

# Unit 5 Lesson 3: Representing Exponential Growth

## 1 Math Talk: Exponent Rules (Warm up)

### Student Task Statement

Rewrite each expression as a power of 2.

$$2^3 \cdot 2^4$$

$$2^5 \cdot 2$$

$$2^{10} \div 2^7$$

$$2^9 \div 2$$

## 2 What Does $x^0$ Mean? (Optional)

### Student Task Statement

1. Complete the table. Take advantage of any patterns you notice.

$x$	4	3	2	1	0
$3^x$	81	27			

2. Here are some equations. Find the solution to each equation using what you know about exponent rules. Be prepared to explain your reasoning.

a.  $9^? \cdot 9^7 = 9^7$

b.  $\frac{9^{12}}{9^?} = 9^{12}$

3. What is the value of  $5^0$ ? What about  $2^0$ ?

### 3 Multiplying Microbes

#### Student Task Statement

1. In a biology lab, 500 bacteria reproduce by splitting. Every hour, on the hour, each bacterium splits into two bacteria.

a. Write an expression to show how to find the number of bacteria after each hour listed in the table.

b. Write an equation relating  $n$ , the number of bacteria, to  $t$ , the number of hours.

c. Use your equation to find  $n$  when  $t$  is 0. What does this value of  $n$  mean in this situation?

hour	number of bacteria
0	500
1	
2	
3	
6	
$t$	

2. In a different biology lab, a population of single-cell parasites also reproduces hourly. An equation which gives the number of parasites,  $p$ , after  $t$  hours is  $p = 100 \cdot 3^t$ . Explain what the numbers 100 and 3 mean in this situation.

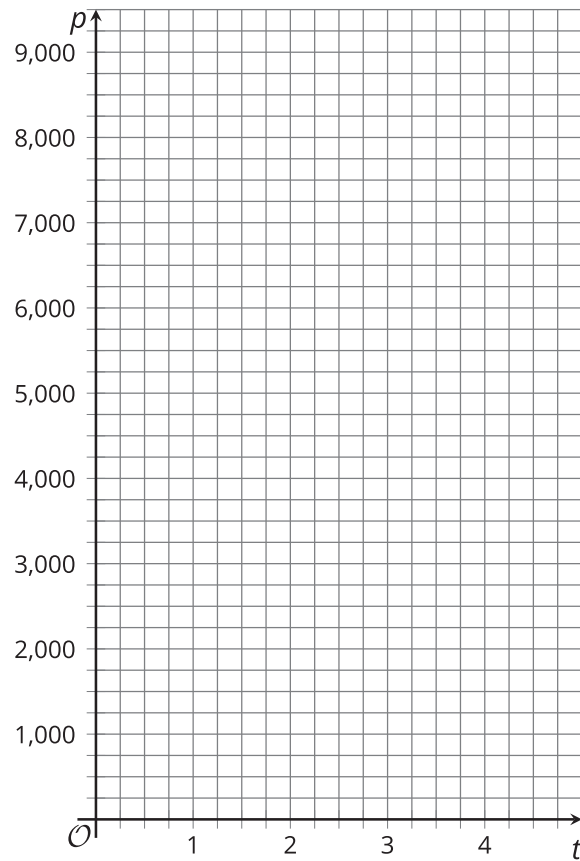
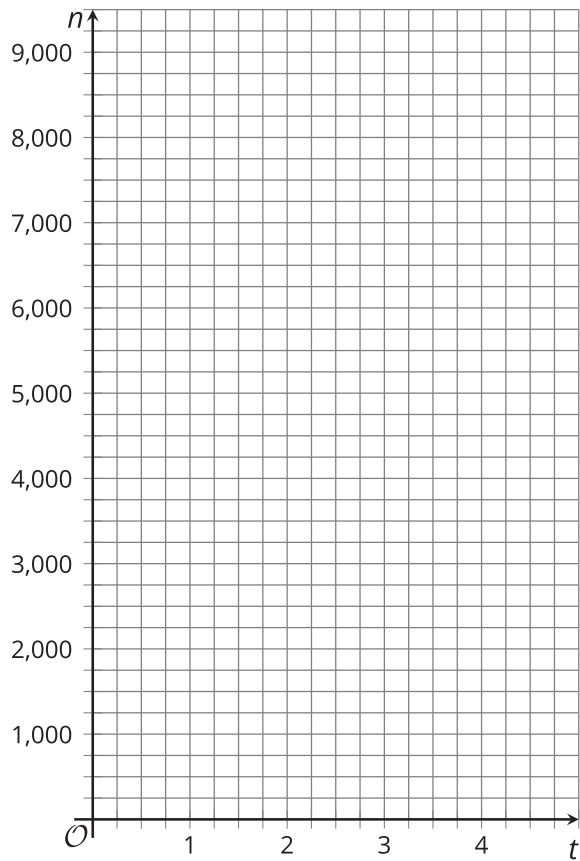
## 4 Graphing the Microbes

### Student Task Statement

1. Refer back to your work in the table of the previous task. Use that information and the given coordinate planes to graph the following:

a. Graph  $(t, n)$  when  $t$  is 0, 1, 2, 3, and 4.

b. Graph  $(t, p)$  when  $t$  is 0, 1, 2, 3, and 4. (If you get stuck, you can create a table.)



2. On the graph of  $n$ , where can you see each number that appears in the equation?

3. On the graph of  $p$ , where can you see each number that appears in the equation?

### Images for Activity Synthesis

