

# Problem Solving Strategies and Conceptions Used by 4<sup>th</sup> Graders in Elementary School

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Using mainly the qualitative approach, this study investigated the concepts and strategies used by fourth-graders to solve problems in relation to water state learning. Data collected included clinical interviews with students, questionnaires, video recordings, and students' worksheets. Out of a total of 201 fourth-graders in a primary school, 28 students were selected to participate a problem-solving teaching activity and then a one-to-one interview. The results of the study were as follows: (1) There were three levels of problem-solving conceptions that the students had: the concrete level of conceptions, the half-abstract level of conceptions, and the abstract level of conceptions, (2) The style of conceptual development in problem-solving that the students had was mainly using higher level conceptions to solve problems stably. Furthermore, through peer discussion and reflection during the problem-solving activities, students who used the lower level conceptions previously could use the higher level conceptions. However, after teaching, some students without peer interaction would possibly use the lower level conceptions again, and (3) We also found that students who had similar preconceptions might not apply similar problem-solving strategies. However, the conceptions that students used influenced the strategies the students used in problem-solving.

Keywords: problem-solving, conceptual development, three states of water

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