

# IBL & Active Learning with Math Puzzles at Lamar University

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# Safe and Secured

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At the entrance to his/her secret lair, you find a strange combination lock. Fortunately, Insert Name Here is pretty forgetful, so you also find a post-it note with this hint for the combination:

*correct combination uses exactly one of each symbol / letter / character per row and column.*

Can you crack the code and access Insert Name Here's hideaway?

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
























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 C %	 C @	 C \$	 C &	 C #
 D %	 D @	 D \$	 D &	 D #
 E %	 E @	 E \$	 E &	 E #

A **puzzlehunt**, also known as a puzzle race, puzzle party, or mystery hunt, is a type of scavenger hunt where instead of a list of items to collect, players are presented with a number of puzzles to solve.

Since this is a hunt, usually the puzzles are hidden in a physical location within certain boundaries (campus, city, building), or the solutions send players to hidden locations to find some sort of token, or both!

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Some puzzlehunts are organized by communities of puzzle solvers, and others are sponsored by companies.

Increasingly, businesses are using puzzles as a way to determine if future employees are able to problem-solve (as opposed to assessing prior knowledge).

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Designing math problems and puzzles are very similar processes.

- What do we want to design our problem/puzzle about?
  - Integration
  - Morse code
- How should I present the problem so it isn't trivial?
  - Ask about area under a curve
  - Embed it as punctuation within a paragraph
- How do I make sure the player/student doesn't get off-track?
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The AMP'd (Auburn Mathematical Puzzle) Challenge was founded in 2012 when attempting to adapt a weekend-long IBL math camp format into a day-long math competition. High school and middle school events are held each year, and the LaMP (Lamar Mathematical Puzzle) Challenge high school event will run in April 2015.

Rather than asking individual students to sit at a desk for two hours and work abstract mathematical problems, teams of students collaborate on puzzles by (incidentally) modeling them with mathematics.

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A physical challenge requiring students to run around a green space to collect the data required to solve an otherwise quick puzzle. Teams must quickly submit a solution to earn points and unlock the main game.

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# LaMP Format (cont.)

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Extensions to the main puzzles, typically optimization puzzles. Teams which submit the best solution earn points.

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An undergraduate-level mathematics problem from a field unrepresented at the high school level. Hints are provided to teams as main Puzzles are solved, and points are awarded based on the generality of the submitted solutions.

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We're planning a web application to manage the game, as well as allow teams to optionally play from their schools if there isn't an event nearby.

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EXTRA Puzzle: Add numbers 1-5 which appear with each column, row, shape, letter, and symbol exactly once!

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Questions? Thanks for having me!