*Institute for Research in Schools*Worksheet KS3.1

Using maths to help us track a disease

1. We use the R-number of a disease to help us work out how quickly it might spread. Why do you think it is useful to have an idea of how many people might get ill with a disease and how quickly?



1. The R-number or reproduction number of a disease is the number of people one ill person infects.

If R=1, then each ill person infects one other

If R=2, then each ill person infects two others

If R=3 then each ill person infects three others

… and so on.

Each infection cycle of a person infecting the next person is called an ‘iteration’.

When R=1, it takes 100 iterations to infect 100 people.

1. How many iterations do you guess it would take to infect 100 people when the R-rate is 2?
2. How many iterations when the R-rate is 3?
3. i) Fill in this chart. Use a dot to represent an infected person. The first row and some boxes on the second row are completed for you. Use a pencil!

**Hint: You may want to use numbers rather than dots for the last two rows!**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| R-number  | First iteration | Second iteration | Third iteration | Fourth iteration | Fifth iteration | Total number infected by first ill person |
| 1 |  |  |  |  |  | 5 |
| 2(each infected person infects two others) |  |  |  |  |  |  |
| 3(each infected person infects three others) |  |  |  |  |  |  |
| 4(Each infected person infects four others) |  |  |  |  |  |  |

1. Look back at your answers to 2 i) and ii)

Do you agree with your predictions? After filling in the table above, explain why an R-number over one can be a problem.