

## 2 Functions

### Activity: Bacterial growth (Teacher version)

For this task you will be creating a formula to model the growth of a bacterial colony and determining how valid your formula is.



### Questions

- 1 You have a bacterial colony starting with two bacteria. Every hour, each bacteria divides into two by binary fission.

How many bacteria will you have after

- a 1 hour      4 bacteria
- b 2 hours      8 bacteria
- c 3 hours      16 bacteria
- d 10 hours    2048 bacteria
- e  $t$  hours.     $2^{t+1}$  bacteria

- 2 A scientist collected data showing the number of bacteria after a certain number of hours, starting with two bacteria.

Time (hours)	Number of bacteria in the colony
0	2
1	4
2	7
3	16
4	30
5	67

Create an approximate formula for the number of bacteria in the colony in terms of time. Be sure to define your variables.

$$N = 2^{t+1}$$

where  $N$  is the number of bacteria after  $t$  hours.

- 3 The scientist records that, after 10 hours, there are approximately 2000 bacteria in the colony. Calculate the percentage error of the number of bacteria by your formula and the actual number recorded by the scientist.

Using formula,  $N = 2^{11} = 2048$  bacteria

$$\text{Percentage error} = \frac{2048 - 2000}{2000} \times 100\% = 2.4\%$$