

# Ohio Journal of School Mathematics

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*Spring 2008*



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*Number 57*

OHIO COUNCIL OF TEACHERS OF MATHEMATICS

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- 3 Proofs of the Irrationality of  $\sqrt{2}$   
**Zengxiang Tong & David J. Stucki**, Otterbein College

The discovery of incommensurables, the fact that  $\sqrt{2}$  is irrational, ranks as one of the most important events in the history of mathematics. In this paper we explore the beauty of this result by presenting several proofs, some historical and some our own, that demonstrate not only its depth, but also the broad range of ideas and techniques to which it is accessible.

- 7 *Flatland: A Novel Approach to Mathematics*  
**Gail Kaplan**, Towson University

After geometry students read *Flatland*, a novel written in the 1800's, they gain a thorough understanding of the abstract concept of dimension. The project described provides students with the opportunity for an interdisciplinary exploration of ideas from a variety of fields including philosophy, sociology, art, theology, and advanced mathematics. This investigation encourages students to use critical and creative thinking skills as they gain understanding and ownership of mathematical ideas and their connection to other disciplines. Students enjoy a stimulating journey on a road of discovery!

- 11 A Classroom Discussion on the Inevitability of Mathematics  
**Joseph Gerhardinger**, Notre Dame Academy

The development of mathematics is tied to the history of humans on earth. This paper summarizes a series of classroom discussions the author has had with students about how a different human history within a possibly different universe with its own characteristics and laws of nature may affect mathematics. What is truly universal in mathematics is contrasted with what is perhaps accidental. As one example, students reflect on how a mathematician living in a region of the universe with no flat space would think to graph functions. Participating students benefit from gaining a larger perspective of mathematics, and readers are encouraged to try a similar exploration with their own classes.

- 16 An Example of Using Art and Culture to Teach Mathematics: Geometric Constructions of Pennsylvania Dutch Hex Signs  
**Evan Evans**, Frederick Community College  
**Reza Sarhangi**, Towson University

This paper discusses the mathematics that is involved in the construction of "Hex Signs", describes the construction of these signs and determines the symmetry groups of such constructions. Hex Signs are circular discs with intricate geometric designs, which have specific meanings and were hung on barns in the "Pennsylvania Dutch" region of the United States. Common designs include: Rosettes, Birds, and Star Polygons.

25 **Mathematical Poetry**  
**Jeffrey J. Wanko**, Miami University

Through various poetry forms, preservice teachers develop representations of their mathematical understanding that reflect a deeper integration of mathematics with this art form, one that recognizes the foundational structure of mathematics. Preservice teachers practice writing poetry using some well-defined forms before exploring with a more open-ended format.

32 **The Role of Manipulatives – Learning from a Master Teacher**  
**Natasha Fogt**, Muirlands Middle School

This article discusses the knowledge a beginning teacher gained through the student teaching experience along with research done concerning the use of manipulatives at the secondary level. The article provides motivation to beginning teachers as well as established teachers to use manipulatives with their students and also to spread the positive impact that manipulatives can have on student learning.

37 **Sharing Teaching Ideas: Partners in Problem Solving**  
**Dianna Galante**, Governors State University

Helping students develop mathematical thinking and reasoning skills, along with providing opportunities to communicate their ideas mathematically is a goal of every mathematics teacher. One classroom approach to achieving this goal is to pair up students and allow them to share their problem-solving strategies at the board. Students must use correct mathematical language and communicate their ideas clearly when describing their solution to their classmates. A wide variety of problem-solving strategies usually emerge in a short amount of time with every student engaged and on task. With carefully selected problems, important mathematics becomes a focus of classroom discussion helping to develop student insight and conceptual understanding. Teachers gain insight into the level of student understanding as they listen and observe student solutions unfold. Thus, pairing students in the mathematics classroom can stimulate mathematics learning, engage students with challenging problems, and provide a climate for student-centered discussions while helping teachers improve instruction through the use of classroom assessment.

42 **Utilizing Technology and Baseball Data to Teach an Understanding of Statistics**  
**Heidi Sitzenstock**, East Broadway Middle School

Technology in the classroom adds excitement to any lesson. This article discusses using baseball and classroom software to further understanding of statistics. The students derive equations, complete tables, compute ratios and percents, develop an understanding of tables and graphs all through baseball. Students use real baseball stats to analyze players and pitchers then use this information to build fantasy baseball team. Students use Microsoft Word, Excel, and Power Point in their investigations of players. Developing an understanding of which players they need to trade to make their team stronger or to make their team complete is the reward for all their hard work. The final is a baseball tournament, complete with a world series. The students gain a greater knowledge base of math by applying real world meaning.

46 **Bridging Procedural and Relational Understanding Equals Success on Contests**  
**(Column: Mathematics Contest Corner)**  
**T. Michael Flick &, Debora Kuchey** Xavier University