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Childrens Unscientific Conceptions Before and After Instruction in Space Science

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Abstract

Research has documented childrens difficulty reconciling observations of the sky (Earth-based perspective) with scientific models of the solar system (space-based perspective) (e.g., Vosniadou & Brewer, 1994). We developed a coding rubric to capture childrens explanations before and after instruction that emphasized relational learning mapping the spatial, temporal, and causal relations inherent in the day-night cycle. We focused on several key dimensions including the perspective of the child and their causal attributions, focusing primarily on their mental model (e.g., Sun goes up/down). We coded pre- and post-test videos from 3rd graders from two experiments (N=205) using the rubric. Results suggest that (a) consistent with prior findings, children who received the instruction demonstrated fewer unscientific conceptions about Sun motion at posttest, and (b) these conceptions were more pronounced in modeling than in verbal responses. We conclude that topics that require integration between Earth- and space-based perspectives are particularly challenging for young children.