching chemistry through local case studies [21]. By situating global ocean chemistry within Winneba's lived experiences, educators foster deeper comprehension, cultural relevance, and environmental stewardship among students.

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IV. CONCLUSIONS

Unlocking student's misconceptions and the integration of microscopic models, comparative experiments, and contextual learning carries significant implications for chemistry curriculum design. First, microscopic visualization of ion hydration should be embedded into lessons to strengthen conceptual understanding and reduce persistent misconceptions about dissolution. Second, comparative salinity experiments between river water and seawater should be incorporated into laboratory activities to provide tangible, inquiry-based evidence that challenges oversimplified notions of ocean chemistry. Finally, contextual learning strategies that link global chemical principles to local environments; such as Winneba's coastal traditions, estuaries, and lagoons should be prioritized to make lessons culturally relevant and personally meaningful. Together, these approaches encourage active learning, foster environmental awareness, and connect chemistry education to sustainability and community practices. For curriculum design, this means moving beyond abstract theory toward a pedagogy that emphasizes visualisation, experimentation, and contextualisation, thereby equipping students with both scientific literacy and the ability to apply chemistry knowledge meaningfully in real-world settings.

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APPENDIX A

Diagnostic Test: Common Salt in Seawater diagnostic Test (CSST)

Student Code: ..... Level: ..... Date: .....

Instruction: Underline: True/False and explain WHY. Then write equation(s) or draw diagram(s) to support your answer.

➢ *PART A: True or False? - Explain your thinking*

- The salty taste of the sea is because waves break rocks at the beach and salt comes out.

True / False
Reason: .....

- If you look at seawater with a microscope, you will see tiny white crystals of NaCl floating.

True / False
Reason: .....

- NaCl in the sea is formed by Sodium metal reacting with Chlorine gas in the water: $2Na+Cl_2 \rightarrow 2NaCl$

True / False
Reason: .....

- The sun makes seawater salty by creating new salt every day.

True / False
Reason: .....

- Seawater contains only NaCl, nothing else.

True / False
Reason: .....

➢ *PART B: Draw the Journey - Correct your own idea*

- Draw and label the ACTUAL pathway of *NaCl* to the *Winneba Sea water*.
  Use these words: *Rock weathering, River, Evaporation, Ocean storage*, No *Sodium metal* [Stage 1: Inland Rocks] to [Stage 2: River] to [Stage 3: Sea] to [Stage 4: What sun does?]

Explain in one sentence:

- What is in seawater as ions? Write the equation for what happens when solid salt dissolves:

Equation: NaCl(s) → .....