Acid Rain

* Precipitation that has a pH of less than that of natural rainwater (which is about 5.6 due to dissolved carbon dioxide).
* It is formed when sulphur dioxides and nitrogen oxides, as gases or fine particles in the atmosphere, combine with water vapour and precipitate as sulphuric acid or nitric acid in rain, snow, or fog.
* Natural Sources
  + Emissions from volcanoes and from biological processes that occur on the land, in wetlands, and in the oceans contribute acid-producing gases to the atmosphere
  + Effects of acidic deposits have been detected in glacial ice thousands of years old in remote parts of the globe
* Canada
  + Acid rain is a problem in Canada
  + Water and soil systems lack natural alkalinity such as lime base
    - Cannot neutralize acid
  + Canada consists of susceptible hard rock such as granite
    - Do not have the capacity to effectively neutralize acid rain
* Industrial acid rain is a substantial problem in China, Eastern Europe and Russia and areas down-wind from them.
* Acid rain from power plants in the Midwest United States has also harmed the forests of upstate New York and New England.
* This shows that the effects of acid rain can spread over a large area, far from the source of the pollution
* Harmful to aquatic life
  + Increased acidity in water bodies
  + Stops eggs of certain organisms (e.g. fish) to stop hatching
    - Changes population ratios
    - Affects the ecosystem
* Harmful to vegetation
  + Increased acidity in soil
  + Leeches nutrients from soil, slowing plant growth
  + Leeches toxins from soil, poisoning plants
  + Creates brown spots in leaves of trees, impeding photosynthesis
  + Allows organisms to infect through broken leaves
* Use cleaner fuels
  + Coal that contains less sulphur
  + "Washing" the coal to reduce sulphur content
  + Natural Gas
* Flue Gas Desulphurisation (FGD)
  + Removes sulphur dioxide from flue gas (waste gases)
  + Consists of a wet scrubber and a reaction tower equipped with a fan that extracts hot smoky stack gases from a power plant into the tower
  + Lime or limestone (calcium carbonate) in slurry form is injected into the tower to mix with the stack gases and reacts with the sulphur dioxide present