

## Play with Water

### Introducing Ecological Engineering to Primary Schools to Increase Interest and Understanding of Natural Sciences

EcoEng-NL 13/2007

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The project with the official acronym "WasteWaterResource" is a coordination action funded by the European Union. The project addresses the objectives of Science and Society within the 6th Framework Program for Research and Technical Development. It started in November 2005 and will end in June 2008, when a concluding workshop in Switzerland will be held.

The consortium consists of six of research institutions active in the field of ecological engineering:

- ◆ The University of Applied Sciences Zurich, Institute of Natural Resource Science, Switzerland (ZHAW)
- ◆ University of Aarhus, Department of Biological Sciences, Denmark (UA)
- ◆ LIMNOS Company for Applied Ecology, Ljubljana, Slovenia
- ◆ Norwegian University of Life Sciences, Norway (UMB)
- ◆ Training and Demonstration Centre for Decentralized Sewage Treatment, Germany (BDZ)
- ◆ Mid Sweden University, Sweden (MIUN)

Each of these institutions has close connections with pedagogical specialists, schools and other stakeholders in the field of primary education.

"WasteWaterResource" is focussed on ecotechnologies, as they are developed and studied by project partners. These are the starting point for the design of four different learning systems that initiate pupils of primary schools in basic concepts of ecology and cycling of elements in nature. In collaboration with national and regional education authorities the project will apply task based approaches of teaching natural science, with ecological engineering.

The provided experiments and classroom models are addressing current research fields of the project consortium in eco-technologies. The classroom models and learning paths are very suitable to illustrate complex natural systems since pupils undergo hands-on experience by constructing the systems themselves.

Fig. 1: Setup for the Evapotranspiration experiment in the classroom



Fig. 2: Plants being transplanted to the aquariums



The four different learning systems are:

1. **The Compost Factory:** Several experiments guide the children through the recycling of organic wastes into crops and ornamental plants. The last experiments move the focus from kitchen wastes towards composting toilets and ecological sanitation.
2. **Fish grow Chips:** These experiments introduce pupils to the subject of aquaponic. The primary goal of aquaponic is to reuse the nutrients contained in fish faeces to grow crop plants. Wastewater and sludge from fish production are being used in an integrated vegetable/fruit production to make use of these residual nutrients.
3. **The Secrets of Water:** This learning system guides into different topics of ecoremediation. It provides ideas for excursions and experiments that refer to different compounds of a river ecosystem that are important for its self-cleaning capacity. The goal is to sensitize pupils for the importance of taking care to river ecosystems.
4. **Sewage produces Energy and Food:** Pupils are being introduced to the global water cycle as well as to water distribution and use. Furthermore this learning system provides experiments to the topic of construction and different application opportunities of constructed wetlands.

Fig. 3: Sketch from the "recirculation book" done by a pupil of a Swedish primary school where the classroom aquaponic system was tested



So far, construction manuals and teacher instructions have been created by each project member. On the project website ([www.play-with-water.ch](http://www.play-with-water.ch)) the systems and the different experiments are well documented in order to make all information and material easily accessible to the public and particularly to primary school teachers.

The project is now in the phase of assessment of teaching units. Trial learning units applications consist of translating of the materials into local languages and of assessment of each teaching unit in at least two countries. The last step will be to disseminate the results to the public and to organize a conference on the outcome of the project activities.