features

176 Supporting Productive Struggle with Communication Moves
Ben Freeburn and Fran Arbaugh
Read about ways to determine how your students are thinking, and then implement NCTM's mathematical teaching practices as students work on a task.

182 Fostering Persistence: 3D Printing and the Unforeseen Impact on Equity
Daniel L. FitzPatrick and Victoria S. Domínguez
A professor and a preservice teacher take some risks constructing a "homemade" printer.

190 6 Essential Questions for Problem Solving
Nancy Emerson Kress
Increase students' access to and success with complex quadratic function tasks in any middle school, high school, or early college mathematics class.

198 Guess the Number of . . .
Monica Housen
This engaging activity helps improve students' estimation skills while encouraging persistence and mathematical discussion.

207 Investigating Problem-Solving Perseverance Using Lesson Study
Kristen N. Bieda and Craig Huhn
Middle and high school mathematics teachers share what they learned about supporting students by conducting a series of three lesson studies.

214 Heart Work
Sandra R. Madden and Alicia C. Gonzales
A professor and her student identify key ingredients to nurture teachers in supporting students to be persistent problem solvers.

on the cover

In his 1959 movie, A Hole in the Head, Frank Sinatra sang these Sammy Cahn lyrics: "Anyone knows an ant, can't, move a rubber tree plant. But he's got high hopes . . . apple pie in the sky hopes . . . ." So did the song's ram, trying to "punch a hole in a dam." Persistence and perseverance won out for both, as the song continues: "Oops there goes a billion kilowatt dam." For "when troubles call, and your back's to the wall/There's a lot to be learned, that wall could fall . . . ." Persistence is a wonderful quality to have, but nurturing it in our students is not so easily done. This 2018 Focus Issue tells some wonderful stories about how to nurture this skill and inculcate in students the experience of feeling, as Cahn writes it and Sinatra sings it, the thrill of overcoming difficulties: "Oops there goes another problem kerplunk."

COVER: MEVANS/GETTY IMAGES
departments

166 Mathematics Teacher Online

169 From the Editorial Panel
Nurturing Persistent Problem Solvers
Michelle Berry, Jon Davis, Paul Kelley, and Megan Snow

170 Reader Reflections

172 Mathematical Lens
‘Round ‘n’ ‘Round We Go!
Malcom Devee

200 November 2017 Calendar and Solutions

222 Activities for Students
Fostering Productive Statistical Skepticism
Susanne Strachota and Lindsay Reiten

227 Technology Tips
Using GeoGebra to Help Students Understand the Inverse Cosine Function
Jeremy F. Strayer and Amdeberhan Tessema

232 Delving Deeper
Analyzing Off-the-Peg Geoboard Squares
Matt Ciancetta, Steve Blair, and Dan Canada

238 For Your Information

240 The Back Page
Thinking about Tipping Points
Susan D’Agostino

calls for manuscripts

189 2019 Focus Issue: Mathematical Misconceptions

213 On the Front Burner: Emerging Issues in Mathematics Education

in the next issue

Coming in January/February 2018

• “Leaning on Mathematical Habits of Mind,”
  by Sarah Sword, Ryota Matsuura, Al Cuoco, Jane Kang, and Miriam Gates
• “Developing the Concept of a Radian,”
  by Roger S. Wolbert and Erin R. Moss
• “A Graphic Organizer for Problem Solving,”
  by Jane Gillette