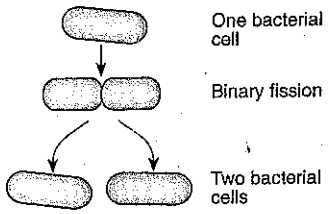
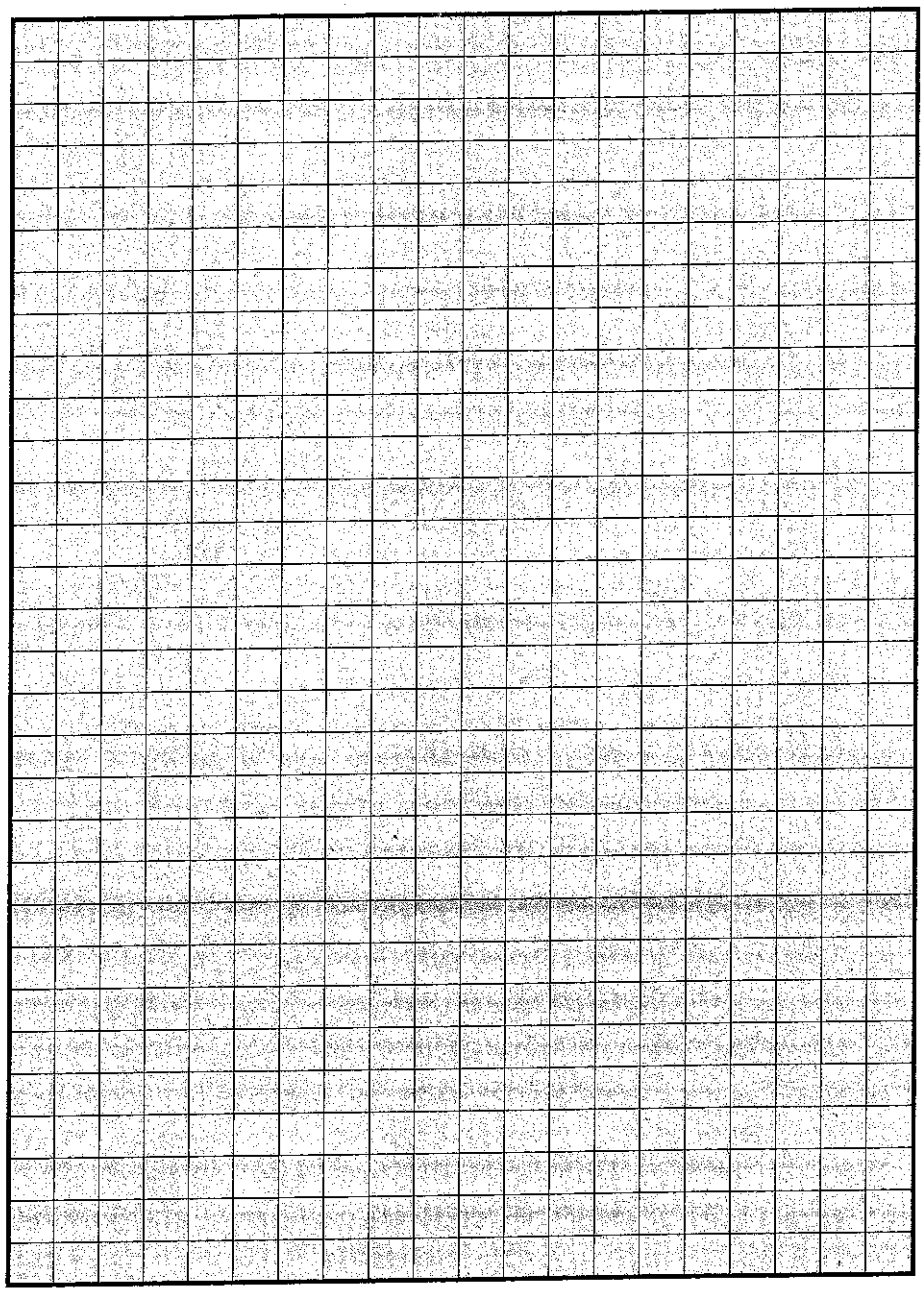
# Growth in a Bacterial Population



Bacteria normally reproduce by a process called **binary fission**; a simple mitotic cell division that is preceded by cell elongation and involves one cell dividing in two. The time required for a cell to divide is the **generation time** and it varies between organisms and with environmental conditions such as temperature. When a few bacteria are inoculated into a liquid growth medium, and the population is counted at intervals, it is possible to plot a **bacterial growth curve** that shows the growth of cells over time. In this activity, you will simulate this for a hypothetical bacterial population with a generation time of 20 minutes. In a bacterial culture with a limited nutrient supply, four growth phases are evident: the early **lag phase**, the **log phase** of exponential growth, the **stationary phase** when growth rate slows, and the **death** phase, when the population goes into logarithmic decline.




| Time (mins) | Population size |
|---|---|
| 0 | 1 |
| 20 | 2 |
| 40 | 4 |
| 60 | 8 |
| 80 | |
| 100 | |
| 120 | |
| 140 | |
| 160 | |
| 180 | |
| 200 | |
| 220 | |
| 240 | |
| 260 | |
| 280 | |
| 300 | |
| 320 | |
| 340 | |
| 360 | |



1. Complete the table (above) by doubling the number of bacteria for every 20 minute interval.
2. Graph the results on the graph grid above. Make sure that you choose suitable scales for each axis. Label the axes and mark out (number) the scale for each axis. Identify the **lag** and **log** phases of growth and mark them on the graph.
3. State how many bacteria were present after: 1 hour: _____ 3 hours: _____ 6 hours: _____
4. Describe the shape of the curve you have plotted: _____
5. Predict what would happen to the shape of the growth curve of this population assuming no further input of nutrients:

_____