

# AQUAPONICS IN EDUCATION

Aquaponics is not only a forward-looking technology, it also promotes scientific literacy and provides an excellent tool to teach the natural sciences at all school levels, from primary school to university level..

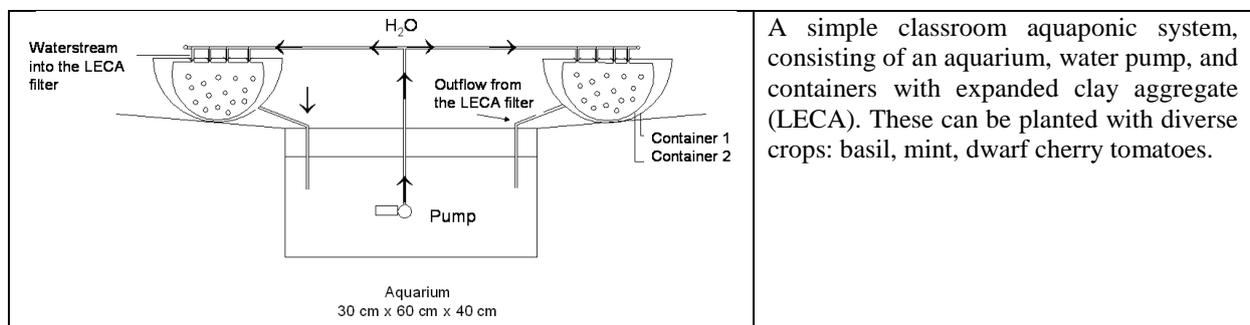
An aquaponic classroom model system provides ways of enriching classes in biology and other life sciences within a “hands-on” teaching unit. Ideally, the aquaponic model is embedded in teaching units, which promote a better understanding of natural cycles, waste recycling, and environmental protection.

The aquaponic system can be implemented in different types of teaching units, over different time periods, and accordingly there are distinct scenarios:

- In the classroom, during one term, 1-2 lessons per week (8 to 12 weeks);
- as an excursion or project week on 2-5 consecutive days;
- as an extracurricular activity, during one term; and
- as a permanent feature for the whole school, thus providing a focal “conversation piece” and study facility for several classes.

Some advice for working with primary school children:

- Simple classroom systems that can be constructed together with students are the most effective for this stage of education (See Figure 1).
- Productivity is not a central issue, but demonstrating the laws of nature is.
- Understanding is more important than perfection.
- Include a wide array of activities: drawing of the plants and animals, class journal, measurements of water quality, observations of the fish, feeding of the fish, and cooking with the produce.



The basics for the implementation of aquaponics in teaching at the primary school level were elaborated during the EU Framework 6 Project “Play with water”. The aim of the project was to develop comprehensive teaching units which should enable primary school children (ISCED 1 Level of Education according to UNESCO) to discover basic concepts of ecology and obtain hands-on experience in cycling of elements in nature, and thus the potential of wastewater as a resource. Play with Water provides teachers with experiments that can easily be integrated in their natural science classes. Materials were developed in close cooperation with stakeholders in the field of education.

The main outputs, including lessons and directions for building a simple classroom system, can be downloaded here: [www.zhaw.ch/iunr/play-with-water/](http://www.zhaw.ch/iunr/play-with-water/).

A series of lessons on system thinking was published as a Textbook<sup>1 2</sup>

<sup>1</sup> Bollmann-Zuberbuehler, B., Frischknecht-Tobler, U., Kunz P., Nagel U. & Wilhelm Hamiti, S. (2010) Systemdenken foerdern: Systemtraining und Unterrichtsreihen zum vernetzten Denken: 1.-9. Schuljahr. Published by Schulverlag plus, Bern. 94 Pp. ISBN: 978-3-292-00628-8.

<sup>2</sup> Junge, R.; Wilhelm, S.; Hofstetter, U. (2014). Aquaponic in classrooms as a tool to promote system thinking. In: Maček Jerala, M.; Maček, M. A. (Eds). Conference VIVUS: Transmission of Innovations, Knowledge and Practical Experience into Everyday Practice. Collection of Papers, Strahinj, 14.–15. november 2014. (234-244). Strahinj: Biotehniški center Naklo. ISBN 978-961-93564-4-9.