

The Breakout Math Circle

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Tulsa Math Teachers Circle - April 2017

Donna and I decided to lock one of our favorite treasures inside these boxes for safe keeping. We were worried that one lock was not enough to keep our treasures safe - so we put several locks on each box. And being the forgetful people we are, we decided to leave clues for ourselves for each of the lock combinations. Each of the puzzles in your envelope contains a clue to the combination of one of the locks. It is your challenge to unlock each of the locks on your box and discover the treasure inside!

A Few Thoughts . . .

- You will have all evening to unlock your box. Your team should determine the best way to solve all of the puzzles in your envelope. Make sure to use all the brain power in your group efficiently.
- There are several puzzles to solve and a limited time to solve them. A good plan might be to “divide and conquer” the work.
- Please leave the locks open when you have unlocked the box. Seriously - don’t mess with the locks or relock them. Thanks in advance!

Basic Information About the Locks

- Word Lock
Align dials to spell the correct “word” aligned with the word MASTER on the lock. Pull shackle up to release the lock.
- 4-Digit Number Lock - Number #1
Align the correct numbers from top to bottom along the indicator line. Pull up on the shackle to release the lock.
- Directional Lock - Number #2
Squeeze the shackle firmly toward the lock twice to begin. “Dial” the combination by sliding the button to each position in the combination pattern until you hear it click. Once the pattern is complete, pull down on the lock to release it.
- Cable Lock - Number #3
Align the correct numbers from top to bottom along the indicator line. Push the button and pull up on the cable.
- 3-Digit Number Lock - Number #4
Align the correct numbers from top to bottom in the viewing window. Pull up on the shackle to release the lock.
- Number & Letter Lock - Number #5
Turn dial three full turns to the right to begin. Then turn the dial to the right to the first letter/number in the combination. Turn the dial to the left one full turn and then to the second letter/number in the combination. Finally, turn the dial to the right to the correct letter/number. Pull on the shackle to release the lock.
- 3-Digit Color Lock - Number #6
Align dials to the correct 3-digit number and the line indicated on the bottom of the lock. Pull shackle up to release the lock.

About the Problems

Problems were selected in six distinct categories. Teachers will work in groups of 6 to solve the puzzles in each envelope. Each category is associated with one of the locks. The solutions to the puzzles form the combinations to each of the locks. General categories for this Breakout session include:

- But Who's Counting?
- It's All Logical
- A Little Bit Puzzling
- Get In Shape
- What's Your Theory?
- Hopping Around

Resources:

- *The Inquisitive Problem Solver* by Paul Vaderlind, Richard Guy and Loren Larson
- *AHA! Solutions* by Martin Erickson
- *Crossing the River with Dogs - 2nd Edition* by Ken Johnson, Ted Herr and Judy Kysh
- *AMC 8 Preparation - Volumes 1 & 2* by Sam Chen and Yongcheng Chen
- The Art of Problem Solving - Database of AMC 8, 10 and 12 Problems
- Math Kangaroo - Selection of Problems from Levels 5 & 6, and 9 & 10 from 2014, 2015 and 2016.
- Brilliant.org
- G'DayMath! - James Tanton inspired Counting Problems
- BinaryPuzzle.com
- Games Magazine