

## Questionnaire study on effectiveness of geological field observation for elementary school

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The phrase 'Understanding with realization' was added to the targets of elementary school science curriculum of Japan. Geological field observation is maybe effective for getting real understanding with realization. Therefore, the authors accompanied the field lecture on geology for elementary school children of sixth grade and did a questionnaire study.

'Understanding with realization' has three meanings: 'Understandings through experience', 'Understanding through action', and 'Understanding and awareness of the relationship between nature and real life'. Questionnaire are as follows: 'Q1 Please write your feelings when you touch or see the stratum', 'Q2 Please write what you have solved.' and 'Q3 Do you think that the stratum is under your feet or house or school?'

Questionnaire survey was done for 100 elementary school children.

For question 1, we analyzed and categorized the words which appeared in the answers. The words were divided into several categories: The words which frequently appeared are as follows: words related to the size and colors (light brown, large etc.), or those related to the state and the pattern (layer, stripes, slantingly, soft etc.), those which they found(strata, rocks, soil etc.), those related to tactile(murmuring, fragile etc.) and those related to impression (wow!, surprise etc.). Conversely, words such as particle size or shape of the rock rarely appeared, which are important when considering about the genesis of the stratum.

For question 2, we analyzed sentences of children and judged whether they have solved some problem on geology. 41% of children were judged to have solved something, 9 percent for instructor-led classes and 66% for in child-centered teaching classes.

For question 3, 96 percent of the children answered that they think that the stratum is under their feet or houses or schools, regardless of the distance from the observation area and school.

For getting 'Understandings through experience', it is important for teachers to show the point of view such as particle size or shape of the rock. For 'Understanding through action', thinking in the classroom before the observation is important. geological field observation is effective for 'Understanding and awareness of the relationship between nature and real life', regardless of the distance between observation point and school.