

CHAPTER 6: SCIENCE, TECHNOLOGY AND SOCIETY 2

Acids in everyday life

Acids in our food and in our body

Some acids are found in food. They include ethanoic acid in vinegar, lactic acid in milk and citric acid in lemons, tannic acid in tea and carbonic acid in soft drinks. They often have a sour taste.

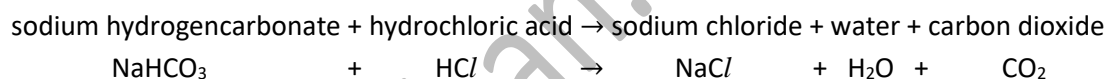
Others are found in animals. The stomach makes hydrochloric acid that helps break down food. Amino acids are the building blocks of helpful chemicals called proteins. In every living organism, all the information about how that organism will look and function is carried in a material called deoxyribonucleic acid, or DNA.

Uses of acids

Hydrochloric acid and phosphoric acid are used as rust removers before painting. Sulfuric acid is used to make fertilisers, dyes, drugs, explosives, detergents and certain batteries.

Acid indigestion (heartburn)

Acid indigestion (heartburn) occurs when the stomach produces too much acid. This excess acidity can be neutralised with antacids like calcium carbonate, magnesium hydroxide (magnesia) or sodium hydrogencarbonate (also known as sodium bicarbonate and found in baking soda):



Bases and alkalis in everyday life

Bases often have a bitter taste and they feel slippery in water. Some bases are used in food or medicines: examples of such bases include baking soda and milk of magnesia. Bases are also useful as cleaning agents, for example, in drain cleaners.

Other bases are used in manufacturing. Sodium hydroxide, or lye, breaks down animal and plant tissues. It is used to make soap, paper and artificial fibres.

Using neutralization in everyday life

Neutralisation is also used in everyday life to:

1. neutralise bee stings with weak alkalis like sodium bicarbonate (baking soda),
2. neutralise wasp stings with weak acids like ethanoic acid (vinegar),
3. neutralise the excess acid in the soil with lime (calcium oxide). High soil acidity is often a consequence of acid rains,
4. neutralise acidic factory wastes with calcium hydroxide before they are released in the environment.
5. neutralise the oxides emitted from factory chimneys and which are responsible for acid rains. Calcium carbonate is used to reduce the effect of acid rain,
6. neutralise the acids released by bacteria in the mouth with toothpastes.

Benefits of science and technology to humanity

The process of science is a way of building knowledge about the universe—constructing new ideas that illuminate the world around us. Those ideas are inherently tentative, but as they are tested and retested in different ways, we become increasingly confident in them. Furthermore, through this same iterative process, ideas are modified, expanded and combined into more powerful explanations.

Many other animals are stronger, faster, fiercer or more rugged than human beings. Yet humans, more than any other species, have put their mark upon the Earth. This is because people have used their intelligence to adapt materials in nature to their own use and to invent new devices or tools. The methods they use are called technology.

Limitations of science and technology

Science exerts its great power by strictly limiting its investigations to impersonal interrogation of the natural physical world and only asking questions it knows it can answer. The utility of science is knowledge of natural physical mechanisms and the generation of technology. Science can give us atomic energy and cure diseases but cannot tell us whether to make peace or war or how to organise a free and just society. Science can give us power and comfort but not wisdom and happiness.

Science is silent in many areas that are of the greatest importance. Science is silent on values, meaning and purpose. A scientific analysis of music or painting would simply catalogue frequencies, amplitudes and chemical composition but not explain beauty. And science is silent on the supernatural. It does not deny the supernatural—it just has nothing to say about it.

The invention of communications technologies using a mobile phone or the computer is destroying student life; student performance is declining because they spend more time playing or communicating about trivial matters. Technology is also making people lazier and more dependable; this is leading to many health problems like obesity, heart disease and even mental problems like screen addiction.