

Synthetic Fibres and Plastics

- **Introduction**
- **Classification and Advantages of Natural Fibres**
- **Synthetic Fibres and its uses**
- **Types of Synthetic fibres**

CLASSIFICATION OF FIBRES

Fibres

- Silk
- Wool
- Leather

Natural fibres obtained from Animals

- Nylon
 -
 -
 -
- Fibres that are made by human beings are called synthetic fibres.

Fibres obtained from plants and animals are called natural fibres.

Natural Fibres

- Cotton
- Jute

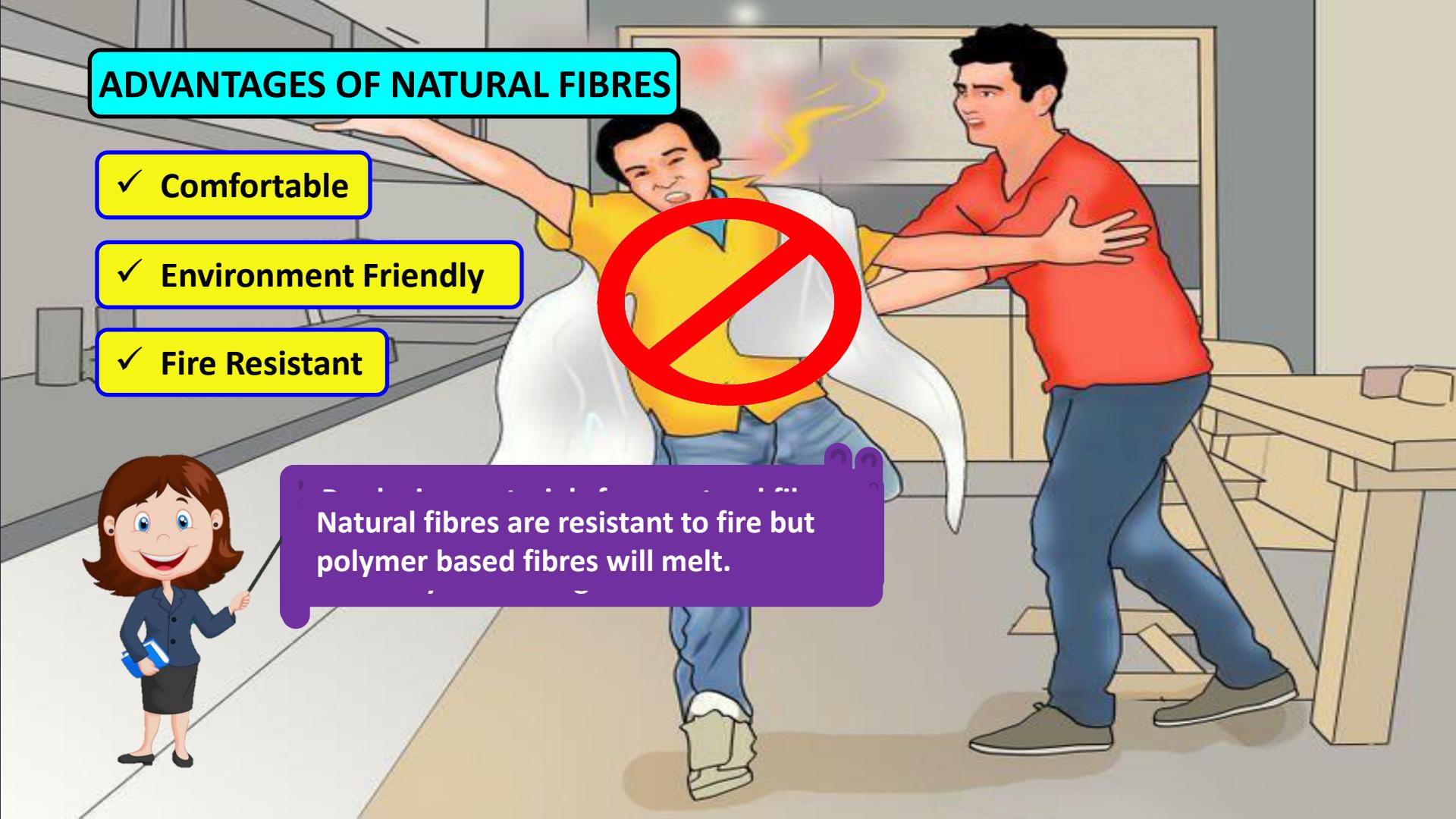
Natural fibres obtained from plants

ADVANTAGES OF NATURAL FIBRES

- ✓ Comfortable
- ✓ Environment Friendly
- ✓ Fire Resistant



Natural fibres are resistant to fire but
polymer based fibres will melt.



WHY DO WE USE SYNTHETIC FIBRES?

Natural fibres have many advantages over synthetic fibres.



WHY DO WE USE SYNTHETIC FIBRES?

Most synthetic fibres can handle heavy loads without breaking.

and more readily available than those made of natural fibres.



WHY DO WE USE SYNTHETIC FIBRES?

A synthetic fibres is also a chain of small units (monomers) joined together.

The process by which artificial fibres are made from simple molecules is called polymerization.

The word '**polymer**' has a Greek origin where poly means 'many' and mers means 'small unit' or 'part'.



TYPES OF SYNTHETIC FIBRES

Spandex

QUESTIONS

1. Explain why some fibres are called synthetic.
2. What are the advantages of natural fibres?
3. Why do we use synthetic fibres to make parachute and raincoat?
4. Nylon and rayon are man-made or natural fibres?
5. What is polymerization?



Synthetic Fibres and Plastics

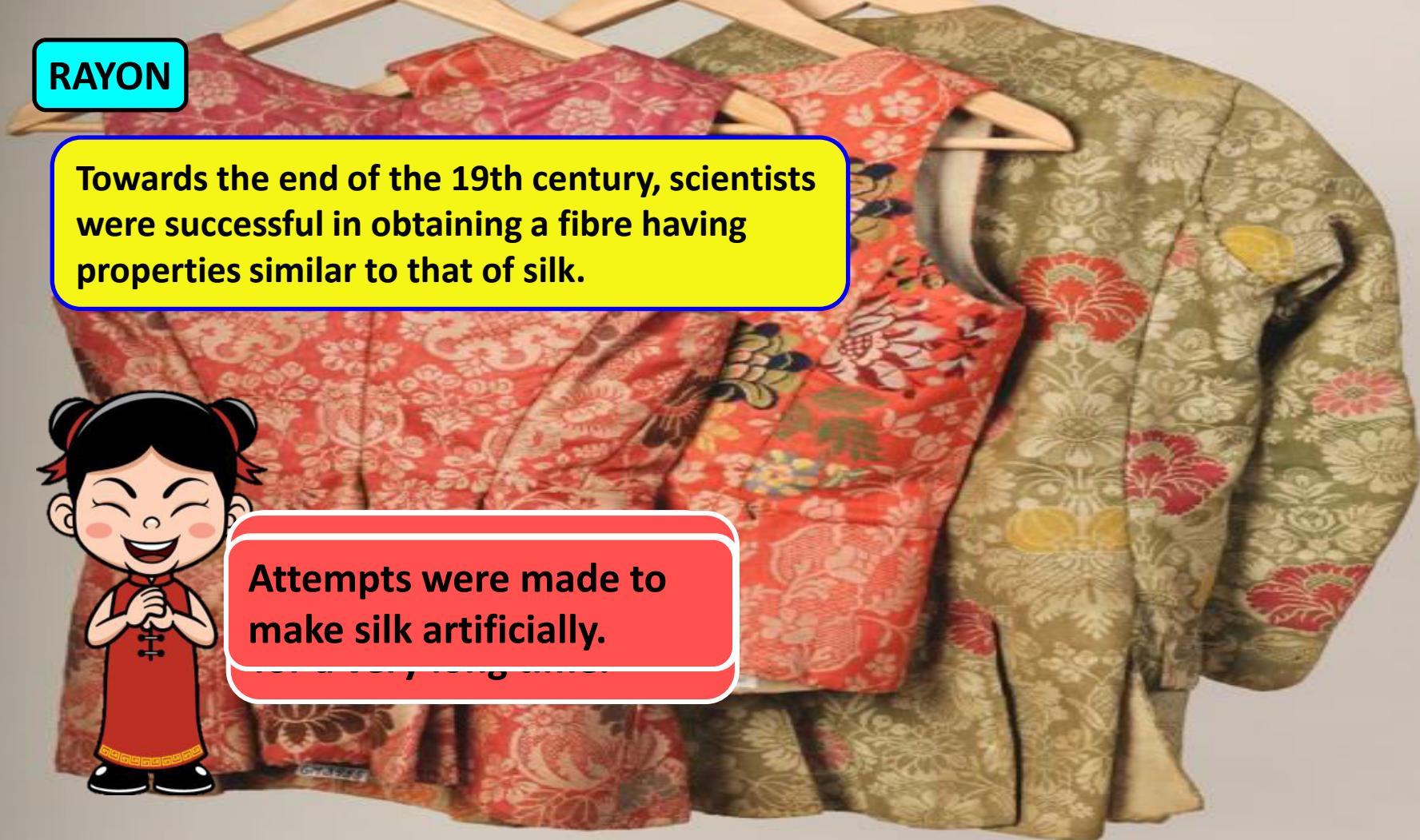
- Rayon
- Properties and uses of Rayon
- Nylon and its uses

RAYON

Towards the end of the 19th century, scientists were successful in obtaining a fibre having properties similar to that of silk.



Attempts were made to make silk artificially.



RAYON

This fibre was called rayon or artificial silk.

PROPERTIES OF RAYON

It absorbs sweat. Rayon clothes are, therefore, preferred over other synthetic fibres in summer.

Because the raw material used in the preparation of rayon is wood cellulose which is a natural fibre.

USES OF RAYON

Rayon is used for making :

Bandages Lishing

- Bed Sheets
- Curtains
- Table Cloths



NYLON

It was first produced in the early 1930s by the scientists at the Dupont company from coal, water and air.



Nylon is named after two cities, (NY) New York in USA and (Lon) London in Great Britain.



NYLON

Due to their high strength and elasticity,
Nylon threads are used for making

**Fishing nets, bristles
and tennis racquets**

QUESTIONS

1. How is Rayon made?
2. Amit wants to buy shirts for summer. Should he buy a shirt made of Rayon or Nylon? Give reasons for your answer.
3. How is Nylon produced?
4. Give three uses of Nylon?



Synthetic Fibres and Plastics

- Polyester
- Properties and uses of Polyester

POLYESTER

Polyester is another synthetic fibre.



What are

Esters are the chemicals which give fruits their smell.



POLYESTER

For example : Terylene is blended with a natural fibre cotton to form Terrycot.

Terylene

Terrycot

Cotton

Blended

POLYESTER

Terylene is blended with wool to make **Terrywool**.



Terylene

Terrywool

Cotton

Blended

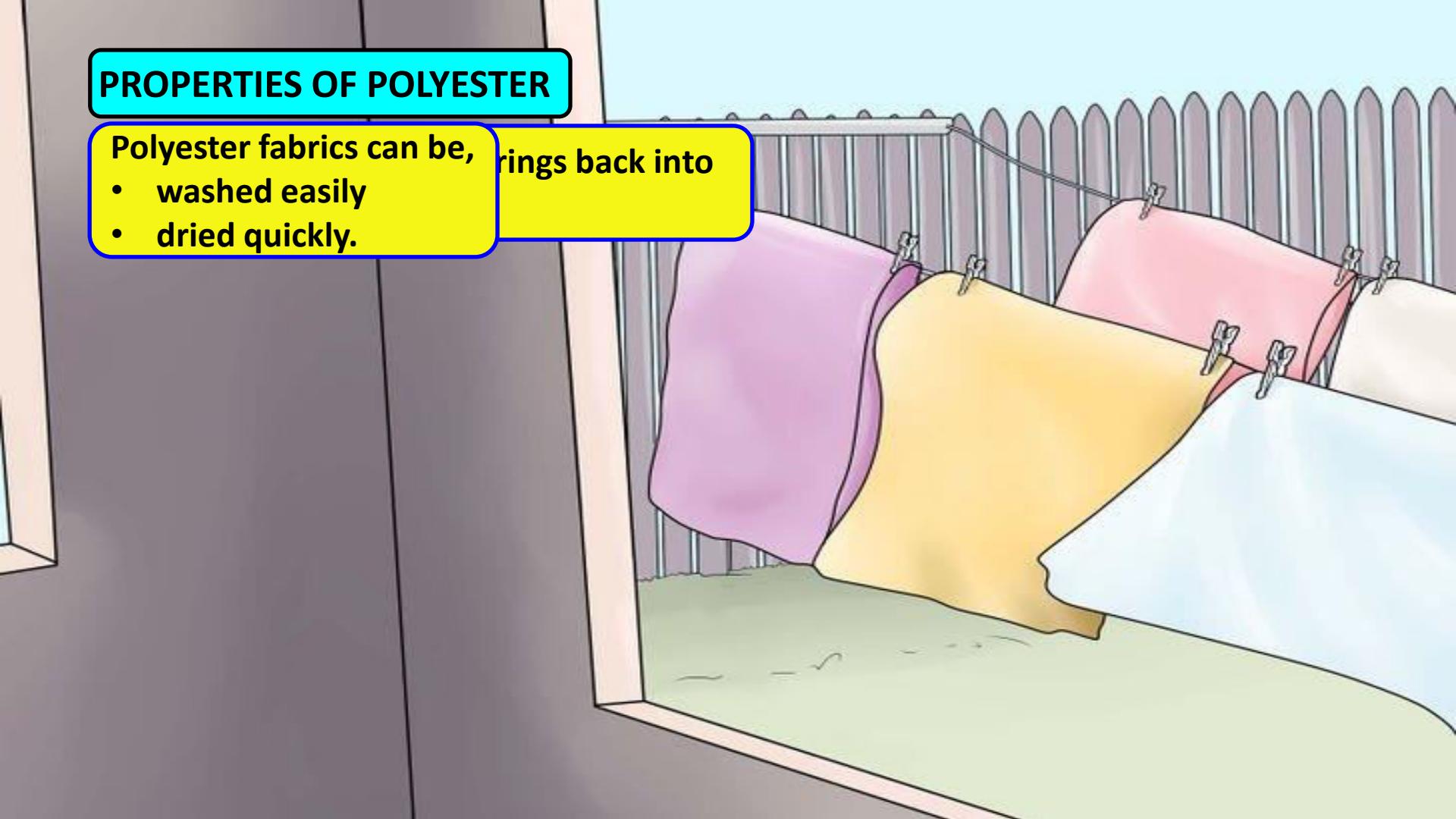
Terrywool, which is warm in addition to all the characteristics observed in polyesters.

PROPERTIES OF POLYESTER

Polyester fabrics can be,

- washed easily
- dried quickly.

... brings back into



USES OF POLYESTER

Terrywool is used for making formal suits, blouses, skirts and other dress material.

floppydisksites



QUESTIONS

1. How is Terrycot made ?
2. What is polyester made up of ?
3. Give two properties of polyester.



Synthetic Fibres and Plastics

- **Acrylic Fibre**
- **Spandex and uses of Spandex**
- **Advantages of synthetic fibres**
- **Disadvantages of synthetic fibres**

ACRYLIC FIBRE

Acrylic fibres, also known as Orlon and Acrilan.



Many of these actually not made from natural wool, though they appear to resemble wool.

SPANDEX

It has excellent elasticity, which makes it suitable for use in clothes that require snug fitting.

by

very tight



Joseph Shivers

USES OF SPANDEX

It is often mixed with other fibres, like cotton, to get stretch fabrics which are used for making caps and T-shirts.

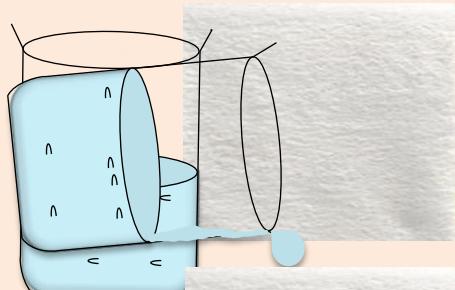


ADVANTAGES OF SYNTHETIC FIBRES

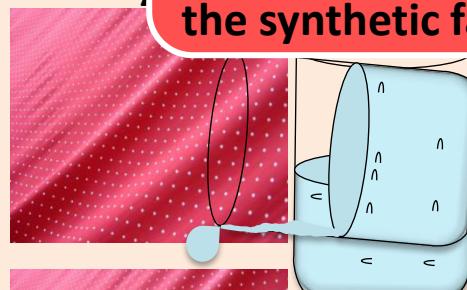
Activity:

1. After five minutes, take out the cloth.
2. Observe the water remaining in the beaker.

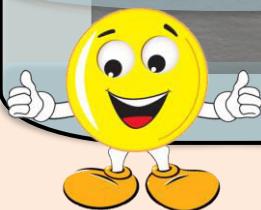
Cotton



Nylon



What does this activity tell us about the characteristics of the synthetic fabrics??



Conclusion: Synthetic fabrics has less water-absorbing capacity compared to natural fabrics.

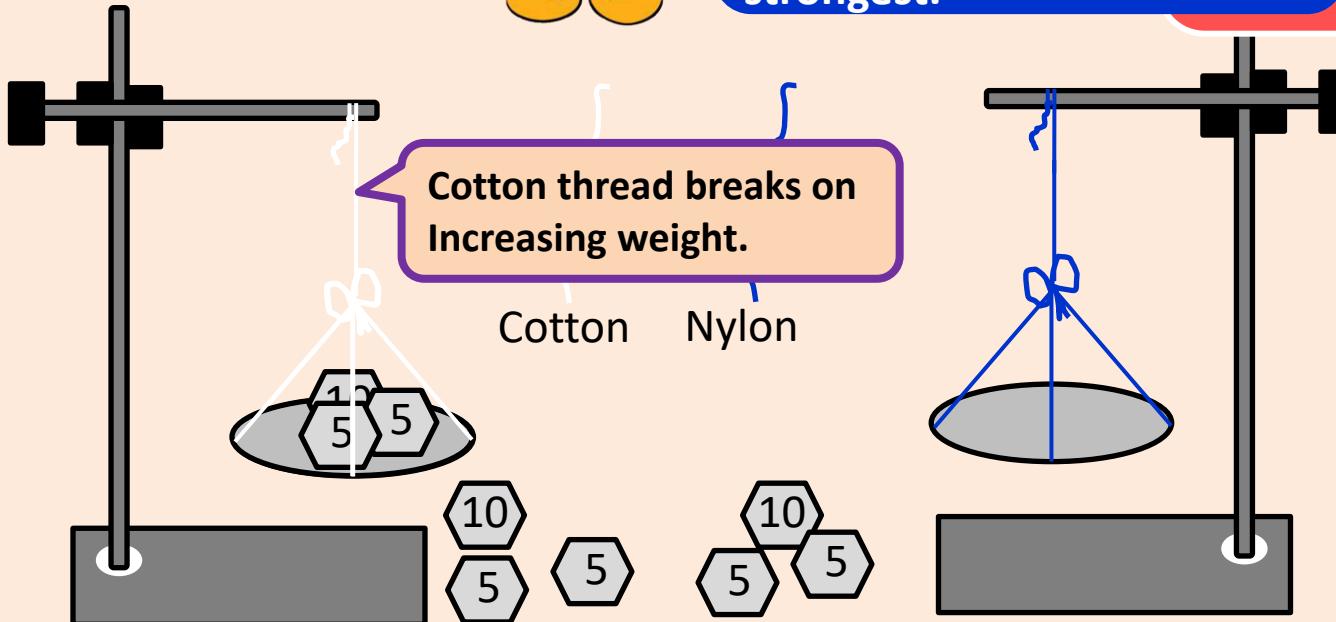
ADVANTAGES OF SYNTHETIC FIBRES

Activity:

Keep on increasing the weight until the thread breaks. Add weights in the pan so that the thread breaks.

Conclusion: The thread that breaks at the maximum weights i.e nylon is the strongest.

Weight is added to break the thread compared to cotton thread.



DISADVANTAGES OF SYNTHETIC FIBRES

On catching fire they stick to the body of person wearing them, causing severe injury. Therefore, it is dangerous to wear them near a source of fire.
Example; while working in the kitchen.



QUESTIONS

1. Which synthetic fibre resembles wool ?
2. Why is Spandex used for making swimming costume ?
3. Why is Spandex mixed with other fibres?
4. Why is it advised not to wear synthetic clothes while working in a laboratory or working with fire in the kitchen ?



Synthetic Fibres and Plastics

- Plastics
- Types of plastic

PLASTICS

The first man-made plastic was invented by Alexander Parkes in 1862.



He called plastic as 'Parkesine' .



TYPES OF PLASTIC

On the other hand, there are some plastics which when moulded once, can not be softened by heating. These are called thermosetting plastics.



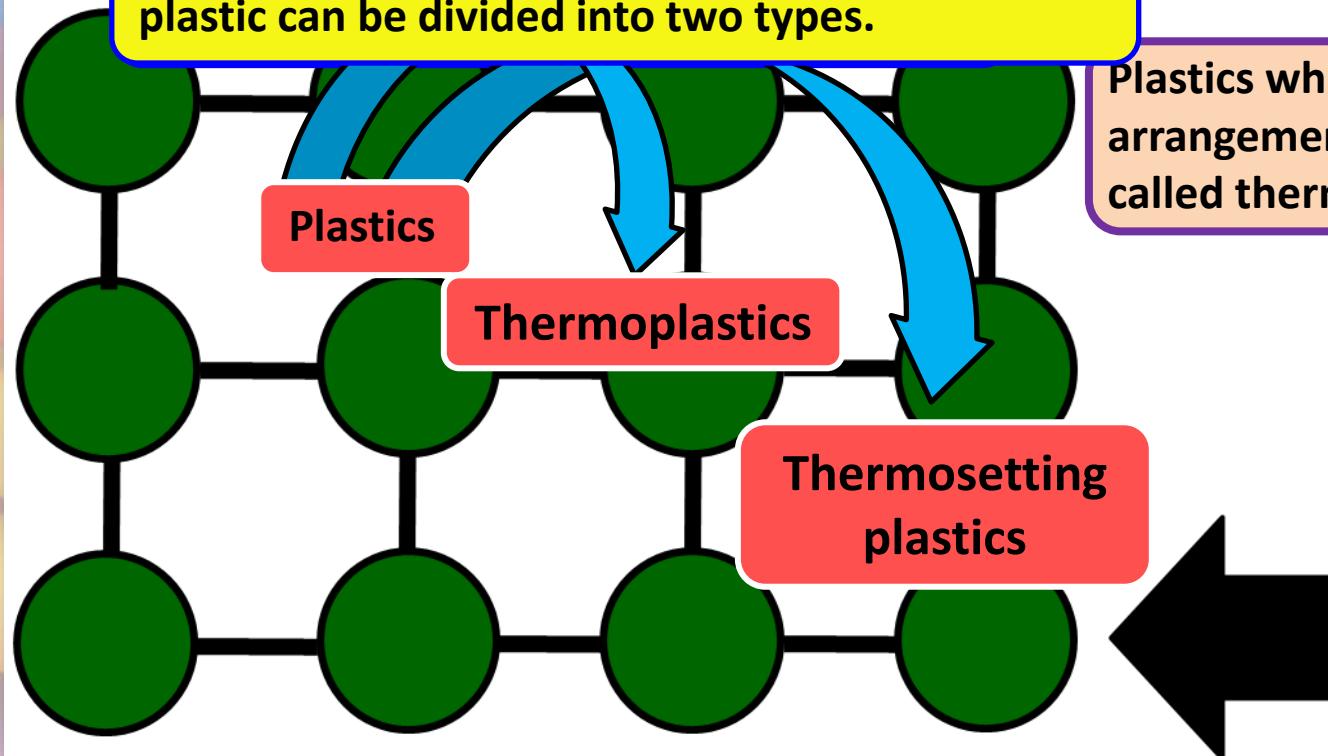
You will observe that some
When we add hot water to a
plastic bottle, it gets deformed.
forced to bend.



The thermosetting plastics

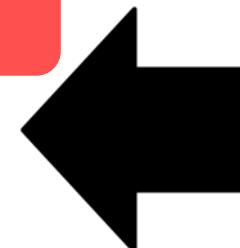
TYPES OF PLASTIC

Depending upon the arrangement of monomers, plastic can be divided into two types.



Plastics which have a cross-linked arrangement of molecules are called thermosetting plastics.

Thermosetting
plastics



Monomers

TYPES OF PLASTIC

Plastics

Thermoplastics

Thermoplastics can be melted by heating and thereafter moulded into desired shapes. This is a reversible process.



PVC (polyvinyl chloride) and LDPE(low-density polyethylene) are examples of thermoplastics.

TYPES OF PLASTIC

Plastics

Thermosetting plastics

Unlike thermoplastics, thermosetting plastics cannot be remoulded after reheating.



Melamine and bakelite are examples of thermosetting plastics.

QUESTIONS

1. What is plastic ? Why is it used in variety ?
2. What is thermoplastic and thermosetting plastic ?
3. Name any two thermosetting plastics.



Synthetic Fibres and Plastics

- Characteristics of plastics
- General properties of plastics

CHARACTERISTICS OF PLASTICS

Lustrous and colourful:

They can be made in any desired colour and texture and can be used for making a large variety of household products.



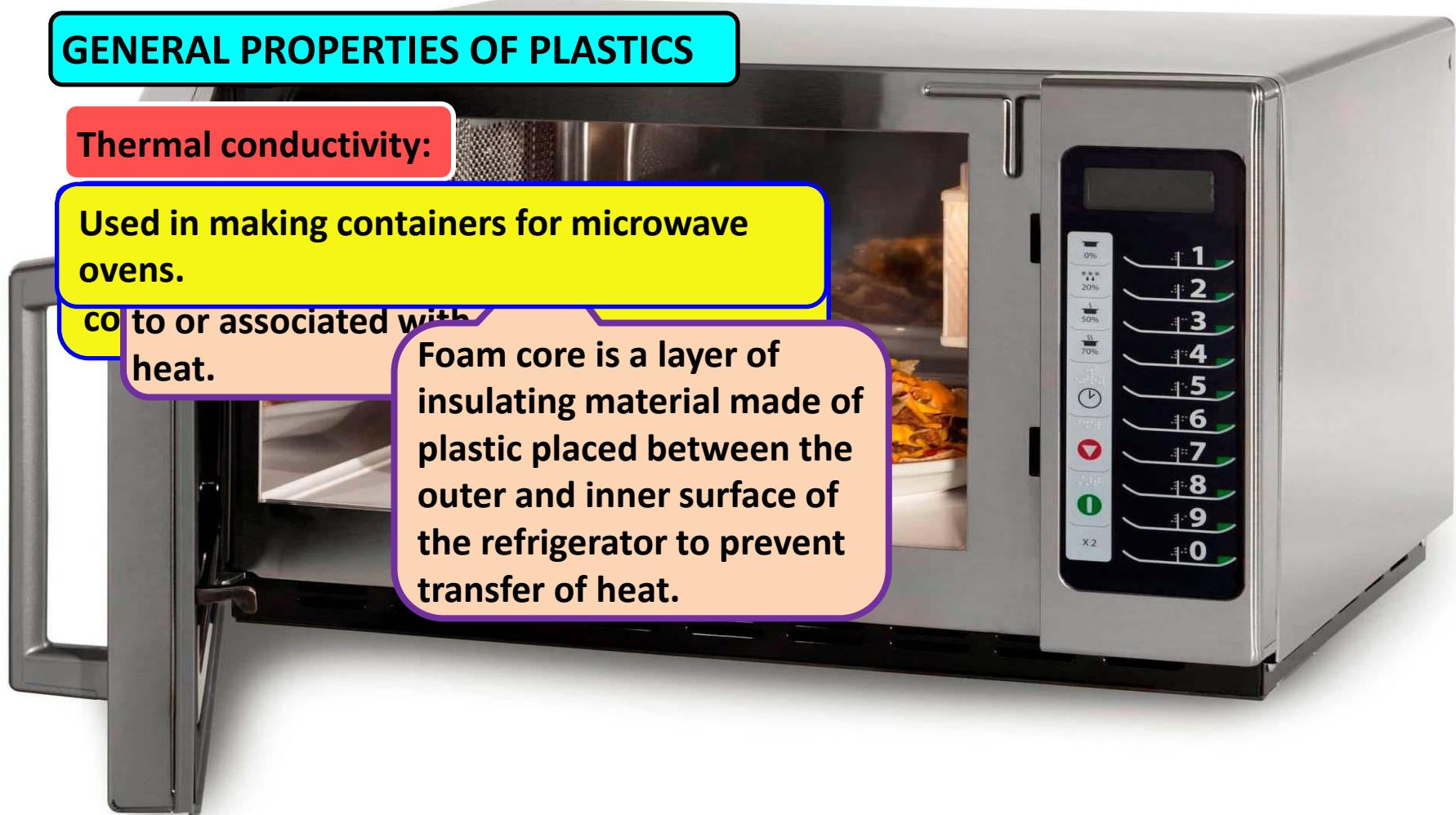
GENERAL PROPERTIES OF PLASTICS

Thermal conductivity:

Used in making containers for microwave ovens.

co to or associated with heat.

Foam core is a layer of insulating material made of plastic placed between the outer and inner surface of the refrigerator to prevent transfer of heat.



GENERAL PROPERTIES OF PLASTICS

Solubility in water: **No:**

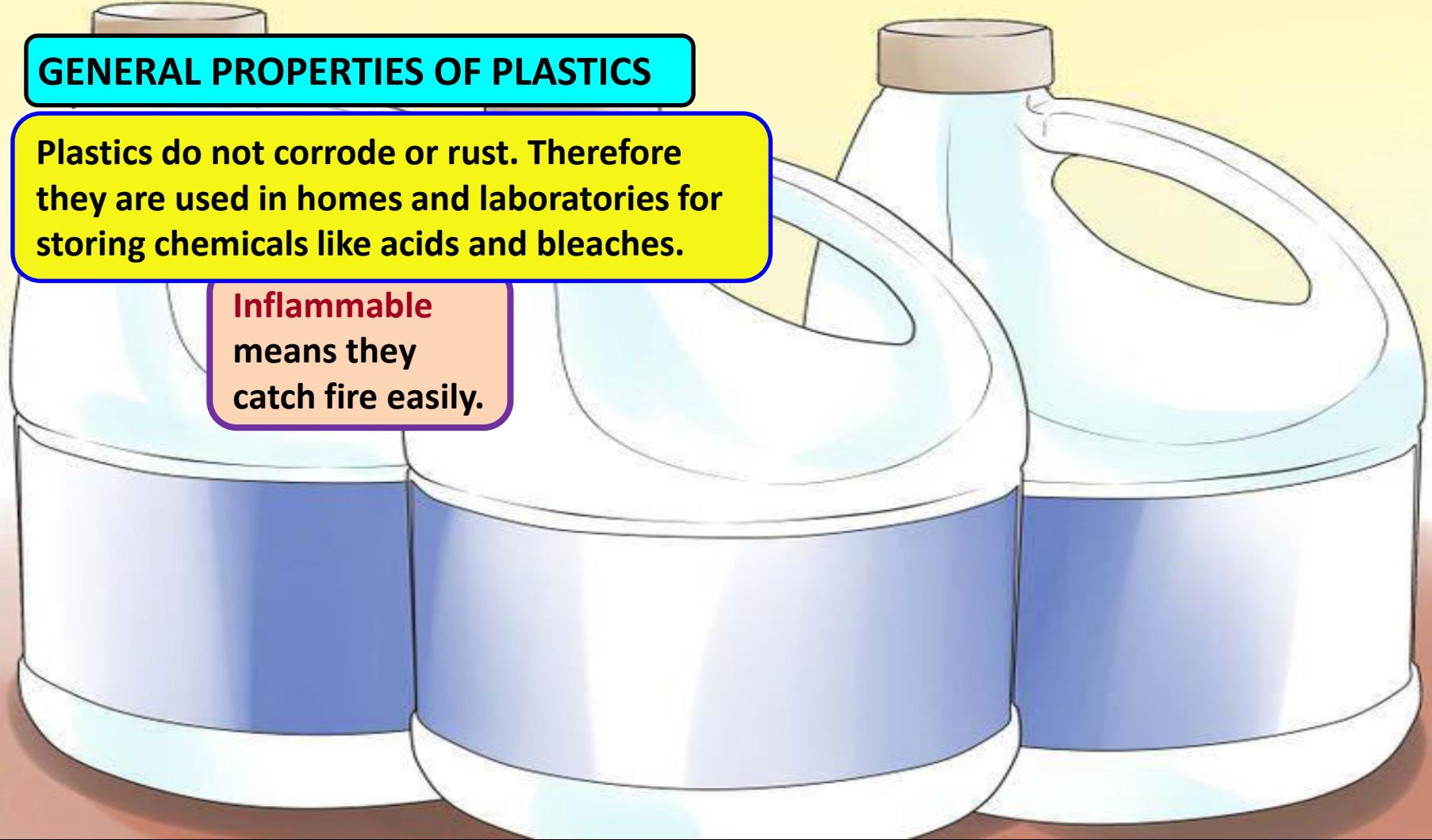
Plastics are insoluble in water. Therefore they are used for making bottles, buckets and other containers used for storing water.



GENERAL PROPERTIES OF PLASTICS

Plastics do not corrode or rust. Therefore they are used in homes and laboratories for storing chemicals like acids and bleaches.

Inflammable means they catch fire easily.



QUESTIONS

1. Give two characteristics of plastics.
2. Explain why plastic containers are used for storing chemicals like acids and bleaches.
3. Explain Thermal Conductivity of plastics



Synthetic Fibres and Plastics

- **Uses of plastics**
- **PET**
- **Plastics and the Environment**

USES OF PLASTICS

Teflon : C=CC=C (PS) : CC=CC=C (PVC) : CC=CC=CC=C (LDPE)

Molded into

used for making

uses.

Teflon is a special plastic on which oil and water do not stick. It is used for non-stick coating on cookwares.



POLY ETHER TETRAPHTHALATE (PET)

Uses of PET :

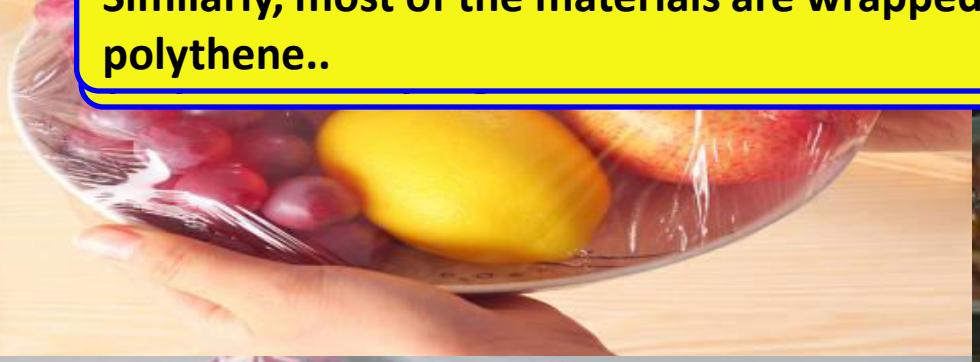
PET is used for making magnetic tapes used in audio and video cassette recorders.

PET bottles are commonly used in industry for selling all kinds of soft drinks, oils and other food articles.



PLASTICS AND THE ENVIRONMENT

Similarly, most of the materials are wrapped in polythene..



PLASTICS AND THE ENVIRONMENT

The disposal of the plastic garbage is a major problem all over the world.

It is because plastic has no practical use.



It is because plastic does not get decomposed by natural processes, such as action of bacteria.



PLASTICS AND THE ENVIRONMENT

Materials that do not decompose through natural processes and take a very long time to degrade are called non-biodegradable.

Parts of vegetables, fruits, left over food stuff, paper, etc., are examples of biodegradable materials.

QUESTIONS

1. What is PET ?
2. Explain why plastic containers are preferred for storing food.
3. State whether plastic is biodegradable or non-biodegradable. Give reasons for your answer.



Synthetic Fibres and Plastics

- **Damage caused by Plastic Waste**
- **Measures to control Plastic Waste**

DAMAGE CAUSED BY PLASTIC WASTE

Stray cows and other animals, in the process of eating the food waste, swallow materials like polythene bags and wrappers.



DAMAGE CAUSED BY PLASTIC WASTE

Plastics dumped in water bodies pose a threat to aquatic life as toxic substances present in them can cause reproductive failure in fish and other aquatic organisms.



This water forms muddy puddles on the surface. This also affects the plants growing in the area as they do not get enough water from the soil.



DAMAGE CAUSED BY PLASTIC WASTE

Biodegradable and non-biodegradable waste should be collected separately and disposed off separately.



MEASURES TO CONTROL THE PLASTIC WASTE

Make use of bags made of cotton or jute when you go out for shopping. This will reduce the use of plastic.

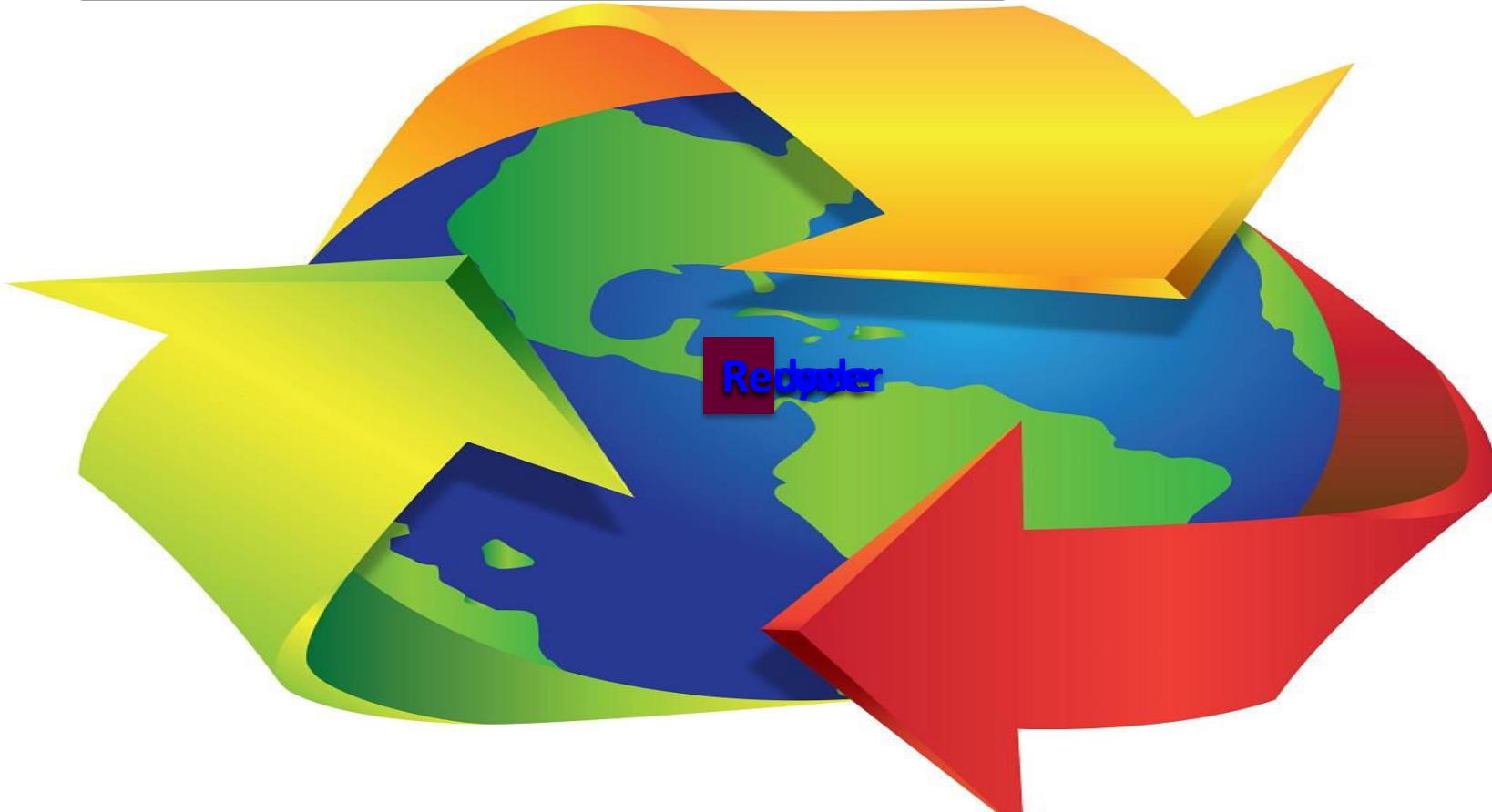


MEASURES TO CONTROL THE PLASTIC WASTE

As a responsible citizen remember the 4 R principle.



MEASURES TO CONTROL THE PLASTIC WASTE



QUESTIONS

- 1. What is meant by the 4R principle ?**
- 2. What are the various ways to save the environment from excessive plastic wastes ?**
- 3. Why are plastics considered a threat to our environment ?**



Thank You