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| **Learning Target(s):**1. Analyze linear, quadratic and exponential functions using different representations.
* I can graph functions expressed symbolically and identify and interpret key features of the graph.
* I can translate between different but equivalent forms of a function to reveal and explain properties of the function and interpret these in terms of a context.
* I can compare the properties of two functions given different representations.
 | **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 an algebraic 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 an algebraic problem.
* Communicate their reasoning clearly.
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| **Suggested Activity:**This task challenges a student to use knowledge of equations to match tables, verbal descriptions, and tables to equations. A student must be able to work with graphical representations of linear, quadratic, inverse relations, and exponential equations to find all the matches. A student must be able to identify keyfeatures in similar tables to distinguish between them. Students should be able to understand the relationship between equations, graphs, rules, and tables. Students should know a variety of ways to check these relationships. Lessons should regularly focus on relating multiple representations of the same idea. It is important that algebraic ideas not be taught in isolated skill sets. Consider this quote from Fostering Algebraic Thinking by Mark Driscoll, *“One defining feature of algebra is that it “introduces one to a set of tools – tables, graphs, formulas, equations, arrays, identities, functional relations, and so on – that constitute a substantial technology that can be used to discover and invent things. To master the use of these tools, learners must first understand the associated representations and how to line them together. A fluency in linking and translating among multiple representations seems to be critical in the development of algebraic thinking. The learner who can, for a particular mathematical problem, move fluidly among different mathematical representations has access to a perspective on the mathematics in the problem that is greater than the perspective any one representation can provide.”* Activity Link: <https://www.insidemathematics.org/sites/default/files/materials/sorting%20functions_6.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:*** Provide written instructions.
* Provide a vocabulary list.
* Peer support.
* Discourse strategies.
* Reading and writing prompts.
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| **Vocabulary:*** Linear
* Quadratic
* Functional Notation
* Systems of Equations
* Sum
* Product
* Rational
* Irrational
 | **Aligned Resources:*** **Lesson PDF:** <https://www.insidemathematics.org/sites/default/files/materials/sorting%20functions_6.pdf>
* **Student Artifact:**

n/a | **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).   |