

Activity sheet 1: Heads or tails

If you were to toss a coin ten times, how many times would you expect to get a head? How many times would you expect a tail? Test your hypothesis.

Using a spreadsheet, you can model this experiment over and over again.

- 1 Open a blank spreadsheet.
- 2 Let 1 signify a 'head' and 0 signify a 'tail'.
- 3 In cell A1, type =RANDBETWEEN(0,1). This function generates a random number, 0 or 1.
- 4 Use the fill handle to copy this formula from A1 through to A10.
- 5 Use the <F9> key to recalculate over and over again.
- 6 Elsewhere in the spreadsheet (e.g. L1), calculate the number of heads by typing =COUNTIF(A1:A10,1). This function counts the number of cells in the range A1:A10 that contain a 1.
- 7 Dividing this value by 10 will give the proportion of heads. Create a formula to do this, putting the result in M1.

*Was the hypothesis for number of heads (proportion =0.5) correct?
Recalculate over and over again, using the <F9> key.*

How often does this equal 0.5? What are the extreme values?

What does the model tell us? What doesn't it tell us?

How could the model be improved?

- 8 Extend the model to 100 trials. Copying the formula down to J10 will give 100 trials. Adapt your formulae for counting the number and proportion of heads. Extend to 1000.

Does the model 'improve' and converge to 0.5 as the number of trials is increased?