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Concrete models for promoting students' understanding of high school mathematics

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Mathematics is characterized as abstract subject. This is one of the causes that make students lose their motivation toward learning mathematics. However, when the teacher shows and utilizes concrete models in the classroom, there is a possibility that students come to be interested in mathematics and develop their understandings.
Key words: Concrete model, Teaching material, Mathematical activity

INTORODUCTION

In this presentation, concrete models mean teaching materials that represent specific mathematical structures or concepts. I have been making and using concrete models for teaching mathematics in high school (Usui, 2008, 2009). Students can acquire important mathematical knowledge by operating these models. In addition, when students work together with their friends in the classroom, they are provided with the opportunity to clarify their ideas and thinking and to communicate their ideas and thinking to other people.

MAIN SECTION

"Looking at" and "touching" the concrete models are very important for students in understanding mathematics. Therefore, in this presentation, I exhibit some concrete models which I made and explain mathematical structures and concepts that are represented by the models. Moreover, by sharing my experience in the classroom, I discuss how concrete models can contribute to students' mathematical activities of finding out formulas and properties (MEXT, 2009). <Exhibition of concrete models: parabolic billiard; oval billiard; blocks for sum of natural numbers, sum of square numbers and sum of cubic numbers; binary system; circular permutation; line symmetry and rotational symmetry>

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