Vol. 53 #3
March 2015
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Submission of Articles
The Ontario Mathematics Gazette (OMG) is looking for news items, articles, and good ideas that are useful to mathematics teachers and mathematics teacher education. We are seeking submissions, preferably from mathematics teachers K–12 and other mathematics education professionals, that describe innovative and creative approaches to mathematics teaching.

Please keep in mind the following criteria when making submissions to the OMG:

- The ideas/activities must be of interest to the readership.
- The ideas/activities must be fresh and innovative.
- The mathematics content must be appropriate for the readership.
- The mathematics content must be accurate.
- The article must be well written and easily understood.
- The article and its ideas must be free of sexual, ethnic, racial, or other bias.
- The article must not have been previously published, nor should it be out for review by other publications.
- The article must be original.

Articles must be word-processed in MS Word, double-spaced with wide margins, not exceeding 10 numbered pages of text, and prepared according to the Publication Manual of the American Psychological Association, Sixth Edition. Figures and diagrams should be drawn by computer, if possible, or drawn in black ink in camera-ready form. Embedded images must also be submitted separately in jpeg or tif format. Proof of the photographer’s permission is required, and for photos of students under the age of 18, the written permission of a parent or guardian is required.

You must submit one complete copy of your article, embedded with any tables, figures, and captioned photographs or graphics, to the Editor, Dan Jarvis, along with separate files for each of the text, graphics, and/or photographs. Please e-mail all files to Dan Jarvis at dan.jarvis@oame.on.ca.

Your name should not appear anywhere in your article, including websites, so that your article can be sent out for blind review. Your name, full mailing address, and e-mail address must be included on a separate sheet. Upon review, you will be notified as to whether your article has been accepted for publication (as is, or pending minor or major revisions) or rejected.

The Editor reserves the right to edit manuscripts prior to publication. Once an article is published, it becomes the property of OAME.

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Greetings once again, fellow math teachers, coordinators, researchers, and general math enthusiasts!

In 1884, English schoolmaster, Edwin Abbott, in his intriguing satirical novella entitled Flatland: A Romance of Many Dimensions, presented the life and adventures of the main character, A. Square, attorney-at-law, who inhabits a two-dimensional world, yet is one day visited by a three-dimensional guest, A. Sphere. The book used the fictional two-dimensional world of Flatland to comment on the hierarchy of Victorian culture, but also provided a careful and delightful examination of multiple dimensions. What follows is the classic meeting of the above-mentioned protagonists:

Stranger: Now, Sir; listen to me. You are living on a Plane... I am not a plane Figure, but a Solid. You call me a Circle; but in reality I am not a Circle, but an infinite number of Circles, of size varying from a Point to a Circle of thirteen inches in diameter, one placed on the top of the other. When I cut through your plane as I am now doing, I make in your plane a section which you, very rightly, call a Circle. For even a Sphere—which is my proper name in my own country—if he manifests himself at all to an inhabitant of Flatland—must needs manifest as a Circle...

A. Square: Every reader in Spaceland will easily understand that my mysterious Guest was
speaking the language of truth and even of simplicity. But to me, proficient though I was in Flatland Mathematics, it was by no means a simple matter. (pp. 85–86)

In 2007, Flatland was made into two separate computer-animated films. _Flatland: The Movie_, directed by Johnson and Travis, and produced by Caplan and Wallace, was created as a more kid-friendly version, straying farther from the original text, and side-stepping or down-playing many of Abbott’s more controversial social issues. In this film, Flatlanders have fractals for their insides, and carry suitcases with them by some magical means. In contrast, _Flatland: The Film_, directed by Ladd Ehlinger Jr., and produced by F.X. Vitolo, was made more for an adult audience (e.g., some animated violence, as mentioned in the book), and preserved the social dynamics as described in Abbott’s world. In this version, we can see Flatlander’s internal organs, the clockwork of their brains and hearts, and wiggling hairs which cover their bodies and presumably aid in locomotion within their flat world. Abbott’s _Flatland_ novella was apparently among Einstein’s favourite texts, the main theme of dimension visualization undoubtedly paralleling his own pursuit of attempting to describe a fourth dimension (i.e., time) to the lay reader, when elaborating upon his theories of relativity.

Dr. Ian Stewart, a Professor of Mathematics at the University of Warwick, published a sequel to Abbott’s classic work entitled Flatland: _Like Flatland, Only More So_ (2001). The multi-dimensional plot line runs as follows. Nearly a century after A. (Albert) Square’s adventures, his great-great-granddaughter, Victoria Line (Vikki), finds a copy of his book in her basement. This prompts her to invite a sphere from Spaceland to visit her, but instead she is visited by the “Space Hopper” who can actually travel to any space in the Mathiverse, a set of all imaginable worlds. After showing Vikki higher dimensions, he begins showing her more modern theories, such as fractional dimensions, dimensions with isolated points, topology, hyperbolic geometry, the Projective “Plain,” and the quantum level.

An excerpt from the book:

The Peoples of Planiturth are just as complacent about living in a 3D world as we Flatlanders are about living in a 2D one. Most of them are convinced that there is no such thing as the Fourth Dimension. The Space Hopper says that they’re right, but for the wrong reason. I wonder what he means by that?... “They’re right, Vikki, because there is no such thing as the Fourth Dimension. And they’re wrong, because there are lots of different Fourth Dimensions—not to mention Fifth, Sixth, or even a Hundred-and-First—many of which they experience in their daily lives, but fail to recognize.” Vikki found it hard to believe that anyone could experience a Fourth or Fifth Dimension and not know it, and said so. (pp. 39–40)

From point, to line, to shape, to solid, and beyond—the imaginary journeys between dimensions were indeed fascinating, eventful, and unpredictable for Albert and Vikki in Flat- and Flatterland, respectively.

Within this March issue of the Gazette, you will encounter three new articles and nine regular columns, covering a number of exciting dimensions of mathematics content, teaching, and research.

In _Recasting Mad-Minutes: Going Back to the Basics?_, Marc Husband and Tina Rapke share the results of a classroom-based research experiment, in which Grade 4 students were asked to complete “mad-minute” 1x2-digit multiplication questions, some (control group) using traditional algorithms, and others (treatment group) being encouraged to analyze the questions in terms of perceived difficulty level, to use a variety of previously encountered solution strategies as appropriate, and to generate and share their own set of similar questions and solutions with their peers. The results of pre- and post-tests written by each group are discussed, as are implications for teaching in light of the Ontario Curriculum.

In their article, _The E-Brock Bugs Computer Game: What If Becoming a (Better) Mathematician Was a Fun-Filled Adventure?_, co-authors Laura Broley, Chantal Buteau, and Eric Muller lead us through a bug’s-eye view of the recently released (2013) digital version of an intriguing educational board game that was originally developed at Brock University back in the 1980s, and that has been successfully used to help elementary and secondary (MDM4U, in particular) students explore the major concepts of probability. Join narrator Bumble the Bee as she encounters helpful friends Bugzy and
Smarty, as well as the evil gang of Mac, Bash, Fitz, Trickz, Crazee, Wicked, and the ultimate mastermind, “Dr. P,” and attempts to free the six districts of Bug City. A project website featuring the free game download, teacher resources, media coverage, and related publications is also shared.

Finally, in *Vectors and the Track and Field Jumping Events*, author Patrick Russell explains how vectors (arrows that describe direction and magnitude of an object in motion) are applied in the various track-and-field jumping events: long jump, triple jump, high jump, and pole vault.

Regular columns include the following highlights: OAME President, Paul Alves (President’s Message) introduces us to Daniel Kish, The Batman, and elaborates on the related importance of appropriately high teacher expectations, growth mindsets, and the fostering of challenging learning opportunities for our students; Todd Romiens (OAME/NCTM Report) discusses three NCTM websites—*Illuminations, Figure This, and Reflections*; Stewart Craven (Fields Institute Report) reports on the five speakers involved in the Annual Research Day (Jan. 31, 2015) of the MathEd Forum; Mary Bourassa (Technology Corner) highlights PhET interactive simulations, and revisits the open-source software, Desmos; Shawn Godin (What’s the Problem?) poses a problem regarding completing the square; Lynda Colgan (Hey, It’s Elementary) takes us up, up, up, and away with her detailed description of the history and construction of the Bell tetrahedral kite; Mirela Ciobanu (In the Middle) looks at using efficient visual representations to solve mathematical word problems; Ann Kajander (MB4T) explores the importance of connecting patterns to multiple algebraic descriptions; and Greg Clarke, Agnes Grafton, Ross Isenegger, and Markus Wolski (Provincial Digital Learning Resources) share some classic Geometer’s Sketchpad (GSP) files, and also provide us with an exciting update regarding their recently released Rekenrek app for desktop and mobile devices. As usual, this issue also features the rich content—both the key-processed and tree-processed versions—will continue to provide a wealth of multi-dimensional stimulation for your professional reading pleasure. We look forward to receiving your future submissions.

**References**


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Mathematics is the art of giving the same name to different things.

*Henri Poincaré*

May not music be described as the mathematics of the sense, mathematics as music of the reason? The musician feels mathematics, the mathematician thinks music: music the dream, mathematics the working life.

*James Joseph Sylvester*