Creating and Sharing Mathematics through Puzzle Apps: In School and Out

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Why Puzzles?

Mathematical Puzzles:
• (are fun and engaging)
• are genuine problems
• support number sense
• encourage logical reasoning
• help students develop strategy in problem solving
• promote constructive collaboration
• encourage perseverance and stamina
Our Research and Development

• Funded by the National Science Foundation
• Based on paper-based R&D with puzzles embedded in elementary and high school curricula
Playing SolveMe Mobiles

\[ \text{\textcolor{red}{A}} = \text{\textcolor{green}{3}} \]

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4/17/15
Playing SolveMe Mobiles

solveme.edc.org
for iPads and Laptops

Choose Play for now.
Why Have Students Create Puzzles?

Creating Puzzles:

• supports deeper understanding the of the logic and mathematics of the puzzles
• helps students develop sense of agency as producers not just consumers of mathematics
• focuses on creative element of doing mathematics
• offers a social mathematics activity
Building SolveMe Mobiles Puzzles

Create a shape

Spare parts

\[\begin{align*}
\text{\textbullet} &= 8 \\
\text{\textbullet} &= 4 \\
\text{\textbullet} &= 3 \\
\text{\textbullet} &= 2
\end{align*}\]

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Using Mathematics Apps Effectively

• Get to know the app well first (use help pages)
• Introduce apps *briefly*—allow for exploration
• Have students “play” before “building”
• Assign benchmarks (in class or as HW)
  – solving specific puzzles (easy to differentiate)
  – earning certain badges or trophies (e.g. “solve 5”)
  – building puzzles with particular characteristics
Other Tips for Success

- Use a projector or an interactive white board
- Have students demonstrate solving
- Ask for “good next steps” (no “right way”)
- Ask for “another way” to solve same puzzle
- Focus on students’ logic over algebra at first
- Turn off devices during group discussions
In the Classroom

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Playing SolveMe Who Am I?

$t < u$
All of my digits are even
$h = 6 + u$
The sum of my digits is 10
Building SolveMe Who Am I? Puzzles

SolveMe Who Am I?
Explore, Deduce, Create!
SolveMe Who Am I? Sneak Preview

solveme.edc.org/whoami
for iPads and Laptops
Adapting Who Am I? Puzzles

Choose or build puzzles with relevant content:

- place value
- parity: evens and odds
- inequalities
- squares and roots
- multiples
- primes
- divisibility
- factors
- GCD & LCM
- algebraic expressions
- factoring (ex: \( t + u = 12 \) and \( tu = 36 \))
SolveMe MysteryGrid
SolveMe MysteryGrid Sneak Preview

solveme.edc.org/mysterygrid
for iPads and Laptops
Discussion Questions

• What has been your experience using math apps with students?
  – Which apps have you tried?
  – Which do you like best and why?
• What challenges have you seen or do you expect to see when using apps in the classroom?
• What could help you overcome these challenges?
SolveMe Links

• Primary link: solveme.edc.org
• Prototypes:
  – solveme.edc.org/whoami
  – solveme.edc.org/mysterygrid
• Contact: solveme@edc.org
• Curriculum: transitiontoalgebra.com

Thank you for coming!