

Assignment

1. How much more acidic is a solution with a pH of 4.5 compared to the solution with:

(a) pH = 5.5 _____ (b) pH = 6.5 _____

2. How much more basic is a solution with a pH of 12.5 compared to a solution with:

(a) pH = 10.5 _____ (b) pH = 8.5 _____

3. Apples with a pH of 3 are _____ acidic than lemon juice with a pH of 2.

4. Bleach with a pH of 12.4 is _____ more basic than blood with a pH of 7.3

5. Stomach acid has a pH of 1.5, this is _____ more acidic than tomatoes with a pH of 4.0

pH Indicator

A **pH indicator** is a substance that changes colour over some narrow range of pH values.

Some indicators are shown below:

| | | |
|------------------|-----------------------|-------------|
| Methyl orange | red to yellow | pH 3 — > 5 |
| Bromothymol blue | yellow to blue | pH 6 — > 8 |
| Phenolphthalein | colourless to magenta | pH 8 — > 10 |

Assignment

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2. There are three sensors on a tongue. One part of the tongue has sensors of acids, another for bases, and another for salts. Sketch a diagram of the tongue and record the words sour taste, bitter taste and salty taste into the appropriate parts of the tongue.

3. Enter a number from the tongue diagram into each box provided to the left of each substance:

sea water gastric juice Vinegar tears Soap suds

4. Identify the acids, bases, and salts among the following list:

| pH paper | Aqueous solution of the substance | Category (acid, base, salt) |
|-----------|-----------------------------------|-----------------------------|
| red | Vitamin C | |
| blue | Windex | |
| red | carbonated drink (7-UP) | |
| dark blue | Tums antacid | |
| green | table salt | |
| blue | oven cleaner | |
| green | Miracle Grow (sodium nitrate) | |
| blue | baking soda | |
| red | Javex | |

5. The following substances, in solution, were used for some experiments:

- (i) Acetic acid (ii) sodium chloride (iii) hydrochloric acid
 (iv) Potassium hydroxide (v) sodium hydroxide (vi) sulphuric acid
 (vii) Sodium hydrogen carbonate

a) Pair each substance with its formula by entering the matching number from the above list in the box below: on the left. Enter an **A, B or S** in the boxes below to the right for acid, base or salt:

- Ca(OH)₂ CH₃COOH NaCl NaOH
 HCl KOH NaHCO₃

b) What is in the formula for acids that identifies them? _____

c) What is in the formula for bases that identifies them? _____

d) How is the formula for salts different? _____

e) If the electrical conductivity apparatus was placed in each of the solutions above, what would be observed? _____. Explain why? _____.

f) If equal volumes and equal concentrations of (iii) and (v) were to be mixed:

(i) What name is given to this type of reaction? _____.

(ii) Name the substance formed. _____.

(iii) Write a balanced equation.