Section 4 Summary

4.1 The pH Scale

- a) Universal indicator, pH paper or a pH meter can be used to find the pH of solutions.
- b) pH paper and universal (pH) indicator have different colours for pH values

Acid pH Neutral pH Alkali pH red/orange/yellow green blue/purple

c) The **pH scale** has a number range from 0 to 14 (although it is possible for pH to go below 0 and above 14)

d) If the pH equals 7 then the solution is neutral.
e) If the pH is less than 7 then the solution is acidic.
f) If the pH is greater than 7 then the solution is alkaline.

g) Water is a neutral substance with a pH = 7

Sugar solution and salt solution are both neutral pH = 7

h) The lower the pH, the more concentrated the acid

the greater the acidity

i) The higher the pH, the more concentrated the alkali

the greater the alkalinity

j) Diluting Acids (Acids have a pH less than 7)

Adding water to acids decreases the acidity.

Increases pH number until it reaches 7.

pH number never goes above 7.

k) Diluting Alkalis (Alkalis have a pH above 7)

Adding water to alkalis decreases the alkalinity.

Decreases pH number until it reaches 7.

pH number never goes below 7.

Section 4 Summary

4.2 Common Acids and Alkalis

a) Acids and alkalis are very common in the home

laboratory.

b) Laboratory acids include hy

(pH usually around 0-1)

hydrochloric acid, sulphuric acid,

c) Household acids include

(pH usually around 3-6)

vinegar,

nitric acid.

lemon juice,

lemonade,

soda water,

coke.

d) Laboratory alkalis include so

sodium hydroxide,

lime water,

ammonia solution.

e) Household alkalis include baking soda,

oven cleaner,

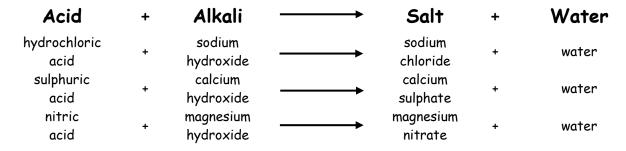
dishwater powder,

bleach.

Section 4 Summary

4.3 Neutralisation

- a) Neutralisation is the process where the pH moves towards 7
 - Neutralisation moves the pH of the acid up towards 7.
 - Neutralisation moves the pH of the alkali down towards 7.
- b) Alkalis and acids neutralise each other to form water and a salt.



c) **Metal carbonates neutralise acids** producing water, a salt and carbon dioxide gas.

d) Naming of Salts

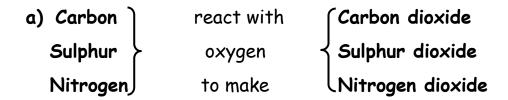
First Name	The salts contain the metal from the 1. Alkali (metal hydroxide)
of Salt	2. metal carbonate
Second	hydrochloric acid forms chloride salts
Name	sulphuric acid forms sulphate salts
of Salt	nitric acid forms nitrate salts

- e) Everyday examples of neutralisation
 - reducing soil acidity
 - reducing acidity in lakes
 - treatment of indigestion.

Summary 4.4

Section 4 Summary

4.4 Acid Rain



- Sulphur dioxide

 Nitrogen dioxide

 Nitrogen dioxide
- c) Carbon from fossil fuels (coal, oil and natural gas) burns in air to form carbon dioxide
- d) **Sulphur** is found in coal and other fossil fuels. Sulphur Dioxide is formed on burning these sulphur-containing fuels.
- e) Nitrogen in air turns into Nitrogen Dioxide by the sparking of air in car engines. (Lightning also produces the same effect
- f) Carbon dioxide
 Sulphur dioxide
 dissolve in rain water to produce acid rain
 Nitrogen dioxide
- g) Acid rain has the following damaging effects on the environment
 - damages carbonate rocks in buildings
 - speeds up rusting of iron and steel structures
 - changes the pH of soil (giving less crops)
 - kills plant life
 - kills marine animals e.g. fish