

Exponential Patterns

Grade Level	8
Subject	Mathematics & Technology
Curriculum Objective	Mathematics 1.01 & 5.04
Guiding Question	After a plant is planted it produces ten seeds. If each of these ten seeds grows into a plant with the same seed-producing season, how many seeds will you have at the end of six seasons?
Lesson Summary	Students will investigate the relationship between multiplication with repeated factors and the use of exponents. Students will connect “powers of ten” to place value positions.
Activating Strategy	Have students investigate a problem that requires multiplication of a repeated factor. (Guiding Question)
Cognitive Strategy	<p>Have students discuss how they might use the calculator to perform the repeated multiplication actions in the problem they choose to investigate. Ex. $2 \times 2 \times 2 \dots = \underline{\hspace{2cm}}$</p> <p>Demonstrate using the exponent key $^$ for multiplication of a repeated factor. Ex. $2^4 = 16$</p> <p>While students generate data for the different bases (factors) and exponents (powers) in their problems, ask questions such as:</p> <ul style="list-style-type: none"> • What factor are you using? How is it represented in your problem? • What does the exponent represent? • Predict what your next entry will be. How do you know? • What happens when you change the exponent?
Summarizing Strategy	<p>After students have made and compared several pairs of lists using different bases (factors), have them discuss their results as a whole group. Ask questions such as:</p> <ul style="list-style-type: none"> • What problem did you make up to generate your data? • How are everyone’s problems alike, different? • How are the different data lists alike, different?

	<ul style="list-style-type: none">• What kinds of relationships do you see between the two lists of data?
Evaluation	<ul style="list-style-type: none">• Student observations• Check progress• Show examples on board• Use student whiteboards to display answers
Resources	Uncovering Mathematics with Manipulatives, the TI-10 and the TI-15 Explorer Calculator
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