The pH Clue

Compare acid, base, and neutral water properties using evidence.

8.6.D "compare and contrast the properties of acids and bases, including pH relative to water; and"

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each statement that compares pH with water, circle properties acids and bases share, and number two statements that show how they differ.

Testing Three Solutions

1. During a water-quality investigation, students test three labeled solutions with a pH meter and indicator paper. The pH scale describes how acidic or basic an aqueous solution is. At about 25°C, pure water is neutral, with a pH of 7. An acid has a pH below 7, while a base has a pH above 7. The farther a value is from 7, the stronger the acidic or basic character usually is under these conditions in water.

2. Acids and bases share some properties. When dissolved in water, both can form ions that allow the solution to conduct electric current. Both can also change the color of acid-base indicators, but their color changes differ. Blue litmus paper turns red in an acid. Red litmus paper turns blue in a base. A pH meter gives a number, whereas litmus gives a color clue. Neither method tells students that a substance is safe to taste or touch.

3. At the particle level, acids increase the amount of hydronium, H_3O^+, in water. Bases increase the amount of hydroxide, OH^-. Neutral water has balanced amounts of these ions. When an acid and a base are mixed in suitable amounts, they can neutralize each other, forming water and a salt. This reaction moves the mixture toward pH 7. Scientists compare pH, indicator results, and conductivity to identify whether an unknown solution behaves more like an acid, a base, or neutral water during a careful investigation in a laboratory setting.

2 ANSWER WITH EVIDENCE

Use the passage

1. Compare the pH of an acid and a base with the pH of neutral water.

2. How do blue litmus paper and red litmus paper respond differently to acids and bases?

3. What property do aqueous acids and bases share, and what causes this property?

4. Compare the ions in acidic water, basic water, and neutral water.

3 YOUR TURN

Your own words

Complete the table for these samples: a garden soil-water sample has pH 4, a cleaning solution has pH 11, and a distilled-water sample has pH 7. For each sample, classify it and write one pH comparison or particle-property statement that supports your choice.

SAMPLE	CLASSIFICATION	SUPPORTING EVIDENCE

ANSWER KEY

The pH Clue

GRADE 8 · TEKS 8.6.D

PART 1 · READ AND MARK

Underline each statement that compares pH with water, circle properties acids and bases share, and number two statements that show how they differ. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Compare the pH of an acid and a base with the pH of neutral water.	**An acid has a pH below 7, neutral water has a pH of 7, and a base has a pH above 7.**
2	How do blue litmus paper and red litmus paper respond differently to acids and bases?	**Blue litmus turns red in an acid. Red litmus turns blue in a base.**
3	What property do aqueous acids and bases share, and what causes this property?	**Both can conduct electric current because they form ions when dissolved in water.**
4	Compare the ions in acidic water, basic water, and neutral water.	**Acidic water has more hydronium, H_3O^+. Basic water has more hydroxide, OH^-. Neutral water has balanced amounts of both ions.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

SAMPLE	CLASSIFICATION	SUPPORTING EVIDENCE
Garden soil-water sample	Acid	Its pH, 4, is below water's pH of 7.
Cleaning solution	Base	Its pH, 11, is above water's pH of 7.
Distilled-water sample	Neutral	Its pH is 7, and it has balanced H_3O^+ and OH^- ions.

Accept acid or acidic, base or basic, and neutral as appropriate. Supporting evidence must accurately connect each pH value to water or correctly describe the ion balance.