New Perspectives in Science Education
International Conference
NEW PERSPECTIVES in SCIENCE EDUCATION
Edition 4

Introducing Young Children to the Science of Celestial Bodies

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Abstract

This paper presents an instructional intervention for teaching young children about the science of celestial bodies, which is developed within a social constructivist paradigm. We argue that, in order to understand basic astronomical phenomena such as the day and night alternation, the phases of the moon, or gravity, children need to work meticulously and grasp some fundamental and cross-disciplinary concepts. Thus, a concept-based approach to developing curriculum activities in astronomy is adopted, and we strongly focus on spatial thinking and learning.

Spatial thinking can be used as a framework for understanding in astronomy and for this reason, learning activities should target the use of all the three types of spatial cognition that help us interpret the world: (a) cognition in space, which is thinking about movement, navigation and physical actions in space; (b) cognition about space that focuses on a scientific understanding of the nature, structure, and function of phenomena that range from the microscopic to the astronomical scales; and (c) cognition with *space, which we develop when using space in the abstract, e.g. when we make maps or even concept maps. In our paper, we briefly present how spatial and crosscutting concepts, as well as spatial cognition, are being addressed through the proposed instructional intervention.*

Moreover, we focus on the everyday, and direct experiences children should have with the phenomena that enhance the learning of abstract concepts. The paper, therefore also brings up the crucial role of home-school collaboration and the family's involvement in the development of spatial thinking and learning. The family environment can play an important part in enhancing the knowledge and understanding of these subjects, and the role of parents is pivotal in the development of spatial cognition and awareness. Informal learning activities produce various emotional and cognitive interactions among families. The family members' cognitive contribution extends and promotes the understanding of facts, principles and theories while emotional contributions create enthusiasm, motivation and willingness for learning. We discuss the different ways in which families can collaborate with schools to infuse the use of spatial thinking throughout the day and help children appropriate and construct the understanding of new knowledge.