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Connecting spatial reasoning ideas in mathematics and chemistry.

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From the text: Concepts in mathematics are often universally applicable to other fields. A critical aspect for success in high school or college is the ability to transfer content knowledge from one discipline to another. This is especially true for material learned in the sciences and mathematics. Several studies have suggested that strong mathematical skills are necessary for enhanced learning in introductory science coursework in college. Prior research has shown that familiarity with geometric shapes and spatial reasoning skills is a predictor for developing good problem-solving skills in chemistry. In this article we describe two activities used as part of a mathematics workshop designed to encourage high school students to develop connections between mathematical problem solving and its application to other scientific fields. The workshop was conducted as part of a partnership between a university and a nearby high school with a high failure rate on state-mandated mathematics assessments. The focus of the partnership was to enhance college preparation skills for the high school students. The activities were conducted by three university faculty members – two from the mathematics department and one from the chemistry department – and the high school mathematics department chair. These activities will be most beneficial if students' spatial visualization skills are developed in the mathematics and chemistry classrooms simultaneously. If teaching the chemistry and mathematics concepts concurrently is not possible, the mathematics teachers can share this activity with their chemistry colleagues, and each teacher can emphasize the link in the activities for their respective discipline.

Classification: M60 G40 A20

Keywords: problem solving; chemistry; spatial ability; thinking skills; activities; puzzles; mathematical concepts; scientific concepts; spatial reasoning; geometry; intercurricular instruction

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