

Formula Writing and Naming!

Anion Name	Acid Name:
_____ate ion	_____ic acid
_____ite ion	_____ous acid
_____ide ion	hydro_____ic acid

1. a. Are the compounds shown in 1c ionic or covalent? How can you tell?

ionic - have metal ion

b. Are the compounds in 1c acidic or basic? (which one?) acidic

c. Fill in the missing name or formula for each of these compounds.

potassium hydroxide	<u>KOH</u>	CaCO ₃	<u>Calcium carbonate</u>
lithium carbonate	<u>Li₂CO₃</u>	NaHCO ₃	<u>sodium bicarbonate</u>
aluminum hydroxide	<u>Al(OH)₃</u>	Pb(OH) ₂	<u>Lead (II) hydroxide</u>
Iron (III) carbonate	<u>Fe₂(CO₃)₃</u>		

2. a. Are the compounds shown in 2c ionic or covalent? How can you tell?

b. Are the compounds in 2c acidic or basic? (which one?)

c. Fill in the missing name or formula for each of these compounds.

HClO ₃	<u>chloric acid</u>	HCN	<u>hydrocyanic acid</u>
HClO ₂	<u>chlorous acid</u>	Carbonic acid	H₂CO₃ <u>H₂CO₃</u>
HCl	<u>hydrochloric acid</u>	acetic acid	<u>CH₃COOH</u>
H ₂ SO ₄	<u>sulfuric acid</u>	H ₂ C ₂ O ₄	<u>oxalic acid</u>
hydrobromic acid	<u>HBr</u>	hydroiodic acid	<u>HI</u>
phosphoric acid	<u>H₃PO₄</u>	HF	<u>hydrofluoric acid</u>
sulfurous acid	<u>H₂SO₃</u>	perchloric acid	<u>HClO₄</u>
HNO ₃	<u>nitric acid</u>	nitrous acid	<u>HNO₂</u>
HClO	<u>hypochlorous acid</u>	H ₂ S	<u>hydrosulfuric acid</u>

3. Properties of Acids and Bases:

Acids: How do acids taste? sour

What gas is produced when acids react with metals? H₂

What gas is produced when acids react with carbonate ion or bicarbonate ion? CO₂

The acid-base indicator phenolphthalein is colorless in acid. What color is litmus in acid? red

What kind of pH values would you expect for an acidic solution? low

Bases: How do bases taste? bitter What do bases feel like? slippery

The acid-base indicator phenolphthalein is pink/magenta in base. What color is litmus in base? blue

What kind of pH values would you expect for a basic solution? high

4a. What ion is found in almost all acids? H⁺

b. Give the formula for two ions that are basic. OH⁻ CO₃⁻² HCO₃⁻¹

c. What is the formula for ammonia? NH₃ d. Is ammonia acidic or basic? Base

WS 20.1 1) Name the following acids:

Name: KEY 2017 p.

Sulfuric acid a. H₂SO₄

Sulfurous acid b. H₂SO₃

hydrofluoric acid c. HF

perchloric acid d. HClO₄

chloric acid e. HClO₃

acetic acid f. CH₃COOH (use organic naming)

2) Write formulas for the following acids:

H₃PO₄ g. phosphoric acid

HCl h. hydrochloric acid

HClO i. hypochlorous acid

HCOOH k. methanoic acid (organic acid)

3) Selenate has the following formula: SeO₄²⁻ and selenide has the following formula Se²⁻

H₂SeO₄ Write formula for selenic acid.

H₂SeO₃ Write formula for selenous acid

H₂Se Write formula for hydroselenic acid

4) Acids can react with most metals. Use the activity series to identify two metals that will NOT react with acids:

Cu Pt Ag Au

5) Write balanced equations for these single replacement and double replacement reactions involving an acid:

a. Aluminum metal and hydrochloric acid: 2Al + 6HCl → 2AlCl₃ + 3H_{2(g)}

b. Calcium hydroxide and acetic acid: Ca(OH)₂ + 2CH₃COOH → Ca(CH₃COO)₂ + 2H₂O

c. sodium hydroxide and nitric acid: NaOH + HNO₃ → NaNO₃ + H₂O

d. zinc metal with sulfuric acid: Zn + H₂SO₄ → ZnSO₄ + H_{2(g)}

8) Most acids react with carbonates. For example: CaCO_{3(s)} + 2HCl_(aq) → CaCl_{2(aq)} + H₂O_(l) + CO_{2(g)}

a) Balance the equation b) Identify a spectator ion in the reaction: 2Cl⁻ (doesn't change from reactant to product)

c) How many **grams** of CO₂ gas can be formed if 5.0 **grams** of CaCO₃ are reacted with excess HCl? Show all stoichiometry.

$$\underline{5.0 \text{ g CaCO}_3} \left(\frac{1 \text{ mol CaCO}_3}{100.09 \text{ g}} \right) \left(\frac{1 \text{ mol CO}_2}{1 \text{ mol CaCO}_3} \right) \left(\frac{44.01 \text{ g}}{1 \text{ mol CO}_2} \right) = \underline{2.2 \text{ g CO}_2}$$

d) If you wanted to form exactly 10.0 grams of water, how many grams of CaCO₃ should you start with? (assume excess HCl)

$$\underline{10.0 \text{ g H}_2\text{O}} \left(\frac{1 \text{ mol H}_2\text{O}}{18.02 \text{ g}} \right) \left(\frac{1 \text{ mol CaCO}_3}{1 \text{ mol H}_2\text{O}} \right) \left(\frac{100.09 \text{ g}}{1 \text{ mol CaCO}_3} \right) = \underline{55.5 \text{ g CaCO}_3}$$