LESSON MAKER PRO

Charge Match

Build and name acids and bases

HIGH SCHOOL · CHE.6.b

CHE.6.b "Use the periodic table and computational thinking to derive chemical formulas and names of acids and bases."

NAME _____ DATE _____

BALANCE THE CHARGES

Use the periodic table: group 1 metals form 1+ ions, group 2 form 2+ ions, and group 13 form 3+ ions. Acids use H^+, while bases use OH^-; choose subscripts that make the total charge zero, and put parentheses around a repeated ion. Name a base as metal hydroxide; for acids, anions ending in -ate give -ic acid, and anions ending in -ite give -ous acid.

WORKED EXAMPLE

Aluminum is in group 13. Write the formula and name of its base with OH^-.

METAL ION CHARGES

Periodic table group	Ion charge
1	1+
2	2+
13	3+

1. Group 13 gives Al^{3+}.
2. Three OH^- ions balance one Al^{3+}.
3. Put parentheses around the repeated OH ion.

Answer: $Al(OH)_3$, aluminum hydroxide

PRACTICE 4 problems

1 Potassium is in group 1. Write the formula and name of its base with OH^-.

ANSWER _____

2 Magnesium is in group 2. Write the formula and name of its base with OH^-.

ANSWER _____

3 Combine H^+ with nitrite, NO_2^-. Write the acid's formula and name.

ANSWER _____

4 Combine H^+ with sulfate, SO_4^{2-}. Write the acid's formula and name.

ANSWER _____

APPLY IT Show your work

1 A garden store sells calcium hydroxide to adjust soil pH. Calcium is in group 2. Write its formula and state how many OH^- ions it contains.

WORK SPACE

ANSWER _____

2 An air-quality report mentions sulfurous acid in rainwater. Sulfite is SO_3^{2-}. Write the acid's formula and show how its ions balance.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A student writes $BaOH_2$ for barium hydroxide. Barium is in group 2. Correct the formula and explain why parentheses are needed.

WORK SPACE AND ANSWER

Charge Match

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Potassium is in group 1. Write the formula and name of its base with OH^-.	**KOH, potassium hydroxide**
2	Magnesium is in group 2. Write the formula and name of its base with OH^-.	**$Mg(OH)_2$, magnesium hydroxide**
3	Combine H^+ with nitrite, NO_2^-. Write the acid's formula and name.	**HNO_2, nitrous acid**
4	Combine H^+ with sulfate, SO_4^{2-}. Write the acid's formula and name.	**H_2SO_4, sulfuric acid**

PART 2 · APPLY IT

1. **$Ca(OH)_2$; two OH^- ions** Group 2 gives Ca^{2+}. Two OH^- ions balance its charge.
2. **H_2SO_3; two H^+ ions balance one SO_3^{2-} ion.** Two hydrogen ions give a total charge of 2+, which cancels the sulfite ion's 2− charge.

CHALLENGE

$Ba(OH)_2$. One Ba^{2+} ion needs two OH^- ions; parentheses show that the subscript 2 applies to the whole OH ion.

Require parentheses when a formula contains more than one OH ion. Accept equivalent charge-balance explanations.