

Ohio Journal of School Mathematics

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3 **Representations and the Work of Jerome Bruner**

Jeffrey J. Wanko, Miami University

This article examines the role that representations play in the development of mathematical ideas and emphasizes their importance in mathematics education. It also looks at the work of Jerome Bruner, an educational psychologist who advocated the importance of representations in mathematics education as early as 1960. This article uses Bruner's Stages of Representation as a framework for investigating student approaches to solving a problem and suggests ways that teachers may find Bruner's theories useful in their own classrooms.

10 **Teaching Percent through Problem Solving in Chinese Classrooms**

Wei Sun, Towson University; **Jinfa Cai**, University of Delaware; **Tingyao Zheng**, Buffalo State College

Percent is a challenging topic for many school children to learn and for teachers to teach. This paper provides a Chinese perspective to handle this challenging topic in school mathematics. In particular, this paper discussed how Chinese teachers emphasize the meaning of percent as a number, as a ratio, and as a rate. The concept is introduced and developed by engaging students in analyzing and solving various problems, often in multiple ways.

16 **Exploring Eccentricity Using Focus-Directrix Graph Paper**

Elizabeth Jones & Elizabeth M. Brown, Indiana State University

The authors present alternative graph paper which is ideally suited to graphing conic sections using the focus-directrix definition. The use of this paper helps students see the connections between the various conic sections and helps them explore limiting cases while gaining a deeper understanding of this definition.

21 **Using Ohio's Academic Content Standards: Reflections from Two Stakeholders**

Shelly Sheats Harkness, Miami University; **Danette Hickey**, Talawanda School District

This article, written as a story, describes how two different stakeholders made sense of *Ohio's Academic Content Standards: K-12 Mathematics (OACS)*. It also emphasizes the notion that mathematics lessons can and should address multiple standards, benchmarks, and grade-level indicators. The story is written as a reflection from the perspectives of – a mathematics teacher educator and a preservice teacher. New to the state of Ohio and beginning her first semester as an Assistant Professor at Miami University, Shelly describes her experience learning about the OACS and teaching a course titled *Teaching Math: Early Childhood (EDT318E)*. Danette discusses what it was like to be a preservice teacher learning about the OACS in EDT318E and to use the standards to write one mathematics lesson plan for a two-week field experience. Students count kernels of Indian corn in this lesson, one that K-2 teachers could use or modify to fit within a thematic unit related to Thanksgiving.

- 27 [The Area of a Trapezoid with Perpendicular Diagonals—a Dynamic View](#)
[David Minda](#), University of Cincinnati; [Steve Phelps](#), Madeira High School
The authors explore a problem posed in the spring 2003 Journal concerning the area of a trapezoid with perpendicular diagonals. By investigating this problem with Geometer's Sketchpad, the authors uncover other solution paths and other relationships to the broader class of orthodiagonal quadrilaterals. The authors suggest how this problem addresses the Ohio Mathematics Standards, as well as other questions for further study.
- 34 [The Puzzles and Problems of Lewis Carroll: Mathematical and Otherwise](#)
[Anthula Natsoulas](#), University of Toledo
The writings of Lewis Carroll provide many interesting connections for the mathematics classroom. Their complexity varies from fairly straightforward problems to the more complex, and in his many writings something can be found that would be appropriate for students at all levels.
- 42 [Proofs: The Nemesis of the High School Student](#)
[Don Hutchins](#), Arizona State University
When the word “proof” is mentioned in a classroom, the students’ reaction is often negative. This article mentions historical research into the development of proofs and the importance placed on them. It offers suggestions to help teachers present proofs in ways that will help the students visualize the concepts being presented. It discusses research results that show that students in the elementary grades are capable of handling reasoning and proof even though not as sophisticated as those at the high school level. It illustrates NCTM’s claim that deductive reasoning is not a topic that should be taught in only one or two sections, but should be part of the students’ curriculum throughout the year.
- 49 [Writing across the Curriculum: A Writing Project Saved Me in Math](#)
[Rosanna Vail](#), a recent graduate of Southern Oregon University
This article accounts the success of incorporating writing assignments and activities into the mathematics classroom in order to better understand Trigonometry concepts. The account includes a description of the project, materials, procedures, instructions, extensions and adaptations, positive results, and diagrams of portions of the project. The ideas for this project can be altered to be used by teachers of all levels of mathematics.
- 52 [\(Column: Research Relevant to Teachers\) Students’ Problem-Solving Behaviors that Lead to Success](#)
[Michelle K. Reed](#), Wright State University
- 56 [\(Column: Mathematics Contest Corner\) Time to Heighten Skills in Problem Solving](#)
[T. Michael Flick](#) & [Debora Kuchey](#), Xavier University
- 61 [\(Activity\) “Candy Graph” Generator: A Graphing Calculator Activity](#)
[Michael Krach](#), Towson University

- 63 (Activity) A Novel Sequence of Squares
Bonnie H. Litwiller and **David R. Duncan**, University of Northern Iowa
- 64 (Activity) Investigating Vertical Asymptotes and the Graphs of Rational Functions
Marvin Harrell, Emporia State University; **Dawn Slavens**, Midwestern State University