

## Arc of Learning for Growing, Growing, Growing

The *Growing, Growing, Growing* unit continues the discussion of functions by examining exponential functions. Models of exponential growth and decay are numerous such as growth or decay of populations—from bacteria, amoebas, radioactive material and money, to mammals (including people). Doubling, tripling, halving, and so on, are all intuitive situations for students to help them make sense of exponential functions.

<i>Growing, Growing, Growing: Exponential Functions</i>					
<b>Exponents</b>	<b>Introduction Setting the Scene</b>	<b>Exploration Mucking About</b>	<b>Analysis Going Deeper</b>	<b>Synthesis Looking Across</b>	<b>Abstraction Going Beyond</b>
<b>Investigation 1: Exponential Growth</b>					
1.1 Making Ballots: Introducing Exponential Functions	1.1	1.1			
1.2 Requesting a Reward: Representing Exponential Functions		1.2			
1.3 Making a New Offer: Growth Factors		1.3	1.3		
Mathematical Reflections			MR		
<b>Investigation 2: Examining Growth Patterns</b>					
2.1 Killer Plant Strikes Lake Victoria: $y$ -Intercepts Other Than 1		2.1	2.1		
2.2 Growing Mold: Interpreting Equations for Exponential Functions		2.2	2.2		
2.3 Studying Snake Populations: Interpreting Graphs of Exponential Functions			2.3	2.3	
Mathematical Reflections				MR	
<b>Investigation 3: Growth Factors and Growth Rates</b>					
3.1 Reproducing Rabbits: Fractional Growth Patterns			3.1	3.1	
3.2 Investing for the Future: Growth Rates			3.2	3.2	
3.3 Making a Difference: Connecting Growth Rate and Growth Factor			3.3	3.3	
Mathematical Reflections				MR	
<b>Investigation 4: Exponential Decay</b>					
4.1 Making Smaller Ballots: Introducing Exponential Decay			4.1		
4.2 Fighting Fleas: Representing Exponential Decay			4.2	4.2	
4.3 Cooling Water: Modeling Exponential Decay				4.3	4.3
Mathematical Reflections					MR
<b>Investigation 5: Patterns With Exponents</b>					
5.1 Looking for Patterns Among Exponents		5.1	5.1		
5.2 Rules of Exponents		5.2	5.2		
5.3 Extending the Rules of Exponents			5.3	5.3	
5.4 Operations With Scientific Notation			5.4	5.4	
5.5 Revisiting Exponential Functions				5.5	5.5

Mathematical Reflections					MR
Looking Back					LB