Chemistry Clue Hunt

Use context clues to interpret scientific symbols and technical terms.

CCSS.ELA-Literacy.RST.11-12.4 "Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each scientific term or symbol whose meaning is explained by nearby details. Circle the words or phrases that help you infer its meaning, and number each term with its clue.

Reading the Chemistry of Seawater

(1) At a coastal research station, scientists track ocean acidification by measuring pH, a scale that describes how acidic or basic seawater is. The pH scale is logarithmic, so a change of one unit represents a tenfold change in hydrogen ion concentration. When air holds more carbon dioxide, some of that gas dissolves in the ocean. It reacts with water and produces hydrogen ions, written H^+. More H^+ means a lower pH. Researchers do not call the water "acid" in the everyday sense, it remains slightly basic, but its chemistry is shifting toward greater acidity.

(2) To see whether organisms can build shells, the team also calculates aragonite saturation state, written Ω_{arag}. Aragonite is a form of calcium carbonate used by many corals and some shellfish. A saturation state above 1 means seawater contains enough carbonate ions for aragonite to form more easily; below 1, forming or maintaining shells becomes harder. This value is not a direct count of shells. Instead, it summarizes a chemical balance between calcium, carbonate, and water. In the station's report, a falling Ω_{arag} is a warning that shell-building conditions are becoming less favorable.

(3) Scientists compare these measurements with a control site, a location chosen because it has less exposure to the carbon dioxide plume released near an undersea volcanic vent. The control does not prove that one factor causes every difference. It gives the team a baseline, or reference condition, for judging the vent site. If pH is lower and Ω_{arag} is lower near the vent than at the control site, the pattern supports the hypothesis that added carbon dioxide changes seawater chemistry. The word supports matters: field data can strengthen an explanation without establishing certainty, because temperature, currents, and biology may also affect the measurements.

2 ANSWER WITH EVIDENCE

Use the passage

1. What does logarithmic mean as it is used to describe the pH scale? Use a detail from the passage in your answer.

2. What does the symbol H+ represent in this passage, and what happens to pH when there is more of it?

3. Explain what Ωarag measures. Why does the passage state that it is not a direct count of shells?

4. What does supports mean in the final paragraph? Why do the scientists avoid saying that the data proves their hypothesis?

3 YOUR TURN

Your own words

Write exactly three sentences for a museum display about the research station. Use the word baseline and either H+ or Ωarag, explain what the selected term or symbol means in this context, and describe one result that would signal less favorable shell-building conditions.

ANSWER KEY

Chemistry Clue Hunt

HIGH SCHOOL · RST.11-12.4

PART 1 · READ AND MARK

Underline each scientific term or symbol whose meaning is explained by nearby details. Circle the words or phrases that help you infer its meaning, and number each term with its clue. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What does logarithmic mean as it is used to describe the pH scale? Use a detail from the passage in your answer.	**A one-unit change in pH represents a tenfold change in hydrogen ion concentration.**
2	What does the symbol H+ represent in this passage, and what happens to pH when there is more of it?	**H+ represents hydrogen ions. More hydrogen ions mean a lower pH.**
3	Explain what Ωarag measures. Why does the passage state that it is not a direct count of shells?	**Ωarag measures aragonite saturation state, a chemical balance that indicates how favorable seawater is for forming or maintaining aragonite shells. It does not count actual shells.**
4	What does supports mean in the final paragraph? Why do the scientists avoid saying that the data proves their hypothesis?	**Supports means the pattern strengthens the hypothesis. It does not prove it because temperature, currents, and biology may also affect the measurements.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

At the control site, the baseline is the reference condition for comparing water near the vent. Ωarag represents aragonite saturation state, a chemical measure of how favorable seawater is for shell building. If Ωarag is lower at the vent, the comparison signals less favorable conditions for corals and shellfish.

Accept equivalent explanations grounded in nearby context clues from the passage. For Part 3, confirm that the response has exactly three sentences, uses baseline and one required symbol, explains the selected term or symbol accurately, and identifies a valid result.