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MPTL 13th Workshop

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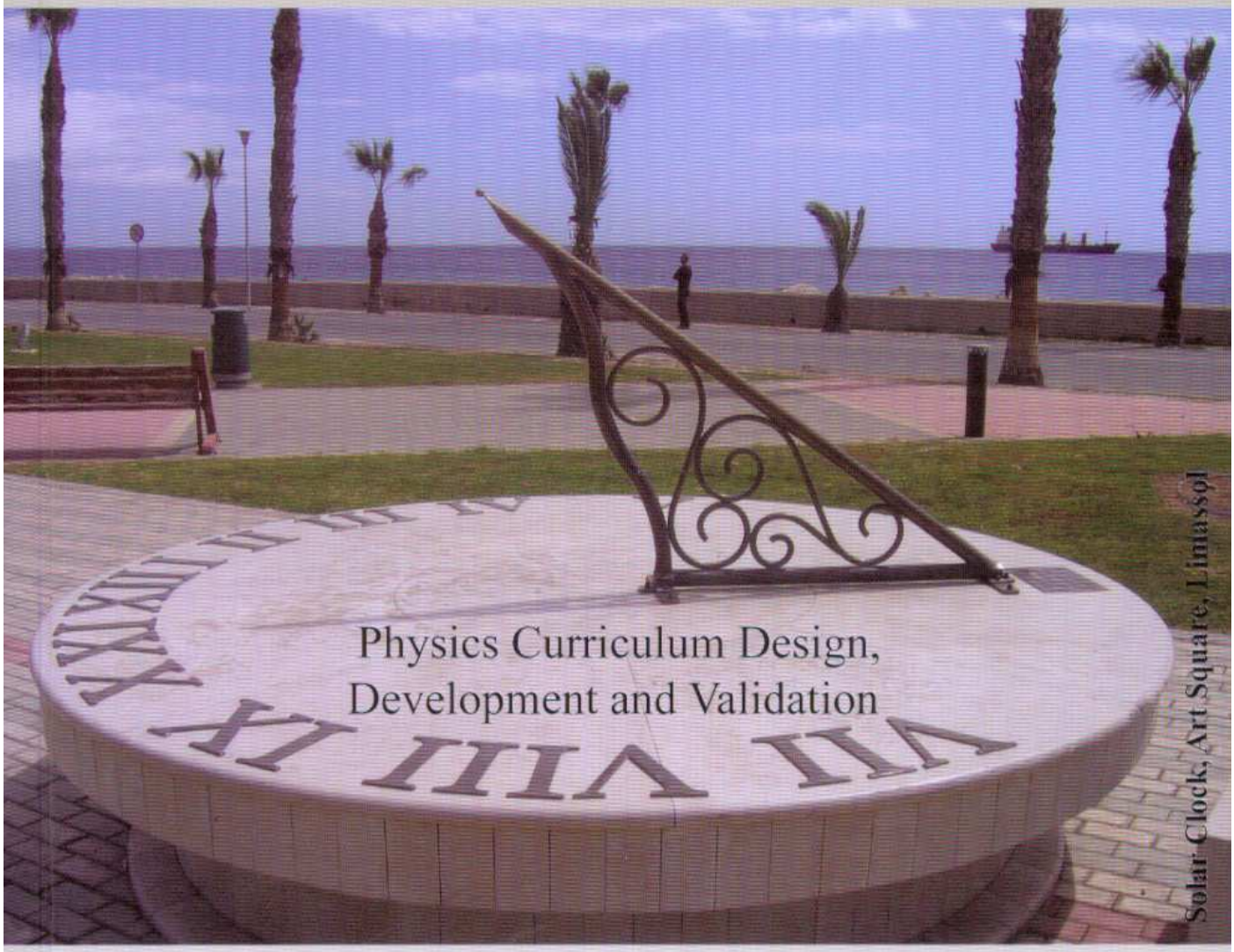

Solar Clock, Art Square, Limassol

Program and Book of Abstracts

August 18 - 22, 2008, Nicosia, Cyprus

Learning in Science Group

University of Cyprus

Energy – An intuitive and interactive educational path

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Are elementary school pupils wiser than Aristotle was? If not, let's start from his statement that heavy objects fall towards the center of the Earth. Also Galileo was saying that objects fall down, but why?
If, by a double, down-and-up inclined plane we show first that objects not only fall down but also come back, then it becomes intuitive that they possess a special quality: let's call it "energy". Now, we can play not with objects, but with this special quality.
An intuitive, strictly sequential path, was constructed inside a long corridor, with about 40 interactive objects, with growing conceptual complexity (friction, rotations, moment of inertia etc.). We tried it during a Science Festival with elementary school pupils. At the end of the path everybody, including university professors, made their own discovery.

A teaching proposal about energy for students aged 11-15

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Learning about energy is recognized as an important objective of science teaching starting from the elementary school. This objective creates the need for teaching simplifications that compromise the abstract nature of this construct and students' need for a satisfactory qualitative definition. Traditional teaching approaches have failed to respond to this need in a productive manner. In an attempt to maintain consistency with how energy is understood in physics they tend to either provide abstract definitions or bypass the question "what is energy?", which is vitally important to students. We suggest that shifting the discussion to an epistemological context provides a means to overcome the difficulties inherent in presenting energy as a physical quantity. This paper reports on an attempt to develop such a teaching approach, which introduces energy as an invented entity in the context of a *theoretical framework* for the unified analysis of the changes encountered in physical systems, regardless of the domain they are drawn from. This theoretical framework is then elaborated in a progressive manner through the assignment of various properties to energy (i.e., transfer, form conversion, conservation and degradation). In addition to this, students are guided to develop the model of *energy chain* as a means of applying the theoretical framework of energy on