You need to know the content of this sheet, 100%.

Chemical reactions involve the rearrangement of atoms in substances to form new substances.

The **keywords** that you need to learn are:

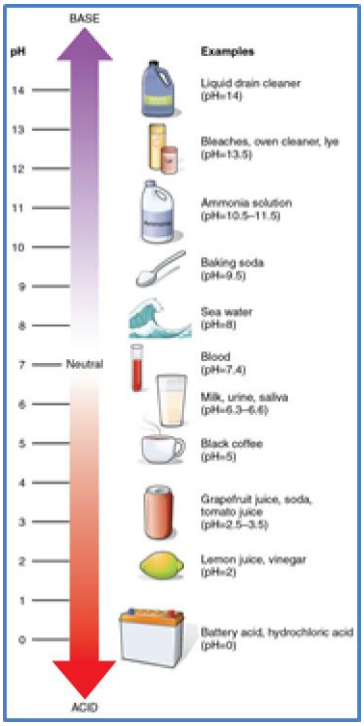
pH: The scale of acidity or alkalinity from 0 to 14.

Indicators: Substances used to identify whether unknown solutions are acidic or alkaline.

Base: A substance that neutralises an acid, those that dissolve in water are known as alkalis.

Concentration: A measure of the number of particles in a certain volume.

Acids and alkalis are at opposite ends of the pH scale. If you mix the correct amounts of each they will neutralise each other completely to make a neutral solution (pH 7) of water and a salt.



Neutralisation is a chemical reaction. This is the word equation for neutralisation reactions:

acid + alkali ⟶ salt + water

Indicators such as red cabbage juice or litmus paper can only be used to show if a solution is an acid **or** alkali, they do not tell you about the strength.

Universal indicator shows you the pH (strength) of an acid or alkali.

- Acids have a pH below 7, they get stronger towards pH 1.
- Neutral solutions have a pH of 7.
- Alkalis have a pH above 7, they get stronger towards pH 14.

Applications of neutralisation

Our stomachs make hydrochloric acid. If too much is made it can lead to indigestion. The strong acid can be neutralised by taking indigestion tablets which contain bases.

Farmers and gardeners can use lime (calcium oxide) to neutralise acidic soils.

Task

Use your knowledge to complete the following activities.

Working towards

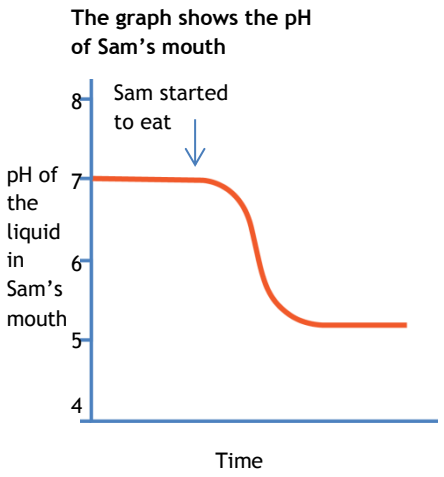
Draw a pH scale from 0 to 14, label it with strong acid, weak acid, strong alkali, weak alkali and neutral. What are the indicator colours at pH 0, 7 and 14?

Expected

Describe how antacid indigestion remedies work by using your knowledge of neutralisation.

Greater depth

The graph shows the pH of Sam's mouth



Describe what happens to the pH in her mouth as she eats.

Why might this be a problem for Sam?

What type of food could she have been eating?

What will happen to the pH if she brushes her teeth?

Answers

1. –

2. Antacids neutralise the excess hydrochloric acid.

   They react together to form a salt and water.

   This raises the pH of the stomach.

3. The pH decreases from pH 7 to pH 5, it then levels off.

   The acidic solution may cause the tooth surface to erode.

   She has been eating an acidic food. (This may be an opportunity to test the pH of different foods and drinks.)

   Brushing teeth with an alkaline toothpaste will help return the pH to normal levels.