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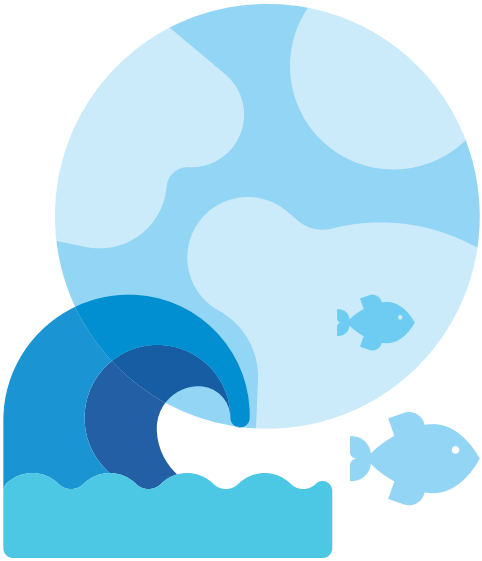

Blue gold:

water, good of mankind

PUPIL BROCHURE
PRIMARY SCHOOLS

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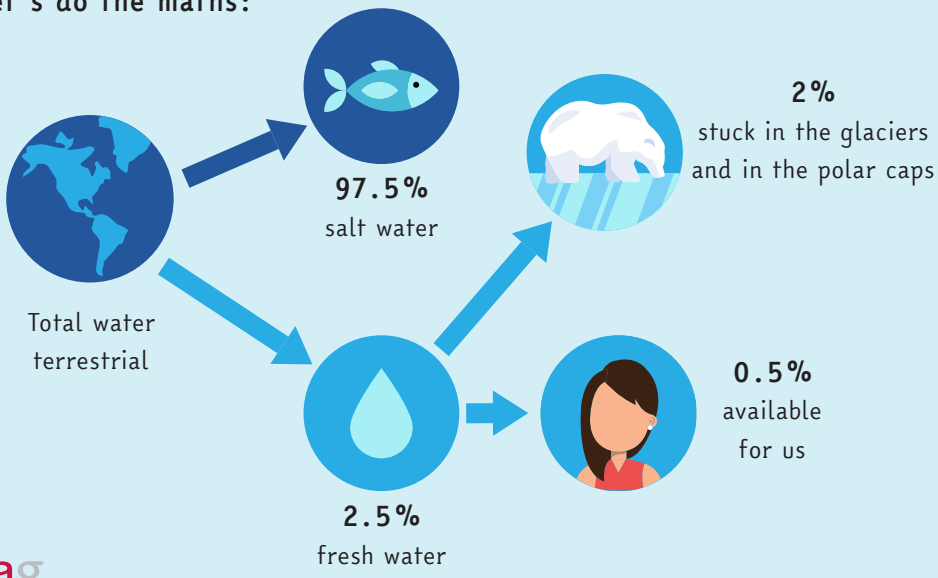
IDEE E PROGETTI PER LA SOSTENIBILITÀ

Why do they say that water is 'blue gold'?

Water is an essential element for the life of living beings: for us, for plants, for animals, for ecosystems in general.
Water is everywhere: it is above, below, around and within us. It is found in our bodies, in the things we eat, in the soil we tread and of course in rivers, oceans, seas, glaciers and 1000 other places...

So can we consider ourselves to be very rich in water? Of course there is water in the world! **Approximately 71% of the earth's surface is covered in water**; in fact, our planet is called the Blue Planet for this reason. But, how much of this water can be used by man?

Let's do the maths:



Water is a renewable element, that is, it is renewed through the water cycle but:

- **it is also a limited resource**
- **and its ability to renew itself is endangered.**

Often, in fact, unregulated use of water means that the quantities withdrawn are not compensated by rainfall.

When man takes water from nature for his various uses and needs, **but also when he changes its course** (river diversions, artificial barriers, etc.), he **inevitably changes its quality**, contaminates it, alters its characteristics and leads to a decrease in drinking water.

Qualitative aspects can be altered by:


chemicals


plastics


cleaning chemicals


vegetable or motor oil


pollutants from industries


agricultural fertilisers or pesticides


slurry from livestock farms


interventions that modify the development of watercourses

DRINKING WATER

It is water for human consumption, a primary resource for survival of human beings.

Features

The water must be:

- odourless
- colourless
- tasteless
- limpid
- free of pathogenic microorganisms and harmful chemicals.

Some pollutants may remain even after treatment of polluted water.

So, back to the question "why is water said to be blue gold?":

- because **it is a** precious, indeed a most precious **resource**
- because drinking water for human use **is becoming increasingly scarce** for many states
- because **in many areas of the planet it has a very high value**
- because in many parts of the world **the absence of water can trigger wars and cause large** population **migrations** (more on this later)
- **because everyone is interested in water**, not only for living and basic needs, but also for industry and other **economic interests**.

Activities. Test yourself: which things can pollute water if left in the environment?

☐ frying oil for french fries	☐ oil	☐ broken lifebelt
☐ plastic bag	☐ plastic cup	☐ bread crumbs
☐ shower gel and shampoo	☐ fishes	☐ gases of the industries
☐ leaves and twigs	☐ petrol	☐ packaging for ice cream
☐ fertilisers	☐ washing machine	☐ paint

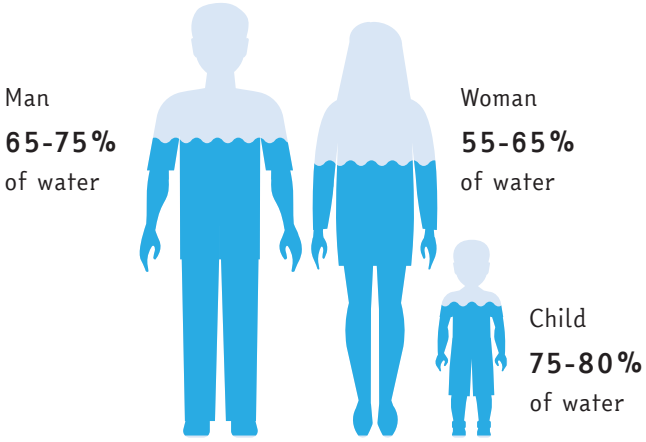
Download the game cards to complete the activities in this booklet!

Very important, indeed vital!

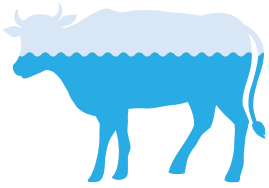
WATER IN OUR BODIES

Most of our body is made up of water: it is in the blood and in our cells.

The amount of water changes if you are male or female, it also depends on your age and body weight. In the drawing you can see the amount of water in a man, a woman and a small child:



And this also applies to all other living beings!



Cow
60%
of water

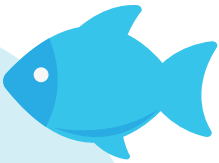
Watermelon
97%
of water

Drinking water keeps **our organs healthy and replaces the fluids we lose** when we breathe, sweat and digest.

WATER IN OUR LIVES

Water has had many functions in the past and still has today, it is a resource that we benefit from every day and there is no other compound that has the same properties for all functions! Water, in addition to drinking, serves ...

- to wash and refresh ourselves
- for cooking
- to clean
- to irrigate fields
- to transport goods and people across rivers and seas
- to breed animals
- for the sewers: yes indeed! Because water carries away our waste so that there is cleanliness and hygiene in the places where we live
- for its force that can move gears (think, for example, of mills in the past) and produce hydroelectric power
- in addition, the water of seas, rivers and lakes provides us with fish as food



CURIOSITY:

How small and how large can marine species be?

Millions of species live in the water. They can be so small that they cannot be seen, as micro-organisms, or as large as blue whales of over 33 metres!

CURIOSITY

How is water transformed into energy?

The water that is born in the mountains is much higher up than we are.

All that water, if we drop it downstream, produces a force. This is what happens, in a controlled manner, in hydroelectric power plants: water is dropped from the mountains into pipes for hundreds of metres; then, once downstream, it pushes the turbine blades which, spinning inside a large magnet, produce electrons, i.e. electricity.

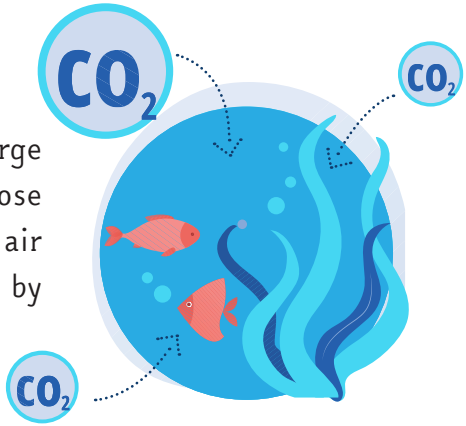
WATER TO REGULATE THE CLIMATE

Rivers, lakes, oceans and seas also serve to regulate the climate:

- **water has the ability to retain heat and release it slowly:** in fact, on the shores of lakes and seas, the climate is milder than in more inland areas. Ocean currents cool or warm many territories and make them habitable
- **evaporation from warm seas causes precipitation** all over the world, in the form of rain (or snow) bringing life!

CURIOSITY

Water captures and absorbs very large quantities of carbon dioxide (whose chemical formula is CO_2) in the air (about 1/4 of that emitted each year by humans).



Images and words: each drawing represents a function of water. Recognise it and describe it in your own words.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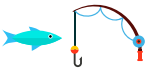
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Download the game cards to complete the activities in this booklet!

Water in human history

Human life has always depended on water and has always been conditioned by its presence or absence.
In prehistoric times, during the Palaeolithic period, man does not know how to cultivate and is nomadic: he moves about in search of food, water and protection that he finds available in the environment.
In the Neolithic man is no longer nomadic but becomes sedentary, he builds pile dwellings and then entire villages, he begins to breed animals and cultivate. The relationship with water therefore changes, man tries to exploit it to his advantage for new activities.

Near the great rivers, the most important civilisations came into being, engineering techniques and systems to exploit water, such as:

- the Egyptian civilisation (Nile)
- the Sumerian, Assyrian and Babylonian civilisations (between the Tigris and Euphrates rivers)
- Chinese civilisation (Yellow River).

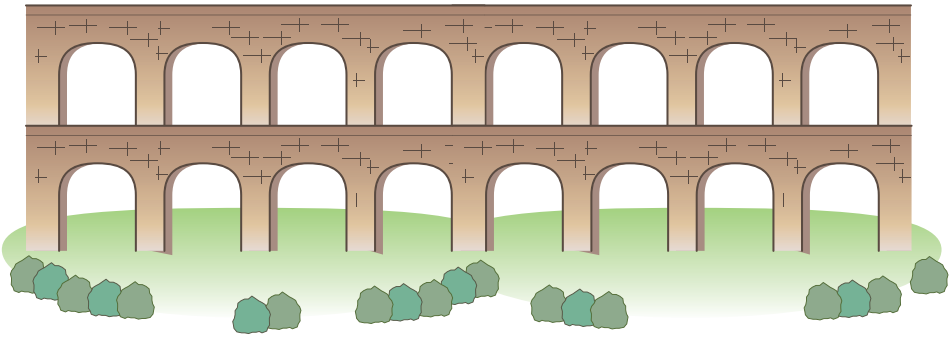
CURIOSITY

The water found on Earth and in the solar system is older than the Sun and originated in interstellar space.
This is the discovery of a group of scientists from the United States and Great Britain, which increases the probability that life has also formed in other parts of the universe.

The great rivers ensured drinking water, food, more fertile soil for crops, livestock breeding and easy transport.
Over time man:

- devised increasingly complex systems to irrigate crops and protect against floods
- shifted from the use of surface water (such as river water), to the search for better (underground) water sources
- designed the first machines for lifting and transporting water, even over great distances

And in Italy?
It was the Etruscans the first Italic peoples (around 500 B.C.) **to develop water technologies** (aqueducts, sewers, cisterns, mills, dams) to bring water to cities and irrigate fields.
Then the Romans developed and greatly improved these works. They built as many as 11 aqueducts in 500 years in Rome alone. They were used to bring water from distant springs to their cities, supplying baths, latrines, fountains and private homes.
But throughout their empire we can count hundreds of similar aqueducts.



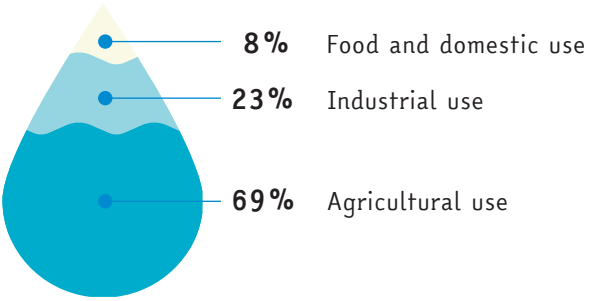
Water in Italy today

In Europe, freshwater resources, compared to many other parts of the world, are quite abundant but are not distributed equally across all territories.

Italy is a country rich in water: springs, watercourses, natural lakes, groundwater, **but availability differs in various areas**:

65% NORTH
15% CENTRE
12% SOUTH
8% MAJOR ISLANDS

Italy is among the largest consumers of water among European states. But how much water is consumed for example in our homes, for industry, to irrigate fields and to produce energy?



Water and climate change

To explain what climate change is, let's start with the concept of the 'greenhouse effect': **certain gases in the atmosphere** (called 'greenhouse gases') trap the sun's rays as they **hit the Earth, trapping heat and consequently increasing the temperature** on the planet.

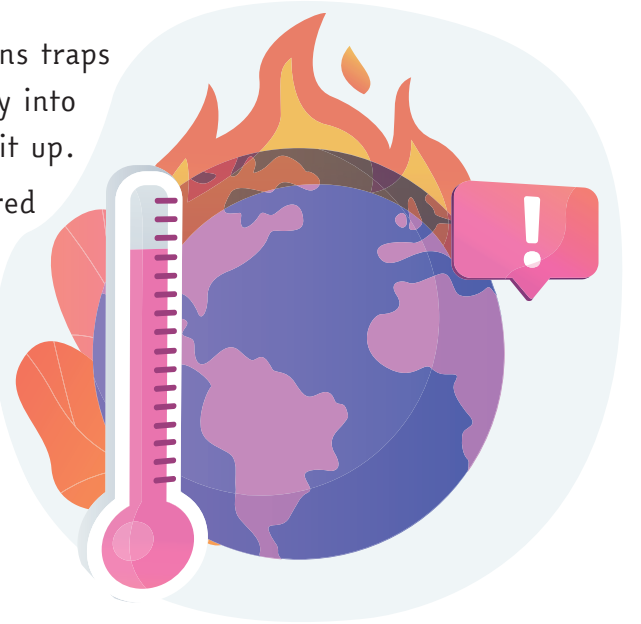
This is **a positive phenomenon:** without the greenhouse effect, instead of an average temperature of +15°C, we would have -19°. This has allowed life to develop on our planet.

However, through his activities such as industry, animal husbandry, transport, agriculture, but also the heating in our homes, **man has significantly increased the amount of greenhouse gases in the atmosphere** (mainly carbon dioxide and methane).

The increase in gas emissions traps more and more solar energy into the atmosphere by heating it up.

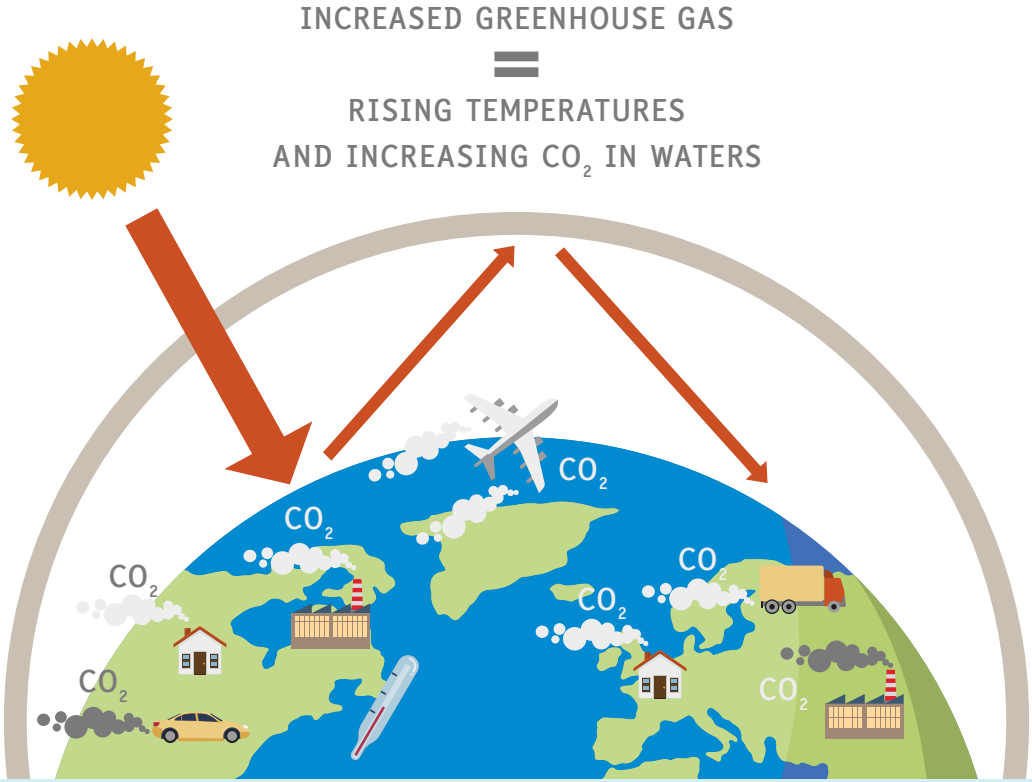
This augmented heat is stored in the oceans, increasing their temperature.

Do you remember that the earth's surface is mainly covered by water?!



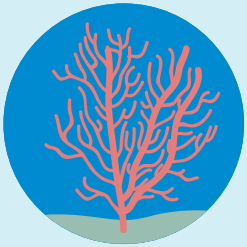
Therefore, **climate change mainly affects the oceans, seas, rivers and lakes.**

The increase of CO_2 in the atmosphere also causes an increase of dissolved CO_2 in seawater, so oceans and seas become more acidic, threatening their inhabitants and the entire marine ecosystem.



CURIOSITY

The higher acidity of seawater creates many problems in the formation of molluscs and corals.



RISING TEMPERATURES GREATLY AFFECT THE TERRESTRIAL WATER CYCLE

INCREASE OF TEMPERATURES

=

THE INCREASED WATER VAPOUR IN THE ATMOSPHERE IMPACTS ON THE WATER CYCLE OF THE EARTH

CONSEQUENCES

Increasingly extreme weather events:

- **heat waves** i.e. long periods during which the temperature is unusually high compared to seasonal average temperatures
- **melting ice** and rising seas
- **inundations, cyclones, floods**
- **wetlands become even wetter**, while **drought situations in many parts of the planet** worsen (drought means prolonged lack of water and dryness of the soil).

Climate change will create more and more problems for water availability worldwide, and the problem also involves Europe, especially the southernmost states, while other areas will be increasingly affected by flooding.

Many marine species at risk

All the **changes that are taking place in seas, oceans, lakes and rivers**, such as the increase in temperature and acidity, but also the modification of habitats (think of the shrinking polar ice caps), are creating problems for the **delicate balance of nature, putting marine species at risk**.

Any examples?

- Fish cannot reproduce and live in waters that are too warm, or they move to other seas in search of their food sources.
- In warm weather, tropical fish species move into seas and oceans that were colder before, threatening other local fish.

... also to the detriment of mankind: **less fish means less food and creates problems for those who make a living from fishing as a job!**

In addition to this, human activities such as intensive fishing, ship traffic and oil activities, waste, microplastics and pollution in general are also endangering the health of water bodies and their inhabitants.

CURIOSITY

In some areas of the planet, there is one third of the fish that was available less than a century ago.

Activities: Mark the right answer

1) The greatest civilisations in human history have developed:

- ☐ In hilly areas far from the dangers of the sea
- ☐ Close to the great rivers that provided food, fertile land, water for livestock and ease for transporting goods

2) Which was the first Italic population to develop aqueducts and sewers?

- ☐ Etruscans
- ☐ Romans

3) Which use consumes the most water?

- ☐ Industry
- ☐ Agriculture
- ☐ Water use in our homes
- ☐ Energy production

4) The greenhouse effect is :

- ☐ a positive phenomenon because it has allowed the development of life on our planet but it must be kept under control
- ☐ a negative phenomenon because all greenhouse gases are harmful

5) Increased heat, due to the increased greenhouse effect, affects:

- ☐ On the temperature of the earth but not of the seas and oceans
- ☐ On both

6) If fish live in warmer waters:

- ☐ They are happier and live longer
- ☐ They struggle to reproduce and escape in search of food

Download the game cards to complete the activities in this booklet!

Wars and Migration

Water is an indispensable commodity for everyone.
Water problems, therefore, are not the problems of a few peoples but **affect everyone and we must deal with them together**.
Let us take a closer look at all the reasons that lead to a reduction in water availability:

climate change as we have already seen

the sharp increase in population over the last 100 years due mainly to better medical care and a better quality of life, reducing mortality

the destruction of habitats such as forests

the discharge of contaminated water into the environment and pollution in general.

INSIGHTS

Population increase over the last few centuries:

- in 1600 ➡ 600 million
- in 1800 ➡ 1 billion
- in 1950 ➡ 2.5 billion
- in 2020 ➡ 7.8 billion

INSIGHTS

Forests are green but also blue!

Forests woods and wetlands are reservoirs of water: they are useful for the water cycle, both in terms of quantity and quality (they purify it!). They reduce landslides, droughts and floods, regulate rivers and streams, recharge flaps and also have an important role on rainfall.

Decline of water availability, dry soils that are increasingly struggling to produce food and extreme weather events such as floods and inundations lead to these consequences:

- **people flee their home areas to survive:** and they do it much more than fleeing from wars and violence

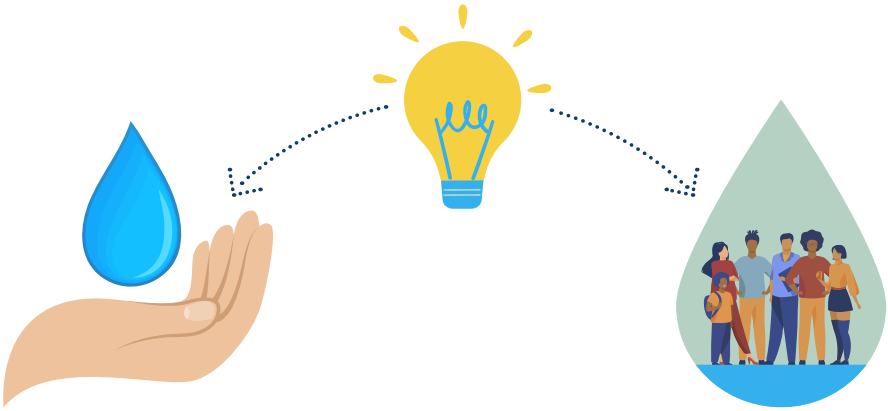
- **wars between peoples** fighting over water resources (e.g. when different states fight over the water of the same lake) or **even conflicts within the same population**, e.g. between groups of farmers and shepherds, or because industrial activities 'steal' water from local populations

Water and the future

The current situation is certainly not very positive, but it is also true that we can do a lot to stop this:

- **collaboration between states to find solutions and projects** for the reduction of climate change

- **use of new technologies** to:



reduce water waste and pollution

make water available to all the people of the world

We can all do our part!

Let us remember that uses in the home also lead to a great deal of water loss, so we can all help not waste it!

- **Use water only for what is strictly necessary:** quick showers, no running water for brushing teeth, washing vegetables, etc. **Reuse water** (e.g. what you used to rinse your vegetables you can use to water your plants)
- **Flush when needed and** remember that a flush is not a wastebasket
- **With your family, install flow reducers on the taps:** less water will come out but you won't notice it

Also for vegetable garden and garden:

- **Collect rainwater** for watering
- **Favour drought-resistant plants**
- For your vegetable garden, **use mulching (i.e. cover the soil with a layer of material such as tarpaulins, even natural material):** it retains moisture and reduces the growth of weeds.
- **Prefer morning for watering** because it is the coolest time, so you avoid water evaporation

Plant maintenance and leakage control

(to be read with your family)

Make sure with your family **that taps and pipes in the house do not leak water.** The loss of even one drop can consume 20 to 30 litres of water at the end of the day. Ask your parents to measure **consumption regularly by checking the meter** and, in general, to do proper maintenance.

Let's take a closer look at what to do to avoid unpleasant surprises.

- **CARE OF THE METER, especially when the coldest weather arrives, as frost can cause it to break** (this appliance suffers from large temperature fluctuations). With a broken meter, the proper distribution of water fails. To protect it, panels with cold-insulating material, can be placed, for example, inside the sump. If the meter is located in a place exposed to bad weather, it is a good idea to wrap the system with rags or suitable insulating materials, leaving the dial uncovered.

- **CHECK FOR LEAKS.** Water leaks from pipes can be easy to find because you can notice some damage in the house (dampness on the walls, mould and bad smells, etc.) or they can be well hidden: in this case, how can we check?

1. Turn off all indoor and outdoor taps and do not use electrical appliances that use water.
2. Note or photograph the meter digits and the position of the hands.
3. At this point, the meter should be standing. If this is not the case and a small wheel keeps turning... the test is over, there are leaks!
4. If, on the other hand, the wheels are standing, let 4-5 hours pass without consuming water and then check the meter (wheels and hands) again.
5. If everything is the same as before... no leaks! If, on the other hand, the wheels and hands have moved (even if the numbers are the same)... alas, there are hidden leaks!

Also pay attention to water bills: strange increases (even small ones) could hide leaks in the house!

THE BENEFITS OF PROPER SYSTEM OPERATION

Regular checks and maintenance of pipes and other water system components (ask your plumber how and where to do this) have several advantages:

- They ensure a longer service **life of the system** itself
- **Avoid** the occurrence of **costly problems and bill increases**
- They allow **better air quality** in the home (hidden leaks or weakened pipes can produce mould)

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