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| **Learning Target(s):**1. Use units to solve problems.
* I can reason quantitatively and use units to solve problems
* I can construct and compare linear and exponential models and solve problems
 | **Pacing:*** 2 Days
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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 an exponentially increasing sequence.
* 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 an exponentially increasing sequence.
* Communicate their reasoning clearly.
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| **Suggested Activity:**This lesson is designed to help students develop strategies for modeling. Note that a video of this lesson is available in the professional development materials. * Before the lesson, students attempt the problem individually. You then review their work and write questions to help students improve their solutions.
* At the start of the lesson, students work individually answering your questions. Then, in small groups, students work collaboratively on the task before evaluating some sample solutions. In a whole-class discussion, students explain and compare the alternative solution strategies they have seen and used.
* In a follow-up lesson, students review what they have learned.

Activity Link: <https://www.map.mathshell.org/lessons.php?unit=9100&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?
* How many cats/kittens will there be after 6 months? 12 months? …?
* 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:*** Peer support.
* Discourse strategies.
* Reading and writing prompts.
* Provide written instructions.
* Provide a vocabulary list.
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| **Vocabulary:*** Real Number
* Fundamental Theorem of Algebra
* Expression
* Equation
* Exponential
* Domain
* Range
* Functional Notation
 | **Aligned Resources:*** **Lesson PDF:** <https://www.map.mathshell.org/download.php?fileid=1708>
* **Lesson Slide Set:**

<https://www.map.mathshell.org/download.php?fileid=1709> | **Blooms:** Analyze**DOK:** 3**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 data on the given “Cat Poster” 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. |