Unit 3: **Plastics and Textiles** (3º ESO)

Plastics can be divided into two types, according to their origin:

- **Natural plastics** are obtained directly from _____ or _____ sources.

- **Synthetic plastics** are made with compounds that come from _____, _____ gas and _____ Most plastics that we use today are synthetic.

*Synthetic plastics are made of _____ and _____ compounds.

Polymerisation:

- During the manufacturing process, **fillers** may be added to _____ the cost of production and _____ certain properties of the raw materials. Some typical fillers include:

_____

_____

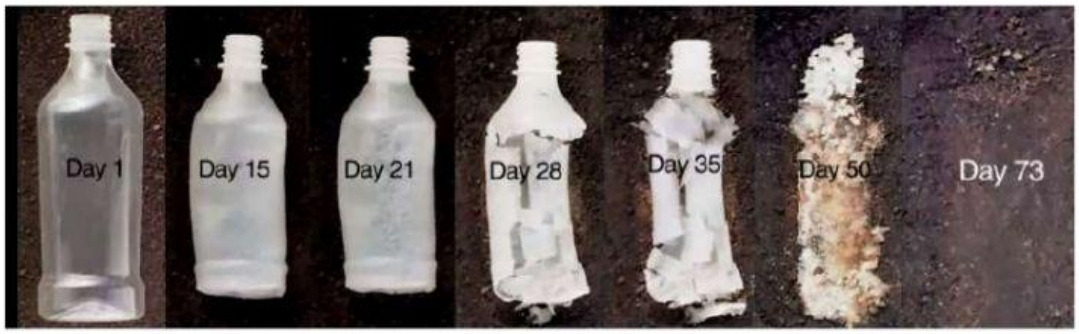
_____

_____

- Chemical **additives** can also be used, such as plasticizers which increase the _____ and _____ of the final product. _____ may also be added to give the plastic a certain colour.

Match the property to its description/definition:

Physically Resistant	Able to be hammered or pressed into shape without breaking or cracking.
Good insulator	Waste or materials can be processed and used again.
Ductile	Able to be deformed without losing toughness; pliable, not brittle.
Malleable	Not allowing fluid to pass through.
Impermeable	Does not readily allow the passage of heat or sound.
Recyclable	How strong the material is when force is applied.



Non-Biodegradable plastics are made from: _____.

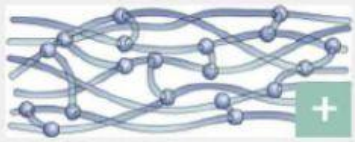
Biodegradable plastics are able to be broken down by _____.

What does "***broken down***" mean? _____

Thermoplastics are composed of polymer chains that are weakly-connected to each other.

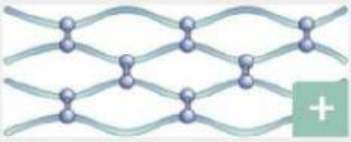
Thermoplastics can be _____ and _____ many times.

Thermosetting plastics are composed of polymer chains that are strongly-connected.



Thermosetting plastics can be _____ and they maintain their _____. This process can only be done __ time(s).

Elastomers are composed of polymer chains that are laterally connected. They can be folded or rolled into a ball, like string.

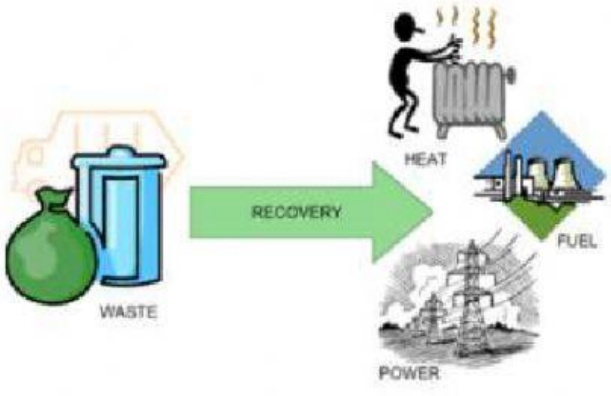


Elastomers have _____ and _____ properties. The production of elastomers is called _____ and this is when _____ is added to rubber that is heated at _____ºC

Many plastics are used for industrial purposes. These are classified into groups.

Thermoplastic materials			
Name	**Properties**	**Uses**	
Polyethylene terephthalate 	Impermeable Transparent Light	Name 1 use:	
High-density polyethylene 	Name 1 property:	Buckets, bottles, packaging for cleaning products, medicine bottles and toys.	

What is energy recovery? _____



Low-density polyethylene  	Soft and light Transparent	Name 1 use:	
Polypropylene  	Name 1 property:	Bottles, bottle caps, packaging for hygiene products and medicine, carpet fibres, bags, plates, cutlery, storage containers and garden products.	

What are bioplastics made of? (Select the correct options)


ceramic


Sugar cane


trees


straw


meat


Sugar beets


cornstarch

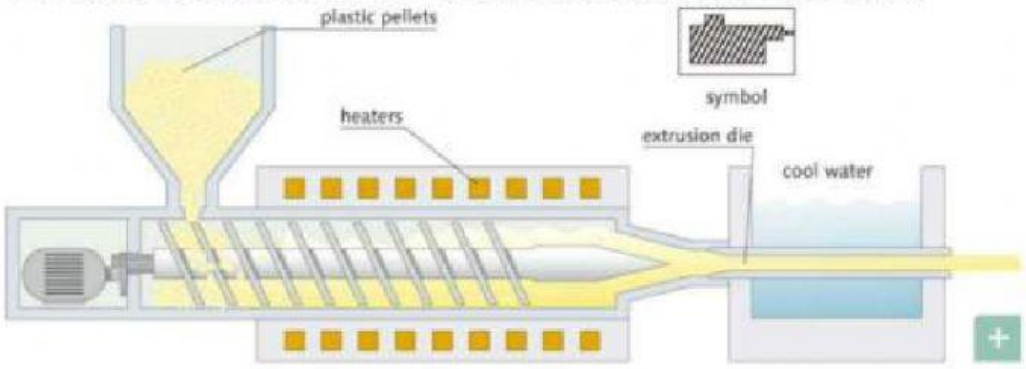

flour


sawdust

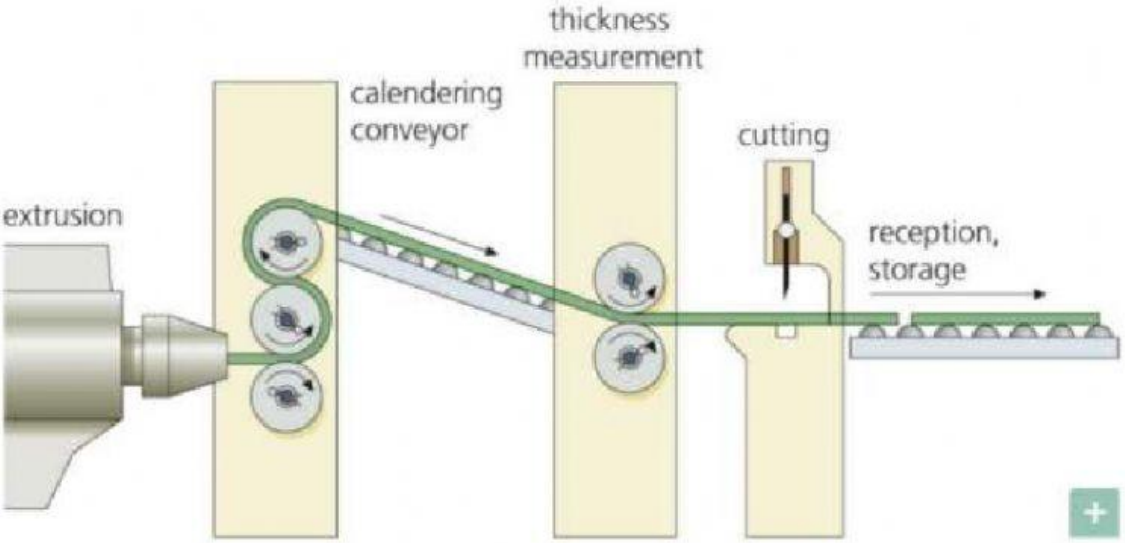
Polystyrene 	Moulded	Name 1 property:	CD cases, clothes hangers, cartons for eggs and dairy products, plates, cups and cutlery.	
	Expanded (Styrofoam)		Packaging, wrapping, thermal and acoustic insulation.	
Methacrylate 		Transparent Impact-resistant	Name 1 use:	

The extrusion process typically includes the following steps:

1 _____ material, usually in the form of _____ added to an extrusion machine. These go into a heated _____ where they melt and form a _____

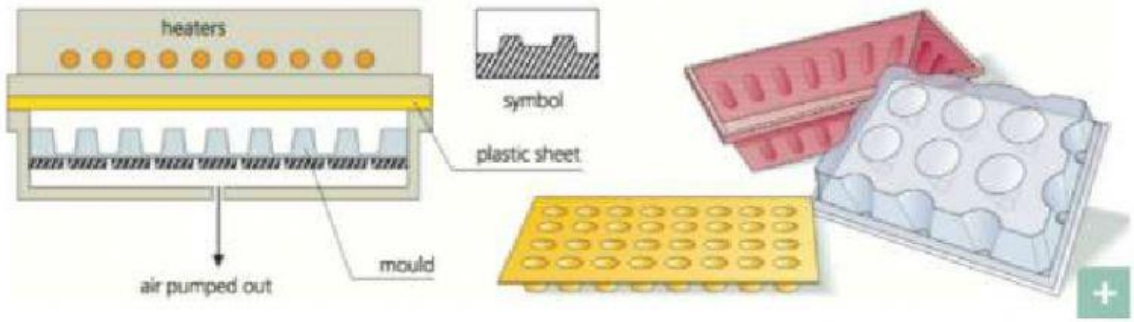


In the calendering process, [ ] material is passed between [ ] to make [ ]



The vacuum forming process involves the following steps:

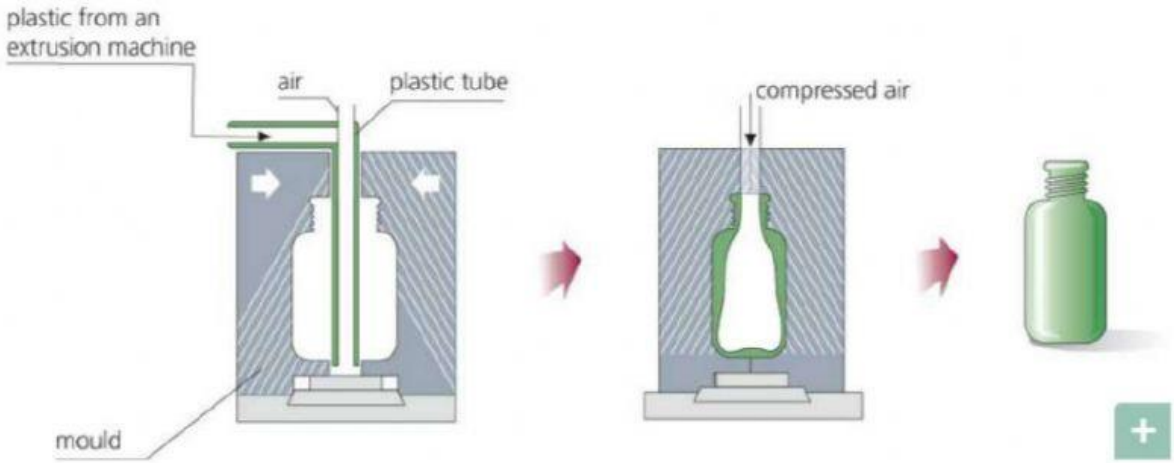
1. A sheet of [ ] material is placed over a [ ]
2. The [ ] of plastic is heated until it becomes soft.
3. The air under the sheet is sucked out to create a [ ]. This [ ] pulls the sheet onto the [ ] which gives it the desired shape.



Blow moulding

1 A tube of _____ material is produced by an extrusion machine. Then this tube is introduced into a _____ mould.

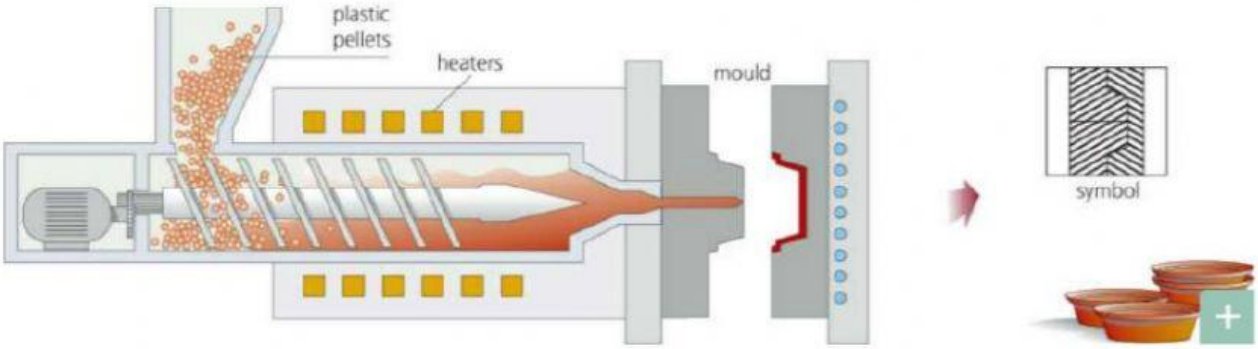
2 The mould is filled with compressed _____ which pushes the plastic against the sides of the mould. This gives the plastic the desired shape.



Injection moulding

1 Melted _____ material is introduced into a _____

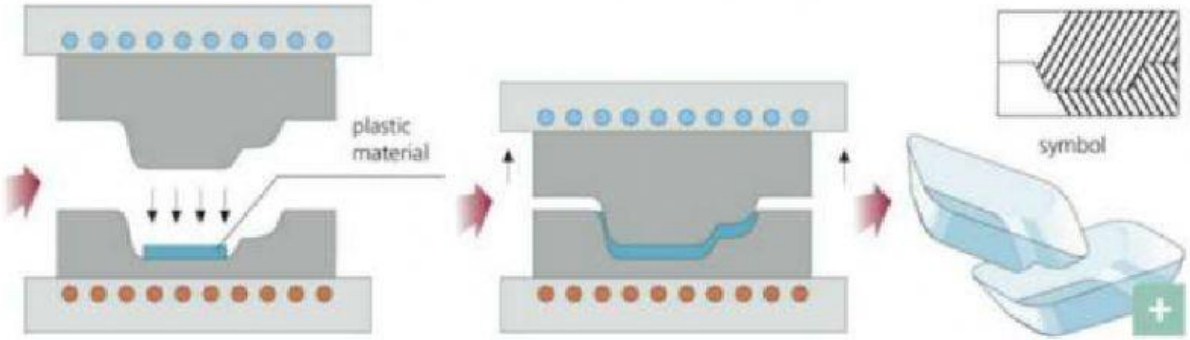
2 After the material _____ down and hardens, it is removed.



Compression moulding

Compression moulding is done with a machine called a [ ]. The main steps of compression moulding are as follows:

1. [ ] plastic materials, such as [ ] or powder, are introduced into a cavity [ ]
2. Heating elements soften the plastic while it is compressed by the other side.
3. The plastic is shaped by the [ ] on both sides.



What is an example of a **machine** used for **cutting**? _____

To **smooth down** rough surfaces we can _____ or _____ them.

Natural fibres from **animal**, **plant** or **mineral** sources:

- wool = [ ] (**animal**)
- silk = [ ] (**animal**)

- cotton = [ ] (**plant**)
- esparto = [ ] grass plants (**plant**)
- linen = [ ] (**plant**)
- bamboo = [ ] plants (**plant**)
- metallic fibres = from [ ], [ ] & [ ] (**mineral**)

Synthetic fibres include: _____, _____, _____& _____.