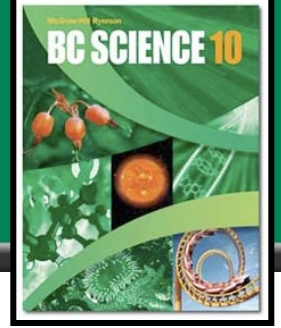


5-1 What is an Acid?

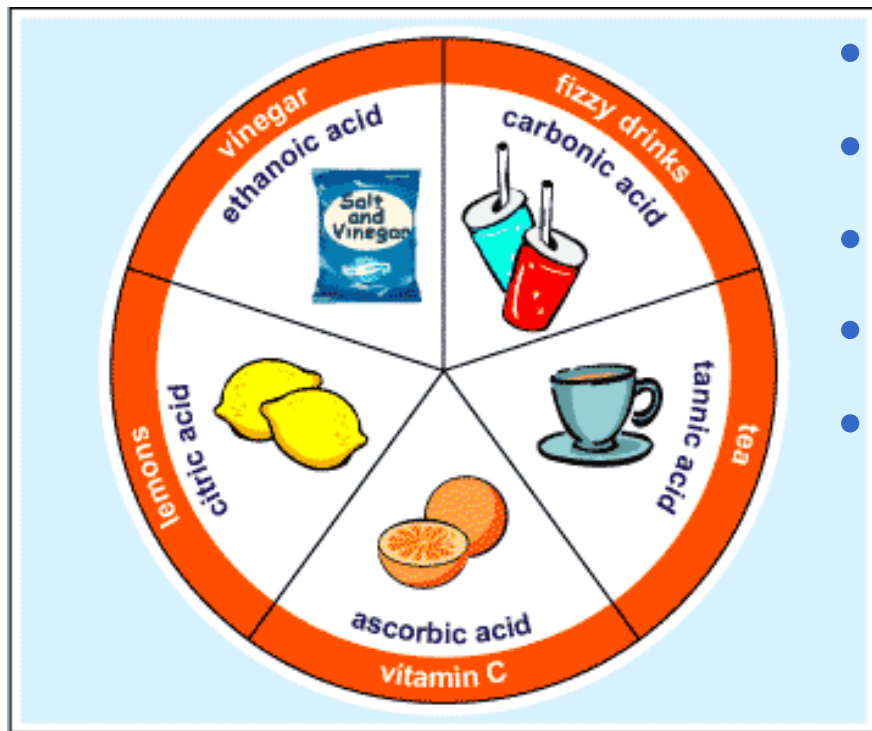
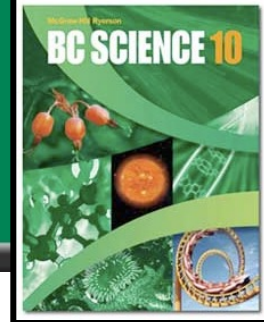


Acids – (means sour) are ionic substances which release **H^+ (HYDROGEN IONS)**

The more H^+ ions, the more acidic it is



Properties of an Acid



- pH **LESS** than 7
- **Tastes Sour**
- **Conducts Electricity**
- **Turns blue litmus paper red**
- **Corrosive, which means they break down certain substances. (fabric, skin, and paper)**
- **Some acids react strongly with metals**

Picture from BBC Revision Bites

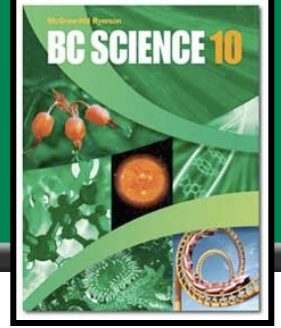
http://www.bbc.co.uk/schools/ks3bitesize/science/chemistry/acids_bases_1.shtml

Recognizing Acids

- Most acid formulas start with hydrogen (H).
 - HCl = Hydrochloric acid,
 - HNO_3 = Nitric acid
 - H_2SO_4 = Sulphuric acid
 - HNO_2 = Nitrous acid
 - H_2CO_3 = Carbonic acid

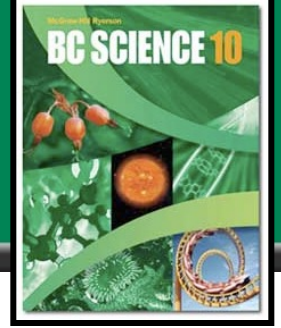


What is a base? (an alkali)?



- A base is an ionic substance which releases OH^- (*HYDROXIDE*) ions.
- Most soaps/cleaning products are bases

Properties of a Base (alkali)



- pH *GREATER* than 7
- Tastes Bitter
- Turns red litmus paper blue
- Feel slippery (think soap)
- Corrosive
- Can conduct electricity. (Think alkaline batteries.)
- Does not react with metals.

Recognizing a Base



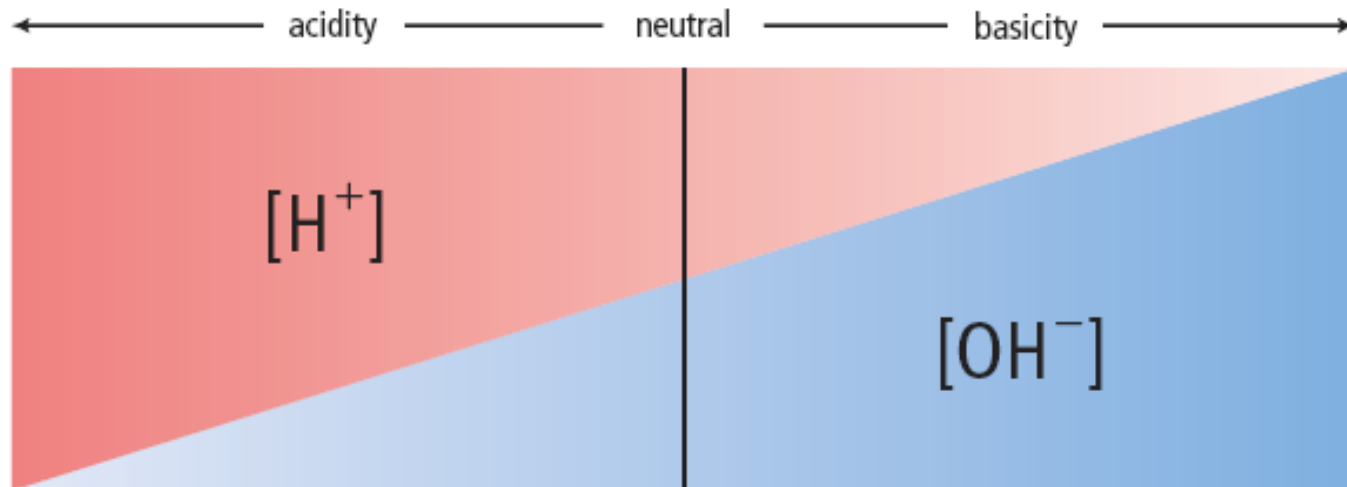
- Generally bases usually ends with (OH-) - hydroxide.
- Bases are named using ionic naming rules
 - Sodium hydroxide NaOH
 - ◆ Magnesium hydroxide $\text{Mg}(\text{OH})_2$
 - ◆ Calcium hydroxide $\text{Ca}(\text{OH})_2$
 - ◆ Ammonium hydroxide NH_4OH



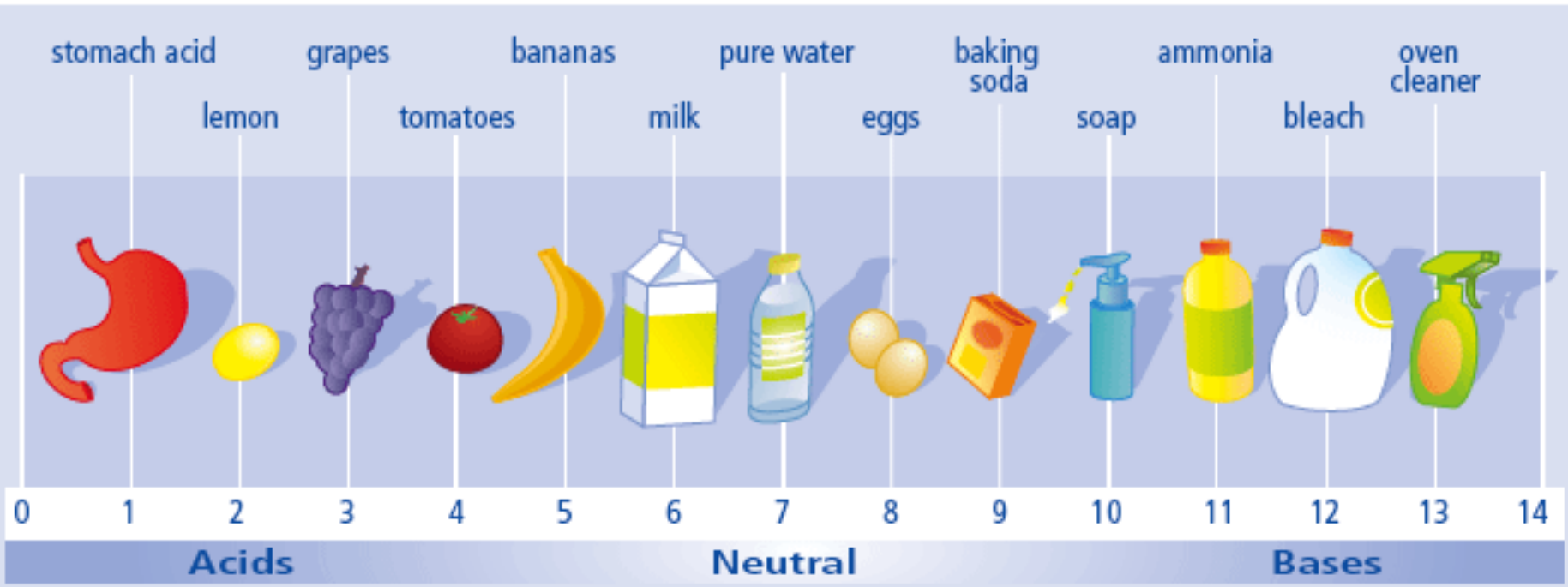
Acids, Bases and the pH scale



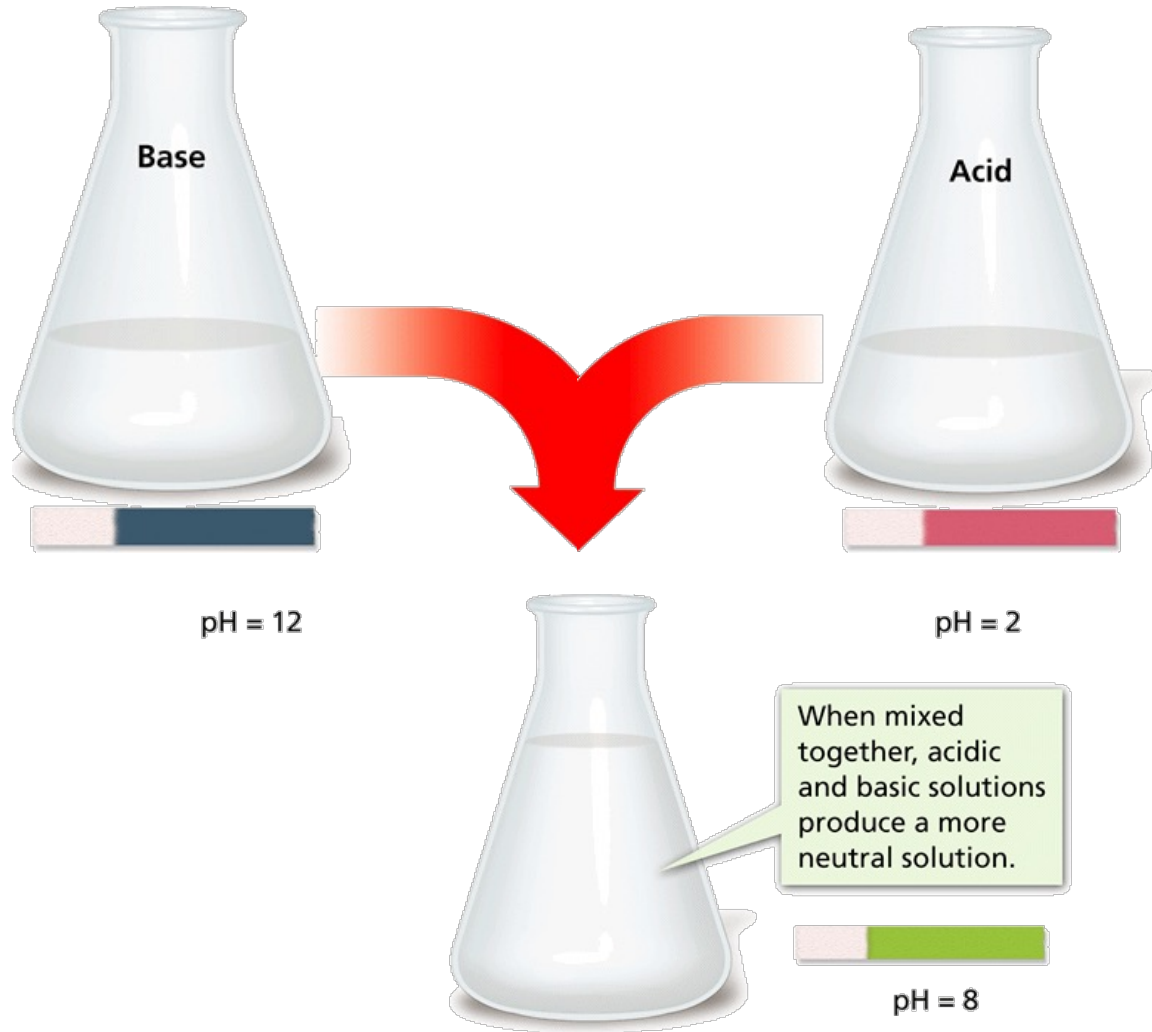
- pH describes the Hydrogen ions concentration
 - Acids -- (pH less than 7) - have more H^+ than OH^-
 - (area of more pink in diagram)
 - Bases -- (pH higher than 7) - have more OH^- than H^+
 - (area of more blue in diagram)
- ♦ Neutral -- pH 7 = H^+ and OH^- concentrations are equal \rightarrow water.
- ♦ $H^+ + OH^- \rightarrow H_2O$ (neutral)



pH of common substances



Acids + Bases can Neutral each other



Chemical Indicators tell us the pH

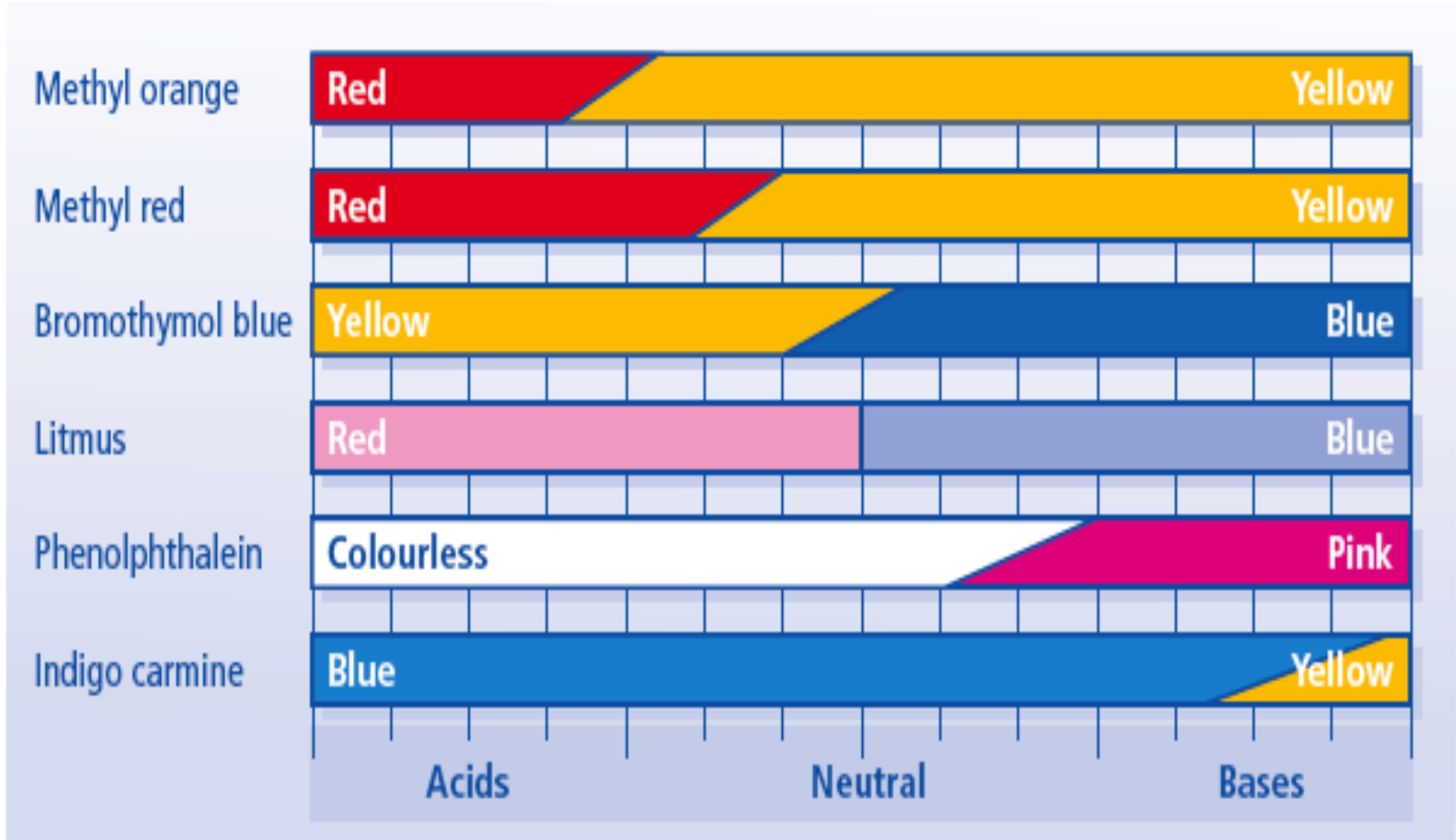


- ◆ pH Indicators - Chemicals whose colour depends upon pH
 - – tells us about the acid/base levels of a solution
- ◆ E.g. Litmus paper – an acid/base indicator
 - Two types of litmus paper (red & blue)
 - If red paper turns Blue = basic (pH above 7)
 - If blue paper turns Red = acidic (pH below 7)
 - Note: - no colour change, no information

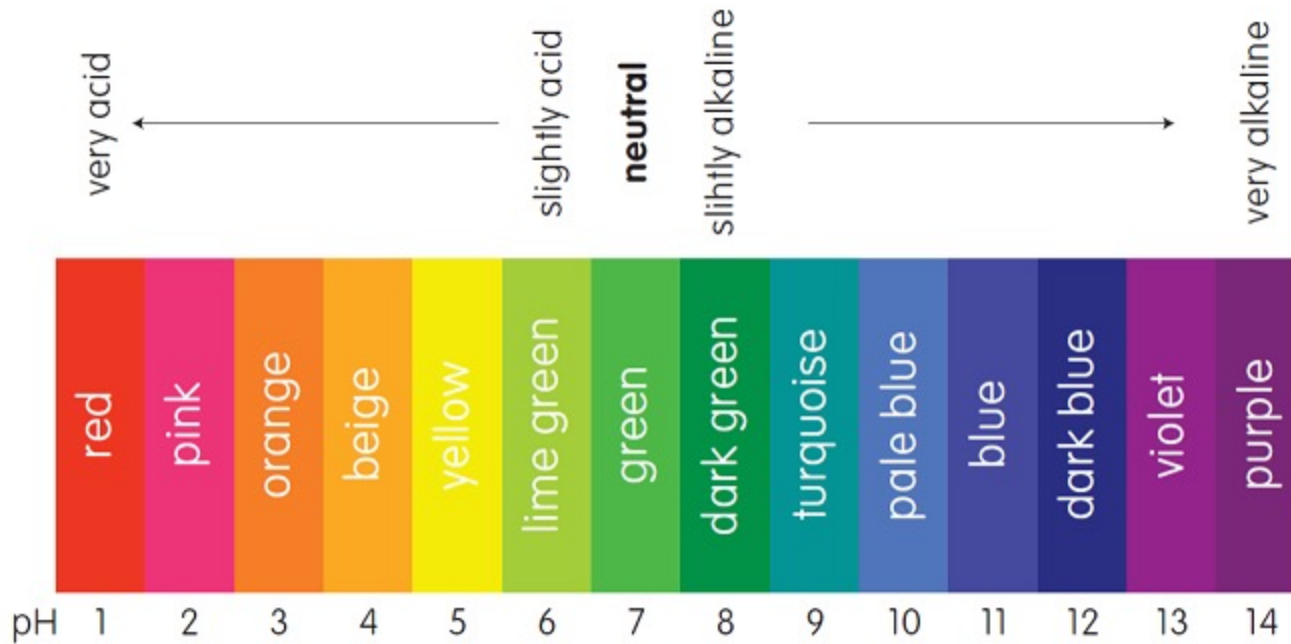




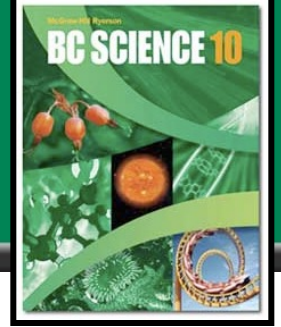
Want to test a different pH? Use a different indicator



Universal indicator – a mixture of many indicators

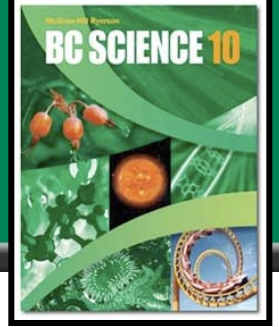


pH and flower colour



Hydrangea flowers change colour with soil pH

Natural pH indicators



Purple cabbage indicator

Neutralizing stings

Bee stings are acidic.

Wasp stings are alkaline.



Which safe household substances could you use to treat a bee sting?



Which safe household substances could you use to treat a wasp sting?



Summary : Properties of Acids and Bases

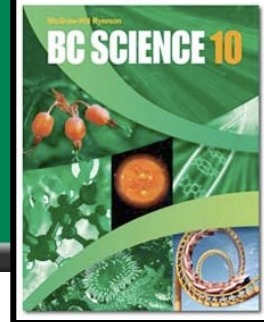


Table 5.6 Properties of Acids and Bases

Property	Acid	Base
Taste CAUTION: Never taste chemicals in the laboratory.	<ul style="list-style-type: none">• Acids taste sour. Lemons, limes, and vinegar are common examples.	<ul style="list-style-type: none">• Bases taste bitter. The quinine in tonic water is one example.
Touch CAUTION: Never touch chemicals in the laboratory with your bare skin.	<ul style="list-style-type: none">• Many acids will burn your skin. Sulfuric acid (battery acid) is one example.	<ul style="list-style-type: none">• Bases feel slippery.• Many bases will burn your skin. Sodium hydroxide (lye) is one example.
Indicator tests	<ul style="list-style-type: none">• Acids turn blue litmus paper red.• Phenolphthalein is colourless in an acidic solution.	<ul style="list-style-type: none">• Bases turn red litmus blue.• Phenolphthalein is colourless in slightly basic solutions and pink in moderate to strongly basic solutions.
Reaction with some metals, such as magnesium or zinc	<ul style="list-style-type: none">• Acids corrode metals.	<ul style="list-style-type: none">• No reaction
Electrical conductivity	<ul style="list-style-type: none">• Conductive	<ul style="list-style-type: none">• Conductive
pH	<ul style="list-style-type: none">• Less than 7	<ul style="list-style-type: none">• More than 7
Production of ions	<ul style="list-style-type: none">• Acids form hydrogen (H^+) ions when dissolved in solution.	<ul style="list-style-type: none">• Bases form hydroxide (OH^-) ions when dissolved in solution.

See page 229