

LEAFLET
"E' VIVO!" ECOSYSTEM
EDUCATIONAL GIFT
(see the attached web part for children and teenagers)

Globus International S.r.l.

Via Benessea, 25

17035 Cisano sul Neva

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"E' VIVO!" ECOSYSTEM: EDUCATIONAL GIFT

Congratulations!

Now you own a **"unique"** item because there are lots of spheres that contain the small renewable "È VIVO!" ecosystem, **but each one contains something different!**

This ecosystem contains living beings that, in a restricted space, are inseparably linked to chemical-physical conditions, where everything carries out mutually beneficial actions. The system is almost completely independent: the only external factors are light (from the sun or an electrical source) and air (once a month).

(foto)

Its origins: Biosphere 2

From Tucson, it takes about one hour on the US77N to get to Oracle, the site of Biosphere 2: a research and study centre founded by *Space Biosphere Ventures (SBV)* to learn about the changes that man is making to our Earth.

The enormous greenhouses in Biosphere 2 contain a coral reef along with other types of terrestrial environments (distributed in the proper proportions) including a tropical rain forest, savannah grassland, fog desert, mangrove wetlands and an intensive farming agricultural system. Biosphere 2 also hosts about 2,000 species of animals and plants, without counting the bacteria and microbes. Numerous researchers have worked in Biosphere 2 which was built between 1987 and 1991 and is slightly larger than a football field (12,700 m²). Instead, from 1995 to 2003, research continued under the management of Columbia University, and always with the objective of increasing public awareness about the importance of taking responsibility for our planet.

The 2 after the word "Biosphere" emphasises the fact that the real biosphere is the one that embraces our Earth. In fact, our planet is a closed system, in which living organisms work together to maintain the delicate balance resulting from the cooperation between plants, animals, micro-organisms and the environment. And all this takes place thanks to the energy of the sun that favours the growth of plants that, through the process of chlorophyll photosynthesis, convert carbon dioxide (CO₂) into oxygen. On the animals, on their part, produce nourishment for plants in addition to carbon dioxide.

From Biosphere 2, the “portable” biosphere

Various experiments were conducted that led to the creation of the so-called “portable biospheres” (*ABS*, or *Autonomous Biological Systems*): small transparent containers, reproducing closed systems, that contain water, salt, animals, vegetation and micro-organisms all living in a state of equilibrium, and supported only by light.

Shrimp astronauts

Experiments were conducted (for eight months) on some *ABS* – even in space – during the 10-day mission of the NASA (USA Space Agency) *Space Shuttle “Endeavor”* (May 1996). These were followed by other experiments during a four-month mission on board the *MIR*, the Russian space station. Those experiments demonstrated that the conditions needed to support bioregenerative life can be recreated in remote and even hostile locations, both on and off our planet.

And so the American scientists developed the procedures to reproduce natural and self-sufficient “ecosystems” and, together with NASA, registered the patent that protects those procedures.

And then there was BioGlobe

In the 1990s, an Italian science and nature documentary film maker visited Biosphere 2 to develop some projects. He was so amazed by the “portable biospheres” that he bought the exclusive rights to utilise the patent, founded a company (Globus International S.r.l.) and developed a range of original products. One of these is BioGlobe: unique marine ecosystems hermetically sealed in glass spheres. And so an Italian entrepreneur has been making unique BioGlobes, the end result of the creative efforts of a space engineer and two Biosphere 2 researchers, backed by an international patent (under a NASA licence), since the end of the Nineties.

BioGlobe, in its own small way, is a hermetically sealed ecosystem containing small red shrimp raised by Globus International in Southeast Asia. This was an insightful decision since it helps to protect the few natural oases where these crustaceans have been living for millions of years. In their natural environment, these shrimp “care for” algae by feeding off the bacteria that infest the algae. The algae, after being disinfested, thrive thanks to the chlorophyll photosynthesis stimulated by sunlight. Globus International’s technicians keep the shrimp in special environments along with the other items needed to (exclusively) hand pack the precious BioGlobes, one by one.

“È VIVO!”, the small renewable ecosystem

To increase the distribution of Globus' product, raising it to the level of an educational toy, a more economical and safer solution had to be found. And so Globus created the small PET sphere.

TAKING CARE OF THE "È VIVO!" ECOSYSTEM

This ecosystem contains living beings that, in a restricted space, are inseparably linked to chemical-physical conditions, where everything carries out mutually beneficial actions. The system is almost completely independent: the only external factors are light (from the sun or an electrical source) and air (once a month).

Four red and orange shrimp, all completely different, rest on the bottom on pebbles and small shells or slowly swim around. They feed on micro-organisms and produce carbon dioxide (CO₂).

This means that everything is fine: enough light is coming in and the sphere is not exposed to direct sunlight. In fact, the best location for the ecosystem is a sunny room because light stimulates the process of chlorophyll photosynthesis that converts carbon dioxide into oxygen.

Register for free at

www.evivo.it

to get more information and download the "Shrimp Diary".

By registering, you can also contact Globus International technicians to ask for lots of helpful tips.

To keep the "È VIVO!" ecosystem in good condition just follow these few simple instructions:

1. After being delivered, put the "È VIVO!" sphere in a sunny place where the shrimp can get over any stress from the trip.
2. Never expose the sphere to direct sunlight and don't put it in front of a window.
3. Never change the water.
4. Check the shrimp every day, for the first three weeks, to make sure that they are red and calm, almost immobile on the bottom or attached to the algae. Instead, if they are always moving around and light coloured or almost transparent, move the sphere to a place with more light.
5. The temperature in the room should range between 13°C and 27°C. If the temperature in the room is higher than 27°C, put the sphere in a small basin of water or in a sink with cool water.
6. Once a month, slowly turn the sphere upside-down and unscrew the cap, making sure not to spill the contents. Keep the sphere open a few seconds and then replace the cap and close it tightly.

TROUBLESHOOTING

For any problem and if the problem persists, call

Register at **www.evivo.it** so you can download lots of information and contact Globus International technicians to ask for lots of helpful tips.

- **The water has become milky.** Attention! This indicates that the water contains bacteria. If this happens put the sphere in a well-lit location (but not in direct sunlight) for a week. The water will gradually clear up.
- **Algae on the transparent surface.** A small amount of algae is OK because it means that the "È VIVO!" ecosystem is getting ample light. However, if the algae multiply too quickly put your sphere in a place that receives slightly less light. The algae should clear up within a few days.
- **Shrimp sluggish because of the cold.** Exposure to cold temperatures may cause the shrimp to seem dead. Put the sphere in a room where the temperature is higher than 13°C (but not more than 27°C) and the shrimp will become active again and swim around normally.
- **Floating exoskeletons.** You may see small transparent objects that look like shrimp, but move around in a strange way. You should know that shrimp shed their skin and discard their "moult". This happens rather often when they are healthy. So, those floating shapes are known as "moults" or "exoskeletons".
- **Dead shrimp.** Shrimp live for several years and then die of natural causes. But accidents may happen such as hard shaking, a violent movement when changing the air or something else. So, if a shrimp dies and the water is crystal clear and there are no algae on the transparent surface or on any of the small shells, then you probably need to give the "È VIVO!" ecosystem a little more light.
Remember that you can always contact your nearest dealer to regenerate your "È VIVO!" ecosystem.

THE PART FOR CHILDREN AND TEENAGERS

“The Shrimp Diary”

(IN THE WEBSITE)

A TRULY EDUCATIONAL GIFT!

(foto)

A small PET sphere on a pedestal, that's also a hermetic cap, which should be opened (once a month) to change the air inside the sphere.

This ecosystem contains living beings that, in a restricted space, are inseparably linked to chemical-physical conditions, where everything carries out mutually beneficial actions. The system is almost completely independent: the only external factors are light (from the sun or an electrical source) and air (once a month). Each sphere is unique and no two are alike!

The "È VIVO!" ecosystem is made exclusively by hand and may contain one Gorgonian branch, or some algae (or micro algae), small white pebbles, coloured sand, little shells, salt water and four live shrimp. There will never be more than four shrimp because, due to its size, the ecosystem would not support a larger population.

Observe and learn by playing

First write the date that you received this fabulous gift...

Then leave the "È VIVO!" ecosystem undisturbed for a few hours so that the shrimp can get over any stress caused by the trip and by being placed in the brightest place in your room. Now observe the situation.

Is the temperature right? Not too cold and not too hot?

Four red and orange shrimp, all completely different, rest on the bottom on pebbles and small shells or slowly swim around. They feed on micro-organisms and produce carbon dioxide (CO₂).

This means that everything is fine: enough light is coming in and the sphere is not exposed to direct sunlight. In fact, the best location for the ecosystem is a sunny room because light stimulates the process of chlorophyll photosynthesis that converts carbon dioxide into oxygen.

If the shrimp are agitated, go to the TROUBLESHOOTING chapter.

Write down the things you are learning:

You are learning new words. Jot them down here below and look up what they mean. **If you don't have enough space, get a notebook.**

You don't have to change the water or feed the shrimp. Do you know why?

Inside the "È VIVO!" ecosystem the shrimp live in a marine environment, thanks to light that causes the micro algae and the vegetation to produce oxygen and food. Our Earth is a closed system where living organisms thrive: a biosphere where nothing but sunlight comes in or goes out. That's exactly what your "È VIVO!" ecosystem is. Think about this and then write down any questions that come to mind. Talk about them with your parents and try to understand and write down the things that are clear to you. Keep the chapter open so that you can add the things that you learn over time.

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Carefully observe the sphere and you will notice drops on the cap. This is condensation (water that evaporates and then returns to the liquid state). In other words, it's similar to rain. In fact, the ecosystem reproduces what takes place on our planet. No clouds are formed in the sphere but the drops represent rain.

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What do you know about chlorophyll synthesis?

Your shrimp and the vegetation in your ecosystem new photosynthesis in order to live. Why? Find out and write down what you learn.

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Did you notice that the four shrimp are all different?

Carefully observe the shrimp. Give each one a name. Try to recognise them over time and every so often write down how each one acts:

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The colour of the shrimp is important because, when they are bright, it means they are healthy!

Above all, it means that they are getting the right amount of light. But do not to expose the sphere to direct sunlight! The "È VIVO!" ecosystem must be placed in a well-lit location. And if there is not enough light during the day, you have to turn on an electric light (no halogen). You should also make sure that the sphere doesn't get too hot because it is too close to a heat source.

Did you find the right exposure? Do you periodically check the colour of your shrimp? Write down your observations every week, starting with the colour of the shrimp. However, you should know that some shrimp are not red from the beginning. In the same way that some of us have blond hair and some have brown, some shrimp are red and some aren't.

.....

If you use an electric light, the sphere must be placed the proper distance from the light source, as shown in the following table:

incandescent		fluorescent	
40 W	15 cm	W =Watt	cm
60 W	25 cm	≤ 30	40
100 W	30 cm	> 30	65

Learn how to find the power of the incandescent and fluorescent bulbs (neon) and write them down:

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Temperature is also important! Can you read a thermometer?

The ideal temperature ranges between 13°C and 27°C. In the summer, when the outside temperature is higher than 27°C, you have to put the sphere in a basin with cool (not cold) water and let it soak, changing the water in the basin until the temperature has gone down. Describe this experience so you will remember it next year.

.....

It's time to change the air in your "È VIVO!" ecosystem

You've had the ecosystem for more than a month. Carefully turn the sphere upside-down so that the hermetic cap is at the top. Carefully unscrew the cap and leave the sphere open for thirty seconds. This will regenerate the air. Now carefully return the sphere to its normal position. The shrimp might be a little upset when you do this. And maybe their colour will fade slightly. But don't worry: with the right light they will become calm again.

Describe the situation and what you notice the next few times you check. This will help you the next time you change the air.

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After having the "È VIVO!" ecosystem in your house for one year, you can do this operation every two months.

Write down the dates when you regenerated the air in your "È VIVO!" ecosystem:

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TROUBLESHOOTING

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