

# THE BLUE-PLANET EARTH SYSTEMS APPROACH (BEPESA) FOR THE STUDY OF WATER-RELATED SYSTEMS

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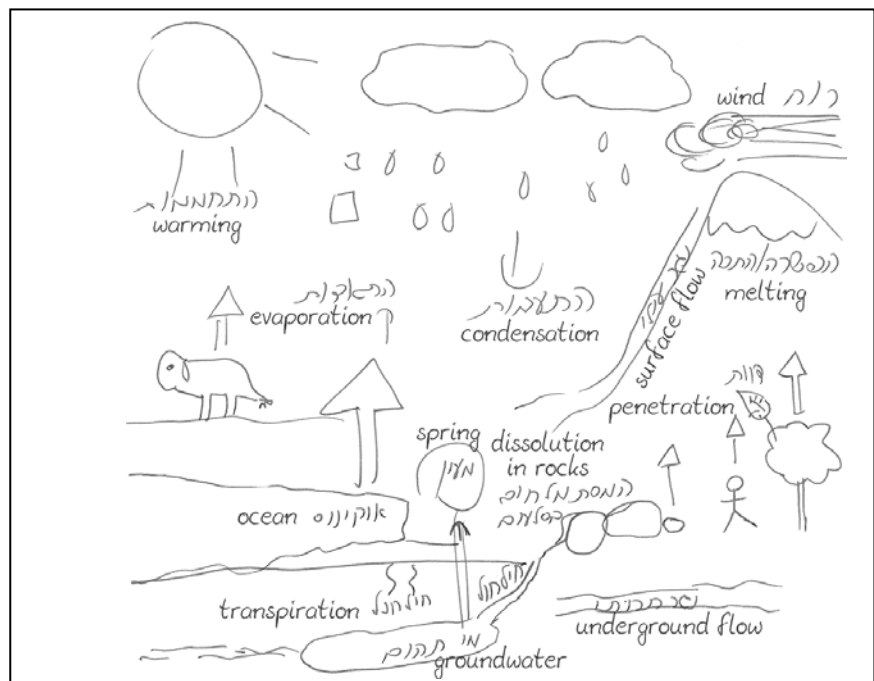
## Abstract

In the XXI<sup>st</sup> century our contact with and understanding of natural aquatic environments becomes an issue of paramount importance for sustaining and improving the quality of human life on Earth. Such an endeavor suggests education to be a key factor in our society, a process that should start as early in life as possible. This calls for an environmentally-oriented program that is based not only on environmental education towards awareness, but a program that helps develop environmental insight and understanding.

The main goal of the Blue Planet Earth Systems Approach (BEPESA), presented here, is to encourage students, at junior-high school level to develop system-thinking as a basis for environmental literacy. BEPESA is an earth system-based curriculum package that focuses on the study of water-related issues in an environmental context. It has been applied and tested in Israel since 2000, in association with a cognitive-based research that disclosed unusual positive results. High order thinking skills, such as system thinking skills, can indeed, be taught at the junior high-school level, leading to considerable gains in students' reasoning and abilities. The research results indicated that the students improved their ability to identify dynamic relationships within the systems of Earth. This yields, for example, an increase (from 30% to 70%) in the number of students who acknowledged the connection between the composition of a water solution and the rocks through which they pass. Moreover 90% of the students incorporated the penetration of rain into soil and rocks in their post-test drawings (Fig. 1). It was also found that in spite of minimal initial system thinking abilities 25% of the students reached the highest level of system thinking in the context of the hydro cycle.

It is suggested that building understanding of water related concepts through direct, concrete experiences with earth spheres in natural environments contributes significantly to the development of system thinking skills.

Fig. 1 – Drawing showing cyclic dynamic perception of a 13 year old student after being exposed to BEPESA.



BEPESA emphasizes that understanding is not about single propositions or concepts, but rather about interrelated sets of ideas that provide a framework for understanding environmental phenomena. The following scientific principles were included in the program: a) The existence of dynamic relationships between different Earth “compartments” (e.g, biosphere, hydrosphere); b) Energy and substance transport between biogeochemical cycles that affect the systems of Earth, and c) The need for environment-friendly development, along with the implementation of technological solutions to reduce negative environmental impacts and to preserve nature's capacity as a life-supporting system.

After the very positive Israeli experience, BEPESA is ready to be presented to the children of the world, and this first Edition is dedicated to the Spanish speaking countries.