Co-funded by the
Erasmus+ Programme
of the European Union

RECOVERING CENTER WORKER

UNIT 1 – Making a preserving collection

This project has been funded with support from the European Commission.

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INTRODUCTION

It seems that to solve the problems of excessive consumption, depletion of land resources, pollution, massive deforestation, etc. we need political interventions, in a broad sense: laws, binding treaties that affect everyone and is respected by everyone.

But the small daily gesture of almost 7 billion people, educated by the fact that this problem is important and even more concrete: the desire to consume less resources to protect the earth, to use sustainable and be more respectful the use of goods; consider sustainability and renewable, rather than immediacy and disposable, accepting consume "responsibility" and buy goods produced next to home, easy to install and take down for reuse, eco-friendly and/or not consisting any hazardous chemicals. These decisions will have a great impact on the future of our blue planet.

WASTE

In this first part it is important to define the notion of waste.

Definition of waste. Waste means all objects, material or substances that the proprietor wishes to dispose of or is obliged to dispose of. The waste definition is common to the EU (EC Directive 2006/12 / EC on waste).

A material or an object becomes waste according to the point of view to which we refer: ecological (pollution and secondary matter), economic (negative or positive value), sociological (NIMBY35 and employment), legal (abandonment and exploitation).

Moreover, some definitions may be considered from the point of view of environmental impacts, in particular those on the ground (pollution at the level of arranged or organized deposits), on water (groundwater and surface pollution), on air (methane emissions) from discharges, dioxin emission from incinerators), on public health and land planning.

Waste is the mirror of consumption.

They come from:

- ✓ The manufacture
- ✓ Advertising, samples: posters, prospectuses
- ✓ Packaging waste: plastic bags, expanded polystyrene
- ✓ Waste, the consumable: batteries, cigarette packs, chewing gum
- ✓ The end of life: televisions, furniture, cars in demolition

LEGAL DEFINITIONS OF A REFUSAL

Rejection means "any material or object that detects the categories listed in the Annex to the walloon Decree of 27 June 1996 concerning waste".

Inert waste

Pursuant to article 2, 6th of the wallon decree of 27th June 1996 concerning waste36, inert waste is defined as: "waste that does not undergo any important physical, chemical or biological modification, not decomposing, not burning and producing no other physical or chemical reaction, not being biodegradable

and not deteriorating in other materials with which they come into contact, in a manner likely to contribute to environmental pollution or to harm human health ".

Domestic waste

"Waste from ordinary domestic activity and waste treated as such waste ...".

Producers responsibility waste

Packaging, tyres, cars that has a producers resonsibility to take care of when they are used.

WEE

Electronic waste as computers, mobiles...

Industrial waste

Waste by manufacurers and industries when producing products.

Hazardous waste
"Wastes that represent a specific danger for man or the environment ...".

Non-hazardous waste
"Waste that does not represent any specific danger to humans or the environment".

Dredging sludge and surface water cleaning
"The materials (except for exogenous materials such as bulky materials, wood, scrap metal and plastic) taken from the bed and from the banks of watercourses and water platforms or from their works annexed by the work of dredging and cleaning".

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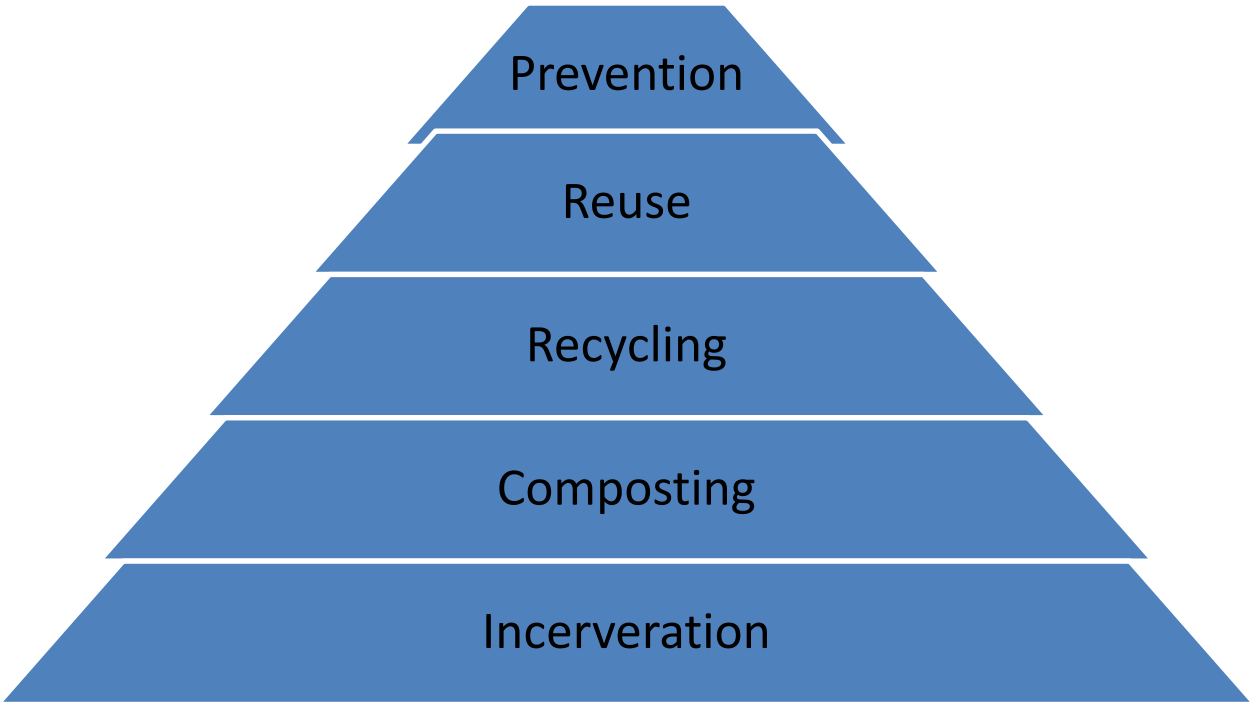
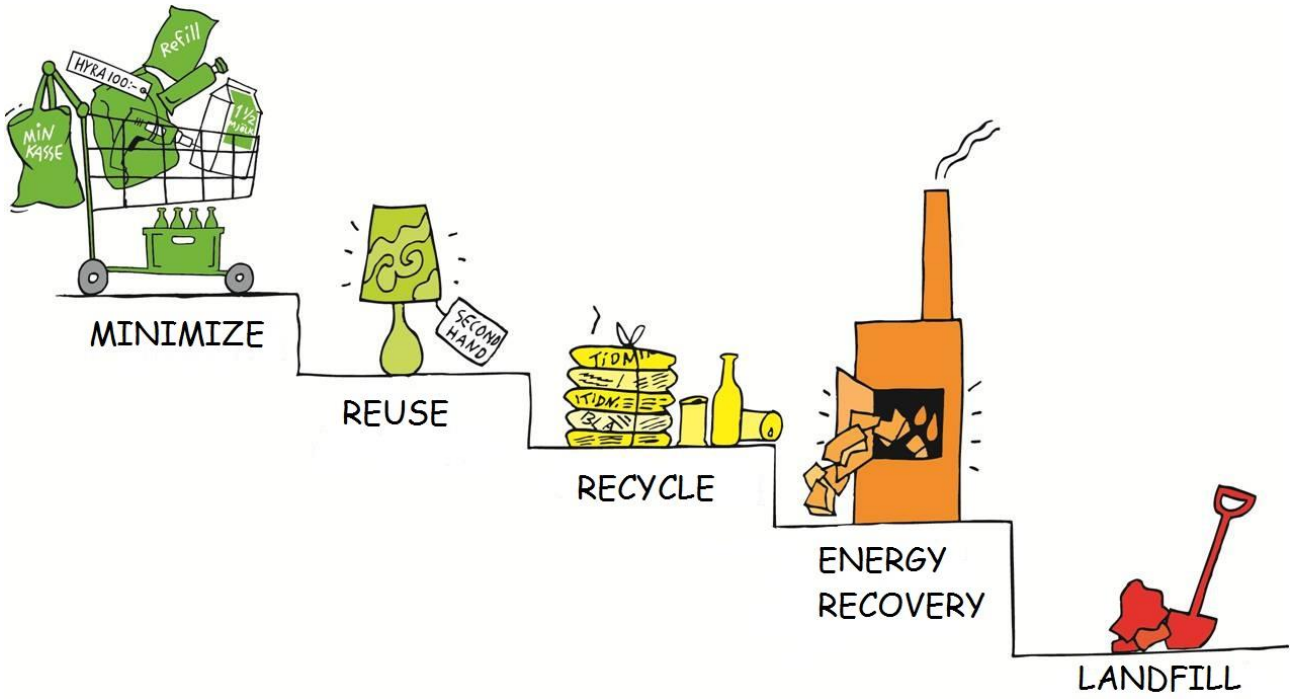




THE RECOMMENDED SOLUTIONS FOR WASTE TREATMENT

I. PREVENTION / WASTE REDUCTION

Consumer's possibility to buy less or buy products with quality. Reflection to bring to the source, when designing a new product.

II. VALORIZATION OF THE MATERIAL

• re-use: recover or repair a product or a material for use without modifying its shape or function.
• reuse (in the same form): use a recovered material for a different use from its first use and favor parallel distribution channels such as second-hand shops, exchanges, exchanges, the social economy sector, etc.
• recycling: turning the material into new products
• composting: composting is an advantageous technique from an environmental point of view (soil reduction, nutrients, fertilizers, energy gain for waste recovery or landfill) and financial.

III. INCINERATION OF WASTE WITH OR WITHOUT RECOVERY OF ENERGY

This technique is used for the management of domestic waste and is widely used by industries (incinerators and cement kilns). There are a huge difference between a) using the energy and heat b) burn the waste to "get rid of it"

IV. TECHNICAL DUMPING

Last "solution" for waste management, this technique is the last possible solution if the other options of the scale cannot be exploited.

PRINCIPLE OF 3 R-V

3RV-É Table in Brief Priority order	Definition	Examples or terms

1. Source reduction	Action to avoid generating residual materials during the manufacture, distribution and use of a product	Limit to consumption Choice of products with a minimum of packaging Purchase of durable goods
2. Reuse	Repeated use of a product or packaging, without significant change in appearance or properties	Attendance at "garage sales", thrift stores, etc. Propensity to repair rather than throw
3. Recycling	Use of residual material to replace virgin material as an input in an industrial process	The wood fiber (trees) can be used up to 7 times for the production of paper and cardboard Aluminum is infinitely recyclable
4. Valorisation	Transformation of a residual material by the enhancement of some of its properties	Use of used tires or wood residues as a source of energy production. Manufacture of compost from organic residues
5. Elimination	Ultimate tailings management mode, with or without energy recovery	Burial Incineration

1. REDUCTION
An action to bring back something to a simpler and more basic state. In the reduction we will understand all the strategies implemented to consume less. Priority is given to "products" or "behaviors" that are particularly harmful to the environment.

2. REUSE
The second life allows you to save production. In particular, the effect on gray energy of consumer goods is considerable.
A very important part of our consumption can come from re-use. More and more labels (electrorev, ...) exist to guarantee the reliability of second-hand or second-hand purchases.

3. RECYCLING
Recycling is a method of waste treatment (industrial waste or household waste) that allows the re-introduction of a product into the production cycle, materials that make up a similar product reach the end of life, or manufacturing residues.

4. VALORIZATION
The definition of the term is ambiguous. Used sometimes for energy recovery during deletion, sometimes for relooking (?!). We use it to designate functional or aesthetic transformations on cumbersome objects. Composting is the most accepted form of recovery.

Part 1. Measurement methodology

The **measurement** is the assignment of a range of values to a particular physical property called measuring. With term **measuring**, we do not refer to the object or phenomenon on which we are making a measurement, but to a specific quantity that characterizes the latter.

Each measure is thus defined as a range of values within which it is probably included. The width of this interval defines its **accuracy**: the larger the range, the less accuracy is associated with the measurement.

The development of metrology has led to the introduction of the concept of **measurement uncertainty**, which can be defined as the width of the range of values: the larger the interval, the greater the measurement uncertainty. At the interval we associate a numeric value identified with the average of the measures.
Therefore, in the metrological field, a **measure** is always defined with three components:
• numerical value;

• unit of measure of the size, or the scale of the property;

• uncertainty associated with the measure.

Units of measurement and physical quantities

Measure = compare the chosen unit of measure with the quantity to be measured and count how many times it is contained in the quantity.

Unit of measurement = a quantity of the same type as the one to be measured, whose value comes arbitrarily established equal to 1.

Physical quantities = quantities that can be measured (for example: length, area, volume).

Physical quantities	Unit of measure
Length	Meter (m), centimeter (cm), millimeter (mm), micrometer or micron □□m), decameter (dam), hectometer (hm), kilometer (km), yard ...
Time	Second (s), hour (h), minute ...
Mass	Gram (g), hectogram (hg), kilogram (kg), milligram (mg), microgram □□g), quintal, ton ...
Power	Newton (N), erg
Speed	Kilometers per hour (km / h), meters per second (m / s) ...
Density	Grams on cubic centimeters (g / cm3), kilograms on cubic meters (kg / m3) ...

There are seven **fundamental quantities**. For each of these there are more units of measurement, but there is a set of units of measure called the **International System**, the one most commonly used in physics.

Fundamental physical quantities of the international system

First name	*Unit of measure*	*Symbol*
Length	meter	m
Time	second	s
Mass	kilogram	kg
Temperature	kelvin	K
Quantity of substance	mass	mol
Intensity of electric current	Ampere	A
light intensity	Candle	Cd

Derivative quantities are defined through expressions that involve other physical quantities. For example:

- the area, which is a squared length,
- the volume, which is a cube length,
- density, which is the ratio between the mass of an object and its volume (d = M / V).

The units of measurement of the derived quantities listed above:

- unit of measurement of the area: square meters (m2),
- unit of measurement of volume: cubic meters (m3),
- unit of measurement of density: kg on cubic meters (kg / m3), or grams on cubic centimeters (g / cm3).

Measurement tools

The measuring instruments are those devices used to make a measurement, for example:

- the meter, used to measure the length,
- the scale, used to measure the mass,
- the thermometer, which is used to measure the temperature.

Characteristics of the measuring instruments:

- Sensitivity = The smallest value of the quantity that I can measure with the instrument.
- Flow rate = The greatest value of the quantity that I can measure with the instrument.
- Readiness = The time that the instrument takes to make the measurement.
- Accuracy = The relationship between sensitivity and flow (expressed as a percentage).

Methodological typologies

The **measurement method** is the set of theoretical and practical operations, expressed in general terms, which are used in the execution of a particular measurement.
To make a measurement you need two basic elements:

- a measurement system (instruments and equipment);
- a methodology suited to the task.

The methodologies must adapt to the various factors that constitute the problem of measurement:

- measured quantity;
- type of object to be measured;
- measurement principle;
- instrumentation available;
- required precision;
- control of contour parameters.

The main ones will be listed below, referring to what is defined in the VIM (International Metrology Vocabulary).

Direct method: the value of the object is obtained by directly reading the magnitude of interest, comparing it with another of the same species, chosen as a sample and representing the unit of measurement (for example: measurement of a length with a graduated ruler).

Indirect method: measurement is obtained by reading one or more quantities functionally linked to the value of the measurand, but not homogeneous to the magnitude of interest (for example: measurement of the pressure by measuring the height of a column of liquid).

Instrumental method: the value of the measurand is obtained directly from the measurement system that is applied to it. The value is read immediately on a scale, a dial or an indicator of the system itself. Comparison method: the measurand is compared simultaneously with an instrument that represents a known value magnitude (for example: measuring the mass of an object by means of an arm balance).

Method for substitution: the measurand is replaced with a quantity of the same nature of known value, chosen so that the effects on an indicator instrument are the same (for example: measuring a mass using a series of known masses as a measuring system and a dynamometer).

Differential method: the value of the measurand is determined by a comparison with a known quantity of value and not very different from the value of the measurand, of which the difference is measured with respect to the reference (for example: measurement of the height of an object using flat blocks and a comparator).

Zero method (zero reduction method): the value of the measurand is obtained when a balance has been reached in the measurement system by varying one or more known value quantities, connected to the measurand by a known ratio.

Method according to definition: the value of the measurand is obtained in accordance with the very definition of the unit of measurement of this quantity (for example: pressure measurement by means of pressure scales).

Measure of lengths

Length = distance between two points

As a unit of measurement of lengths, the **meter** (m) corresponding to the forty-one million part of the Earth's meridian has been defined.

In most of the world the **metric-decimal system** is used, characterized by the fact that the different units of measurement used for the various quantities are all multiples and submultiples.

Multiple and sub-multiple of the meter are:

- nm nm 10-9 m = 0.000000001 m
- micrometer or micron μm 10-6 m = 0.000001 m
- mm mm 10-3 m = 0.001 m
- centimeter 10-2 cm m = 0.01 m
- decimetre dm 10-1 m = 0.1 m
- meter m 1 m
- decameter dam 101 m = 10 m
- hectare hm 102 m = 100 m
- km km 103 m = 1000 m

To transform a measurement from one unit of measurement to another, an **equivalence** is made. The **proportions** are used to make equivalences.

Surface measurement

Area = measurement of a surface.
The area is a derived quantity, in fact its unit of measurement in the International System is given by the square meter (symbol **m2**).
A square meter is the area of a square of side 1 m.
If the linear dimension of an object doubles, since the area is a square length, its area becomes quadruple.
If the linear dimension of an object triples, the area becomes 32 = 9 times the area of the object of departure.

Multiple and sub-multiples of the square meter:
- Square millimeter mm2 10-6 m2 = 0.000001 m2
- Centimeter square cm2 10-4 m2 = 0.0001 m2
- Square decimeter dm2 10-2 m2 = 0.01 m2

Volume measurement

Volume = measure of the space occupied by a body.
Also the volume is a derived quantity, in fact its unit of measure in the International System is given by the cubic meter (symbol **m3**).
One cubic meter is the volume of a cube of 1 m side.
Multiple and sub-multiples of the cubic meter:

- Square millimeter mm3 10-9 m3 = 0.000000001 m3
- cm3 square centimeter (= cc, a lot used in recipes)
- 10-6 m3 = 0.000001 m3
- Square decimetre dm3 10-3 m3 = 0.001 m3
- Square meter m3 1 m3
- Damask square meter 103 m3 = 1000 m3
- Hectometer square meter hm3 106 m3 = 1000000 m3

- Square kilometer km3 109 m3 = 1000000000 m3

An important unit of volume measurement, widely used for liquids, is **liter**. 1 liter (symbol l) = volume contained in a cube of side 10 cm.

Relationship between density and mass

Mass is a physical quantity of material bodies, that is, their property, which determines their dynamic behavior when they are subject to the influence of external forces.

The ratio between a mass and the volume occupied by it is known as **density**. The term **specific volume** indicates the value obtainable by dividing the volume by mass. It can be defined as the reciprocal of the mass density, expressed according to the SI in kilograms on cubic meter (kg / m^3).

How to take measurements

Measure rectangular objects

Measure the longer side of the object from one edge to another using a ruler. This number corresponds to the length of the neck.
Detects width (the shorter side of the bottom or top face from one edge to the other).
Use the ruler to detect the size of the vertical side of the object, from the base to the top face; the number corresponds to the height.
Double height and width. Multiply both dimensions by 2. These calculations are of particular importance to find the perimeter of the base later. Add double values to each other. The total value corresponds to the perimeter of the base.
Calculate the combined value of length and perimeter. To know the overall dimensions of the package, add the length to the perimeter of the base.

Measure irregular objects

Measure the longest side of the object from one edge to another using a ruler and consider the result as the length.
Measure the widest portion of the object. Place it on a surface, so that the length is parallel to the table or floor; the dimension perpendicular to the length represents the width. Find the distance that is greater than the width; it may correspond to one of the outer edges, but it could also be in an intermediate point.
Identify the last dimension that you still have to measure and that should be perpendicular to the table or floor; this side corresponds to the height. Search for the highest point of the object and measure the distance between it and the base of the object; do not rest the ruler along the outside edge, unless this is also the maximum height.
Consider the irregular object as a rectangular one. To find the perimeter of the base or the total size, apply the same method described above.

Measure Volumetric Weight

Detects the height, width and height of the object from corner to corner. To calculate the volumetric weight no matter which side you consider as length, width or height; you just have to find the values exactly.
Calculate the volume. To do this, you must multiply the three dimensions together.
To obtain the volumetric weight for the metric system, divide the volume by 5000. The volumetric weight is only an estimate and not a precise calculation.

Part 2. Sub-elements of the property and modes of their reuse

We would like to familiarize ourselves with the different classes of R4, the ecological risks associated with it, their constitution in the sector and the possibilities of exploitation.

I. COLLECTION:

1. Collection at predestinated routes
    - Planning made by the planning responsible according to customers subscription

2. Collection on demand
    - ✓ Receiving a telephone call, mail or by webpage

    - reception,
    - acquisition of information,
    - first selection,
    - information.

- ✓ Preparation of collection tours
- ✓ Telephone confirmation of transit time
- ✓ Removal, recycling information, orientation according to nature.

II. SORT:

A. RECOGNITION AND PROPERTIES OF THE MATERIAL

1. WOOD
The wood comes from a living being: the tree. Like humans, it is made up of living cells that perform different functions such as growth, support, assimilation of food...
We classify them in 2 large groups:

- Resinose (pine, spruce, fir, ...)
- Hardwood (oak, walnut, poplar, ...)

The tree consists of three parts, the roots, the trunk, the branches.
The trunk is made up of several layers: the outer part constitutes the bark. The central cylinder which is formed from wood.
The bark is the protection of the tree, it is intended to protect the wood from external aggression. From inside to outside, the cortex is composed of the following anatomical structures:

- Change: it is the set of lining fabrics in the secondary structure and is originated from the activity of a secondary meristem, the fellogenous or suber-fellodermal exchange.
- Book: it is composed of cribrosi and cribroso cells, cellular structures responsible for the transport of descending lymph.
- Ritidoma: also called **rind**, the rhytidome is the outermost part of the cortex composed of the dead residues of the oldest external tissues left isolated each year from the formation of the new periderm.

Immediately below the bark is the *sapwood* - the younger woody part of the trunk of the trees. Like liber, this part brings the nascent sap from the roots to the leaves. The sapwood is a wood that is not yet fully formed (young, imperfect wood, has little strength and must be removed by the carpenter).
The *heartwood* is the internal woody part no longer vital to the trunk of the trees, it surrounds the marrow and extends to the sapwood. Most commonly called perfect wood. Represents the frame that has the role of keeping the tree. This part will be used by the carpenter.

The *marrow* is the central part of the tree, much darker. The marrow only serves the initial formation of the tree, it is important during the youth of the tree, it often disappears with age. It will also be eliminated by the carpenter.

The *growth rings* represent tree growth year after year.

2. METAL
Metals exist in the form of chemical combinations called minerals. The common characteristic of all metals is to be good conductors of heat and electricity. Metals (except mercury) are solid, ductile, malleable at room temperature. We classify them here in three categories:

- ✓ iron
- ✓ non-ferrous
- ✓ precious

Table. Ferrous metals

Name	Symbol	Colour	Specification	Mode of use
Iron	Fe	White-gray		Magnetic, subject to erosion of rust. The most common. Cheap. Used everywhere in the form of alloys: steel or cast iron. It must be protected against corrosion: paint, stainless alloy, galvanization.
Cast iron	FE + C	iron + carbon (over 2.1%) Not malleable, easy to break		radiators, bathtubs, drains
Steel		(exists in two forms: mild or temperate) iron + carbon (less than 2.1%)		Beams, buildings, bodywork, tools, bicycles, boats, bridges, cans, ...

Table. Non-ferrous metals

Metals not belonging to the iron group or to the family of iron or iron carbon alloys. Non-ferrous metals originate in combination with other metals, many alloys to improve the mechanical performance, workability, corrosion resistance and high temperatures of the base metal.

Name	Symbol	Colour	Specifications	Mode of use
Brass	Cu + Zn	Yellow gold	copper and zinc, of	Bathroom (faucets,

			gold color, it is susceptible to blows. Its price is quite high.	evacuations, bathtubs, shower hoses, bathroom furniture). Ornamental metal for furniture, trinkets (statues pipes ashtrays), Screws. Weight.
Bronze	Cu + Sn	Gray green	copper + tin, very old	
Aluminum	Al	White	From bauxite, which contains alumina (white powder). Lightweight, resistant, a good conductor, it does not rust, reflecting, non-magnetic, non-toxic and decorative.	wrapping paper, cans, aeronautics, power lines.
Chromium	Cr	Bluish-white	Hard, stainless (for coating)	
Lead	Pb	Bluish-gray	Very toxic, very dense and very soft. It used to be used for pipes. It was abandoned because of its toxicity. The is easyment fuse: circuit breaker. The mold easily: print. On the use of giving very beautiful glasses in "crystal"	Roof covering, old pipes, batteries
Zinc	Zn	White	Corrosion coating It is easily worked in plate and cuts itself well.	roofs, gutters ...
Copper	Cu	Red-brown	Low hardness, malleable, ductile, toxic conductor. Pretty expensive.	Plumbing pipes, electric wires, electric motors.
Nickel	Ni	Greyish white	Pour alliage	
Tin	Sn	White	More expensive than copper. Very malleable, for copper and steel alloy Easily fusible, it is used for welding or to protect the iron surface. very malleable, it is recognized by its reaction to the flame of a lighter: it melts.	plates, glasses, trophies
Stainless steel	Fe + C + Cr + Ni	Silver gray	iron + carbon +	Kitchens, thermos,

			chrome + nickel Available in different alloys: - magnetic stainless steel = Fe + C + Cr: more sensitive to corrosion, it has less value - Inox Food (18/10) = Fe + Cr + Ni (nickel): more resistant Marine Inox: Fe + C + Cr + Ni + Mo (molybdenum): (ex 316 stainless steel), nonmagnetic, it is worth three times more expensive than the previous ones.	pots, tables, washing machines (drums), dishwashers and metal sinks

Table. Precious metals

Name	Symbol	Colour	Specification	Mode of use
Gold	Au	Yellow	The most ductile and malleable of all metals by hammering or can get gold leaf (2/1000 mm) Almost unalterable and expensive. We make jewels. Microscopic electrical wires (microprocessors) and covers the electrical contacts (stainless and good conductivity electric).	
Yellow gold	Au + Cu + Ag	Yellow	Yellow gold	Jewelery, connectors
Silver	Ag	White	Very ductile and very malleable, better driver. It is mainly used in jewelery. He tarnishes in the air.	Jewelery, cutlery, coins
Platinum	Pt	White-gray	Quite hard, ductile and malleable, very very expensive.	Electronic cards & printed circuits (computers, hi-tech ...) Car catalysts Implants, dentistry, UHT crucibles, syringe needle, in

				ovens / fridge, cancer drugs, nuclear missile heads...

CORROSION AND OXIDATION. Corrosion is a process in which the metal is discolored and decomposed. The oxidation discolours the metal and forms a layer of oxide (rust).

METAL SURFACE TREATMENT. Surface treatment of metals allows:

- protect against oxidation and corrosion

- change the appearance and beautify their surface.

3. PLASTIC

Plastics are products made of or containing, as their main ingredient, an organic substance with a high molecular weight (a polymer). The word "plastic" derives from malleability or plasticity. Plastics cover a wide range of synthetic or artificial polymeric materials. Today it is possible to observe the same material properties that had never been combined, such as transparency and impact resistance. Typical structure has the following formula:

plastic material = raw polymer (base resin) + fillers + plasticizers + additives

There is a large number of plastics; some have great commercial success.

Plastics come in many forms: injection molded parts, tubes, films, fibers, fabrics, mastics, coatings, etc.

Recyclable plastic:

Simbolo	Cod.riciclo	Abbreviazione	Nome del polimero	Usi
01 PET	1	PETE o PET	Polietilene tereftalato o arnite	Riciclato per la produzione di fibre poliestere, fogli termoformati, cinghie, bottiglie per bevande. (vedi: Riciclaggio delle bottiglie in pet)
02 PE-HD	2	HDPE	Polietilene ad alta densità	Riciclato per la produzione di contenitori per liquidi, sacchetti, imballaggi, tubazioni agricole, basamenti a tazza, paracarri, elementi per campi sportivi e finto legno.
03 PVC	3	PVC o V	Cloruro di polivinile	Riciclato per tubazioni, recinzioni, e contenitori non alimentari.
04 PE-LD	4	LDPE	Polietilene a bassa densità	Riciclato per sacchetti, contenitori vari, dispensatori, bottiglie di lavaggio, tubi, e materiale plastico di laboratorio.
05 PP	5	PP	Polipropilene o Moplen	Riciclato per parti nell'industria automobilistica e per la produzione di fibre.
06 PS	6	PS	Polistirene o Polistirolo	Riciclato per molti usi, accessori da ufficio, vassoi per cucina, giocattoli, videocassette e relativi contenitori, pannelli isolanti in polistirolo espanso (es. Styrofoam).
07 O	7	ALTRI	Altre plastiche, tra le quali Polimetilmetacrilato, Policarbonato, Acido polilattico, Nylon e Fibra di vetro.	

4. TEXTILE

Nomenclature:

- ✓ Natural fibers
- ✓ Artificial fibers
- ✓ Synthetic fibers

B. WEIGHT

The materials are sold per tonne or per m³ (container unit volume), there are different evaluation techniques:

- Each of the elements is weighed one by one, precise but expensive and boring.
- The elements are estimated according to their nature and the number from an average observation: it depends on a statistic, less reliable but faster.
- The elements are evaluated according to their volume: an 8 m³ container is an average of 2.4 tonnes.

C. LABELING

Each resource has its own labeling policy, in most cases it is absent.
Labeling is performed at the entrance of goods in the processing chain and:

- allows you to evaluate the stock: I have too many kitchens and not enough bedrooms, ... and then, see the unsold, adjust pricing.
- Makes price policy consistent or even transparent.
- Allows you to track objects.

III. RECYCLING

Waste recycling refers to the set of strategies and methodologies aimed at recovering useful materials from waste in order to reuse them rather than dispose of them directly in landfills.

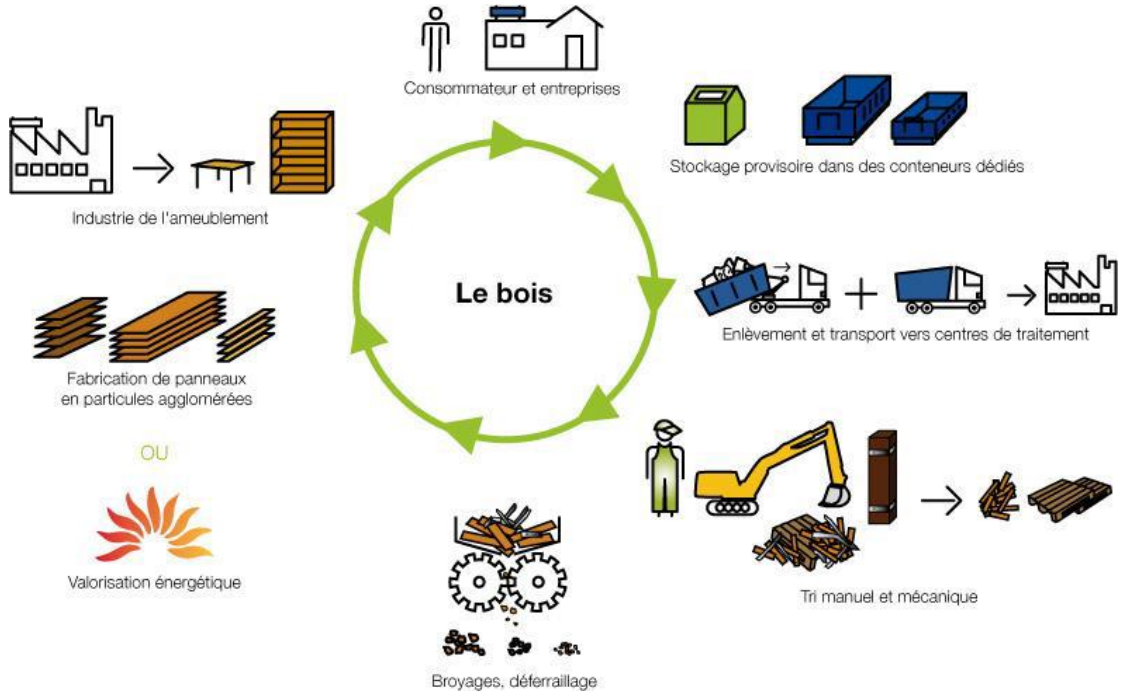
POSSIBILITY OF RECYCLING OF VARIOUS MATERIALS

1. Wood

Types of recyclable wood residues

	Materials	Size (shape)	Wood type	Contaminants
Industrial waste	Packaging	Varied	Mainly pine tree	Metal, Plastic, Textile fiber, Rubber
	Carpenter's residues	Wood chips	Pine, exotic wood	Glues and paints, Plastic, metal, dust
	Furniture industry Industria del mobile	Block of wood and scrap of panels Blocco di legno e rottami di pannelli	Exotic wood, panels, composite panels (wood + cement)	Glues and paints, Plastic, metal, dust

Residues of urban origin	Used furniture	Varied	Panels Exotic wood	Glues and paints, plastic, metal, silicon (sand or rock)
	Demolition wood and Miscellaneous construction	Varied	Exotic wood, panels composite panels (wood + cement)	Glues and paints, Plastic, Metal, Silicon
	Urban Arboriculture	Trunks with a diameter of more than 1.5 cm	Varied	Scorze, leaves, Metal, silicon



There are three families of wood to be recycled:

- Tree wood. All tree woods are not exploitable in traditional supply chains (paper pulp, crafts, furniture, composting ...). They can not be taken over by recycling chains (burial, incineration).
- Class A wood is a clean wood. Class A wood has a second path and saves natural resources. Example: the already used palettes can be recreated in other palettes or transformed into raw materials.
- Class B wood is loaded with chemicals (paint, solvent, paint) and can not be landfilled or incinerated. In fact, it is necessary to solve a production of polluting products for the environment. Approximately, the woods are very hand, chipboard, calibrated according to the desired use.

Tree and class A waste can be recycled into fuels, industrial wood, palettes, panels ...

For the third family of wood (class B), they are recycled, after rehabilitation, in panels of particular agglomerates, MD and others for the furniture industry. Class B Lego is easily adjuvant coming from the panels or in demolition.

2. Paper - Cardboard

Recycling conditions

Separate collection is the first stage of recycling. Then, the used paper "impegolata" is entrusted to professional retrievers who sort it and press it into bales, ready to use for paper factories. The recuperators provide the paper mills with the quantity and quality of paper used.

The fibers are integrated into every type of application. This concept is based on the progressive "downcycling" principle of wood fibers.

The greater the technical quality of a product, the greater the contribution of new fibers will be.
The higher the quality of the paper to be produced, the higher the quality of the paper used must be. Today we use paper and cardboard used as raw materials in the production of new newsprint (for 56%) and corrugated cardboard (for 86%) - European averages.

The card can not be recycled indefinitely. The very nature of the wood fiber strongly limits its use. Each treatment decreases the quality of the fibers. They are damaged and become shorter. Generally, the fibers can not be reused two to five times, depending on the type of paper to be produced. The ongoing supply of new fibers is therefore a necessity.

Recycling process

The card used for recycling goes through several phases:

- The fibers are first suspended in water. This gives a greyish paste (pulp). The latter is purified and free of all unwanted elements such as staples, lacquers, varnishes, glue deposits, pieces of plastic, ropes, etc.
- The production of certain types of paper (eg graphic and health cards) generally requires further processing: "de-inking".
- Often the cleansed mash is still bleached. Hydrogen peroxide is widely used as a bleaching agent.
- For some types of high quality paper, sometimes it is necessary to separate the long fibers (softwoods) from the short fibers (hardwoods).
- As the pulp is ready and suspended in water, the fibers are collected on a conveyor belt. This band is in fact a perpetual sieve in which water is sucked to retain only the fibers. The fiber net appears gradually and is subsequently pressed, dried and processed for finishing.

3. Plastic

The recycling of plastic materials avoids the high energy consumption compared to the production of primary plastics. The secondary raw material must be cheaper than the primary raw material. Recycling of plastics avoids landfill or incineration costs while saving primary raw materials. During recycling, plastic packaging is transformed into new products. Packages are sorted by family and are then merged or paid directly into another form. Sometimes plastic is first transformed into flakes or pellets.

WHY DOES THE PMC DO NOT INCLUDE ALL PLASTIC MATERIALS?

There are several reasons to limit the collection to plastic bottles and bottles:
- Bottles and flasks are only found in some important homogeneous flows; other plastic packaging consists of dozens of plastic types in small quantities.
- Small plastic containers are often dirty with product residues and their rinsing is not an ecologically correct solution given the contamination of the water that involves such an operation.
- The recycling processes for small plastic and film packaging are scarce, expensive and designed exclusively for very small quantities: their use is therefore not justified from an economic point of view.

PET (polyethylene terephthalate)

PET recyclable household waste consists mainly of bottled mineral water and soft drinks. The collected bottles are crushed, cleaned and transformed into very pure flakes. Depending on the finished product, a wide variety of conventional processing techniques are used (spinning, extrusion, calendering, injection, blow molding, etc.). PETs have many applications in the textile industry:
· padded coats (plush), sleeping bags ...
· dressed as hats, gloves, sweaters ...
· carpets.
There are other applications such as plastic fibers, vases, paper clips, bottles and flasks, packaging blister boxes ...

HDPE

After sorting, HDPE bottles are crushed, cleaned and processed into ready-to-use granules. The collection and sorting must be carried out very carefully, otherwise the HDPE loses all its properties of secondary raw material. The regenerated HDPE can be used for the same applications as the primary HDPE. The applications for recycled HDPE are:
- At home: baskets, chests, shelves, baskets ...
- In industry: pipes, cable ducts, windings, pallets, pipes, pipes ...

4. *Metal*

STEEL

From the memory of man, we have always recycled steel. The scrap business is also the oldest recycling network in the world. Discarded steel is a material that can still be re-used without any loss of quality. Nowadays, rough steel is still manufactured with over 40% of used metal. In this way, not only the raw materials (coal and iron ore) but also energy (-70%) are saved.
The steel sorting technique is based on one of the characteristics of the product: magnetism. Using large magnets positioned above the conveyor belt, the steel boxes of the PMC packages are insulated in the sorting center. The steel and the scrap are then transported out of the magnetic zone, by a belt that runs around the magnet and are located on a discharge chute.
In steel mills After the pre-treatment, the scrap metal lands in the steel factory in a loading tank that feeds the converter or the electric oven. The converter converts the fusion of steel blast furnaces, but an additional waste is needed for this process. The electric furnace melts a load of cast iron and scrap into a new steel (sometimes the load is made of 100% scrap metal). Thus, the steel is cast in the form of blocks or cylinders, depending on the final product desired (flat or long product).
After rolling, the blocks are turned into sheets, plated or not.

ALUMINUM

Aluminum packaging can be ordered economically using a "eddy current separator". To do this, we rely on the technique of current induced in metallic masses (patented by Thomas Alva Edison in 1889). This technique has been used profitably for only a decade. The eddy current separator detects all non-ferrous metals, such as aluminum, and separates them from the rest. The aluminum package falls into a separate container. Often, sorting is also done by hand.

After sorting, we reduce aluminum packaging and remove impurities. Then the packages are dissolved into ingots.
Recycled aluminum sockets from household packaging is a popular product. It is used to produce new packaging, but other sectors like construction and transport are in great need of recycled aluminum. This saves up to 95% of the energy needed to produce new products.

5. Carton of beverage boxes

The sorting of beverage cartons is done by hand or by technological means. The beverage cartons are equipped with a thin layer of aluminum and polyethylene, which allows them to be easily separated by mechanical means. A "parasitic current" orders them on the basis of the aluminum layer. An alternative technology is to detect the typical spectrum of light that is reflected through the polyethylene layer of beverage cartons. This operation is performed by an optical detector.
After sorting, the beverage cartons are packed into 500 kg bales, ready to be transported to recycling companies. These are paper mills in which the beverage cartons are turned into pulp, as in the case of old paper.
The beverage cartons are turned into pulp in a normal pulper. The pulper is optionally equipped with a special grid that separates the fibers of the polyethylene and aluminum fraction.
At present, this process is applied in about twenty paper mills in Europe, as well as in North America, Australia and Asia.
The pulper that is used to transform paste beverage cartons is a tank with a rotor that could be compared to a kitchen mixer or a rotating drum. Due to the presence of water in the pulper and rotary movements of the rotor or dissolution drum, the fibers begin to swell and detach from their polyethylene-aluminum foil. The loose fibers are then directed, with water, into a sieve or through the orifices of a second drum which is called a separation trombone. After that, they are purified and stored in a tank until they are used in the paper machine.

TREATMENT OF RESIDUAL FRACTION. The polyethylene and aluminum fractions are collected at the outlet and recovered. There are several possibilities. In several European countries, the residual fraction is transformed into grains that are used in a solid plastic for different products.
The cement factories use polyethylene (which has a high heat content) by incinerating in the ovens. Aluminum is used as a catalyst in cement production.

Very often, paper mills use waste substances as a source of energy to dry the pulp in paper machines. The aluminum oxide is then re-melted by the aluminum plants that make new products.

FINISHED PRODUCTS. The beverage carton pulp provides long, high quality fibers that will probably replace the much more expensive primary pulp. Depending on the plant, the pulp is used for the production of household paper, paper towels, industrial paper towels, cardboard, paper bags, egg cartons, envelopes and other forms of office paper, tissue paper, etc.

6. Glass

GLASS COLLECTION. The glass contained in the glass bubbles is collected by special trucks. The glass bubbles have a retractable bottom through which the glass can be poured into the truck. The trucks are suitable for different types of containers for white glass and colored glass. In the recycling company, the truck unloads its goods separately, on two deposits.

THE PURITY OF GLASS IS PRIMORDIAL. Cleaning and color purity are very important for glass recycling. White glass can not be mixed with other colored glass. Impurities like earthenware, stoneware, porcelain, iron, aluminum, plastic, opaque glass are hardly tolerated. Too high a concentration of these impurities

increases processing costs and can lead to manufacturing defects in the new blown glass. In the worst case, the ovens are damaged. In the recycling sector, most of the impurities are removed manually. Then the glass is crushed from 5 to 60 millimeters. Using magnetic "separators", ferrous metals are removed from the glass fragments. Non-ferrous metals are separated by "eddy current separators".

THE CONTRIBUTION OF TECHNOLOGY. In recent years, all plants that prepare glass for recycling have introduced automatic processes. These processes are based on "optoelectronic" systems that separate the glass chips according to their color and remove the sandstone and porcelain. The glass fragments pass through a light barrier that separates the transparent material (glass) from the opaque material (terracotta, gres and porcelain and, in some rare cases, metals and plastics). The glass fragments then fall on a conveyor belt, while the impurities are diffused by a wind tunnel. The chips then pass a second light barrier that separates, for example, the white glass from the green glass. The sorting is then carried out on the basis of the light spectrum. In our example, we finally get a small piece of green glass and a large part of white glass, purified glass. In glass, this glass melts again.

The new glass is generally obtained from a mixture of sand, sodium carbonate and lime heated at temperatures ranging from 1500 to 1600 ° C. The use of the glass used saves natural raw materials. It is also possible to reduce the amount of energy required by over 25% and the amount of soda used to lower the melting point by over 66%.

7. Specials: WEEE, TEXTILE, BATTERIES, OILS, MEDICINES, INERTS

WEEE:

WEEE is waste of electrical and electronic equipment. This term includes all objects or components that work electrically or electronically and are intended to be thrown away.

TEXTILE

The fabrics are processed by the social economy companies through voluntary donations to stores, door-to-door, through the textile bubbles, the gift of the citizen's clothing.

The collected clothes are then sorted. The "cream" (clean clothes, in good condition and up-to-date) can be sold in second-hand shops or delivered to needy people. This represents 5% of the collected tonnage. Damaged clothing can be recycled in cloths for the cleaning of the industry or new fabrics, after the unraveling (fiber recovery process), which represents 25% of the collected mass. However, the treatment of damaged clothing involves a cost of elimination for companies in the social economy. To achieve their social and environmental goals, it is therefore essential that clothes donated by the public are of good quality.

BATTERY

The batteries can be stored in collection points. These include supermarkets, but also private and public institutions and, of course, municipal containers.
Used and collected batteries and accumulators are sorted by category.
For each cell the dimensions, weight and magnetic field are measured and, with these data, the chemical composition is determined. Therefore, the batteries are ordered by chemical composition in the following flows: alkaline, zinc-carbon, primary lithium, rechargeable lithium, NiCd (nickel cadmium), NiMH (nickel metal hydride), lead-acid batteries, button cells.
Alkaline and zinc-carbon batteries are the most used. Each stream is recycled specifically and by a specialized alkaline recycler and zinc coal: they are recycled to recover metal, plastic, zinc and manganese. The recovered materials are reused as raw materials for: fuels (plastics) for cement factories, iron and steel industry, zinc particles for roofs, paint peppers, chemicals for the galvanizing industry, raw materials for road construction. Button cells: mercury is distilled and the metal is recovered. The metal is reused as a raw

material in the steel industry. NiCd and NiMH: cadmium and nickel are the main raw materials that are recovered. Cadmium is mainly reused for the production of new NiCd batteries. Nickel is used in the production of ferronickel. Lead-acid battery: the battery acid is separated into water and metal. The lead-acid battery is separated and re-used. Lead is accumulated and melted in bars used in the production of new lead-acid batteries. Rechargeable lithium: cobalt and nickel are recovered as pure raw material for the respective production of new lithium ion batteries, slag is used in construction or as a base material for concrete.

OIL
Used engine oils are hazardous waste. There are strict rules for their conservation, transport and processing.

DRUGS
Pharmacies carry out the collection and sorting of expired or unused medicines. The collection by the pharmacist guarantees that no one, no child, no elderly person will be put in contact with these products and that no accidental consumption will occur. Let's not forget that the drugs are not harmless, they are active products that can not be dispersed as in nature.

INERTI
Definition of inert waste: waste that does not undergo any significant physical, chemical or biological change. Inert waste does not decompose, does not burn or produce other physical or chemical reactions. They are not biodegradable and do not damage other materials they come into contact with, so as to cause environmental pollution or damage to human health.
Included in this category of demolition waste, such as broken brick masonry, cement waste, ceramics, tiles, stone, marble, earth, tiles etc.

IV. EVALUATION

For some packaging, recycling is not the cheapest or the most environmentally friendly solution. Recycling of these packages is sometimes impossible in the current state of the art.
In this case, another solution is to burn waste by recovering the energy produced. For example, waste combustion energy saves oil by producing, for example, electricity or steam used for heating.

We proceed in stages to examine, dismantle, repair, reassemble, paint, resell these objects.
The various techniques that will be implemented, for example - sanding, welding, bending, etc. will be examined in Module 2. In this chapter we mention only the first stage:

Visual examination of the object

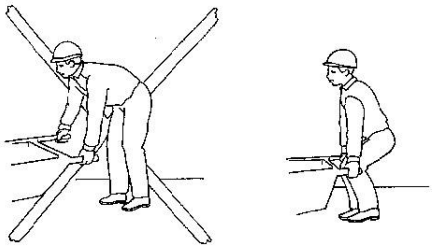
When an object is archived, a first visual examination should be done, to try to quickly determine whether it is worth taking care of, what the expected costs would be, if it can be sold profitably. For metal objects this examination can consist in the evaluation of:
• Fabric conditions (blow, tear, fold, take-off of walls, state of welds, ...).
• State of the painting (claws, deep traces, stairs, overlapping paintings, ...).
• Conditions of fasteners, rivets, welds, ...
• Corrosion problem (rust, oxidation).
• State of hinges, locks, bolts.
• Status of internal accessories (separation plates, etc.) and of any external (wheels, ...).

Part 3. SECURITY

The basic notions of ergonomics are used to avoid any sort of accident related to transport and maintenance of loads.

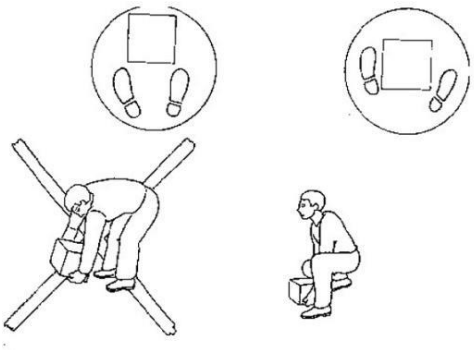
LIFTING AND CARRYING THE LOADS CORRECTLY

Lifting and transport of loads are physically strenuous actions that always entail risks of accidents and, in particular, injuries to the back and arms. To avoid this, it is important to estimate the weight of a load, the level at which the load is to be manipulated and the object's environment to be lifted. It is also necessary to know how to choose a safe working method and how to use the devices and the equipment that facilitates the work.



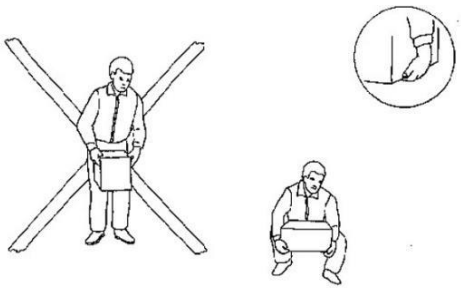
Position of the back and legs

Lift the object close to the body, also the muscles of the back, the ligaments stretch and the presser on the intervertebral discs increases.
Stretch the muscles of the stomach and back in such a way that the back remains in the same position during the whole time of the object's lifting.



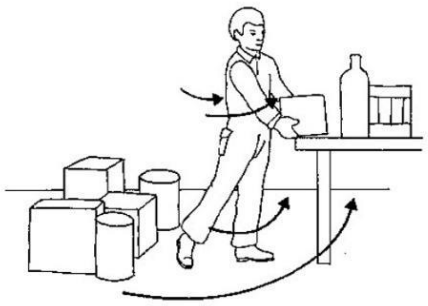
Position of the legs

Get close to the object. The closer we are to the object, the more surely we can lift it.
Keep your feet apart in order to maintain balance.



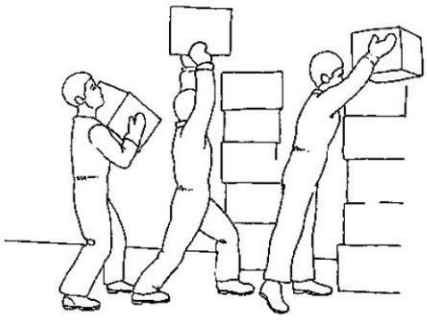
Position of the arms and grip

Try to hold the object firmly and with full hands, in a correct angle relative to the shoulders. It is not possible to grasp a load firmly from the fingertips. If possible, lift the load with two hands.



Lateral lifting of a weight

Lifting a weight while making a rotation of the body increases the risk of back injuries. Place the feet in running position, one foot slightly pointed in the direction of the object to be lifted. Lift the object and then move the weight of the body on the foot in a rotating way.



Raise a weight upward

You need to lift anything above shoulder level, place your feet in the running position. First lift the object up to the level of the chest. Then start pushing upwards by moving your feet and balancing the load slightly, and also shift the weight of the body on the front foot.
In case there are many people, the desirable level to lift an object is at the height of 70-80 cm. Lifting a load from the floor can be three times more tiring.

Raise an object with the help of other people

Those who often lift weights together should have more or less the same strength and should practice lifting weights together. Lifting movements must be done at the same time and at the same speed.

The maximum weights recommended by the International Labor Organization are:

Men: occasionally 55 kg, usually 35 kg
Women: occasionally 30 kg, usually 20 kg

Do not lift anything if you have a backache. When the pain is gone, start lifting carefully and progressively.

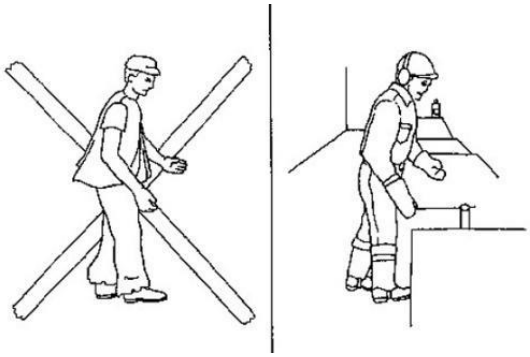
Transport

The transport of objects imposes the greatest tension on the back of the neck, the upper limbs, the heart and the circulation. Bring the objects close to the body. We must make a minimum effort to maintain balance by transporting the load. A round object is difficult to transport because the weight is removed from the body. Good handles facilitate work and increase safety. Divide the weight equally on the two arms.

Transportation is always tiring. Check if the object can be moved with the help of a transport belt, a wheeled loader or a cart. Make sure that the object to be transported is not too heavy for its strength, that there are adequate handles and that they are at a desirable distance, that there is room to lift and transport the object, that the floor is not slippery, that there are no obstacles on the way to go and that the light is sufficient. Unless they are well created, stairs, doors and ramps are dangerous.

Clothes

The clothes should regulate the temperature in the air and the heat generated by the body. The clothes should not be too wide, long or wide for safety reasons. The gloves must protect the hands and help to have a better grip. The shoes must be solid, they must not slip and have large soles.



The upper must be able to protect the foot in the event of an object falling. A helmet is essential for mechanical lifting and must be firmly attached so as not to fall at a critical moment and not obstruct the view. A wide belt that supports the back can be useful.

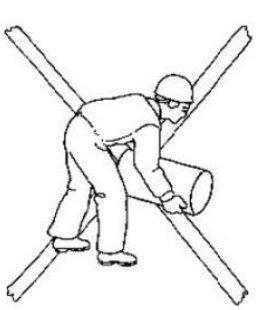
Accessory devices

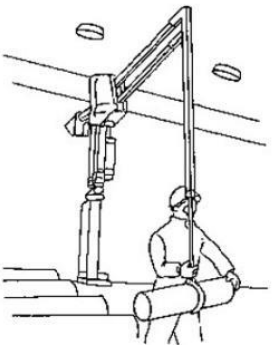
Devices used to facilitate work must be light and easy to reduce tension and accident risks. For example, magnets, calipers or eccentric or lifting boxes, suction cups, loading devices such that pitchforks and backpacks make it possible to grip loads and improve the working position.

La tomaia deve poter proteggere il piede in caso di caduta di un oggetto. Un casco è essenziale per il sollevamento meccanico e deve essere fermamente attaccato per non cadere in un momento critico e per non ostruire la vista. Una cintura larga che sostenga la schiena può essere utile.

Dispositivi accessori

I dispositivi utilizzati per facilitare il lavoro devono essere leggeri e facili in modo da ridurre la tensione e i rischi di incidente. Per esempio, i magneti, le pinze o i cassoni eccentrici o di sollevamento, le ventose, i dispositivi di carico tali che i forconi e gli zaini permettono di afferrare bene i carichi e migliorare la posizione di lavoro.





Wagons, rollers, rollers and conveyor belts, transport belts reduce transport work.

HAZARDOUS BEHAVIOR

You will be driven to work with electromechanical machines that are dangerous in case of poor handling. In a general way: equip yourself with necessary protections, make slow movements keeping a safety perimeter, check the status of your instruments, never let a car turn around if you do not use it, unplug it after use.
You must always provide you with EPI (Personal Protection Tools) necessary for the activity and the manipulation of the instrument you use. If in doubt, the technical manager is there to inform you.

IDENTIFICATION DES PICTOGRAMMES DE SÉCURITÉ

Prohibition panels

No smoking and producing flames

No smoking

Do not switch off with water

Do not touch

Prohibited to enter unauthorized persons

Prohibited to pedestrians

Prohibited to vehicles under maintenance

Non-drinking water

Rescue and rescue panels

Way out

Way out

Way out

Emergency telephone

First aid

Stretcher

Safety shower

Rinsing the eyes

Direction to follow

Direction to follow

Direction to follow

Direction to follow

Panels on fire fighting equipment or equipment

Fire launches

Fire extinguisher

Ladder

Telephone against the fire

Direction to follow (additional indication signal to the overlapping panels)

Direction to follow (additional indication signal to the overlapping panels)

Direction to follow (additional indication signal to the overlapping panels)

Direction to follow (additional indication signal to the overlapping panels)

Required panels for the port of EPI

Mandatory sight protection

Mandatory protection of the head

Mandatory respiratory protection

Mandatory body protection

Mandatory protection of the feet

Mandatory protection of hands

Mandatory face protection

Compulsory personal protection against falls

Mandatory passage for pedestrians

General obligation (accompanied by another panel)

Labeling of chemical products

Explosive

Extremely flammable

Easily flammable

Oxidant

Very toxic

Toxic

Harmful

Irritating

Corrosive

Dangerous for the environment

RISKS RELATED TO THE HANDLING OF HAZARDOUS PRODUCTS

Among the risks related to the handling of dangerous products we find:
- Fire / explosion risk
- The risk of burning
- The risk of protection
- The risk for the environment

1. FIRE / EXPLOSION RISK

Definition:

- **Fire** is an uncontrolled burning.
- **Explosion** is an extremely rapid combustion that causes a deflagration.

The conditions of a fire or explosion: the meeting of three factors causes these violent reactions.
These risks are related to the use of gas as a means of heating and the use of flammable or explosive products and oxidising products.
The suppression of only one of the three factors eliminates the risk. Thus the means of prevention are as follows:

- ✓ Do not mix an oxidizing product with a combustible product (or scrupulously observe the dosages and recommendations). Example: a solvent painting in contact with the air in a small badly ventilated room brings a danger of over-concentration, only a spark.
- ✓ Never store an oxidizer next to a fuel.
- ✓ Never bring these two products close to a flame or a switch.
- ✓ Handle these products in a room with good ventilation.
- ✓ Do not place flammable / explosive products near a heat source: oven, stove, radiator, sunny placement.
- ✓ Have a fireproof cover in the hall.
- ✓ Have a fire extinguisher adapted to the type of fire (and identified as such) and an alarm system.
- ✓ With regard to the use of gases: no gas reserves are possible inside a building. The arrival of gas must take place from the outside.

2. RISK OF CHEMICAL BURNS AND INTOXICATION

This risk involves the handling of corrosive products.

Thus direct contact with the skin generates a burn, or a more or less deep destruction of the skin. Here, the most serious are hands and feet.

The means of prevention:

- • Use gloves in lattex or nitrile.
- • Wear safety glasses and avoid wearing contact lenses, have an eye rinse.
- • Find a system that suppresses direct manipulation
- • Handle in a well ventilated room, wear a suitable mask.
- • Respect laboratory hygiene deliveries: do not eat, do not drink, do not smoke, do not use food containers to store products, wash your hands after handling.
- • Avoid all contact with skin and mucous membranes: gloves, safety glasses and gowns are mandatory.
- • Port of EPI (personal protection equipment)

3. PROJECTION RISK

The mixing of incompatible products are at the origin of the violent reactions such as a mixture of a strong acid and a strong concentrated base. Example: soda and hydrochloric acid or vinegar.

Thus certain products react strongly with water. It is the case of concentrated acids.
Make sure that the products are compatible with their mixing (read the labels well).

4. ENVIRONMENTAL RISKS

Environmental pollution is carried out in two ways: contamination (transfer of pollutants into water, air or soil) and bioaccumulation (pollutant assimilated by organisms such as fish and stored in their tissues).

The most important waste is the sewage of polluted liquids. These pollutants then contaminate river waters, groundwater and soils. These are organic solvents for paints, hydrocarbons, paint strippers and heavy metals.

Each pollutant product must be recovered, stored and recycled by a specialized company (the traceability of the waste must therefore be ensured).

THE MANAGEMENT OF ACCIDENTS

An accident is structured over 2 times:

To protect	*Alert the rescue*
Neutralize the cause Remove the individual in danger If there is loss of knowledge: lateral safety position If there is respiratory arrest: remove what may prevent breathing Only persons with a First Aid training certificate or a job rescuer license have the skills to do these manipulations.	Urgent call: - the number of the infirmary - help: 101 - fireman: 100 - European emergency call: 112 Message: - address, place - cause of the accident - number, state of persons and age Send someone before rescue.

Case of trauma:

- Do not move the victim
- The other actions are only done by trained and experienced rescuers

Thermal burn case:

- ✓ Switch off the flames
- ✓ Pass under cold water at least 5 minutes (more on medical advice).

Case of chemical burn:

- Skin: wash immediately and abundantly with water for 15 minutes.
- Eyes: immediately and abundantly flush eyes with water for 15 minutes.

Inhalation of toxic gases:

- Evacuate people around the polluted site
- Look for the individual with a mask and take it to a ventilated place.

Ingestion case:

- Do not vomit or drink the victim
- Indicate to the rescue service the substance (label and safety data sheet) ingested and the quantity.

THE TOXICITY MEASURE AND THE LIMIT VALUE OF TOXICITY

The limit value of a chemical compound represents its concentration in the air that can breathe a person in a given time without risk of alteration to health.

- VLE: Value Exposure limit

Limit value measured over a maximum duration of 15 minutes, compliance allows to avoid the risk of immediate or long-term toxic effects.

- VME: Average exposure limit value:

is estimated on the duration of an 8-hour work place, is intended to protect the worker from long-term toxic effects. It can be overcome by short periods provided it does not exceed the ELV.

REPORT PICTOGRAMS / TOXICITY / RISK FRY

Table. FIRE / EXPLOSION RISK

Classification	Pictogram	Risk phrase	Examples
Explosive		R 2 explosion hazard R3 great risk of explosion	TNT Salts of picric acid
Oxidant		R7 can cause a fire R8 promotes inflammation R9 can explode in combination	Organic peroxides Inorganic peroxides Some chlorates: sodium chlorate
Extremely flammable		R12 Extremely flammable	Ethyl ether Carbon sulphide
Easily flammable		R11 Highly flammable R15 Emission of extremely flammable gases in contact with water R17 spontaneously flammable with water	Neoprene glue Acetone Ethanol Xilenum (diluent and paint)

Flammable		R10 flammable	White spirit Wood paint Essence of terebentina

Table. RISK OF CHEMICAL AND IRRITATION BURNS

Classification	Pictogram	Sentence R	Example
Corrosive Tissue destruction		R35 causes severe burns R35 causes burns	Acids and bases Concentrates (hydrochloric acid, caustic soda) Bleach Ammonia
Irritating Inflammation Important of the skin		R38 irritating to the skin	Sulfamic acid Vinyl glue Xylopeno (insecticide for wood) Epoxidic resin
Irritating Important ocular lesions Serious eye damage Irritation of the respiratory system		R36 irritating to the eyes R41 risk of serious damage to eyes R37 irritating the respiratory tract	

Table. RISK OF INTOXICATION

Classification	Pictogram	Sentence R	Example
Very toxic		R 26 R 27 R 28 Very toxic by inhalation, skin contact, ingestion	Hydrogen sulfide Cyanide
Toxic		R 23 R 24 R 25 Toxic by inhalation, skin contact, ingestion	Mercury Formol

Harmful		R 20 R 21 R 22 Harmful by inhalation, skin contact, ingestion	Ethylene glycol (antigel) Xylene (paint thinner) Hydrocarbons (wood insecticide) Oxide (garden insecticide)

Tabele. RISK OF ALLERGY

Classification	Pictogram	Sentence R	Example
Harmful		R42 can develop inhalation sensitization	Frequent sensitization reaction by inhalation
Irritating		R43 can develop a sensitization for skin contact	Sensitization possible by skin contact

Tabele. RISK OF CONTRARY CANCER, MALFORMATION, STERILITY

Classification	Category	Pictogram	Sentence R	Example
Carcinogenic	1 2		Asbestos Benzene Milk vinyl	R45 can cause cancer R49 can cause cancer by inhalation
	3		Diesel fuel Antimonio Cloroform Nickel sulphate	R40 possibility of irreversible effects
Mutagen	1 2		Chronic acid Benzotyrene	R46 can cause genetic alterations

	3		Atrazine	R40 possibility of irreversible effects
	1 2		Carbon dioxide Predate compounds	R60 can alter fertility R61 risks of nefarious effects for the child at the time of pregnancy Toxic for reproduction
	3		Carbon sulfur Dipal derivatives	R62 possibility of alteration of fertility R63 possible risk of nefarious effects for the child during gravidana

Tabele. POLLUTION RISK

Classification	Program	Example	Sentence R
Substances dangerous for the aquatic environment		Aminotrazole (selective disinfectant)	R50 very toxic to aquatic organisms R51 toxic to aquatic organisms R53 can train long-term nefarious effects on the aquatic environment
Substances dangerous for the aquatic environment			R52 harmful to aquatic organisms
Substances dangerous for the non-aquatic environment		Essence of terebentina	R54 toxic for the flora, R55 toxic for fauna, R56 toxic to soil organisms, R57 toxic for bees, R58 can lead to long-term adverse effects on the environment

STORAGE

The goal is to optimize the organization of the storage of dangerous products. Here are not taken into account the storage of weak volumes, and not the important storages, in the tanks for example.

1. THE RISKS LINKED TO THE STORAGE
    - The risk of leaks and leaks related to falling, aging of packaging or following a shock
    - The risk of emanation
    - The risk of fire / explosion
    - The risk of decomposition

In the event of the fall of bottles or containers and therefore of unexpected mixture of products, it will be careful not to expose to gases or vapors resulting from a chemical reaction, since the odor is not a relevant index to assess the potential danger.

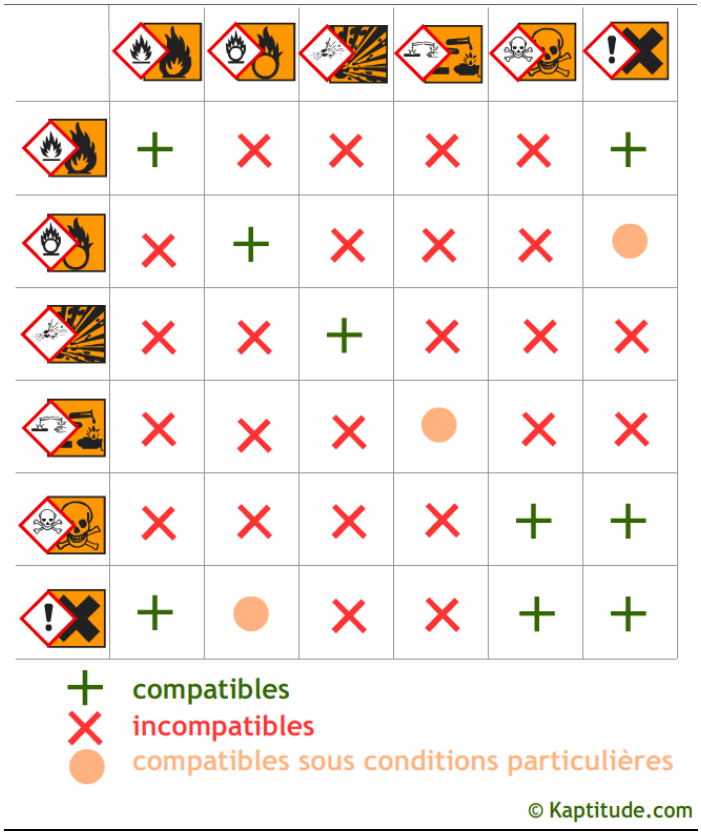
2. THE ORGANIZATION OF THE STORAGE

To organize the storage of chemical products it is necessary:

a) Identify the dangers of each product
b) Identify dangerous chemical reactions that could occur in the event of an accident
c) Organize the storage room

The rearrangement of the products must take into account their compatibility, their properties (fuel / combustor-acid / base ...):

Table of compatibility and incompatibility at the storage level (according to I.N.R.S.)


+ compatibles
× incompatibles
● compatibles sous conditions particulières
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Part 4. Quality control and management system of municipal waste

Waste regulations in EU

Definition of waste

According to the EU waste legislation definition of waste is:

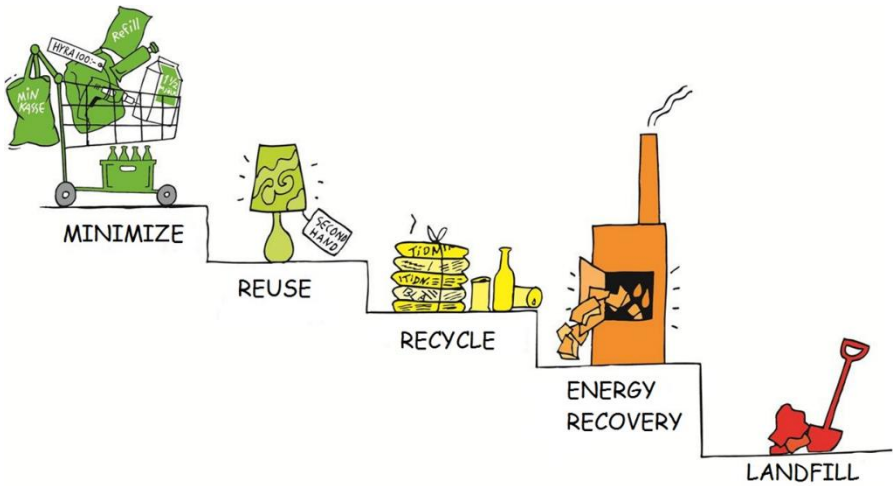
Waste means all objects, material or substances that the proprietor wishes to dispose of or is obliged to dispose of. The waste definition is common to the EU (EC Directive 2006/12 / EC on waste).

You can divide waste into different groups:

- Household waste
- Bulky waste from households
- Hazardous waste
- Producer´s responsible waste
- Industrial waste or operational waste
- Sewage waste
- Waste from mining

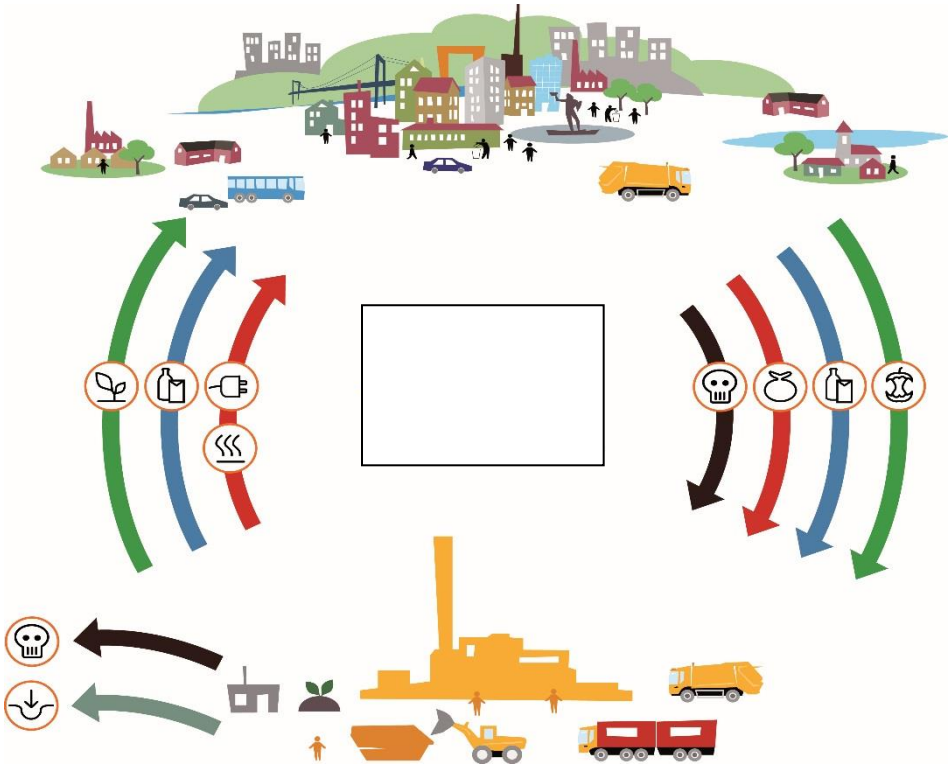
The waste hierarchy

The waste stair is showing how we will work with the waste today. All efforts must be made to climb higher up in the stairs and goal is to minimize the waste.



Both the consumers and the industry will work according to the hierarchy.

The durable circle



All material and subjects are suppose to be coming back in a recycling circle except hazardous waste that has to been taken care of and withdrawn from the durable circle.

European directives

Framework 2008/98/CE

In the Waste Framework establishes a legal framework for the management of waste within the European Union. The Directive aims to **protect the environment** and **public health** by preventing the adverse impacts of the generation and management of waste.

The waste volumes are constantly increasing within the European Union. The European Union therefore sharpens the measures that must be taken to prevent and reduce the environmental impact of the occurrence and handling of waste.

Recycling of waste and use of recycled materials is encouraged to preserve natural resources.

There are also **two basic principles** of waste management which the directive describes:

- By 2020 shall at least 50% of the municipal waste be prepared for re-use and material recycling. In this target, at least paper, metal, plastic and glass are included.
- By 2020, at least 70% of non-hazardous construction and demolition waste be prepared for re-use and material recycling.

Member States shall take all necessary measures designed to achieve the following targets:

Hazardous waste targets:

- Hazardous waste shall be stored and handled so that the environment and the human health is protected
- Hazardous waste shall not be mixed with other hazardous waste. It must be packaged and labeled in accordance with international standards.

The bio waste targets:

The framework provides no impetus for the separate collection of biowaste. Instead, each Member State shall take measures if necessary to:

- To encourage the separate collection of organic waste for composting and digestion
- Treat biowaste in a way that fulfills a high level of environmental protection.
- Using environmentally safe materials produced from biowaste.

The principle targets:

- The principle of self-sufficiency and proximity
- The principle that the producers of waste should pay for it. (Polluter-pays)

Member States may, where appropriate, cooperate to establish a network of facilities for the disposal of waste. The network will be designed so the European Union as a whole becomes self-sufficient in waste disposal. States must individually or in collaboration make sure they use good technical methods that contribute to a high security when it comes to the environment and public health. It shall also apply as a principle that the producers of waste should pay for it.

Ex: When the company produces/sells a refrigerator, shall they be responsible for the cost and management of the fridge when it becomes waste.

End of waste

Waste ceases to be waste when it has completed a recovery operation.

The landfill directive

The landfill directive has three main objectives

- Reduce greenhouse gases
- Prevent contamination of water and soil
- Reduce the amount of compostable waste to landfill

Incineration directive

Incineration Directive establishes strict requirements for purification to reduce emissions from the combustion of waste.

In all cases where it is possible shall the incinerator plant provide heat to the district heating network and electricity?

Collection and transport of waste

All European countries must have a National Waste Management Plan and all municipalities must have their own Waste Management Plan. The plan will have two parts:

1. A description part with regulations
2. A plan with objectives, activities and evaluation of the work.

Each member country should have a national waste plan. Member States shall ensure that their relevant agencies, establish one or more waste management plans that cover all of the relevant Member State's geographical territory. The purpose of the waste management plan is to reach the various targets of the Framework Directive.

A management plan shall include an analysis of the current waste management and measures to be taken to improve the preparation for reuse, material recycling, recycling and disposal of waste. A waste management plan shall also include an evaluation of how it will contribute to the implementation of the targets and provisions of the Framework Directive.

Each management plan shall have national targets consistent with EU targets.

All residents should have an organized system for collection of household waste. The municipality is not only responsible for collecting the waste, but also ensure that the waste is sorted and most preferably at the source. Namely ensure that households sort out things that can not be classified as combustible. Food waste and packages shall not end up in the household waste. The municipalities must arrange the collection, transport and treatment of household waste by themselves or together with other municipalities or contractors.

Build/create locations or other alternatives for the collection of electronic waste and other bulky waste which shall also should be informative for residents. Arrange collection of hazardous waste.
Property owners are required to pay a fee to the municipal for their waste management.

Companies who shall managing, transport or treat waste shall be registered and they shall self-declare what they do and their skills. The companies are responsible for measuring the waste, register and have control over the collection and where the waste is transported. Special transport rules are required for hazardous waste. For more information see(EG 1013/2006).

The companies (both transportation companies and companies dealing with waste treatment) and the municipalities are required to inform the National agencies about the volume and weight of waste collected and treated.