



USEFUL PRODUCTS FOR US

Wherever you live whether city or village you have seen many objects around you, many things like utensils, clothes, books, toys, chair, table, cycle, car, telephone etc are daily use items. If these things are not available then what will be our life? All these things have become an important part of our life. We cannot imagine our life without them. But these things are not available to us at one go. Although humans used to wear animal skin and eat raw fruits and vegetables. He used to live in caves. Now the life has completely changed into a comfortable one. It took thousands of years to happen. During this long journey human learnt to use the natural object from his surroundings. He also discovered new objects, various types of metals are found in India from Vedic times. These range from agricultural equipments, construction tools or weapons. Many examples of using metals and other objects can be seen.

Let us learn about the daily use of some elements in this lesson.



OBJECTIVES



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After reading this lesson, you will be able to:

- Understand the need of aluminum and copper wires in electricity
- Tell the reason for naming an age of human civilization as metallic age
- Explain the process of colouring glasses and making types of glasses
- Explain the reason for non-foaming of soap in hard water
- Describe the effect of polythene and
- Importance of fertilizers and pesticides

2.1 OUR NEEDS

Necessity is the mother of invention. Food, shelter, clothing, transport and communication are our basic needs. We need many objects to fulfill our need. For example, we use utensils to cook, store and serve food products. Utensils are made up of many objects- examples- metals, glass or clay (bone china) and now a days we use non-stick, plastic and products of other utensils. If we discuss regarding clothes, we find many beautiful dresses made up of cotton, woolen, silk, nylon, polyester etc.



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In the same way soil, brick, cement, wood, mortar, glass, aluminum and other materials are made to build houses. Iron net and grill etc is used to make windows and doors.

Maximum furniture is made up of woods but now a days furniture made up of plastic steel, can, iron etc. Many useful items like watch, pen, telephone, fridge, t.v., car etc are made up of many modern particles. All these things were our need and we were motivated to develop many kinds of objects from these elements.

2.2 MINERALS

We have been using metals since ages. The use of metals has been very important for human life that many civilizations have been named after metals like Iron Age, copper age etc.

Many objects are made up of many type of elements. Have you ever thought where these metals came from? Some metals are found naturally in mountains where as some are prepared by humans in factories.

Minerals available in nature have been classified into two categories- metallic and non-metallic. We get metals from metallic minerals. These are also known as mineral ores. 89 types of minerals are found in India, out of which 11 are metallic, 52 non-metallic, 4 fuel minerals and 22 other minerals.

Let us know about metal minerals. Those minerals from which metals can be extracted easily are called metal ores.



Some of the important minerals are iron, copper, aluminum, manganese and gold. In the same way, many non-metallic and minerals are also found in India, these are mica, gypsum, limestone, dolomite and asbestos.

2.3 METALS AND NON-METALS

Now identify the things given in the figure 1.1 and classify which are made up of metals and non-metals.

Some of these objects are made up of metals and some are made up of other objects. For example, knife, spoon, nail-bolt, key lock etc are made up of metal where as rope, shoes etc are made up of plastic or leather and Chakla-belan by wood. Pots are made up of mud, bottle, glass, bucket etc can be made from plastic. Let us know more about metals.



Fig, 2.1: some objects of daily use



Properties of metals

Whatever we have said about metals is based on our daily experience and knowledge. Many metal elements can be separated from each other on the basis of physical qualities. These physical characteristics are used to identify metals.

(A) Physical Properties

1. metals are shiny and they have a special metal lustre.
2. metals are hard but sodium, magnesium are exceptions, these can be cut easily by a knife.
3. metals can be made into thin sheet. Aluminum polythene is used to wrap chocolates and medicines; it is also used to keep the food fresh and war.
4. metal wires are good conductor of electricity. Wires can be made from aluminum and copper. They are used to pass the electricity current.
5. metals are good conductors of heat. These are used in the cooking food utensils.
6. metals are hard and strong, these are used to construct buildings, trains, vehicles, instruments and bridge etc.

Non-metals are different from metals. They don't have physical properties of metals. Some examples of non-metals are- nitrogen,

chlorine and oxygen gases, carbon, silicon etc. let us know what the chemical properties of metals are.

(B) chemical properties

Chemical properties of metals include reactions with air, water and acid. Some metals like sodium potassium, aluminum, copper, iron etc are more reactive whereas gold, platinum etc are less reactive. These metals are found in free form on earth. Therefore, they are less reactive. Due to reactive properties, oxide, sulphides and carbonates etc are found in compound form.

Other than pure metals, mixture of metals are also used. These are known as alloy. Let us get more knowledge related to it.

Alloy

Alloys are compounded and homogenous mixtures and are prepared by melting of metals. Some properties of alloy are different from metals. For example- Brass is composed of copper and iron metals. Tin is strong and corrosion resistant but copper is a soft metal. In the same way, iron gets rust easily. However, when mixed with carbon produces steel mixed metal. When iron, carbon, chromium and nickel mix together, then they form stainless steel. These mixed alloys are strong, tough and does not get rust. This form of metals are used in many ways, some of the common alloy are-



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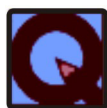


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Table 2.1 : Alloy and its uses

Alloy	Components	Uses
Steel	Iron, carbon	Bridge, railway line, instrument, tank, ships
Stainless Steel	Iron, Chromium, Nickel	Utensils, medical instruments
Brass	Copper, tin	Coins, idols, ornaments, utensils, metals
Brass (another form)	Copper, zinc	Utensils, musical instruments, wire, parts of machine, ornaments

Let us now learn about human made elements after metals and their uses which were discussed in the beginning of the lesson. This includes cement used for construction, glass, soap, detergents, polymer, fertilizers and pesticides.



INTEXT QUESTIONS 2.1

- Fill in the blanks:
 - Aluminum is found as _____ ore.
 - _____ metal can be cut easily from knife.
 - Limestone is found in _____ and _____ states.
- Write the names of any three maximum reactive metals?
- What is ductility?

2.4 MATERIALS USED IN CONSTRUCTION

Construction of home, bridges, roads and dams use natural stone wood, metals and bricks, lime, cement, concrete etc. Natural stones like granite, marble and sand stone are also used. These materials have been used in the construction of nagarjun sagar dam. Tajmahal, vridheshwar temple and Lal Qila of Delhi, Indian sculpture is world famous for its monumental heritage on stone and building vast temples, we have seen making big temples by joining pieces of stone without mortar in earlier times these stones are used now a days in homes and buildings in cities.

Construction sites also use brick prepared by baking loamy soil. Earlier it was used to join stones and bricks. Afterwards bitumen and lime began to be used. However, Portland cement was invented in the 19th century. Now cement is used in constructing homes, buildings, bridges etc. let us read about cement.

Cement

Portland cement was discovered by Joseph Espidy in 1824. He mixed limestone and loamy soil to make a powerful water resistant material. The colour of this material looked like the lime stone of Portland. Therefore, the material was called Portland cement.

Modern Portland cement has 60-70% calcium oxide, 17025%



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silica, 3-8% aluminum oxide and up to 6% iron oxide; Lime stone and loamy soil is mixed as per desired ratio. This is heated in a rotary kiln at the temperature of 1150 Kelvin. The material is called clinker. When powdered gypsum is mixed with this material, cement is produced.

The plastering material is prepared by mixing sand, cement and water to hold brick and stones. It is also used for plastering.

Concrete is formed by mixing sand, soil and water in cement. This is used in corners of road and middle pathways, roofs of homes and electricity poles etc.

2.5 SOAP AND DETERGENT

Many soaps and detergents are available in the market for bathing , washing and cleaning. They are made attractive by adding colors and smell.



Soaps are prepared by the chemical reaction of fat of sodium hydroxide with oils available in natural form. Natural oils are obtained from fats of oily organisms and seeds from plants. Some examples of oils are - palm oil and olive oil. Asters present in oils get decomposed by water with sodium hydroxide. We get acid present in aster with sodium salt and glycerol.

This we find that sodium salt of acids are soaps.

When soaps are used in hard water then foam is not built. It happens because hard water has soluble calcium and magnesium salt, these react with soap to form non dissolve particles.

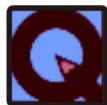
But this thing doesn't happen with detergents they produce foams even in hard water because they do not form non dissolve particles with calcium and magnesium salt.

Let us now understand how soap and detergents are a part of cleaning process.

Many detergents are available in market now days. Some of them are biodegradable but not all. Bio degradable means decomposition can be done by micro organisms like bacteria and worms. Those non biodegradable particles flow in rivers and other water resources and pollute them. This water is harmful for both water plants and water animals.



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INTEXT QUESTIONS 1.1

1. What is the difference between soap and detergent?
2. How are detergents harmful for environment?

2.6 FERTILIZERS AND PESTICIDES

Fertilizers and pesticides are used largely to fulfill the food needs of the growing population of the world. Let us first read about fertilizers.

Fertilizers

Fertilizers are used to increase the production capacity of the land. They help plants in getting proper nutrition and high yield. Fertilizers improve the following elements in plants.

1. Nitrogen - nitrogen is useful for development in plants and protein synthesis. This dissolves in water and reaches plants after getting absorbed in roots by water.
2. Phosphorus - this is essential for development of roots of plants. We get it from phosphorous mountains.
3. Potassium - this element is important for the production of fruits on plants. This is used as potassium sulphate. Water soluble 'super phosphate' and 'triple super phosphate' etc are obtained by grinding mountains and its reaction with sulphuric acid.

Regular use of chemical fertilizers is harmful for nature. This increases pollution and affects the fertility of the soil. It is also harmful for human health. This is the reason behind the increasing use of fertilizers like compost, vermin compost etc.



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Pesticides

Pesticides are those elements which stop the growth of unwanted plants and organisms. These unwanted plants and organisms are harmful for both plants and humans. Pesticides are of many kinds and can be divided into many categories. These categories are made on the basis of how the bacterial growth is stopped by them.

Bacteria pesticides, fungicide, weed cutting, insecticides and weed pesticides.





These pesticides protect humans and plants from many diseases and benefit their health.

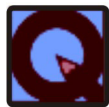
Pesticides have been used around 2000 years ago. Arsenic and its compound were used as pesticides for the first time, they were used till the mid of last century. Some carbonic pesticides were discovered during World War II. They were more effective than a carbonic pesticide like arsenic. This can stop insect development from a small amount and they are less harmful from other organisms and plants.

You all must have heard about D.D.T. this was invented in 1939. It was used massively in Second World War to stop the growth of mosquitoes responsible for spreading malaria. They were so affected by that that the use of D.D.T. increased day by day.

Slowly and gradually insects and mosquitoes became resistant to D.D.T. and they did not show any effect. This was also said that D.D.T. remains in soil for many years and does not get decomposed. It reaches food chain and is harmful for other organisms and humans.

After this information some countries banned D.D.T.

Chemical elements are chemical products and should be used very less because they pollute our environment. We must use our resources judiciously and lessen our needs to save pollution in environment. Many biological organic pesticides like til oil is used in present time.



INTEXT QUESTIONS 2.2

1. Why are pesticides and fertilizers used?
2. What does plant get from fertilizers?
3. Give two examples of pesticides?



WHAT HAVE YOU LEARNT

- Our needs have motivated us to use available natural resources and making new products.
- Metals are found in minerals and have special physical and chemical properties.
- Alloy has different properties from metals and has better properties than metals.
- Many fertilizers and pesticides are use to get better yield. However, they should be used in a balanced way.



TERMINAL QUESTIONS

1. Name the ore of iron?
2. Which metal constitute brass?
3. Name three physical properties of metals?
4. How do we get concrete?
5. How is D.D.T. harmful?



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ANSWERS TO INTEXT QUESTIONS

2.1

- (i) bauxite
(ii) Sodium, magnesium
(iii) MP, Rajasthan
- Sodium, Potassium, Aluminum, Copper, Iron
- Making wires from metals is called ductility.

2.2

- Soap does not give foam in hard water where as detergent give foam in hard water.
- Some detergents cannot be biodegrades. Therefore, they pollute nature.

2.3

- Fertilizers are used to increase the crop yield where as pesticides are used to stop the growth of insects and weeds that harm the crop,
- Nitrogen, Phosphorus, Potassium etc.
- D.D.T., B.H.C., Pararhylone, Methylone etc (any two)

