

- (b) A base forms a solution with a pH greater than 7.
 (c) A neutral solution has a pH = 7.
3. It is unsafe to taste substances in the lab, even if they are food items, due to the possibility of contamination with a poison.
4. (a) Solution A is more acidic.
 (b) A is 1000 times more acidic than solution B.
- 5.

| Indicator | Colour at pH 1 | Colour at pH 7 | Colour at pH 10 |
|-------------------|----------------|----------------|-----------------|
| Red litmus paper | Red | Red | Blue |
| Blue litmus paper | Red | Blue | Blue |

6. (a) Colourless
 (b) Green
 (c) Yellow
7. (a) Sour
 (b) Forms bubbles
 (c) Conducts
8. (a) Bitter
 (b) No reaction
 (c) Conducts
9. (a) Acetic acid
 (b) CH_3COOH
10. (a) Sulfuric acid
 (b) H_2SO_4
11. (a) Magnesium hydroxide
 (b) $\text{Mg}(\text{OH})_2$
12. (a) Sodium hydroxide
 (b) NaOH

Understanding Key Ideas

13. (a) Hydrogen chlorate is changed to perchloric acid.
 (b) Hydrogen sulphate is changed to sulfuric acid.
 (c) Hydrogen fluoride is changed to hydrofluoric acid.
14. (a) Hydrochloric acid
 (b) Nitric acid
 (c) Acetic acid
 (d) Sulfuric acid
15. At pH 8.5, the solution is slightly basic, so:
 (a) Bitter
 (b) Slippery
 (c) Blue
 (d) No reaction

Pause and Reflect Answer

Students may cover some of these points in their answer.

- Gentle acids include vinegar, vitamin C, orange juice, soft drinks, and shampoos. They are variously ingested or used as hygiene products.
- Acidic shampoos are better for hair and scalp because they do not dissolve oils as much as basic ones do.

Other Assessment Opportunities

- Assessment Checklist 1, Making Observations and Inferences
- Assessment Checklist 4, Laboratory Report
- Assessment Checklist 25, Safety Checklist
- Process Skills Rubric 7, Predicting
- Process Skills Rubric 8, Interpreting Data
- Process Skills Rubric 10, Measuring and Reporting
- Assessment Rubric 5, Conduct an Investigation Rubric
- Assessment Rubric 11, Communication Rubric
- Assessment Rubric 12, Using Tools, Equipment, and Materials Rubric

5.2 SALTS

BACKGROUND INFORMATION

Salts are ionic compounds that can be produced in the reaction of an acid and a base. All salts are ionic compounds, but not all ionic compounds are salts. Metal oxides, such as sodium oxide (Na_2O), are ionic but are not considered to be salts. Carbonates, such as calcium carbonate, are not considered to be salts, either. Neither of these compounds would be produced from the reaction of an acid with a base. The process of reacting an acid and a base to form a salt and water is called acid-base neutralization, or simply neutralization. In this process, provided the reactants are combined in the correct quantity, the original acid and the original base are neutralized. Be careful not to imply that the resulting solution is always neutral. In some cases, the solution is neutral, but in others, due to the presence of the newly formed salt, the solution can have a pH different from 7. Students investigate this property of salts in Chemistry 12.

Because organic acids have the acidic hydrogen on the right of the formula instead of the left (as in CH_3COOH), students should be alerted to this difference in writing neutralization reactions.