

## Writing Exponential Functions

Through this activity, students will learn to write exponential functions by examining real-world examples of exponential growth and decay. By the end of this exercise, students will be able to create exponential functions that accurately represent different scenarios.

1. **If you were asked to start with the number 5 and double it three times, how would you write this problem using math notation?**
2. **If you were asked to start with the number 5 and double it nine times, how would you write this problem using math notation?**
3. **If you were asked to start with the number 5 and double it one hundred times, how would you write this problem using math notation?**
4. **Given the exponential function  $y = 3(5)^x$** 
  - a. State the starting value:
  - b. State the growth/decay factor:
  - c. Is the function growing or decaying?
  - d. What is the result if  $x = 3$ ?
5. **Given the exponential function  $y = 32(0.25)^x$** 
  - a. State the starting value:
  - b. State the growth/decay factor:
  - c. Is the function growing or decaying?
  - d. What is the result if  $x = 5$ ?
6. **Everytime Pinocchio lies, his nose doubles in size. His nose is 1.5 inches long before he has told any lies.**
  - a. Write an equation that represents this situation where  $x$  is the number of lies and  $y$  is the size of Pinochchio's nose after  $x$  lies.
  - b. Use your equation to calculate how long Pinocchio's nose will be after 6 lies.
7. **You make a \$10,000 investment that has historically doubled every 7 years.**
  - a. Write an equation that represents this situation where  $x$  is the number of years and  $y$  is the investment value after  $x$  years.
  - b. Use your equation to calculate the value of your investments after 15 years.