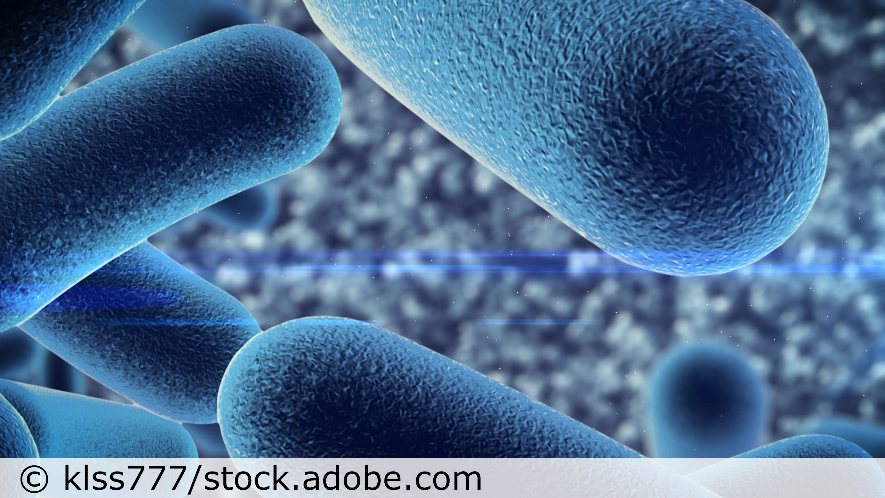
2 Functions

Activity: Bacterial growth (Student 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

**b** 2 hours

**c** 3 hours

**d** 10 hours

**e** *t* hours.

**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.

**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.

This time-lapse video shows actual bacteria growing by the process of binary fission: [www.youtube.com/watch?v=j8\_xoM8Wwgs&t=22](http://www.youtube.com/watch?v=j8_xoM8Wwgs&t=22)

**4** Create a data table and collect data for the number of bacteria in the colony over time. You can use a stopwatch or the time-counter on the video.

**5** Use your data to create a formula for the number of bacteria in the colony. Be sure to clearly define all variables and clearly show how you created the formula.

**6** Comment on the validity of your formula from question 5, including

**a** explaining how accurate your formula is (using percentage errors)

**b** describing the scope and limitations.

**7** Make one modification to your formula based on your scope and limitations from question 6 and explain how it makes your formula more valid.