



## Elementary School Science with the Labdisc





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## The Need

Science education in schools is very important for sustainable national economic growth and independence in a competitive global economy. To nurture the next generation of scientists, engineers and technicians, effective and engaging science teaching is essential. Research shows that the best way to teach science, while increasing student motivation and understanding, is to combine technology with inquiry-based learning.

Science is a language, and like any other language it is best taught from a young age. As important as it is to teach science properly, it is critical to start science learning early. This will plant the seeds of curiosity and foster a love of science in young students, ensuring a greater number later major in sciences at high school and make science-driven career choices.

However, currently science has a very different reputation with students. Due to the tedious, dull and passive rote learning methods used to teach science (such as memorizing formulas), most students associate science with difficulty, boredom and irrelevance.

## The Labdisc Solution

The Labdisc Enviro solution makes science exciting with a focus on a subject that is relevant to all: Exploring our environment and the sustainability of our planet.



**Left:**  
*Elementary school students use the Enviro Labdisc to measure pH, temperature and water cloudiness in a pond*

**Right:**  
*Elementary school students use the Enviro Labdisc in a weather box to take temperature, humidity and barometric air pressure measurements over 48 hours.*





To discover their world, and understand the importance of environmental protection, young elementary school scientists don't need special materials or bulky equipment and cables. The Labdisc is simple and immediate, and open the door for inquiry-based learning with compact award winning data logging technology.

The Labdisc also fully integrates with the latest and ubiquitous technologies that children love to use such as tablets, iPhones and computers. Labdisc technology is cost effective, as well as being very easy-to-use by young students and elementary school teachers who have limited or virtually no technical experience.

The Labdisc is the only all-in-one wireless laboratory which teachers can apply with confidence in elementary school science. As a direct result of this, Globisens is currently the only science education company implementing data logging on a grand scale across a large number of elementary schools in Russia, Israel, Chile, Brazil and more.



## Pedagogic Benefits

**Parallel real scientific behavior:** Young students learn in an intuitive way to connect their actual sensations and experiences to real science. For example, when a child says “I feel hot”, they can translate this sensation to degrees Celsius. In other words the room’s temperature is 35 degrees Celsius.

**Prepare young students for their responsibility to our planet:** Students can learn about their immediate environment, the globe and the detrimental effects of global warming. They are educated to protect their environment and ensure the sustainability of resources for their own and future generations.

**Familiarity with important science tools:** The digital laboratory technology allows students to become fluent in data interpretation via graph-reading, meters, understanding coordinates and even spreadsheets.

**Delighting in science:** Students have the opportunity to act as real scientists and conduct science experiments, inquiry and research. They develop a sophisticated scientific vocabulary and understanding, but more importantly they learn to appreciate the beauty in science; an appreciation which directly influences their later academic choices and career path.





## Equipment

The Science course provided here is based on the Labdisc Enviro unit. This is a single multi-meter device that can measure 13 different parameters such as: Temperature, barometric pressure, relative humidity, , water quality, sound level, UV radiation and many more. The Enviro also includes a GPS unit allowing student to plot their measurements on Google or Apple maps. The Labdisc rechargeable battery allows up to 150 hours of measurements between charging – very useful for long weather recordings. All measurements performed with the Labdisc can be wirelessly transmitted to any computing platform, such as desktops, netbooks or tablets, where students can use our GlobiLab software for data analysis.



By focusing on Environmental Studies with an all-in-one solution like the Labdisc, schools need make no further investment in additional experiment materials. The single exception is a basic weather box located in the school yard which can store the Labdisc during long-term weather recording and observations.

## Activities & Curriculum

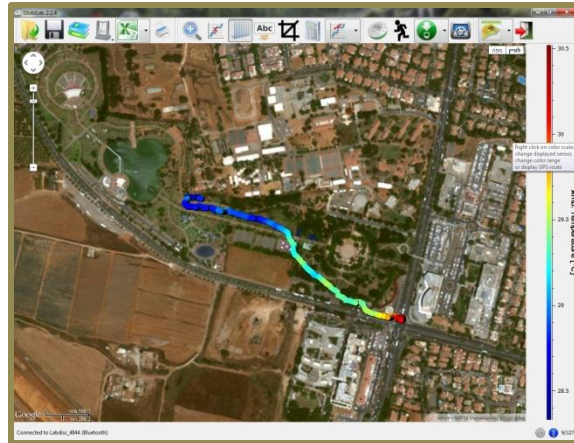
Starting at fourth and fifth grade in elementary schools makes the Labdisc the first measurement device young students will have ever experienced in their science activities. Thus, the course will start with simple temperature measurements to allow students to become acquainted with basic units of scientific measurement, such as Celsius and Milibar, and fundamental measuring and data display tools such as meters, graphs, bar graphs and tables.

The course will provide students with basic science knowledge and inquiry skills. Students will learn about the need for environmental protection and schools will be able to conduct

collaborative research and share data measurements collected by different schools, located in different climate areas.

Activities will include:

- Weather observations
- Water quality measurements
- Heat isolation
- Acid rain
- The Greenhouse Effect
- Microclimates
- Noise in the city
- Cloud detection
- UV radiation





## Labdisc Enviro Data Logging Specifications

Parameter	Labdisc Enviro
Supported Platforms	Standalone, PC, MAC, iPad
Built-in Accessible Sensors	12 sensors: Ambient Temperature, Barometer, Colorimeter, Dissolved Oxygen (electrode sold separately), External Temperature, GPS, IR Temperature, pH, Relative Humidity, Sound Level, Turbidity, Universal Input and UV
Max. Sampling Speed	10/s
Sampling Resolution	12-bit
Internal Data Storage	100,000 samples
Internal Rechargeable Battery	LiPO 7.2V
Battery Life <sup>1</sup>	> 150 Hours
Display	Graphical LCD 64 x 128 pixels
Keypad	Yes
Communication	USB 2.0
Wireless Communication	Wireless Bluetooth V2.0 communication for all sensors
Remote Data Collection	Yes
Automatic Sensor Testing & Calibration	Yes
Size	$\phi=132$ , H=45 mm
Weight	200 gr
Temperature Range	-10 to 50 °C
Standard Compliance	CE, FCC

<sup>1</sup> For sampling rate of 1 per minute





## Labdisc Enviro Built-in Sensor Specifications

Sensor Type	Max. Range	Accuracy
Ambient Temperature	-10 to 50 °C	±1 °C
Barometric Pressure	300 to 1100 mB	±2.5 mB
Colorimeter	10 to 90% transmittance (3 colors)	±5 %
Dissolved Oxygen	0 – 14 mg/l	±8 %
External Temperature	-25 to 125 °C	±2 %
GPS	N/A	±3m
IR Temperature (Wide)	-70 to 380 °C	±0.5 °C @ 0 to 60°C ±1 °C @ 60 to 120°C ±1 °C @ -40 to 0°C ±2 °C @ 120 to 380°C ±2°C @ -70 to 40°C
pH	0 to 14 pH	±2 %
Relative Humidity	0 to 100 %RH	±4%, 10% to 90% RH
Sound Level	58 to 93 dB	±4 dB
Turbidity	0 to 1000 NTU	±10 %
UV	0 to 400 mW/m2	±5 %

## Analysis Software Specifications

Parameter	Description
Data Retrieval	Online up to 100s/s, or download Labdisc stored data
Data Display	Line Graph, Table, Meters, Google map
Communication	USB, Bluetooth
Data Logging Configuration	Sensor selection, sampling rate, sampling points
Data Manipulation	Placing and moving up to 2 markers on the graphs zoom in/out, graph cropping, graph coping, functions such as: derivative and regressions
Data Export	Automatic export to EXCEL
Simulation	Effect of Temperature and Air Pressure on Gas and Liquid molecules
OS	PC, MAC, iOS