School green education and best practices

Prof.ssa Paola Perotto – IIS Leardi (Casale Monferrato)

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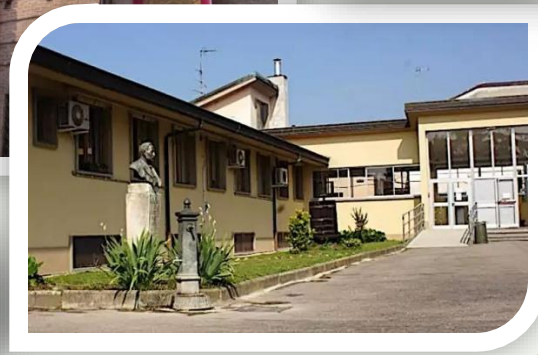
“Leardi” and “Luparia” Secondary Schools

One of the Most Ancient Technical Schools in Italy

IIS "Leardi" is a **higher secondary school**, attended by **more than 900 students**.
It's **one of the most ancient technical schools in Italy**, it dates back to **1858**.
It consists of **four branches**: Economics and Accountancy, Tourism, Graphics, Artistic and Geotechnical.
We have also **another branch**, a school for Agriculture and Farming, *ITA "V. Luparia"*, located in a small village: San Martino di Rosignano, in the country. In 2024 another course was added: Food, Wine and Catering.
There are about **150 teachers** in all.



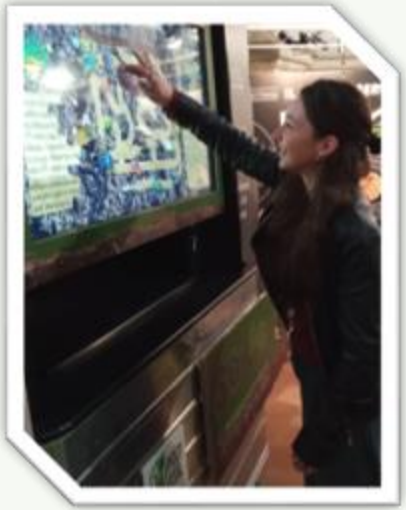
Laboratories, Digital Technologies & Green Projects

Our school is well equipped with **laboratories**: multimedia, cinema and photography, graphics and languages laboratories.
Our extension school in San Martino di Rosignano has always been involved in many **projects related to growing olives, the cultivation of vineyards, the production of wine, beer and oil**. Lately they have installed a **hydroponic greenhouse**, to underline opportunities and challenges faced by **indoor farming and vertical farming systems**.
We give great importance to **foreign languages** and **digital technologies**, also aimed at acquiring **European certificates**.

02

Our Green Projects and Activities

Biodiversity, Indoor pollution, Green economy, circular economy & Sustainable development explained to students



Exhibition about the climate changes and microplastics

RIS.OS – Opportunities of development for rice crops

Festival of Civic virtue and Luisa Minazzi Award

Concorso “G. Cavalli“

competition about the Environment and Health

Climate changes issues

Lectures, seminars and meetings with experts

Water footprint

Some students of the Geotechnical Course at Istituto Leardi have collaborated with the Municipality and the MU.DI DYNAMIC MUSEUM-Geometries of Water for the restoration and recovery of the local Hydraulic Lifting Station system for Irrigation.

Asbestos Classroom, Projects & Scientific meetings about Asbestos

“I change my climate”, a project for teenagers’ active behaviour

in collaboration with “Università Cattolica” of Rome and UniFi (University of Florence)

03

New Technologies 4.0 in Agriculture

NEW TECHNOLOGIES 4.0 IN AGRICULTURE to meet sustainability and the world food demand.

HUNGER AND POVERTY AROUND THE WORLD

ZERO HUNGER GENERATION 2030

The Way to Agriculture and Technology 4.0

In **2050** there will be **10 billion people on Earth**.
Now we are **about 7 billion**.
In **2025 two thirds of the population** will suffer from the **lack of water**.
In **2050 most people** will find **hard to live**.
In **2025** we will need **60% more land to provide food** for the growing population.
In **2050** we will need **more than twice the land of today**.

*To do this, **we have to adopt 4.0 solutions in agriculture** to calculate precisely the need of water of a certain cultivation to avoid waste, to prevent serious plant diseases or to identify any pests that could harm the plants in advance, finding strategies to increase production efficiency.*

Hydroponics 4.0: The Future of Agriculture

The **floating Hydroponics system** in agriculture is a method of growing plants which:

- **does not use soil as a substrate** and **does not need large spaces**
- uses a **complete nutrient solution for plant growth** in a **controlled environment** such as greenhouses or special structures
- can **provide 3 to 8 times higher yield** compared to an agricultural land of 1 ha
- Is an **innovative system designed to make cultivations possible even in extreme habitats**, ensuring a year-round yield and a fast and organised production.

Hydroponics 4.0: The Future of Agriculture

IA and Robotics are setting the pace in agriculture, leading to **higher efficiency, productivity and sustainability**.

This **combination of technologies** is revolutionising the agricultural sector and it enables farmers to **face complex new challenges such as the climate change**.

It is **urgent to find answers** to the **increasing demand for food** and to the **lack of resources**.

04

«HortoMio» Grow Lab Green

The village of San Martino di Rosignano

In Monferrato area **agriculture is the expression of culture and tradition**.
It is also **one of the most important sources of income** and our school teaches, keeps and passes these **values** to students.

PON Edugreen

EDUGREEN is a support that the Government gives to schools to **promote technological green and progress**, facilitating sustainable development in economy. Through this project we aim at promoting the creation of **eco-friendly workplaces for ecological transition**, particularly related to the agri-food supply chain, thanks to state-of-the art equipment, useful to **re-engineering the production system and ensuring full environmental sustainability in the process**.

HortoMio Grow Lab Green

HORTOMIO systems are designed and **built to respond to the European and national guidelines** to **facilitate a green, digital and resilient economic recovery**.

HORTOMIO green laboratories are created to be modelled on different floor plans and surfaces, ensuring the **maximum adaptation** and **easy and effective maintenance**. Everything is **managed electronically** by a control unit which uses digital systems (the Internet of things) monitoring the crops growth. They are perfect in recovering old varieties of vegetables, both leaf and fruit.

Students can test directly a **low-consumption production** and be **more aware of a healthier way of thinking food**.

HortoMio

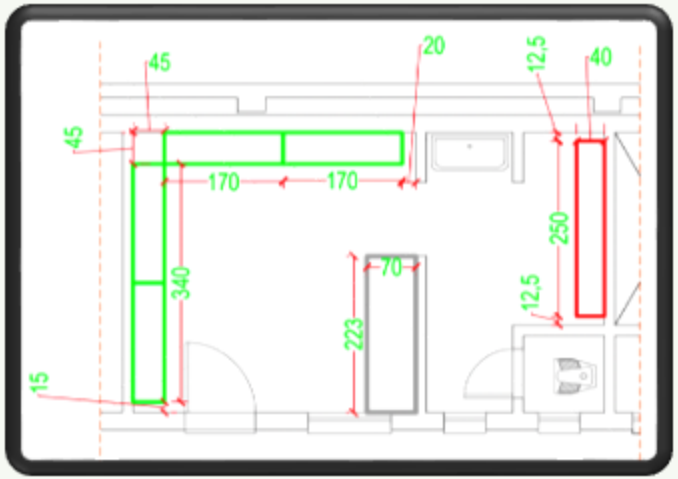
HortoMio Grow Lab Green

The project aims at ensuring a **research tool and training**. It is an **experimental and demonstration context**. Thanks to the installation of **“production walls” with hydroponic technology**, HORTOMIO aims at creating an analysis laboratory to study the development of the cultivations, grown thanks to **technological supports** which can:

- recover and experiment with old varieties
- increase food safety
- promote healthy eating and sustainable practices
- experience the environmental impact of economic activities
- analyse and reduce consumption
- promote soil conservation

HortoMio Grow Lab Green

The placement provided includes an **inside space of about 26 square metres with water and electrical connections**. The laboratory takes up all the surface of the room where the production walls are built. There is a **refrigerated counter** with support shelves and a **steel table**, where students take part in research activities. **All data are processed in IT systems**. The structures are composed of **4 levels of cultivation for leafy plants** and each plant tray represents a growing area with its own lighting system.



Modules & Production

The production area for the cultivation of **leafy plants**, for example salads and basil, consists of **4 modules**. To ensure the growth a **floating technique** is used, which keeps plants on floating supports, allowing nutrients to be absorbed from water without the need for substrate. There is a series of shelves equipped with tubs and growing modules which can provide a maximum number of 198/256 plants. Each module is modern, easy to be built, maintained and cleaned.

The production area for the cultivation of **fruit plants** consists of 1 module which can contain 6/8 plants. It is possible to **observe and assist the plants from germination to the full ripeness of the fruit**.

Laboratory Components

In the laboratory we have:

- a **fertirrigation system** which allows to recover water, reuse it with a negligible consumption;
- an **air conditioning system** to keep the GROW LAB GREEN at optimal temperatures throughout the year;
- a **refrigerated counter** in the middle of the room which serves as a storage for germplasm and other materials, to keep them cold, the counter top is used as a sterile worktop;
- an **indoor lighting system** which is dimmable and waterproof;
- an **all-in-one computer** which acts as a control and analysis centre and data collection;
- the **Internet-connected cameras** which are placed in strategic points to monitor the production area.

Agriculture Is Changing

Climate changes and new diseases are leading to **ecosystem changes** too. In the past some varieties of crops were discontinued and some new others were introduced to ensure more income to the farmers. But these ones are **more sensitive to the changes** that are taking place.

Now it is important to **grow old varieties** which are **more tasty and resilient**. Our area has rolling hills that gently slope towards the river Po, it is a **rich land where unique fruit and vegetables are grown** (the golden celery of Asti, the fragrant strawberry of Tortona, the horn shaped pepper of Carmagnola...).

They have common features such as their taste, their disease resistance, their reduced need of water and nutrients, their integration in the local ecosystem, their stories, traditions and recipes.

Relationships with Local Businesses & Supermarkets

The project offers great opportunities to our students, our territory and business activities aiming at **reducing pollution from transport over long distances and packaging**. **Large supermarket chains** can be **potential investors** in getting **unique agricultural produces** coming from a serious and careful research and can be interested in local promotion.

Thank you for listening!

Do you have any questions?

alis013001r@istruzione.it
perotto.paola@istitutoleardi.edu.it
www.hortomio.it