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| **Learning Target(s):**   1. Interpret and use structure.  * I can interpret the contextual meaning of individual terms or factors from a given problem that utilizes formulas or expressions. * I can analyze the structure of polynomials to create equivalent expressions or equations. | | | **Pacing:**   * 1 Day | |
| **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. | | | | |
| **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. | | |
| **Suggested Activity:**  This task has students combine polynomial arithmetic with pattern-matching. Students can expand powers of x+1 using either repeated multiplication CCSS (A-APR.1) or by the binomial theorem CCSS (A-APR.5), and then are asked to analyze the question of whether the similarity of coefficients with the digits of powers of 11 is a coincidence. Identifying patterns, as Felicia has done, is an important part of mathematics. In this case, there is a deep relationship between the numbers and polynomials that Felicia is investigating; on the other hand, further consideration shows that the pattern does not continue. It is important for students not only to identify patterns but also to look more deeply to understand whether or not the patterns are ''generalizable'' or true because of some essential mathematical structure. For these reasons, the task provides a good illustration of Standard for Mathematical Practice 7: Look for and make use of structure.  This task might be used as either practice with polynomial arithmetic or as an introduction to the binomial theorem, providing a process for raising binomials to powers without dredging through many repetitive applications of the distributive law.  Activity Link: <https://tasks.illustrativemathematics.org/content-standards/tasks/1654>  **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. | | | | |
| **Vocabulary:**   * Linear * Quadratic * Expression * Equation * Domain * Range | **Aligned Resources:**   * **Lesson PDF:** <https://tasks.illustrativemathematics.org/content-standards/tasks/1654> * **Lesson Slide Set:**   n/a | | | **Blooms:** Comprehend  **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 |
| **Test Item Exemplars:**  Open Exploration Activity (Ongoing Formative Assessment). | | | | |