

6th Science Lesson 15 Notes in English

15] Chemistry In Everyday Life

Introduction

- Chemical change results in the change of the substance; in physical change only the shape, size or volume changes; the state of the matter may also change, from liquid to gas or from liquid to solid, however the substance remains, chemically as it is.
- Chemists identify turmeric powder as a '**natural indicator**'. The change in colour indicates that the material is either acid or base medium.
- We use chemical changes in various forms in **our daily life**. Chemistry is the branch of science which deals with the study of particles around us.
- The beauty of chemistry is that, it explains the properties of the basic components of particles such as atoms and molecules and the effects of their combination.
- We can consider all the particles around us as chemicals. The **water (H₂O)** we drink is the combination of hydrogen and oxygen.
- The **salt (NaCl)** we use in our kitchen is a combination of the chemicals, sodium and chlorine. Even our body is made up of a lot of chemical particles.
- We could prepare soft idly as a result of a chemical change named fermentation takes place in the idly batter.
- During **fermentation the idly batter undergoes a chemical change by bacteria**. While cooking, the food products undergo so many chemical changes.
- As a result there are favourable changes in colour, flavour and taste in the food.
- We can use chemical changes to produce certain materials. For example, some of the objects such as soaps, fertilizers, plastics and cement which we use in our daily life can be prepared by making chemical changes in some naturally occurring objects.
- We can study about the manufacturing processes and usages of certain materials we use in our daily life such as **soaps, fertilizers, cement, gypsum, Epsom, plaster of paris, phenol and adhesives**.

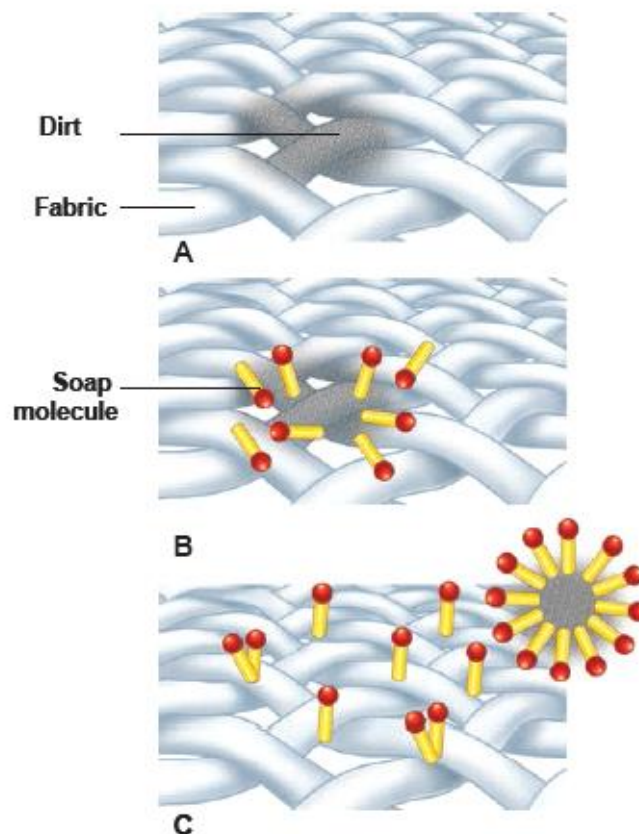
Soaps and Detergents

- Bathing soap and washing detergents are kinds of soaps which we use in our daily life. In addition to this, we are using wash powder to remove strong stains on the clothes.



- The detergent molecules have two sides, one side water loving, and other water hating.
- Water hating goes and joins with dirt and oil in the cloth while the water loving joins with the water molecules.
- When you agitate the cloth the dirt is surrounded by many molecules and is taken away from the cloth.
- The cloth becomes clean, and the dirt surrounded by the detergent molecules float in the water making it dirty.

How soaps clean clothes?



Fertilizers

- Apart from water, sunlight and air, certain nutrients are also needed for the growth of plants. We know that the plants get their nutrients from the soil.

- **Nitrogen (N), Phosphorous (P) and Potassium (K)** are the three important nutrients among the various nutrients needed for the growth of plants. These three are called as Principal Nutrients.

The table given below depicts the quantity of elements absorbed by certain common plants.

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- Fertilizers are organic or inorganic materials that we add to the soil to provide one or more nutrients to the soil.
- Fertilizers given to plants can be classified into two. They are organic and inorganic fertilizers.

Chemistry in our everyday Life:



- Fertilizers containing **only plant or animal-based materials or those synthesized by micro-organisms** are called **organic fertilizers**.
- These fertilizers can be prepared easily. This type of fertilizers is economical. (e.g.) **Vermi compost, compost**.



Inorganic fertilizers

- The fertilizers prepared by using natural elements by making them undergo chemical changes in the factories are called inorganic fertilizers. (e.g.) Urea, Ammonium sulphate and Super phosphate.

The table given below lists the nutrients in inorganic fertilizers

Name of fertiliser	Nitrogen(%)	Phosphorus(%)	Potassium (%)
Urea	46	0	0
Super phosphate	0	8-9	0
Ammonium sulphate	21	0	0
Potassium nitrate	13	0	44

- If we use 50 kg of urea, then according to the table, 23 kg of nitrogen (46 percent) will be added to the soil.

Cement



- In ancient period, the houses were constructed by using the mixture of lime, sand and wood.
- At present, the people are widely using the cement for construction of houses, dams and bridges.
- The cement is manufactured by crushing of naturally occurring minerals such as **lime, clay and gypsum through milling process.**
- Cement becomes hardened when it is mixed with water. Gypsum plays a very important role in controlling the rate of hardening of the cement.
- During the cement manufacturing process, a small amount of gypsum is added at the final grinding process. **Gypsum is added to control the “setting of cement”.**

Uses of cement

- Cement is used as mortar, concrete and reinforced cement concrete.

Mortar

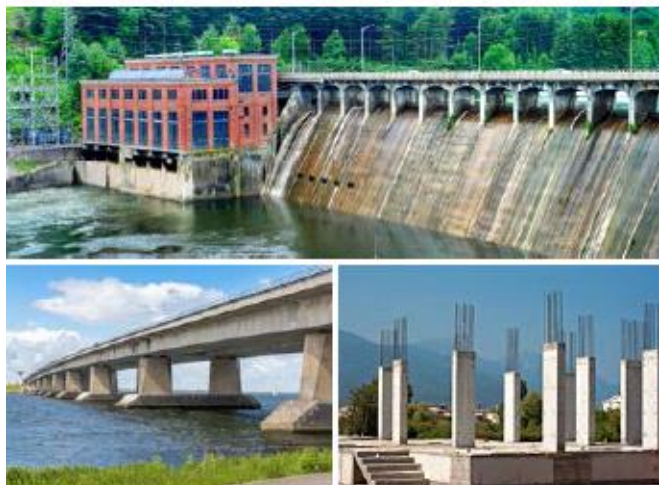
- Mortar is a paste of cement and sand mixed with water. In houses, mortar is used to bind building blocks for constructing walls, to apply coating over them and to lay floor.

Concrete

- Concrete is a mixture of cement, sand and gravel. It is used in the construction of buildings, bridges and dams.

Reinforced Cement Concrete

- Reinforced cement concrete is a composite material by mixing iron mesh with cement. This is very strong and firm.
- It is used in the construction of dams, bridges, centering works in houses and construction of pillars. **Huge water tanks, water pipes and drainages are built with this.**



Gypsum



- Gypsum is a soft white or grey, naturally available mineral. The chemical name of gypsum is calcium sulphate dehydrate.
- The molecular formula of gypsum is **$\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$** .

Uses

- Used as fertilizers.
- Used in the process of making cement.
- In the process of making Plaster of Paris.

Epsom



- Epsom salt is magnesium sulphate hydrate.
- The molecular formula of Epsom is **$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$** . it offers a wide range of uses.

Uses

- Eases stress and relaxes the body
- Helps muscles and nerves function properly
- Medicine for skin problems
- Improving plant growth in agriculture

Plaster of Paris



- Plaster of Paris consists of fine white powder (calcium sulphate hemihydrates) The molecular formula of Plaster of Paris is **$\text{CaSO}_4 \cdot 1/2\text{H}_2\text{O}$** .
- Known since ancient times, plaster of paris is so called because of its preparation from the abundant gypsum found near Paris, capital of France.
- Plaster of paris is prepared by heating gypsum, where it gets partially dehydrated.

Uses

- In making black board chalks.
- In surgery for setting fractured bones.
- For making casts for statues and toys etc.
- In construction industry.

Phenol



- Phenol is a carbolic acid of an organic compound. It is a necessary ingredient for preparing variety of phenol products.
- The molecular formula of phenol is **C₆H₅OH**, it is a weak acid. It is a volatile, white crystalline powder.
- It is a colorless solution, but changes into red in the presence of dust. It irritates when exposed on human skin.
- It is widely used for industrial purposes.
- Phenol itself is used (in low concentrations) in mouthwash and as a disinfectant in household cleaners. Phenol used as surgical antiseptic since it kills micro organisms.

Adhesives

- The substances applied to one surface, or both the surfaces of two separate items that binds them together and resists their separation are called adhesives.
- Adhesives are substances that are used to join two or more components together through attractive forces acting across the interfaces.

Types of adhesives

- There are two kinds of adhesives, one is natural made from starch and another one is artificial made from chemicals. The one used in puncture shop is an artificial adhesive.
- Artificial adhesives may be classified in a variety of ways depending on their utilities. Their forms are paste, liquid, film, pellets, tape.
- It is used in various conditions such as hot melt, reactive hot melt, thermo setting, pressure sensitive, and contact.

More to know:

- When we cut onion, we get tears in the eyes with irritation, because of the presence of a chemical, propanethial s-oxide in onion.

- This is easily volatile. When we cut onion some of the cells are damaged and this chemical comes out. It becomes vapour and reaches our eyes result in irritation and tears in eyes.
- When we crush the onion, more cells will be damaged and more chemicals come out.
- Earthworms take organic wastes as food and produce compost castings. So earthworms are known as **Farmers' friends** because of the multitude of services they provide to improve soil health and consequently plant health.
- In 1824, Joseph Aspdin invented Portland cement by burning finely ground chalk and clay in a kiln. It was named "Portland" cement because it resembled the high-quality building stones found in Portland, England.