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| **Learning Target(s):**1. Solve systems of equations.
* I can solve a system consisting of a linear equation and a quadratic equation algebraically and/or graphically.
* I can justify that the technique of linear combination produces an equivalent system of equations.
 | **Pacing:*** 1 Day
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| **In previous grades, students have:*** In 7th Grade students develop an understanding of rational numbers and work with expressions and linear equations.
* In 6th Grade students write interpret and use expressions and equations.
* In 4th Grade students develop an understanding of fluency with multi-digit multiplication and dividing to find quotients with multi-digit dividends.
* In 2nd Grade students build fluency with addition and subtraction.
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| **Success Criteria** (to be able to do this, students must learn and understand…):* Understand how to represent the constraints and variables mathematically.
* Understand how to select appropriate mathematical methods to use.
* Understand how to make sensible estimates and assumptions.
* Understand how to investigate a maximization problem.
* Understand how to communicate their reasoning clearly.
 | **Performance Task** (students will show they can do this by):* Interpret a situation and represent the constraints and variables mathematically.
* Select appropriate mathematical methods to use.
* Make sensible estimates and assumptions.
* Investigate a maximization problem.
* Communicate their reasoning clearly.
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| **Suggested Activity:**This lesson is designed to help students develop strategies for solving optimization problems. Such problems typically involve scenarios where limited resources must be used to greatest effect, as in, for example, the allocation of time and materials to maximize profit.* Before the lesson, students attempt the problem individually. You then review their work and formulate questions for students to answer in order to improve their solutions.
* At the start of the lesson, students work alone answering your questions about the same problem.
* Students are then grouped, and engage in a collaborative discussion of the same task.
* In the same small groups, students are given sample solutions to comment on and evaluate.
* In a whole-class discussion, students explain and compare the alternative solution strategies they have seen and used.
* Finally, students revise their individual solutions, and comment on what they have learned.

Activity Link: <https://www.map.mathshell.org/lessons.php?unit=9205&collection=8>**Re-teaching:**Student Focus Questions and Thinking Guide:* What is known and what is unknown?
* What are you asked to find out?
* What kind of representation will help you tackle this problem?

*Try not to make suggestions that move students towards a particular approach to this task. Instead, ask questions that help students to clarify their thinking and encourage checking:* * Can you set out your work using a table or diagram?
* What would be a good way?
* What assumptions have you made?
* How can you check your solution?
* Do you think there is just one solution?

**Extension:*** What was your strategy for solving this problem?
* What do you know now that you did not know before?
* Would you continue to use this strategy on similar problem types?
* Are there any other approaches you could try?

Peer Reflection/Assessment:* If you are visiting another group, read through their work. If their work makes sense, explain it in your own words. If the work does not make sense to you, ask for clarification.
* If you are staying at your desk, either carefully listen to the explanation and check it matches your own thinking or answer the visiting students’ questions.
* You may then want to consider improving your artifact.
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| **EL Accommodations:*** Provide written instructions.
* Provide a vocabulary list.
* Peer support.
* Discourse strategies.
* Reading and writing prompts.
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| **Vocabulary:*** Linear
* Quadratic
* Expression
* Equation
* Domain
* Range
* Functional Notation
* Systems of Equations
 | **Aligned Resources:*** **Lesson PDF:** <https://www.map.mathshell.org/download.php?fileid=1718>
* **Lesson Slide Set:**

<https://www.map.mathshell.org/download.php?fileid=1719> | **Blooms:** Analyze**DOK:** 2**21st Century Skills:**Learning and Innovation Skills:* Creativity and Innovation
* Critical Thinking and Problem Solving
* Communication
* Collaboration

Information, Media and Technology Skills:* Information Literacy
* Media Literacy
* Technology Skills
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| **Test Item Exemplars:**Students will analyze and correct, as necessary, the “Boomerangs” activity (pg. T-2 and S-1 of linked MAP Mathshell lesson)… Then, after individual and peer reflections, they shall create their own Cat Poster with corrected data and conclusions. |