Missing Lab Labels

Use ion names to identify familiar lab substances.

PHS.3.4 "Use naming conventions to name common acids and common compounds used in classroom labs (e.g., sodium bicarbonate (baking soda), NaHCO3; hydrochloric acid, HCl; sulfuric acid, H2SO4; acetic acid (vinegar), HC2H3O2; and nitric acid, HNO3)."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each bottle formula in paragraph 3, circle the negative ion named for it, and give each matching formula and ion the same number. Use those matches to work out the missing names.

The Lab Shelf Inventory

1. A lab shelf can hold ingredients that look alike but need different labels. A formula identifies a substance by its elements and their numbers, while a name helps people talk about it. In this activity, read a formula before you choose a name. An acid formula often begins with H, but that clue alone does not supply its complete name. First identify the negative ion paired with hydrogen. On lab labels, chloride is Cl^-, bromide is Br^-, and fluoride is F^-. The ending of an ion's name helps determine the acid's name.

2. For an acid made from an ion ending in -ide, add hydro- to the ion's stem and end the name in -ic acid. Fluoride, for instance, gives hydrofluoric acid. For an ion ending in -ate, keep the stem, change the ending to -ic acid, and do not add hydro-. Chlorate gives chloric acid. An ion ending in -ite instead gives an acid name ending in -ous acid; nitrite gives nitrous acid. Some stems change spelling: sulfate and sulfite use sulfur, nitrate uses nitr, and acetate uses acet. Check both the stem and the ending when you write a label.

3. At a mock inventory check, five formulas are missing names. One bottle reads HCl; its negative ion is chloride. Another reads H_2SO_4; its negative ion is sulfate. A third reads $HC_2H_3O_2$, the formula for the acid in vinegar; its negative ion is acetate. A bottle marked HNO_3 contains an acid formed from nitrate. A fifth reads $NaHCO_3$. Unlike the acids, it contains sodium ions, Na^+, and bicarbonate ions, HCO_3^-. Ionic compounds use the positive ion's name followed by the negative ion's name. Check each formula against its ions before replacing a missing label.

2 ANSWER WITH EVIDENCE

Use the passage

1. What name belongs on the HCl bottle? Use the chloride ending to explain your choice.

2. What name belongs on the H_2SO_4 bottle? Use its ion's ending to explain your choice.

3. What name belongs on the bottle of $HC_2H_3O_2$ found in vinegar? Explain the ending you used.

4. What name belongs on the $NaHCO_3$ bottle? Explain how you ordered the ion names.

3 YOUR TURN

Your own words

Choose two more bottles for the inventory: HBr, made from bromide; HNO_3, made from nitrate; or H_2SO_3, made from sulfite. Write one sentence for each bottle that gives its formula, its acid name, and the ending rule you used.

ANSWER KEY

Missing Lab Labels

PART 1 · READ AND MARK

Underline each bottle formula in paragraph 3, circle the negative ion named for it, and give each matching formula and ion the same number. Use those matches to work out the missing names. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What name belongs on the HCl bottle? Use the chloride ending to explain your choice.	**Hydrochloric acid. Chloride ends in -ide, so the acid name uses hydro- and -ic acid.**
2	What name belongs on the H_2SO_4 bottle? Use its ion's ending to explain your choice.	**Sulfuric acid. Sulfate ends in -ate, so the acid name uses the sulfur stem and -ic acid.**
3	What name belongs on the bottle of $HC_2H_3O_2$ found in vinegar? Explain the ending you used.	**Acetic acid. Acetate ends in -ate, so the acid name uses the acet stem and -ic acid.**
4	What name belongs on the $NaHCO_3$ bottle? Explain how you ordered the ion names.	**Sodium bicarbonate. The positive ion, sodium, is named before the negative ion, bicarbonate.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

HBr is hydrobromic acid because bromide ends in -ide, which calls for hydro- and -ic acid. HNO_3 is nitric acid because nitrate ends in -ate, which changes to -ic acid.

Accept any two correct choices in Part 3, including sulfurous acid for H_2SO_3. Each sentence should name the acid and connect its ending to the ion named in the prompt.