Unit 7

Manmade Materials

In our daily life we use many types of materials. Out of which many are obtained directly from nature and many are made according to the necessities.

Materials which are made by men are called Manmade Material. Now, let us recognize these materials.

What is required ? Two boxes

What to do ?

- ⇨ Collect materials from the surrounding environment.
- ⇨ Out of two boxes, on one box write Natural Materials and on the other write Manmade Materials.
- ⇨ Observe the materials you have collected and identify them and keep them in the corresponding box.
- ⇨ Write down the materials you have collected in both the boxes in the following table.

Natural materials	Manmade materials

Natural Fibres : Cotton, silk, jute and coconut fibres are obtained naturally.

Natural fibres	Product	Uses
Cotton	Cotton is separated from cotton pod. Fibres are drawn from cotton and threads are made from them.	Cotton cloth, threads, pillow, mattress, bandages for hospitals, surgical cotton are all made from cotton.
Silk	Silk-worms are cultivated on mulberry trees. Silk-worms produce cocoons and from these cocoons fibres are drawn and fine threads are made.	It is used in preparing silk clothes and carpets etc.
Jute	Jute plants are cultivated and when they are matured their skin is peeled out and after cleaning it fibres are drawn from it.	Jute fibres are used to prepare strings, ropes and flex i.e. Jute-cloth.
Coconut Fibres	Fibres are separated from the coconut fruits.	It is used in preparing coir, feet-wiping mats etc.

From the school library get more information from the book 'Process'.

Manmade (Artificial) Fibres :

After performing chemical reactions with natural fibers artificial fibres are prepared. Nylon, Terylene, Acrylic are manmade fibres.

Artificial fibres	Properties	Uses
Nylon	It looks like silk. It is strong and hard and also water resistant.	To make cloth, socks string, ropes strings for tyres, carpets, fishing nets and cloth for parasuits.
Tyrylene	These fibres do not absorb any water hence after washing clothes they dry up very fast.	It is used to prepare shirts, sarees and in the preparation of cloth for other garments, water-pipes and in the preparation of sails for boats.
Acrylic	Some acrylic fibres are like wool. some other acrylic fibres are like galss.	It is used in preparing sweaters, blankets. It is used in preparing glass for windows and doors, cups and saucers, glasses and bottles.

Plastic :

- Now a days plastic is very much used in a large quantity.
- Plastic is prepared by chemical reactions with crude oil and natural gases.

Properties of Plastic :

- It is non-effective and water resistant hence it does not get rusted and decayed.
- It is a bad conductor of heat and non-conductor for electricity.
- It is light in weight hence it is easily transferable from one place to another.
- Some plastic are elastic and hard.

- Due to the above mentioned properties plastic becomes cheap hence it is vastly used in domestic useful things and industries.

There are two types of plastic : (1) Thermoplastic (2) Thermosetting plastic.

1. Thermoplastic :

- Plastic which becomes soft by heating at normal temperature but while cooling it regains its original state is called thermoplastic.
- Different thermoplastic substances and their uses are as given below :

Thermoplastic Substances	Uses	Product Specimen
Polyvenile Chloride (P.V.C.)	It is used in the preparation of rain-coats, hand bags, bottles, pipes, foot-wears etc.	
Polystyrene	It is used in preparing domestic things like toys, buckets, tubs. It is also used as heat-resistant in radios and refrigerators and machine-gears.	
Polythine	It is used as insulators on electric wires, in preparations of different types of bags and useful domestic things, laboratory instruments and pipes to spray water.	

2. Thermosetting plastic :

- ✦ In spite of heating at a high temperature the plastics, which do not become soft are called 'Thermosetting plastic'.
- ✦ Its different types and uses are as given below :

Type of Thermosetting Plastic	Uses	Product Specimen
Backelite	It is useful in preparing telephones, light-switches and also electrical instruments.	
Malamine	It is used in preparing crockery, unbreakable cups and saucers, different types of trays. It is also used in preparation of certain parts of aero plane engine.	

Caution regarding plastic

- Plastic does not decompose naturally and hence it pollutes air, water and land.
- Burning the plastic waste spreads poisonous gases, which are very harmful to health.
- Sometimes animals eat useless plastic bags with food and die.
- We should not use the prohibited plastic bags for collection of edible things.
- It is prohibited to use plastic thinner than 20 micron.
- It is not advisable to use recycled plastic for preserving edible things.

Rubber :

There are two types of rubber : 1. Natural rubber 2. Manmade (Artificial) rubber.

1. Natural rubber :

Putting a cut on the trunk of a rubber tree, milk like juice is collected and from it natural rubber is prepared.

2. Manmade (Artificial) rubber :

Manmade rubber is obtained by chemical reactions of natural rubber with certain substance. This rubber is known as artificial rubber also.

Artificial rubber is more durable. Elastic and strong. There is no effect inflammable materials like acid on this kind of rubber.

What is required ? Rubber string, small plastic ball, small stones or sand and a match-box.

What to do ?

- Making a hole in the plastic ball, fill it with sand or small stones.
- Tie a match-stick at one end of the rubber string.
- Fit the match-stick tied end in the plastic ball.
- Now, catch the other end of the rubber string and throw the ball up. Do this activity for two to three times.

You will enjoy playing with the toy thus made.

As per our needs we make use of certain particular types of artificial rubber.

Vulcanized rubber :

- Ordinary rubber is heated at a proper temperature with sulphur and vulcanized rubber is prepared.
- This type of rubber is very strong and elastic.

Uses :

- It is used in preparation of tires and tubes for vehicles, machine-belts, gloves for hands and legs.
- It is used in preparing solid punctures for tubes and tires of vehicles.

If tires of vehicles are burnt it creates pollution. Therefore instead of burning them they are used in the work of repairing old tires and shoes and also in preparing soles for chapples.

Neoprene rubber :

- There is no effect of inflammable substances like acid and petrol on this rubber. Also it remains unaltered at a very high temperature.

Uses :

- Neoprene rubber is used in preparation of electric cables, machine-belts, pipes to draw crude oil and conveyer belts in the roller of printing machines.
- In daily life where do we use rubber ?

Glass :

- Make a list of things made of glass which you have seen.

- Glass is a mixture of silica (sand), soda-ash, sodium carbonet and lime-stones. This mixture is heated at a very high temperature and after it becomes homogeneous liquid, it is cooled down, then it becomes glass.

Common Properties of Glass :

- It is a transparent substance.
- Generally it is brittle.

Types of glass	Uses	Product specimen
Colourful Glass	It is used in preparing colourful objects, window glass and artificial diamonds.	
Transparent Glass	It is used in preparing spectacles, cameras, telescopes, microscopes.	
Bulletproof Glass	This glass is very strong, hence it is used in aeroplanes and windows of some vehicles.	
Photochromic Glass	This type of glass is used in the instruments made for prevention of sunlight. It is used also in goggles.	

Types of glass	Uses	Product specimen
Optical Fibres	Optical fibres are used in endoscope, message-transmission, in preparing toys and decorative articles.	
Glass wool (wool of glass) Fibres	This glass is heat resistant therefore it is used in refrigerators, electric stoves, thermos, solar heaters and ovens.	
Touhgen Glass	This type of glass is very strong. It is used in preparation of glass for vehicles, for drawers inside refrigerators and also outside the walls of modern buildings.	

Papers :

Worn out clothes, fish-catching useless nets, non-smooth fibres and grass were used first time in preparation of papers. After that grass grown in water, strings, waste parts of sugarcane and objects containing fibres like asbestos, were used in the preparation of papers. In the present times fibres from tree are used for preparing papers.

The necessity of papers have increased so much that we are forced to cut more and more trees and jungles are destroyed and reduced very much hence a risk is created for natural balance. It is our sincere duty to use papers very carefully. We should reproduce papers again and again and use them.

Reproduction (recycling) of papers :

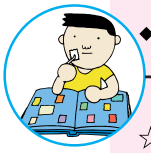
The process of dissolving the used papers and making them into paste and preparing of newpapers is called reproduction (recycling) of papers.

- Thus, new papers are produced from used and useless papers.
- There will not be any need to cut new trees with the use of recycled papers. It will maintain natural balance.

Thus, manmade materials have been so necessary in our routine life that we should make use of it with precaution. Where ever it is possible we should make use of recycled objects and be helpful in preserving the environment.

Instead of one ton of papers made from the fibres of new trees, the one ton of papers made from the useless and wasted papers has the following advantages :

- 17 trees are protected.
- 1100 kilowatts of energy (which can be used in a house for six months) can be preserved.
- 26000 litres of water is saved.
- Air-polluting materials of 27 kilograms can be prevented from use.



☆ As responsible citizens we should use objects, keeping the principle of 4R : (1) Reduce (2) Reuse (3) Recycle (4) Recover in mind.

☆ Write on both the sides of papers.

☆ Make bags from the used papers.

☆ Do not throw away the note-books which you have already used previous year but use them for practicing the sums of mathematics or even you can bind the unused papers and make new note-books.

☆ You can give the used papers to schools or private industries, they will make use of them in different ways. Computer papers, which are used only on one side can be used on the other side.

Q. 1 Why should we use manmade materials with precautions ?

Q .2 Classify the following objects as per the table given below :

Tyrolean, jute, vulcanized, polythene, toughen glass, nylon, cotton, photo chromic Bakelite, neoprene

Glass	Plastic	Rubber	Natural fibers	Manmade fibers

Reproduction (recycling) of papers :

1. Make small pieces of useless and wasted papers and keep them for one night in heated water with washing soda. (Sodium Carbonate)
2. The next day stir this mixture well, so that pieces of papers turn into dense liquid.
3. Fill the liquid thus prepared in a large and shallow vessel and let it freeze.
4. Now, take a wooden frame fitted with thin iron net or a strainer. Deep the strainer in the dense liquid. Then lift it slowly so that there will come out a thin layer of paper paste n it. Now, turn this strainer upside down carefully on a soft cloth or a blotting paper.
5. Now, on the cloth with the layer of paper paste keep another cloth or blotting paper and giving some light pressure on it remove the extra water from it. Let this paper dry for two days. In such a manner performing recycling of papers new papers are produced.