

4 • Classifying Chemicals

1 • pH and pOH

Fill in the missing information:

[H ⁺]	pH	pOH
1 x 10 ⁻⁵		
	3	
		2
2.5 x 10 ⁻³		
	6	
		1

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2 • [H⁺] and [OH⁻]

Fill in the missing information:

[H ⁺]	[OH ⁻]
1 x 10 ⁻⁴	
	1 x 10 ⁻⁸
1 x 10 ⁻¹⁰	
	1 x 10 ⁻²
2 x 10 ⁻⁶	
	3.3 x 10 ⁻⁷
4.8 x 10 ⁻³	
	1.6 x 10 ⁻¹

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3 • ACIDS, BASES, and SALTS

State whether each chemical is an acid, a base, or a salt.

If it is an acid or a base, state whether it is strong or weak:

- | | | |
|--|-------|-------|
| 1. H ₂ SO ₄ | _____ | _____ |
| 2. Mg(OH) ₂ | _____ | _____ |
| 3. KBr | _____ | _____ |
| 4. HI | _____ | _____ |
| 5. HC ₂ H ₃ O ₂ | _____ | _____ |
| 6. NH ₄ OH | _____ | _____ |
| 7. HNO ₃ | _____ | _____ |
| 8. Li ₂ CO ₃ | _____ | _____ |
| 9. NaOH | _____ | _____ |
| 10. HF | _____ | _____ |

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4 • MOLARITY

Calculate the concentration of each of these mixtures:

KOH = 56.1 g/mole

NaOH = 40.0 g/mol

- 4 moles KOH in enough water to make 2 L of solution.
- 0.1 mole NaOH in enough water to make 0.05 L of solution.
- 0.25 mole KOH in enough water to make 500 mL of solution.
- 60 grams of NaOH in enough water to make 800 mL of solution.

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5 • DILUTION PROBLEMS

Answer the following problems about diluting solutions:

$$V \cdot \underline{M} = V \cdot \underline{M}$$

1. A 50 mL sample of 6 M HCl is diluted to a volume of 250 mL. What is the new concentration?
2. What volume of 18.0 M H₂SO₄ is needed to make 100 mL of a 1.5 M H₂SO₄ solution?
3. Calculate the concentration of a solution made by diluting 30 mL of 12 M HCl to a volume of 900 mL.

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6 • PROPERTIES OF ACIDS & BASES

Use the following key:

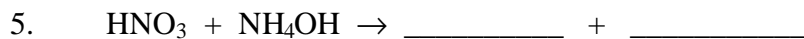
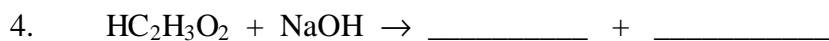
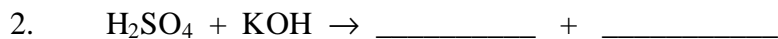
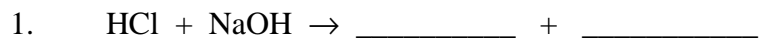
- a) Acid
- b) Base
- c) Both Acid and Base

- | | | |
|-------------------------------------|--------------------------------------|-------------------------------------|
| ___ 1. tastes bitter | ___ 6. increases [H ⁺] | ___ 11. turns cabbage blue/green |
| ___ 2. electrolyte | ___ 7. tastes sour | ___ 12. proton donor |
| ___ 3. increases [OH ⁻] | ___ 8. neutralizes HCl | ___ 13. decreases [H ⁺] |
| ___ 4. turns cabbage pink | ___ 9. feels slippery | ___ 14. corrosive |
| ___ 5. neutralizes NaOH | ___ 10. decreases [OH ⁻] | ___ 15. proton acceptor |

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7 • ACID-BASE NEUTRALIZATION

Write balanced equations showing how the following acids and bases neutralize each other:

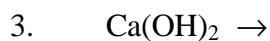


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8 • DISSOCIATION EQUATIONS

Consider the following dissociation equation: $\text{H}_2\text{SO}_4 \rightarrow 2 \text{H}^+ + \text{SO}_4^{2-}$

Write the ions into which the following compounds dissociate:



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9 • COMMON CHEMICALS

Match these substances with their chemical formulas:

- | | |
|-----------------------------|--|
| ___ 1. table salt | a) HCl |
| ___ 2. milk of magnesia | b) CaCO ₃ |
| ___ 3. water | c) Mg(OH) ₂ |
| ___ 4. stomach acid | d) H ₂ O ₂ |
| ___ 5. sugar | e) HC ₂ H ₃ O ₂ |
| ___ 6. limewater | f) H ₂ O |
| ___ 7. household ammonia | g) NH ₄ OH |
| ___ 8. hydrogen peroxide | h) C ₁₂ H ₂₂ O ₁₁ |
| ___ 9. chalk | i) Ca(OH) ₂ |
| ___ 10. drain cleaner (lye) | j) H ₂ SO ₄ |
| ___ 11. vinegar | k) NaOH |
| ___ 12. battery acid | l) NaCl |