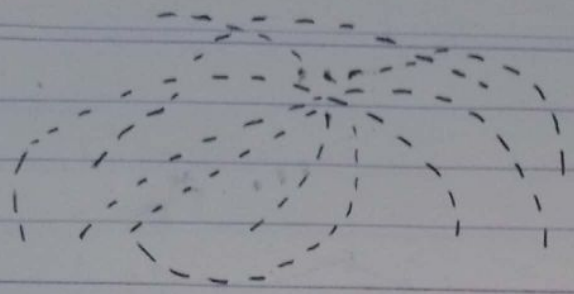
22.06.2022

Polymer chain of polyethene.



In polyethene, the polymer chains are not held to each other very strongly. This means that polyethene is not very strong.

The molecules ~~lain up~~ line up in different direction in the plastics.

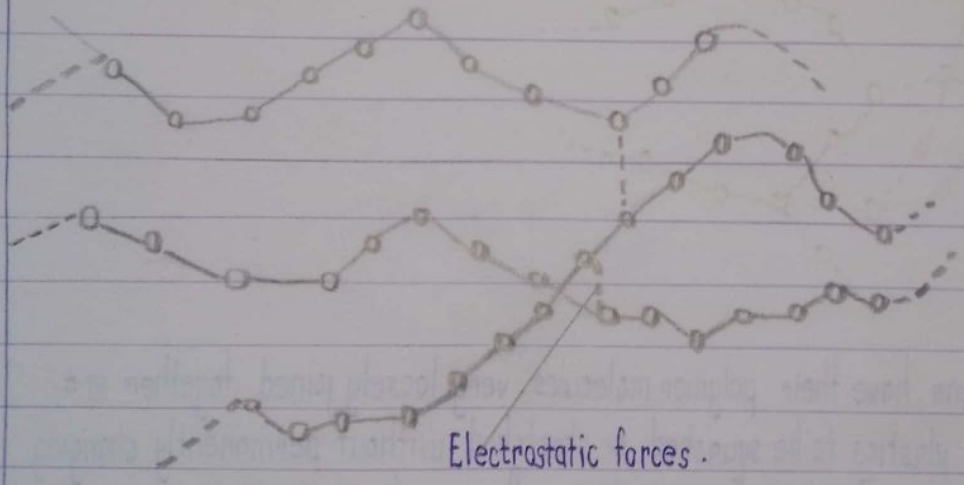
Most plastics are made from crude oil, coal or natural gas.

Polymers are made from small molecules joined together in a chain. The small molecules are called monomers, which are usually gases. The process takes place at very high pressure and is helped by a substance called a catalyst.

A catalyst is a substance that helps a chemical reaction to take place more easily and faster but does not take part in reaction.

In plastics, the force between the polymer chains that hold them together is called electrostatic and are caused by nitrogen or oxygen atoms in the polymer molecule.

Polymer chain of nylon.

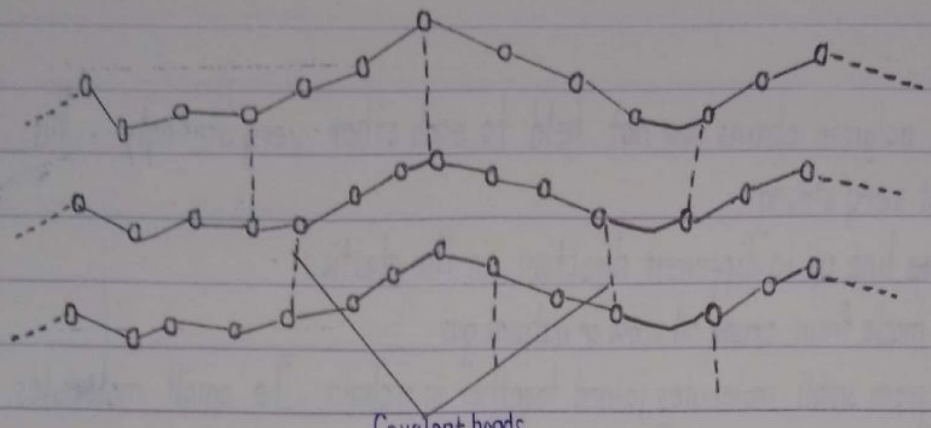


ASSIGNMENT.

1. Polymer chain in melamine.
2. Polymer chain in polyurethane.
3. Use of nylon.

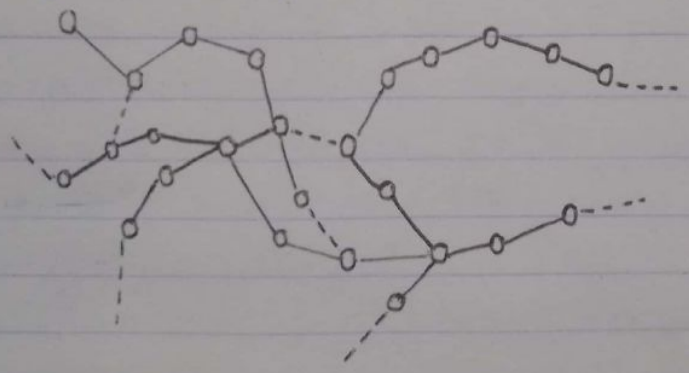
Answers.

Polymer chain in melamine.



Melamine is the plastic surface of many desks and tables. In this plastic, there are strong covalent bonds between the polymers. This makes the polymer rigid; it is hard, it can not be stretched and it will not melt. When it is heated it burns without melting.

Polymer chain in polyurethane.



Plastics like polyurethane have their polymer molecules very loosely joined together in a random way. This allows the plastics to be squashed or stretched without permanently changing their shape. They are like rubber. They are not at all strong. They can be made into a foam like the mattress in the picture by adding chemicals to them which react to form a gas-like carbon-dioxide as the plastics set.

Uses of nylon.

Nylon is used to make clothes.
Nylon is used to make fishing line.
Nylon is used to make ropes.

27.06.2022.

04/07th/2022.

FREE SPACE
No missing work.

27. 04th/07/2022.

TYPES OF PLASTICS.

Plastics can be put into two types depending on their behaviour upon heating ie

* Thermal-softening plastics
* Thermal-setting plastics.

A) THERMAL-SOFTENING PLASTICS

These are plastics that soften or melt when heated and can be therefore be moulded into any shape while they they are still soft.

Examples of thermal-softening plastics.

* Nylon rope.
* Polyethene bag.
* Polypropene

Polythene is a polymer of ethene.

* Polyvinylchloride (PVC)

PVC is made by polymerisation of vinyl chloride (chloroethene).

B) THERMO-SETTING PLASTICS.

These are plastics which do not soften or melt on heating and therefore can not be re-moulded into different shapes once they are set

Examples include;

- Melamine (Used for making cups and children dishes).
- Be Bakelite (Used for making electric plugs, saucepan handles, switches)

NATURAL POLYMERS.

Examples.
Cotton
Banana fibres
Wool.
Wood.

Natural polymers occur in nature and can be extracted. They are often water based (They contain water).

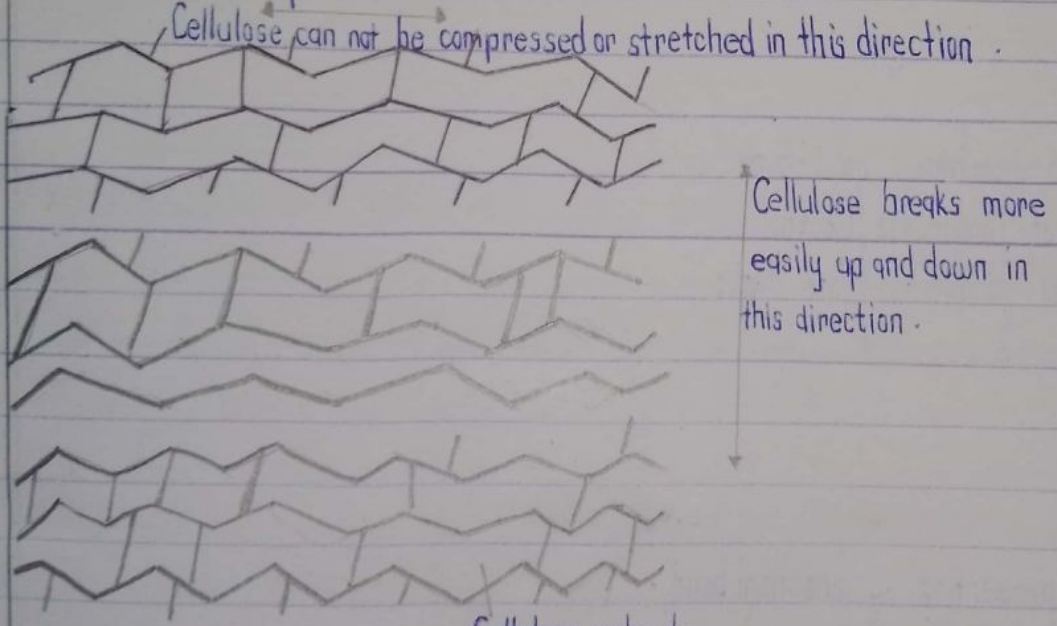
Examples of naturally occuring polymers include.

Silk, wool, DNA, cellulose and proteins. They are made by livingthings as they grow.

i) Cellulose.

This is the polymer that wood is made of. It has a compound complicated structure made out of atoms of carbon, hydrogen and oxygen. There are covalent bonds & strong electrostatic forces holding the polymer chain together. These chains line up next to each other to form the wood. Because of the bond and forces holding molecules together, wood has great strength. It is possible to bend it in the direction of the polymer chain but it is almost impossible to stretch it and break it by pulling it. This is why it is such a useful material.

The structure of cellulose.



Cellulose molecule.

06.01.2022.

ii) Fibres

A fibre is a thin thread of a natural or artificial substances especially ones that are used to make cloth or rope. They can be classified into main groups ie natural fibres and synthetic fibres. Natural fibres can be classified further into three groups ie;

Those from animals,

Those from plants and those from minerals such as **asbestos**. They are dug out of the

ground from quarries.

NATURAL FIBRES AND SYNTHETIC FIBRES.

Natural fibres			Synthetic fibres
From plants	From animals	From minerals	Nylon.
Cotton	Silk	Asbestos.	
Sisal	Wool		Polyster
Jute	Mohair		
Linen			Terylene.
Hemp			

Plants.

Stalk fibres	Leaf fibres	Fruit fibres	Stem fibres	Seed fibres
Examples	-Sisal	-Coconut	-Sugarcane	-Cotton
Wheat	-Pineapple	-Palm oil	-Soya beans	-Rice husks
Rice straw	-Banana			
Grass				
Bamboo				
Sunflower				

NOTE: Summary of properties of chemical bond.

1. Bond	Properties of material with such a bond.
Ionic	-Crystalline solids that are easily broken.
Covalent	-Gases, liquids or solids with a low melting point.
Covalent giant structure	-Very hard solids with high melting points (such as sand)
Metallic	-Ductile, malleable solids that are good conductor of heat and electricity

Natural polymers.

Polymer	Monomer	Use.
Starch	Glucose	Source of energy
Proteins	Amino acids	Repair worn out tissues.
Cellulose	Glucose	Cell wall.
Glycogen	Glucose	Source of energy.
Lipids	Fatty acids and glyceron	Source of energy.
Natural rubber		Making foot wear.

11~~09~~.07.2022.

Activity 4.17

State the use of each fibre mentioned in table 4.1

Fibre	Uses.
Sisal	For making ropes and bag.
Cotton	For making clothes and pillows.
Wool	For making blankets and winter jackets.
Silk	For making clothes.
Nylon	For making fishing lines and ropes, carpet

MATERIALS USED FOR CONSTRUCTING HOUSES.

Building materials are materials used for construction purposes forexample materials for house building. These include; wood, cement, aggregates, metals (iron bars), bricks, concrete, clay are the most common building materials used in construction. The choice of these

materials are based on their cost effectiveness for the building project. Construction materials are generally categorised into two ie ;- Natural building materials. In Ug
-Synthetic.

In Uganda, there are many different kinds of houses. What the houses are made of in any area depend on a number of things such as * The availability of building materials
* The cost of the building materials.
* The space available for building.
* The weather condition in the area.
* The size of the house.
* The labour force needs.

Examples of natural building materials.

- Mud
- Stones.
- Sand.
- Wood
- Leaves.
- Grass like Spear Grass
- Rice stalks
- Papyrus reeds

Examples of man-made building materials.

- Cement.
- Tiles
- Bricks.
- Metals.
- Glass.
- Plastics.

Important building materials and properties.

- Cement
- Bricks.
- Steel
- Sand
- Concrete

Cement.

It is a fine grey powder made of a mixture of limestone and clay ; use with water and a sand to make morta or with water, sand & aggregate to make concrete.

Basic properties of cement.

It is very smooth and cold.
Setting time : Initial set

Initial set

When the cement starts to harden from 30 - 45 minutes

Final set.

When the cement hardens (occurs below 10hrs)

Steel.

Building from houses, schools to sky scrappers rely on steel for their strength.

18. 07. 2022.

COMMON MATERIALS IN OUR ENVIRONMENT.

Examples of non-biodegradable materials.

- Polythene bags. +Medical wastes.
- Plastic cups and plates etc
- Glass containers.
- Paper (Carbon paper)
- Metals.
- Carbon paper.

Examples of biodegradable materials.

* Wood +Wool
* Cotton
* Animal wastes.
* Vegetable and fruit peelings.

DANGERS OF PLASTICS

The major impact of plastics in the environment is that it takes many years to decompose. In Addition, toxic substances are released into the soil when plastic bags perish under sunlight and if plastic bags are burnt, they release a toxic substance into the air causing air pollution.

- Plastic bags ruen soil fertility when disposed on land.
- Plastics lead to water pollution hence loss of acquatic life.
- Plastics pollute the air in the atmosphere when they are burnt.
- Plastics like polythen bags kill animals when they eat them or in any other way.
- Plastics litter the landscape.
- Plastics block drainage hence leading to draught.
- Plastics toxify the environment when burnt, they produce carbmonoxide and Sulphur dioxide that result into saphocation of animals and birds.
- Plastics are non-biodegradable.

20.01.2022.

Questions.

1. Discuss how common materials pollute the environment.
2. Suggest ways in which you can contribute towards reducing the use of plastic materials.
3. Discuss the characteristics of plastics.
4. Make a list of items that can be recycled.

How do materials we use pollute the environment?

Solid materials like papers and plastics pollute water bodies and such wastes lead to death of many acquatic animals as they get entangled in the waste or even ingest. Some plastics and metallic containers disposed in the sewage have contaminants like heavy metals. Heavy metals contaminate the soil hence reducing its quality. This is because such wastes are non-biodegredable ie they do not decompose

Some people burn wastes. Burning of wastes produces smoke which is contaminated with gases such as Sulphurdioxide (SO_2) and Chlorofluorocarbon (Compounds containing chlorine, flourine & carbon). These pollute the air

To prevent the pollution, wastes should be well-disposed.

Appropriate methods of disposing materials (waste) to prevent pollution.

- Re-cycling
- Re-use

Paper and inorganic materials like metal, glass and plastics should be recycled instead of being disposed in the environment.
Packaging materials such as plastic bags can also be ~~re~~ reused.

Composting

This involves putting biodegradable waste materials in composting pits. When this waste decomposes it forms manure that can be used to enrich the soil.

Using landfills

Waste materials that do not decompose can be put in land fills. In this case, waste is burried as a well constructed pit that does not allow harmful products to penetrate into the soil.

Assignment

1a) Defferentiate between recycling and re-use.
b) Name four materials that can be recycled.

2a) What is pollution?
b) State 3 ways in which common materials can pollute the environment.

3a) State 3 appropriate methods we can use to dispose waste to prevent environmental pollution.

THE PROCESS OF RECYCLING

Recycling is a set of procedures that includes the collection and breaking down of waste materials to create something new out of it.

The recycling process can help to convert materials especially those that are non-biodegradable into useful products.

The process of recycling depends on the nature of material. Thus, different materials may require different methods and equipment to recycle them.

PAPER RECYCLING

Paper is the most used material on the earth. Paper is made up of two materials water and

wood. The wood in form of fibres called cellulose. Why should paper be recycled? Paper must be recycled because it is made from wood which means you have to cut trees to be able to make paper. This causes deforestation and environmental degradation. Fortunately, paper is easy to recycle and can be re-used several times in different ways. Figure 4.16 shows different materials made from recycled paper. They include;

- Baskets.
- Wrapping nets.
- Paper bag.
- Toilet paper.

END OF SECOND TERM'S WORK.

5/09/2022.

Metal Recycling.

How do you dispose off worn out materials in your home? Worn out and broken metals become scrap metal. The figure 4.17 shows scrap materials / metal collection transportation and storage in Uganda.

Crap metal trade is a booming business in Uganda today. Children move around villages collecting scrap metal for sale. What happens to the metal scrap collected? Let us find out in the next activity.

Activity 4.20.

Disposing metal scrap in our environment.

1. In your groups, collect the metal waste in your surroundings.
2. Findout if the materials collected belong to the same category.
3. Research and discuss the process by which the metal scrap can be converted into useful material.

New products ;- Iron sheets. -Saucepans.
-Metalic garden forks. -Iron bars.

Assignment.

1a) Why should we recycle materials.

b) What are the problems involved in the recycling process.

Answers.

1a) Recycling materials helps to prevent environmental pollution.
It helps in the obtaining new useful products.
To reduce on the high rate of deforestation.

b) The molten liquid may cause harm to a person during the process in case of body contact.

Glass Recycling.

Glass is one of the most used materials in our homes. However, it is very risky to deal with because it can easily cause injuries to users when it breaks. How do you dispose of the the glass materials (broken) in your home? Sadly, in Uganda most broken glass is easy. The glass is broken into small pieces and then melted and recast. There are some factories in Uganda which are dealing in the recycling of glass materials.

Examples of products got after recycling glass.

Mirrors.
Car screens.
Window glasses.
Domestic glasses containers.
Laboratory glass ware apparatus.

Plastic Material Recycling.

We have already learnt that plastic materials are the most used in Uganda because of their useful ~~materials~~ properties. Do you recall some of the properties of plastics that make

them popular? You have also learnt in the previous section that plastics are non-biodegradable. The figure 4.18 shows a dumping site for plastic materials near Masaka hospital in Uganda.

Plastic materials should be recycled if the disposal problem is to be solved. However, the processing sites are located far from the sources and there are no collection centres for the same. And it is not just collecting the plastics. Plastics of different kinds should be sorted and separated to enable recycling.

Generally, plastic material recycling is not very difficult. The only problem is like metals, plastics have to be sorted such that those of same type are recycled together. As there is a diverse variety of plastic with different properties. Then the materials can be cleaned heated and shaped.

Examples of new products.

Plastic buckets.

Plastic spoons and forks.

Plastic s plates and cups.

07th/09/2022:

CHAPTER FIVE

TEMPORARY AND PERMANENT CHANGES.

Key words.

Materials.

Temporary changes.: These are changes which occur only for a short period of time and are reversible.

Permanent changes: These are changes which remain for a longer time and are irreversible.

Reversible changes: These are changes which can happen forward and backward.

Irreversible changes: These are changes that can not be reversed.

Physical changes: These are changes that occur in the physical properties of a substance

Chemical changes: Chemical changes are changes that occur in the chemical properties of a