

## Mathematical Behaviours

There are some things a mathematician (or young learner) might do when faced with an interesting problem to ponder. Below is a detailed, though by no means complete, description of such mathematical behaviours.

Developing these behaviours is the main goal of the MathsCraft Curriculum. The below description of these behaviours may help you to mentor-by-modelling and is to be used for assessment.

This list is **not** a recipe for solving problems, and it is **not** a checklist. Mathematical adventures are not linear, and it is possible that some behaviours will not be called upon during a given adventure.

These behaviours become more effective with experience, as the learner gains a feel for what is required. Such experience can be gained by working on many problems, alone or with other people. It is rarely gained by following a recipe.

*“It is inherent in the nature of guidelines that they don’t work if you take them too literally.”*

*Ian Stewart (foreword to How to solve it, George Pólya, 2nd ed, 1990)*

## LIST OF MATHEMATICAL BEHAVIOURS

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### DOING THINGS TO HELP YOU HAVE AN IDEA

- Generating data — calculating
- Organising the data
- “Playing” around with the data, getting to know it
- Discussing it with someone
- Looking for patterns or connections
- Establishing a notation
- Deciding on a definition
- Trying a different notation
- Changing a definition
- Asking a question
- ...

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### HAVING AN IDEA

- Observing something
- Thinking of a new way to write something
- Making an association between two things (often one being present in the data, but also a fact or idea that comes to mind)
- Noticing/sensing a pattern
- Making a prediction
- ...

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### DOING SOMETHING WITH THAT IDEA

- Testing it against new data
- Sharing it with someone
- Extending it
- Discarding it
- Convincing someone of its validity
- Recognising gaps in logic
- Cleaning up the idea (working towards a precise statement)
- Forming an argument (working towards becoming sure, beyond all doubt)
- Writing a proof
- ...

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### CREATING A NEW PROBLEM

- Looking before/within/beyond for other things of interest
- Changing, adding, or removing a rule
- Asking a new question
- Pondering other problems known to you and considering links
- ...