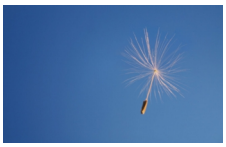

Seeds

Education and Culture
Lifelong learning programme
COMENIUS REGIO

Title	**HOW MUCH OXYGEN?**
Description	Experimental measurements of the main parameters of ecosystems are the foundation of the "precautionary principle" which claims for conscious choices based on objective data. Measuring the dissolved oxygen is an essential parameter to evaluate the health of water environments . Nitrogen and phosphorus pollution, due to the use of industrial fertilizers, has completely upset the chemistry of our planet, doubling the flows of nitrogen and phosphorus in ecosystems. Both the elements are causing a deep hydrogeological pollution, degrading several lakes and rivers and devastating costal see areas : as a consequence wide" dead zones " , characterized by a low level of oxygen ,have recently appeared. A simple experiment to run in class can help to become familiar with the values of dissolved oxygen and its meaning. This will bring the students to investigate the phenomenon of eutrophication than could later be developed in various ways.
Materials and Time needed	Tools provided in the kit: dissolved oxygen meter, pH meter, thermometer. Materials to be provided by the teacher: three transparent containers (small plastic fish tanks, beakers ,cut out bottles 1.5 l,….), a three-liter tank , pond water, fertilizer, dishwasher detergent containing phosphates. Time required:30' to start off the test, 10\15 minutes to monitor it in the following three weeks.
Instructions	• Calibrate the dissolved oxygen meter according to the instructions • Fill the three containers with pond water (about 1 l. each) • The first container is the control sample • Add to the second container half a measuring spoon of fertilizer • Add to the third container half a spoon of dishwasher detergent • Place the containers in the sun light so that they can receive the same quantity of light and heat • Carry out weekly measurements of pH, temperature , dissolved oxygen in the three containers at least for three weeks • Make measurements of dissolved oxygen by dipping the probe in the water and keeping it moving constantly (see instructions) • Build a graph with the results and explain them

In-depth study	Test dissolved oxygen in samples from different origins (possibly collected by the students). Carry out an experiment to verify the influence, on dissolved oxygen, of plants or algae kept in the sunlight or in the dark . Carry out an experiment to evaluate the relation between oxygen in the atmosphere and oxygen dissolved in water and what influences the balance of the two values. Investigate the parameters that contribute to determine the value of oxygen dissolved in water environments and its solubility. Investigate the meaning and the means of calculation of indexes such as: BOD, Biochemical Oxygen Demand COD, Chemical Oxygen Demand