Working Mathematically

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
- Break the problem into smaller parts
- Act it out
- Draw a picture or graph
- Make a model
- Look for a pattern
- Try all possibilities
- Seek an exception
- ...

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

Mathematics Centre
Principles & Support

http://www.blackdouglas.com.au/mathematicscentre

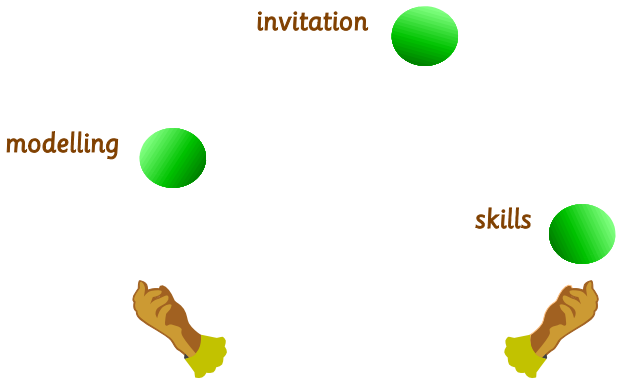
Introduction

Our objective is to assist you in creating:

happy, healthy, cheerful, productive, inspiring classrooms

in which students learn to work like a mathematician. We support you to:

- Model how a mathematician works.
- Invite students to apply the model.
- Encourage students to develop mathematical skills.



Balancing a Working Mathematically curriculum.

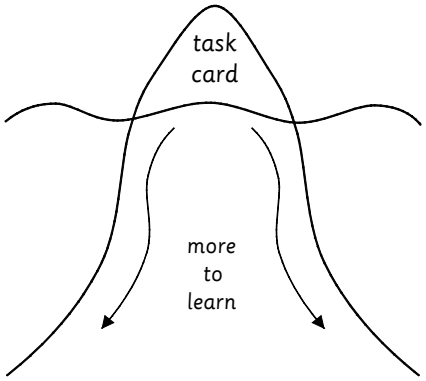
Looking for features of best practice.

Background

- We collect and retell stories of classroom success.
- We use a practical, hands-on manner intended to encourage debate about best teaching practice.
- To support teachers in re-enacting these successes there are a wide range of resources and services.
- Approaches and resources are designed to integrate with, rather than replace, local curriculum.
- As a result of such experiences many teachers/schools/districts have reviewed and enhanced their curriculum.

Projects

- Classroom wisdom can be accessed through three projects.
- The framework for each project is Working Mathematically.
- Working Mathematically means engaging students in learning to work like a mathematician.



A good task is the tip of an iceberg.

Mathematics Task Centre Project

- Hands-on problem solving (2 - 10):
  the invitation to work like a mathematician
- http://www.blackdouglas.com.au/taskcentre

Maths300

- 300 investigation lessons on the web (K - 12):
  modelling how a mathematician works
- http://www.maths300.esa.edu.au

Calculating Changes

- Engineering 'aha' moments in number (K - 6):
  enhancing children's number sense
  http://www.blackdouglas.com.au/calchange

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