



Day/night Cycle: Mental Models of Primary School Children

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ABSTRACT The study investigated the mental models of primary school children related to the day/night cycle. Semi-structure interviews were conducted with 40 fourth-grade and 40 sixth-grade children. Qualitative and quantitative analysis of the data indicated that the majority of the children were classified as having geocentric models. The results also indicated that a large number of primary school children did not appropriately conceptualize the essential prerequisites for understanding the day/night cycle, and that their observational skills were limited. It was also concluded that children's age (class) and their mathematical achievement were good predictors for the quality of their mental models.

KEYWORDS: Alternative conceptions, day/night cycle, mental models.

Introduction

Research studies have well documented that students form ideas and reasonable explanations about several physical phenomena, long before they enter the primary school classes (Dykstra, Boyle, & Monarch, 1992). Constructivist perspectives of knowledge development (Tobin, 1993) offer an explanation for the origin of student alternative conceptions (Strike & Posner, 1992; Vosniadou, 1994). Gunstone, Gray, and Searle (1992) clearly stated that children idiosyncratically construct their own meanings from sensory inputs, and that the different conceptions, so commonly found, are the outcomes of this personal construction process. Children develop ideas and beliefs about the natural world through their everyday life experiences stemming from sensory experiences, language experiences, cultural background, peer groups, mass media, as well as from formal instruction (Duit & Treagust, 1995).

These initial ideas have been described by many terms, such as, misconceptions, pre-conceptions, alternative conceptions, and alternative frameworks (Wandersee, Mintzes, & Novak, 1994). Vosniadou (1994) regards misconceptions to be spontaneous constructions, which are often generated on the spot, and are not deeply held specific theories. These conceptions arise as "individuals attempt to assimilate new information into existing conceptual structures that contain information contrary to the scientific view" (Vosniadou, 1994, p. 45).

Student alternative conceptions that are grounded on everyday experiences are often strongly held and resistant to change (Driver, 1989; Driver & Easley, 1978;

