

Ohio Journal of School Mathematics

Autumn 2005



Number 52

OHIO COUNCIL OF TEACHERS OF MATHEMATICS

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[Marsha L. Guntharp](#), Capital University

- 7 [Operating with Integers: A Familiar Model under New Contexts](#)
[Felice S. Shore](#), Towson University

Although the notion of signed numbers is often introduced through contexts, (distances above and below sea level, money banked versus money owed, etc.), too often such meaningful contexts are abandoned too soon when students are first grappling with operating on integers. This article offers two original contexts that can be used to help students formulate on their own the “rules” for adding and subtracting integers. (By extension, multiplication and division can be related as well.) Both contexts can be represented with the counter-model of integers, which offers a concrete realm in which to explore the various cases of combining integers.

The article includes a description of the progression from 1) introducing the Voting Context with active student participation to 2) using appropriate manipulatives to work through various scenarios to 3) finally representing those scenarios with conventional recordings. “Reflection and Synthesis” questions are included for students to reflect on and solidify their understanding of the connection between the verbal descriptions, the numerical representations, and the net results. Finally, a second context – a behavior modification program – is described as an alternative “storyline” that uses the same counter-model.

- 13 [On Creating Polygons with the Centroid of a Triangle: An Investigation with Geometer’s Sketchpad](#)

[Jose N. Contreras](#), The University of Southern Mississippi

[David Erickson](#), The University of Montana

[Armando M. Martinez-Cruz](#), California State University at Fullerton

This article describes an investigation of properties of the centroid of a triangle using Geometer’s Sketchpad. In particular, the authors investigate that the quadrilateral whose vertices are the centroids of the triangles determined by the vertices of a quadrilateral is similar to the original quadrilateral. The authors also suggest several extensions to pursue.

- 20 [Teaching Mathematics in Honduras](#)

[Don Hooley](#), Bluffton University

Teaching mathematics in Honduras provides an outlet for creativity and a pathway to adventure and learning. This article gives descriptions of teaching and living from the author’s year at a bilingual school, *Academia Los Pinares*, in Tegucigalpa, Honduras. Examples of the variety of Honduran bilingual schools are given and websites referenced which list teaching openings. Teaching loads, classroom facilities and graphing calculator and computer availability at *Pinares* are described. A general portrayal of *Pinares*’ student ability and expressiveness is given. The range of extra-curricular activities is explained and examples provided from the Association of Bilingual Schools of Honduras mathematics contests. Major tourist attractions teachers enjoy are listed. Finally, some practicalities are related regarding food and daily living in Honduras.

24 [Modeling with Rational and Radical Functions](#)

[Russell H. Murray](#), St. Louis Community College – Meramec

Recent trends in state math standards have de-emphasized the importance of rational and radical functions. This might lead, however, to the loss of insight and understanding that can be found in analyzing applied models from these topic areas. Rational and radical functions lend themselves well toward certain modeling applications, and from developing such models an appreciation of the utility and importance of these functions is instilled. In this paper, several rational and radical function models are developed, and then a combination model is developed suitable for describing a situation where features of both models are required. Several of the models presented in this paper are derived from actual data sets.

31 [Teaching Ratios in Geometry](#)

[Gina Buran](#), Mason Middle School

[Ann Dinkheller](#), Mason Professional Development Center

[Donna Kirch](#), Mason Middle School

Teaching Ratios in Geometry was designed to help middle school teachers lead their students in an exploration of trigonometric relationships as part of a unit on similarity. The activities in the article facilitate an understanding of the meaning of sine, cosine, and tangent, and assist students in making the connection that these numbers are just ratios.

The article provides a two-day introductory lesson with background information and a student worksheet. A Geometer's Sketchpad/Cabri Jr. activity from Key Curriculum Press is also described. Questions for classroom discussion and challenges for extending the work to secant, cosecant, and cotangent are included.

Teachers can use the activities to review concepts such as permutations, fractions, decimals, and proportionality. The article gives students and teachers an opportunity to use technology effectively and to extend the ideas of similarity as a foundation for the study of trigonometry.

35 [HML: Using the NFL to Increase Mathematical Understanding and Motivate Test Taking Effort](#)

[Maryanna P. Hamburg](#), Sacred Heart Parish School

Educators continuously seek new approaches to increase student mathematical understanding and raise test scores. The HML (Hamburgonian Mathematical League) is one such strategy that has students applying fundamental mathematical concepts and skills while recording and analyzing their weekly HML game data. Using the National Football League's (NFL) schedule, HML classes pit their weekly mathematical test scores against an NFL opposing team's score. During the HML season, student offensive, defensive, and kicking team players are encouraged to do two tasks while taking their weekly mathematics tests: concentrate and focus on the concepts and skills assessed and be careful while doing their calculations. The culmination of this competition is the HML Super Bowl. As in the NFL Super Bowl all participants are awarded a prize. The HML is a beginning year strategy that not only encourages students to get into the habit of concentrating, focusing, and being careful on weekly tests, but also enables the students to apply fundamental mathematical concepts and skills while recording and analyzing data.

42 **Geometry and the Merger of Reasoning Methods**

Todd Moyer, Towson University

Geometry achievement is not meeting the standards as set forth by NCTM. Results from TIMSS, PISA, and NAEP support this contention. American students consistently score poorly on international tests when compared to students from other parts of the world. NAEP scores have not shown significant growth since the early 1990's.

Geometry instruction at the secondary level has been like a pendulum, with the traditional proof approach at one end and the contemporary inductive activities at the other. A merger of the two logic reasoning patterns lends promise to increased understanding and achievement. In accordance with the van Hiele Model of Geometric Thought, students should experience inductive activities to discover concepts. However, the inductive activity should be followed by logical justification.

This article presents two findings from two informal settings. One is anecdotal, drawn from the author's personal experience. The other is a very preliminary study conducted on undergraduate early childhood and elementary education majors. The author followed van Hiele theory, provided activities for students, and proved conjectures in both settings. In the undergraduate study, some data was collected. Conclusions drawn from the data cannot be accepted without question, but evidence of a pattern may be beginning to emerge.

50 **A Student's Inquiry**

Kim Jackson, Centennial High School

51 **Differentiation in the Mathematics Classroom: A Way to Enhance Problem Solving Skills (Column: Mathematics Contest Corner)**

T. Michael Flick & Debora Kuchey, Xavier University

56 **Symmetry Motions (Activity)**

Michael Krach, Towson University

61 **Priming for the Perpendicular Lines Theorem (Activity)**

Ed Laughbaum, The Ohio State University