Limestone Lab Clues

Use experimental data to classify solutions and predict a reaction.

PS.6.c "Analyze and interpret data from experiments to determine whether solutions are acidic, basic, or neutral to predict properties of the solutions."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Circle the pH readings in the table, underline the rules for interpreting pH and litmus, and number the two sentences about how solutions affect limestone. Use your marks to support your classifications and predictions.

Which Solution Will Bubble?

1. At a school lab, four unlabeled water-based solutions are tested before anyone uses them near a limestone display. A pH probe measures each sample, and two kinds of litmus paper provide a second check. On the pH scale, numbers below 7 indicate acids, 7 indicates a neutral solution, and numbers above 7 indicate bases.

2. Blue litmus turns red in an acid; red litmus turns blue in a base. Neither changes color in a neutral solution. The table records the probe reading and the observed litmus changes for each sample. A lower pH among acids means greater acidity; a higher pH among bases means greater basicity.

RESULTS FROM THE FOUR SAMPLES

Sample	pH	Blue litmus	Red litmus
A	2	Turns red	Stays red
B	7	Stays blue	Stays red
C	5	Turns red	Stays red
D	11	Stays blue	Turns blue

3. To predict how a sample might affect limestone, consider its main mineral, calcium carbonate. Acids react with calcium carbonate and may produce visible carbon dioxide bubbles. Neutral solutions and bases do not show that acid-carbonate reaction under these test conditions. The probe and litmus readings support a classification, but pH alone cannot tell whether a solution is safe to touch.

2 ANSWER WITH EVIDENCE

Use the passage

1. Classify sample A and predict what you might see if it touched limestone. Use two table results to support your classification.

2. Which sample is neutral? Explain how its pH and both litmus results support your choice.

3. Samples A and C are both acids. Which is more acidic, and what table evidence shows this?

4. Classify sample D and predict whether it would produce acid-carbonate bubbles on limestone. Support your answer with table results.

3 YOUR TURN

Your own words

Two new samples have pH readings of 4 and 8. In three or four sentences, classify each sample, predict how both types of litmus will behave in each, and predict whether either sample might bubble on limestone. Explain your predictions using the pH readings.

ANSWER KEY

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HIGH SCHOOL · PS.6.c

PART 1 · READ AND MARK

Circle the pH readings in the table, underline the rules for interpreting pH and litmus, and number the two sentences about how solutions affect limestone. Use your marks to support your classifications and predictions. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Classify sample A and predict what you might see if it touched limestone. Use two table results to support your classification.	**A is acidic: its pH is 2, and it turns blue litmus red. It may produce carbon dioxide bubbles on limestone.**
2	Which sample is neutral? Explain how its pH and both litmus results support your choice.	**B is neutral. Its pH is 7, and neither type of litmus changes color.**
3	Samples A and C are both acids. Which is more acidic, and what table evidence shows this?	**A is more acidic because its pH of 2 is lower than C's pH of 5.**
4	Classify sample D and predict whether it would produce acid-carbonate bubbles on limestone. Support your answer with table results.	**D is basic: its pH is 11, and it turns red litmus blue. It would not produce acid-carbonate bubbles on limestone under these test conditions.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

A pH of 4 makes the first sample acidic, so it turns blue litmus red while red litmus stays red. It might produce carbon dioxide bubbles on limestone. A pH of 8 makes the second sample basic, so blue litmus stays blue while red litmus turns blue. It should not produce acid-carbonate bubbles on limestone.

Accept descriptions of visible bubbles without naming carbon dioxide. Students should base each classification on the pH reading and make predictions consistent with the passage.