Directions: For each of the following, write the letter of the term that best completes the sentence.

1. A substance that produces hydronium ions in solution is a(n) _____.
   a. acid
   b. base

2. The familiar sour taste of citrus fruits is caused by the presence of _____ in these foods.
   a. acid
   b. base

3. An acid that ionizes almost completely in solution is a _____.
   a. strong acid
   b. weak acid

4. The strength of a base is determined by ______.
   a. the concentration of a solution
   b. how completely it separates into ions in solution

5. A substance that produces hydroxide ions in solution is a(n) _____.
   a. acid
   b. base

6. A hydrogen ion is indicated by _____.
   a. H⁺
   b. OH⁻

7. The pH of a substance can be determined by using a device called ______.
   a. an acid meter
   b. a pH meter

8. The term dilute is used to refer to the _____ of an acid or a base.
   a. strength
   b. concentration

9. A hydroxide ion is indicated by _____.
   a. OH
   b. OH⁻

10. An organic compound that changes color in an acid or a base is an _____.
    a. indicator
    b. alcohol

11. The acidity of a solution can be indicated by its _____.
    a. pH
    b. concentration

12. On the pH scale, a solution with pH 7 is _____.
    a. acidic
    b. neutral

13. When an acid is dissolved in water, H⁺ ions form _____.
    a. hydrogen molecules
    b. hydronium ions

14. The formula for a hydronium ion is _____.
    a. H₃O⁺
    b. OH⁻

15. On the pH scale, a solution with pH 3 is _____.
    a. acidic
    b. basic
### Strength of Acids and Bases

**Directions:** The pH values of several common substances are listed below. Place each item from the list on the pH scale in its proper location. The first one has been done for you.

- **pH 7.0:** Pure water
- **pH 8.5:** Ocean water
- **pH 4.0:** Tomatoes
- **pH 13.8:** Lye
- **pH 1.0:** Stomach acid
- **pH 2.5:** Lemons
- **pH 5.8:** Shampoo
- **pH 5.2:** Bananas
- **pH 7.2:** Blood
- **pH 10.5:** Milk of magnesia
- **pH 11.5:** Ammonia
- **pH 7.8:** Eggs
- **pH 10.0:** Soap
- **pH 3.0:** Vinegar

**Directions:** Complete the table below by writing the name of each of the substances above under the proper heading. Place substances with a pH lower than 3.0 in the strong acids column. Place substances with a pH higher than 10.0 in the strong bases column.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure water</td>
<td>Shampoo</td>
<td>Milk of magnesia</td>
<td></td>
</tr>
<tr>
<td>Ocean water</td>
<td>Bananas</td>
<td>Blood</td>
<td></td>
</tr>
<tr>
<td>Tomatoes</td>
<td>Lye</td>
<td>Stomach acid</td>
<td></td>
</tr>
<tr>
<td>Lye</td>
<td>Lemons</td>
<td>Pure water</td>
<td></td>
</tr>
<tr>
<td>Stomach acid</td>
<td>Shampoo</td>
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<td></td>
</tr>
<tr>
<td>Pure water</td>
<td>Bananas</td>
<td>Blood</td>
<td></td>
</tr>
<tr>
<td>Ocean water</td>
<td>Pure water</td>
<td>Milk of magnesia</td>
<td></td>
</tr>
</tbody>
</table>

**Directions:** Answer the following questions on the lines provided.

5. Is pure water an acidic, basic, or neutral substance?
   - Neutral

6. Is the pH of a strong acid higher or lower than the pH of a weak acid of the same concentration?
   - Higher

7. Is the pH of a strong base higher or lower than the pH of a weak base of the same concentration?
   - Lower

8. On the pH scale, what are the values of acids and what are the values of bases?
   - Acids: 0 to 7; Bases: 7 to 14
# Chapter Review (continued)

## Part B. Concept Review

Directions: Fill in the blank spaces in the table below.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Acid</th>
<th>Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Type of ions produced in solution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Charge of ion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Taste</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Common example</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. pH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Common use</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Directions: Match the terms in Column II with the descriptions in Column I. Write the letter of the correct term in the blank at the left.

### Column I

7. the process in which a solution of known concentration is used to determine the concentration of another solution.

8. helps grease and oil mix with water so they can be rinsed away

9. substance with a pH of 3

10. substance with a pH of 9

11. indicator

12. 0 to 14

13. salt

14. refer to the ease with which an acid or base forms ions in solution

15. substance with a pH of 7

16. refer to the amount of acid or base dissolved in solution

17. compounds that allow small amounts of acids or bases to be absorbed without harmful effects

### Column II

a. phenolphthalein

b. acid

c. the terms dilute and concentrated

d. base

e. the terms strong and weak

f. titration

g. neutral

h. sodium chloride

i. pH scale

j. soap

k. buffers
TRUE AND FALSE: CORRECT THE FALSE STATEMENTS.

1. Milk of magnesia would turn red litmus to a blue color.
2. Phenolphthalein is colorless in a basic solution.
3. Drain cleaners are an example of an acid.
4. Bases contain a metal as part of their formula.
5. Vinegar contains a base.
6. A basic solution contains an excess of OH- ions.
7. Soap would taste bitter since it contain a base, sodium hydroxide.
8. Bases feel slippery when placed on the skin.
9. Bases are always dangerous to handle.
10. On the pH scale, the bases are less than pH 7.

COMPLETION:

1. Bases will turn ___________ litmus to a _______________ color.
2. All bases contain _______________ in their formulas.
3. When bases are placed in water, they give off _______________ ions.
4. On the pH scale, bases would have values of _______________.
5. If a substance does not react with either red or blue _______________, then it is neither an acid or a base.
6. A solution that is neither acid or basic is said to be _______________
7. Pure water has a equal number of _______________ ions and is therefore said to be neutral.