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| **Learning Target(s):**1. Analyze linear, quadratic and exponential functions using different representations.
* I can, using tables, graphs and verbal descriptions; interpret key characteristics of a function that models the relationship between two quantities.
* I can graph functions expressed symbolically and identify and interpret key features of the graph.
* I can compare the properties of two functions given different representations.
 | **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 7th Grade students solve problems using scale drawing and informal geometric constructions, with 2-D and 3-D shapes, to solve problems involving area, surface area, and volume.
* 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 geometric 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 geometric problem.
* Communicate their reasoning clearly.
* Generate a function for the real world model.
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| **Suggested Activity:**This task challenges students to understand the construction of a three-step staircase with squares. Students are shown each step at a time and asked the number of steps in each staircase and the total number of squares used to build each stage of the three-step staircase. Using color tiles, students are able to concretely build the stages of the three-step staircase and to answer the question for each stage - the number of squares needed to build each step and each stage. At the end of the class discussion, students either discuss or dictate a summary response to the question, “Tell me how you know.” (Levels A – C)This activity is then extended to students creating a possible “growth function” which students can work collaborative groups to ascertain and then meet back up to peer test their solutions and discuss functional notation and equivalence. (Levels D-E)Activity Link: <https://www.beasleyac.org/ourpages/auto/2015/12/4/50861789/December%202015%20Problem%20of%20the%20Month%207th%20Grade.pdf>**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:*** Peer support.
* Discourse strategies.
* Reading and writing prompts.
* Provide written instructions.
* Provide a vocabulary list.
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| **Vocabulary:*** Linear
* Equation
* Domain
* Range
* Functional Notation
* Systems of Equations
* Geometry
* Staircase
* Equivalence
 | **Aligned Resources:*** **Lesson PDF:**

<https://www.beasleyac.org/ourpages/auto/2015/12/4/50861789/December%202015%20Problem%20of%20the%20Month%207th%20Grade.pdf>* **Lesson Slide Set:**

n/a* **DTMC Exploration Supplement:**

<https://docs.google.com/presentation/d/1VyL6T17ygQe_C9rcADVPCFSJQo41kmmzMOYME76Ky88/edit#slide=id.p> | **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:**Open Exploration Activity (Ongoing Formative Assessment).  |