

# Ohio Journal of School Mathematics

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# Ohio Journal of School Mathematics Abstracts

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**4**    [Developing an Elementary Diversity Index for Classroom Use](#)  
[Donald Hooley](#), Bluffton College

Diversity considerations and the effects of varying levels of diversity are important in the classroom and in our institutional life. This article describes an attempt to define an elementary measure to quantify diversity. It begins by listing examples to illustrate some mathematical properties desirable in diversity indices and then develops an elementary diversity index based on Shannon's index. In addition, suggestions for diversity comparison project topics are given for use in science and social science classes.

**11**   [Face the Facts](#)  
[Daniel J. Brahier](#), Bowling Green State University

In this article, the author presents two activities that can be used at many grade levels to advance number sense. Both activities focus on the study of digital numerals on a clock face. The first activity describes how children can explore the number of light bars that are necessary to illuminate various times during the day. The second activity has children looking for times of the day when a clock displays a "clock fact," such as at 9:27, since  $9 = 2 + 7$ . Both activities feature a number of optional questions that can be raised, depending on the age and experiences of the students.

**16**   [In Search of Math Through History](#)  
[Rebecca J. Kessler](#), Miami University Middletown & The Miami Valley School

After hearing students say, "Math never changes" and "It is the same math that my parents studied," I started to think about the mathematics I had studied as a child and compare it to the math I was now teaching. My journey started with a math history class at a local college. The pieces started to fit together in this puzzle of mathematics, on how and why something came into existence. The challenge was how to apply this to my classroom. Topics now have become more exciting and interesting. How students perceive a topic affects their interest. This article incorporates anecdotes and trivia that I often use in my classroom to convey the concept at hand. Examples of projects are also included.

**21**   [Reading Mathematics: Integrating Literacy into Mathematics](#)  
[Mary Rycik](#), Ashland University

This article details ways to connect reading with mathematics through the use of children's literature, the use of similar literacy and mathematical strategies, and the use of student writing. Numerous trade books that have been specifically written to teach math concepts such as counting, money, fractions, measurement and geometry. In addition, trade books that have not

been specifically written to teach math can also be used for this purpose. Literacy strategies, which are often similar to mathematical problem solving strategies can be employed, along with the use of student writing to help students better understand mathematics.

## 26 Empowering Students Mathematically Requires Mathematically-Empowered Teachers

**Gary S. Christie**, Kent State University – Stark Campus

The 1989 and 2000 NCTM *Standards* envision students that are logical problem solvers who communicate effectively and inquire confidently – students who are mathematically empowered. To foster such power, *teachers* must be mathematically empowered. Therefore, teachers must continually question and reflect upon their own mathematical knowledge, especially traditional algorithms, and ask questions such as, “Why do we do these procedures?” before a lesson can be created which helps students become mathematically empowered.

## 29 Cryptography: Its History and its Mathematics

**Thomas Dence**, Ashland University

Cryptography, or the science of encrypting/decrypting secret messages, dates back to well over 2000 years, or as long as man has had something important to say to someone else without a third party being privy to the message. Some of this magnificent history is discussed, along with a glimpse into the mathematics (which is quite complex and highly mathematical today) that fuels the different encryption/decryption schemes. Important concepts that relate well to the high school classroom are pointed out.

## 37 Misconceptions and Learning Difficulties of *Captured Students* Enrolled in Developmental Mathematics Courses

**Om Ahuja & M. Najafi**, Kent State University

The phrase *captured student* conveys the mood of failure, fear, and frustration or, hatred that a college student frequently brings to a mathematics class. The *captured students*, much to their surprise and disappointment, are suddenly forced to study mathematics which they may have been avoiding for years. In this paper, we study misconceptions and learning difficulties of the *captured students* in our developmental mathematics courses in regional campuses. The study also shows that a majority of our students who after passing developmental mathematics courses get enrolled in college algebra course are mathematically unprepared, lack elementary algebraic thinking skills, and have poor retention of the core material that they have learnt in developmental mathematics courses.

## 44 The Growth of Mastery Math Programs in Ohio High Schools

**Lynne M. Pachnowski**, University of Akron

Recently, some Ohio high schools have adopted an approach to mathematics teaching that requires students to repeat segments of a course until they demonstrate a mastery of the material before moving on to subsequent segments. The model presents challenges to course scheduling, granting credit, student evaluation methods, and student perceptions as learners. This article

describes some of these programs in Ohio, discusses the philosophy behind this approach, and highlights many of the challenges districts face in applying this approach and how some have addressed them.

- 49 The Area of a Trapezoid with Perpendicular Diagonals (MATH CONTEST COLUMN)  
**T. Michael Flick**, Xavier University
- 55 Stepping Stones: A Numeration Game (ACTIVITY)  
**Michael Krach**, Towson University
- 57 Ten Lessons in Fractals, Complex Patterns, and Chaos (ACTIVITY)  
**Jon Lee**, Air Force Research Laboratory (VASS), Wright-Patterson AFB
- 58 Law of Cosines (ACTIVITY)  
**Judy Stroud**, Northwood High School