Math Games for STEM, Borough of Manhattan Community College (BMCC)

A Simulation-Based Curriculum to Accelerate Math Remediation and Improve Degree Completion for STEM Majors

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Project Goal: To create a games-based summer bridge program to encourage high school students to major in STEM fields while completing introductory course requirements. This project was extremely successful, with high pass rates. It is now in its last year, in which we are disseminating the three math games created as part of the grant.

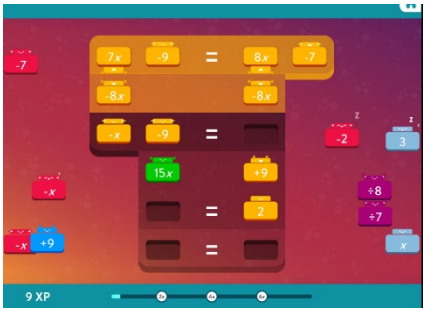
The three **free** games span in level from basic algebra at the middle-school level through college pre-calculus. They can be played on PC or ipad, in the classroom or at home, and are suitable for all ages.

xPonum is a puzzle game in which players collect gems using a beam of energy.

Game play emphasizes exploration, so that players experience mathematics as being about trying out ideas, not just about already having the answer.

- At the basic level, in the first world, players use slope and intercepts and must find points along the line, using the slider to shift the line. This level can be played in an introductory algebra class.
- At later levels, players explore shifts in parabolas, cubic and trigonometric functions, which are suitable as pre-calculus topics.

Algebots is an equation-solving puzzle game, with little robots who cheer when you get the next step completed correctly and fall asleep if you don't move them around.



- Equations range from basic to advanced, including simple linear equations, absolute value and radical equations.
- The game emphasizes that solving is about "undoing" – applying the inverse function – to both sides of the equality or inequality.
- Players can play at the "easy," "medium" or "advance" level for any topic. The time bar can be turned off for anyone who wants to take time figuring out the puzzle!

Project Sampson is an adventure and resource management game for middle school math up to College Algebra.

- The game gives players an appreciation for when linear equations are used, and for how *Geographic Information Systems* are used in disaster preparedness.
- Players fly to locations across the world to save the planet from disasters, using the energy of the ship to slow down the rate of damage done (the slope) based on how many turns (x) until the disaster hits.

All games are available for free MAC and PC download at mathgamesforstem.wordpress.com and are also available in the app store, for ipad; Algebots is also available for iphone. Need guidance for how to use the games in the classroom, or how to play them at home? All available on the website!