

Working Mathematically: The Process

First give me an interesting problem.

When mathematicians become interested in a problem they:

- Play with the problem to collect & organise data about it.
- Discuss & record notes and diagrams.
- Seek & see patterns or connections in the organised data.
- Make & test hypotheses based on the patterns or connections.
- Look in their strategy toolbox for problem solving strategies which could help.
- Look in their skill toolbox for mathematical skills which could help.
- Check their answer and think about what else they can learn from it.
- Publish their results.

Questions which help mathematicians learn more are:

- Can I check this another way?
- What happens if ...?
- How many solutions are there?
- How will I know when I have found them all?

When mathematicians have a problem they:

- Read & understand the problem.
- Plan a strategy to start the problem.
- Carry out their plan.
- Check the result.

A mathematician's strategy toolbox includes:

- Do I know a similar problem?
- Guess, check and improve
- Try a simpler problem
- Write an equation
- Make a list or table
- Work backwards
- Act it out
- Draw a picture or graph
- Make a model
- Look for a pattern
- Try all possibilities
- Seek an exception
- Break the problem into smaller parts ...

If one way doesn't work I just start again another way.

Working Like a Mathematician

Start with an interesting problem.

- . Work with others.
- . Play with the problem
- . Gather data
- . Organise the data
- . Look for patterns
- . Make a hypothesis
- . Test the hypothesis
- . Look in your strategy toolbox for useful problem solving strategies
- . Look in your skill toolbox for useful mathematical skills
- . Explain why the hypothesis is true
- . Publish your result

A mathematician's strategy toolbox includes:

- . Do I know a similar problem?
- . Guess, check and improve
- . Try a simpler problem
- . Write an equation
- . Make a list or table
- . Work backwards
- . Act it out
- . Draw a picture or graph
- . Make a model
- . Look for a pattern
- . Try all possibilities
- . Seek an exception
- . Break the problem into smaller parts

If one way doesn't work, just start again another way.