TEACHING MATERIALS school year 2024/25

EcoGive

DARE PER SALVAGUARDARE





Piano nazionale del Ministero dell'Istruzione per la transizione ecologica e culturale delle scuole

SAPIENZA UNIVERSITÀ DI ROMA, DIPARTIMENTO DI SCIENZE DELLA TERRA

COMUNE DI ROMA ASSESSORATO ALL'AGRICOLTURA, AMBIENTE E CICLO DEI RIFIUTI, MUNICIPIO ROMA II

COMUNE DI PRIVERNO

AGENZIA SPAZIALE ITALIANA

MINISTERO DELL'AMBIENTE E DELLE RISORSE NATURALI, REPUBBLICA DOMENICANA

ALLEANZA ITALIANA PER LO SVILUPPO SOSTENIBILE ASVIS

EARTHDAY ITALIA

UNITED WORLD PROJECT, DARE TO CARE

AMU AZIONE PER UN MONDO UNITO-ONLUS

FONDAZIONE "LEVE-TOI ET MARCHE", BENIN

ACTION CONTRE LA PAUCTRETÉ DU NORD-EST (PACNE), HAITI

























Patto di risparmio energetico

Elena Pace

Schede didattiche

Anna Brunello, Alessandra Castelli, Andrea Conte, Vincenza Maria Duca, Orietta Franca Mecchia, Elena Pace, Manuela Tirocchi.

Atti di risparmio energetico

Elena Pace Andrea Conte

ENERGY SAVING PACT TABLE FOR COUNTING ACTS

(primary school children)

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- 1	w	•	_	м		_	12

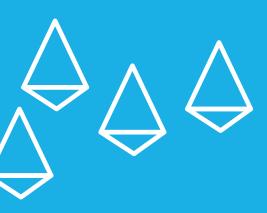
1	I did not let the water run unnecessarily	
_	(e.g. while brushing my teeth or washing my hands or hair) I used the toilet flush with more or less water as needed	
2		
3	I decreased the shower time	
4	I installed the baffle on the taps	
5	I reused the water from washing vegetables for watering	
6	I repaired water leaks immediately (e.g. dripping tap)	
7	I washed vegetables in a container to reuse the water for plants or the toilet	
8	I did the washing machine/dishwasher with a full load	
9	I defrosted food in the air or in a bowl and not under	
_	running water	
10	I reused the water removed from the fish tank to water the plants	
11	I turned off the central water tap before going on a trip	
12	I turned off the tap of a public fountain	
13	I put a basin under the sink to collect and reuse the	
	water that flows when washing or washing something	
14	I planted a tree	
15	I collected rainwater in cisterns for domestic use	
LI	GHT	
1	I switched off the light on leaving a room	
2	I switched off stand-by	
3	I switched off my mobile phone when I don't need it (e.g. during lessons), avoiding battery consumption	
	I used the stairs instead of taking the lift	
4_		
5	l avoided printing	
6	I raised the shutters during the day instead of switching on the light	
7_	I changed a light bulb to an LED one	
8	I dried my hair well with a towel before using the hairdryer	
9	I decreased the time I used the conditioner in summer	
10	I did not use the tumble dryer for the clothes but hung them out carefully	
11	I used the dishwasher with a full load	
12	I used the fan instead of the air conditioner	
13	I used my bicycle or walked instead of the car	
	, ,	
14	I used public transport instead of the car	

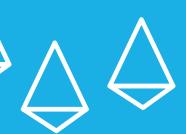
GAS I agreed with my companions to travel together 2 I tried to maintain heat insulation by avoiding draughts I closed the window because the radiator or stove is on 3 I wore an extra pullover to avoid raising the temperature of the heater I lowered the temperature of the heater or the stove (winter) I put a reflective panel (also tin foil) between the wall and the radiator I checked and, if necessary, replaced the window frames I improved the insulation with furniture (curtains, carpets, wooden panels) I had the walls of the house in contact with the outside done with thermal insulation 10 I used the lid and the cooker fire to a minimum 11 I turned off unnecessarily lit cookers 12 I used local food products 13 I recovered animal droppings for gas production 14 I learnt techniques to produce and store gas RECYCLING AND REUSE I increased the life of things by taking care of them or repairing them (give an example: mobile phone, backpack, pencil case, books) I shared the extra things I have (pen, pencil, etc.) I have separated paper, plastic, dry and wet waste before disposing of the waste I donated the extra clothes to charity I transformed an item of clothing into something new I used washable cotton pads or a simple cloth with soap to remove my make-up I reused a jar of jam, cucumber, olives, etc. as a container I used a simple mocha or coffee machine to make my coffee to avoid disposable pods I used a cloth napkin instead of disposable napkins 10 I preferred a bulk product without packaging 11 I used glass, metal or BPA-free plastic food containers, which can be easily washed and reused 12 I used the water bottle by filling it with tap water (if it is drinkable) 13 I bought my tickets online or through their app 14 I brought along a jute, cloth or other reusable bag (avoiding the use of disposable bags) 15 I recovered waste to make art objects **FOOD WASTE** I did not leave snacks in my rucksack that I would not consume later, perhaps crumbled up 2 I consumed food that was about to expire first I did not ask for larger portions than I could consume

When cooking, I paid attention to quantities

5	To avoid the 'flour moth', I stored these products in rigid glass containers and kept the larder clean	
6	I froze fresh produce, bread and leftovers already portioned, as I had no chance of eating them before they went bad	
7	I donated excess produce that I already knew I would not be able to consume in time	
8	I favoured buying seasonal fruit and vegetables directly from the producer	
9	At restaurants, I asked for leftover food to be placed in a container or bag	
10	I collected leftover meals for reuse	
11	I used edible kitchen waste for animal feed	
12	I made tomato preserves or fruit juices at peak production time to avoid waste	
13	I took care of an organic garden to produce healthy fruit and vegetables	
14	I have collaborated in the creation of nurseries for fruit plants	
15	I preferred to use organically grown food	

WATER





Let me introduce myself: I am water, liquid at room temperature (20°C) and my chemical formula is H2O because I am made up of two atoms of hydrogen and one of oxygen.

I am a special molecule, modesty aside, because I participate in vital processes such as chlorophyll photosynthesis, which together with carbon dioxide makes me produce glucose, which feeds plants, and oxygen, which is essential for the existence of living species.

I am the only substance found in nature in all three states of aggregation, solid, liquid and gaseous. The hydrosphere, i.e. all the water and ice on earth, is constantly recycling my molecules. It is the so-called 'water cycle' that continuously transforms me from solid to liquid to vapor while keeping my total quantity constant, and this has been the case since the beginning of the existence of planet Earth.

My shape is angular and I possess a charge separation that, despite being a single neutral molecule, makes me polarised with a positive pole on the hydrogen side and a negative pole on the oxygen side, two atoms capable of forming bridges between very strong molecules through hydrogen bonds.

Thanks to these characteristics, I am able to relate to other water molecules by forming strong bonds that make many things possible, first of all my existence in the liquid state and my ability to dissolve many substances, so much so that I am called the 'universal solvent'.

Another consequence is my high specific heat, i.e. my ability to trap heat, which among other things prevents the sea from overheating to the point of impeding the life of fish and makes for a milder climate.

People talk about the beauty of water drops or dew drops without knowing that a drop is the result of another characteristic of mine, my high surface tension due to the cohesive force between my surface molecules.

When I enter into relation with those who are different from me, that is, with other materials, I can also move upwards, making the force of adhesion to another material prevail over the force of cohesion between my molecules, overcoming the force of gravity. In this way, through capillarity, I help the plants to get water from the soil and to push the sap up the stem.

When I pass through interconnected containers, the so-called communicating vessels, I treat them all in the same way, because even if they are of different shapes and volumes, I reach the same level in all of them. On earth I make up the hydrosphere, with 97% salt water and 3% fresh water, of which only a small part is accessible to living beings, making me a precious and rare resource. I was born to be a gift to everyone and everyone must have access to me because I am an essential, fundamental and universal human right as people can live thanks to me.

If I am scarce, the cost of food and various products that use me will increase, and because of my unavailability, conflicts between nations will increase. Do not waste me, even a drop has great value.

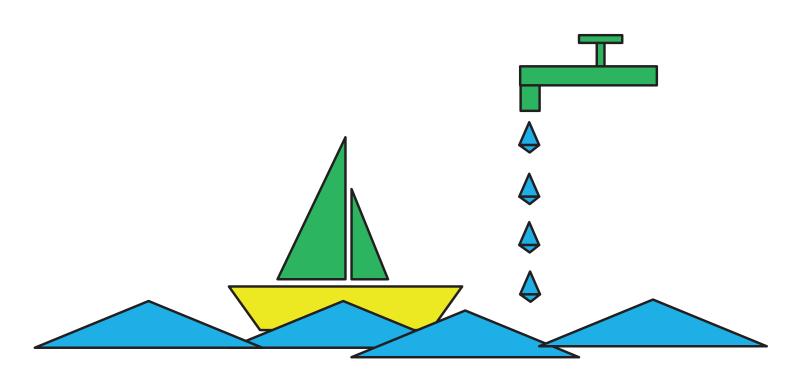
HOW TO EVALUATE WATER SAVINGS

The water bill usually shows the average annual consumption. For example, if 255 cubic metres (m₃) of water are consumed on average in one year, the average consumption in one day is 255 m₃: 365 days = 0.7 m₃/day.

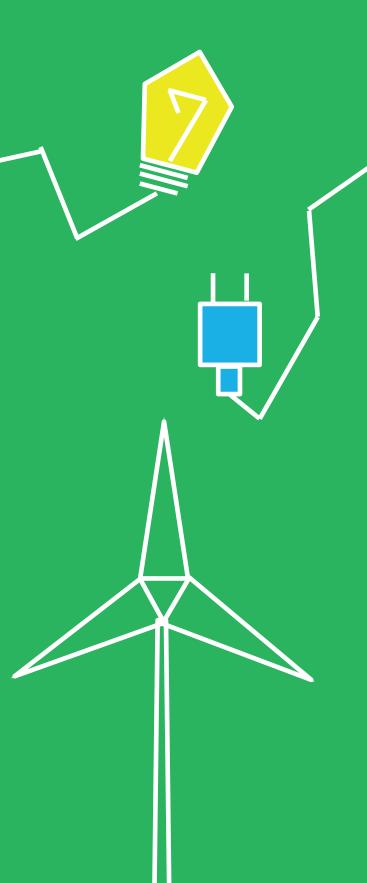
In order to evaluate the savings, the numerical value of the meter can be noted down before starting the schedule of the Energy Saving Pact and immediately after finishing it.

The difference between the two values will correspond to the consumption for the days in which the energy saving actions needed to complete the schedule were undertaken.

The ratio between this value and the days will correspond to mc/day. This value, in order to be successful in saving, should be less than 0.7 mc/day, if there has been no consumption of water other than usual.



ELECTRICAL ENERGY



You know the lightning bolt? Well that's always me moving fast through the air.

But I like running on metals much better. It's on the shiny surface of metal that I really do my best. I don't go fast, in fact I travel over metals at speeds of a few centimetres per second, but my energy is unstoppable. I can burn through anything I cross in my path.

I also love water so much, especially when it is salty, because I find other friends called sodium and chlorine ions that travel with me.

Thanks to my energy I am extremely useful: I make the television work, I turn on the light bulbs, the washing machine, the hairdryer, the refrigerator and much more and for this I have been called the revolution of the 20th century.

Let me introduce myself, I am electrical energy but my friends call me electricity. In reality, I am not just one thing, but I am made up of lots of microscopic particles that are all the same, and aare called electrons. Without electrons, I would not exist at all. A single electron is very weak because it is extremely small, so small that it is invisible to people's eyes. But when they are all together I become a force of nature.

In houses I always arrive as alternating current, in other words my electrons oscillate back and forth continuously 50 times every second. In this form I am easier to generate and can travel many kilometres.

I arrive in power stations thanks to an alternator, a rotating instrument that converts mechanical energy into electrical energy by forming magnetic fields.

Anything that moves can be converted into electrical energy: the wind, the waves of the sea, the course of a river, a waterfall. However, most power plants use coal, which is burnt to heat water, and the resulting steam is used to turn the alternator. This is not a clean and wise way of generating: too much pollution is produced and it increases the greenhouse effect, which inexorably damages the whole planet.

Did you know that even the sun's rays can produce electricity in a clean way? Yes, through a system called the photoelectric effect inside a photovoltaic panel, but I'll tell you that story another time.

Sooner or later, power stations using renewable resources will take the place of coal-fired ones, but in the meantime, in this period of energy transition, it is necessary to prevent me from being wasted. Use me only when you just can't help yourself.

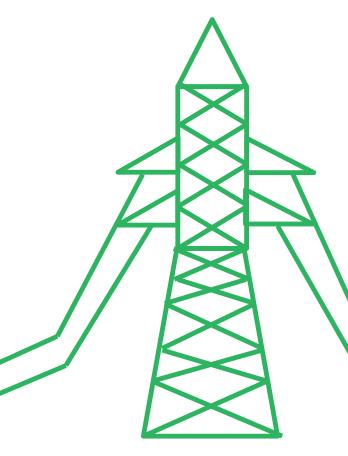
HOW TO EVALUATE ELECTRICITY SAVINGS

The electricity bill usually shows the annual and monthly consumption.

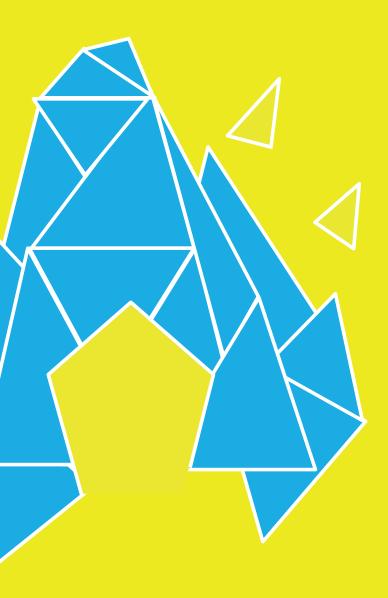
You will notice that consumption increases as you move from the summer months with more light to the winter months with shorter days. This is because electricity usage plays a large part in the bill.

For example, in the bill below, consumption in July was 115 kwh.

In order to evaluate the savings, the consumption of each month can be compared with the consumption of the previous year corresponding to the same month. In order to be successful in saving, the consumption obtained should be lower than the consumption in the same month in previous years, if there was no consumption of electricity other than usual. In other words, the columns in the graph should be lower each year.



NATURAL GAS



I introduce myself: I am the natural gas.
I am produced by the decomposition of organic material, called anaerobic because it takes place in the absence of oxygen. In nature I am commonly found in the fossil state, together with oil, coal or even alone in reservoirs.

Rain, wind and various atmospheric agents dissolve and detach debris from the mountains, which, carried by watercourses, is deposited on the seabed together with salts and the remains of animal and plant organisms. It is only at this point that I begin to form through the process of 'mineralization', which causes hydrocarbons, substances composed of hydrogen and carbon like myself, to form in small cavities containing crystallised salts, water and organic substances. I can also be produced by decomposition processes in swamps, in landfills, during digestion in animals and in other natural processes. I am also released into the atmosphere by volcanic activity.

I am mainly composed of methane (CH4), the smallest of the hydrocarbon molecules. I also have small proportions of non-hydrocarbon gases, for example carbon dioxide (CO2), nitrogen, oxygen, noble gases and hydrogen sulphide (H2S).

I can be transported in gaseous form through large pipes or compressed and cooled to liquid form and transported by ship.

Because of my high calorific value, I am often used to produce electricity in many types of power plants, powering burners that produce steam to drive turbines. I can make cars move by driving the engine with my power. But most people know me because I come out of their home stove I help people cook, heat water and heat their homes.

In nature I am odorless, colorless but also explosive and for greater safety, I am mixed with substances with a strong, foul smell in order to make myself immediately recognisable to the sense of smell and thus avoid explosions.

People don't understand that I like being in the deposits. That's where I was born and that's where I have to stay, also because when they pull me out I always create a lot of problems:

- my extraction reduces the pressure in the underground reservoir, leading to a sinking of the ground that can damage the ecosystem, waterways, water and sewage systems, as well as causing subsidence in the foundations of buildings.
- my combustion and transport generate carbon dioxide and other greenhouse gases.
- people argue because my reserves are not infinite, and are currently limited and concentrated mainly in the Middle East and Russia.

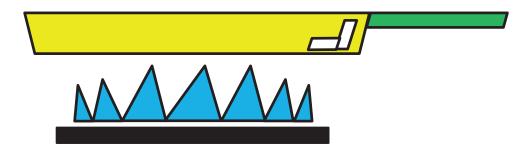
If you really want to use me, please don't waste me. Find alternative solutions to my use. Future generations will thank you because they will have an alternative when I am gone.

HOW TO EVALUATE NATURAL GAS SAVINGS

In the gas bill you will usually find the annual and monthly consumption. You will notice that from May to October the consumption is low and from November to April it is high. This is because in the colder months you use your home heating, which consumes gas. However, in the warmer months your gas consumption is limited to the use of your kitchen cooker.

For example, in the bill below, the estimated consumption in March was 78 cubic metres (mc).

In order to evaluate the savings, one can compare each month's consumption with that of the previous year corresponding to the same month. In order to be successful in saving, the consumption obtained should be lower than the consumption in the same month in previous years, if there was no gas consumption other than usual. In other words, the columns of the graph should be lower each year.



RECYCLING AND REUSE

We introduce ourselves: we are Plastic, Paper, Glass, Aluminium, Organic and Special Waste.

If you human beings could imitate nature's model today, which is waste-free, we would not pose any problems.

So I'll start with plastic. I am the result of one of your great discoveries that has improved human life. My best years, the so-called 'plastic years' began on 11 March 1954 when the chemist Giulio Natta wrote in his diary: 'Made polypropylene'.

With my use, it was possible to make lightweight and durable products that were very useful, but over time you overproduced and failed to dispose of them properly.

So now you have to change course by recycling me as much as possible and drastically reducing my consumption.

So come on, let's try to understand how you have to regulate yourself....

Before throwing away the packaging of a commercial product, are you used to looking at the directions for proper disposal? There are icons on the packaging which, if unclear or missing, should make you think and, even, make you prefer one product over another. There are plastic cards that cannot be separated from plastic, so you are forced to throw them in the undifferentiated bin. This is not good because the plastic that you could have recovered, if it is chlorinated, such as PVC, is incinerated with the rest and produces not only the products of combustion (greenhouse gases with a heating effect) but also the poisonous dioxin that is released into the air we breathe.

There are also non-recyclable plastics that are mistakenly included in recycling, such as those that have the symbol of three arrows chasing each other but which... beware! with the number 7 are not recyclable (unlike those that have a number from 1 to 6 inside the three arrows) and since non-recyclable plastics require special processing procedures because they harden with heat (thermosetting plastics) and incinerate with a second heating - we must avoid mixing them with other recyclables. Of course it is even worse to disperse them into the environment, terrestrial and marine, because everything ends up in incinerators or goes into the sea to form those microplastic soups sadly known as Plastic Islands. And not just in the distant Pacific Ocean: there is a plastic island of my own in the Mediterranean, between the island of Elba and Corsica, smaller but twice as dense as the one in the Pacific. **Luckily** there are the new EU directives!

I too, paper was an important discovery and replaced the tanned animal skins that were only used by a few people for manuscripts.

Today, to produce 1000 kg of white paper, 5.5 m3 of wood, 440,000 liters of water and 7600 Kwh are used,

while to produce the same amount of ecological paper, recycled paper, 1800 litres of water and 2750 Kwh are used.

And when you waste paper, don't forget that, because of the increased demand for pulp for paper production, you are accelerating the destruction of the planet's great forests.

I am glass and I am eternal: I never degrade! I am high quality because I retain the typical characteristics of a liquid, such as taste and effervescence, for a very long time. I'm a so safer from a health point of view because I don't let the crystals in me settle, maintaining the purity of what comes into contact with me.

One of my bottles can be reused even more than 30 times with the 'returnable vacuum' system and can be disposed of through separate collection to be 100% recycled for the production of new bottles. One tonne of recycled glass saves the planet 1200 kg of raw materials, 120 kg of oil and 580 kg of CO2. Everyone knows me: I am Aluminium but few know that as you see me, in my elementary state, I am not present in nature because I am extracted from a mineral, Bauxite.

However, the process needed to extract me is very energy-intensive, so if you don't recycle me, you won't be able to use me!

I'm organic and I don't really smell! But welcome! If you recycle me after a good 'anaerobic digestion' I can produce biogas that allows you to cook and heat yourself or I can help your crops by becoming fertilizer. We special waste (WEEE = Electronic Equipment, Batteries, Medicines, Light bulbs, etc.) are very useful in life but very dangerous when we become useless: if we are not correctly recycled and delivered where required we become a Killer, polluting much more than any other material and permanently and irreversibly like Company Waste, which should always be properly abated. If we are properly recycled we become a source of valuable materials.

But now a consideration for all of us:

If you recycled us completely, would we have solved every problem? No. It is not enough to recycle everything (I wish you could do that!), you must also reduce consumption.

The idea, for example, of using as much plastic as you like, could lead you to fall into Jevons' paradox: "technological improvements that increase the efficiency of a resource can increase the consumption of that resource, rather than decrease it"! In simple terms: if I can recycle you, I consume you without limit. Then take into account that the production of anything uses water and energy which, at present, comes mainly from fossil fuels, which are among the biggest contributors to global warming. So the fact that you can recycle should not lead you to consume more. At the end of the day, always keep in mind the three

R's: not only the R for Recycling, but also the R for Reducing and the R for Reusing. When you circulate goods by reusing them, you contribute to creating a virtuous circle of energy saving, and at the same time you give back dignity to the object itself, extending its life.

In addition to these three R's, we recommend two others: Repair (anything that breaks) and Relate. Relate? In what sense? Why?

The physicist Piero Pasolini (1917-1981) was convinced that the most important discovery of the modern era was the understanding that everything, everything, every being, comes into existence and is realized as a consequence of the unity of other beings.

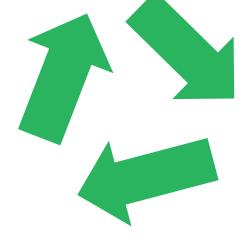
"Things come into existence as a result of the organic and vital relationship with other things which, by uniting, give rise to a third thing that transcends them and is none of them. Two atoms of hydrogen and one of oxygen united together become water; although each remains itself they do not remain oxygen plus hydrogen, but become something new. This discovery is the mechanism of evolution'.

HOW TO EVALUATE THE SAVINGS OF RECYCLING

How to evaluate the savings?

- By weighing the undifferentiated dry waste, which must decrease each time.
- By quantifying whether the amount of recycled product decreases.

Undifferentiated waste should be reduced to zero. But in order to achieve this goal, we must influence companies to produce materials that are uncombined and easy to recycle.



FOOD WASTE



Hello, I am "waste of food" or as they call me in international circles "food waste". There is no official way of defining me, but in 2014 the FAO (Food and Agriculture Organization of the United Nations) stated that "food waste is part of food loss and refers to the elimination or alternative (non-food) use of food that is safe and nutritious for human consumption, along the entire food chain, from primary production to the final consumer".

In practice, 'food losses' refers to losses that occur upstream in the food supply chain, mainly during sowing, cultivation, harvesting, treatment, storage and first agricultural processing; 'food waste', on the other hand, refers to waste that occurs during industrial processing, distribution and final consumption.

Both I and 'food loss' have become a little too abundant, so much so that it has become a scandal when thinking of those who suffer from hunger and also a problem for the health of our planet. Having different origins, the ways to reduce our growth are also different.

Just think that every day in the world tons of edible

food is lost or wasted. Between collection and sale alone, we throw away about 14% of all food produced. And it doesn't get any better when it comes to consumer habits. Suffice it to say that between leftovers and food that has expired, Italian households put 2,200,000 tonnes of food into the dustbin every year; about 36.54 kilograms per person. As far as I am concerned, in order to find effective solutions, it is important that you understand the difference between "waste" and "sqaundering". When you eat a yogurt and throw away the empty jar that contained it, you are producing waste; if, on the other hand, for whatever reason you do not eat the yogurt (for example because you forgot it in the fridge and it has reached its expiry date) and you throw away the jar with all the yogurt without even opening it, you are (squandering) producing waste. In order to make yogurt, in fact, it was necessary to use raw materials (milk) that required work (for breeding) and also consumption of resources (food for the cows), and then the work of all the other operators in the chain downstream of the production of raw materials was needed (those in the factory who prepared the yogurt from the milk, those who packaged it, those who transported it, consuming energy and causing some environmental pollution...).

Already from this simple example, it is clear that wasting yogurt is not only a waste of money, but it means wasting all the work that has gone into the various stages of the chain, consuming unnecessary environmental resources and contributing to pollution for no reason.

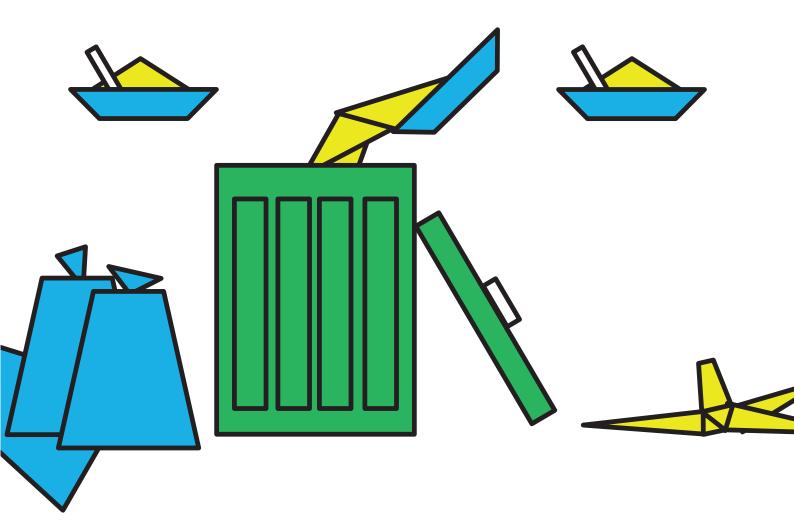
So, while waste is partly inevitable, (squandering) waste is linked to our behavior and can be eliminated. On September 29, 2020, on the occasion of the first

International Day of Food Loss and Waste Awareness, the UN published a small vademecum to reconnect people and food.

You too can do your part, here's how:

- don't ask for larger portions than you can consume so that there are no leftovers on your plate;
- don't complain if there are leftovers at home, rather use your imagination to find appetizing ways of using them too;
- don't ask to buy too many types of snacks which then risk not being eaten by the expiration date;
- when you pick up a food item to eat, choose the one with the earliest expiry date;
- do not leave snacks in your backpack that you will never eat again after they have been crumbled up.

Small gestures made by many can have exceptional effects!





Contatti

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