

Working Mathematically

Learning to Work like a Mathematician

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

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





Mathematics Centre Principles & Support

<http://www.mathematicscentre.com>

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:

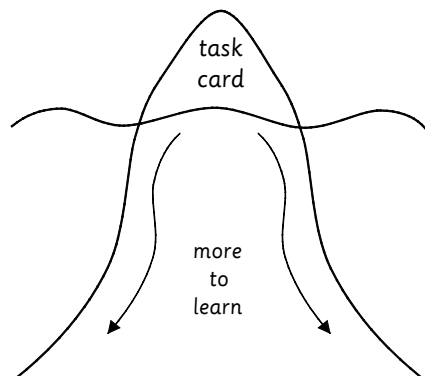
- Model how a mathematician works.
- Invite students to apply the model.
- Encourage students to develop mathematical skills.



Looking for features of best practice.

Divisions

- Classroom wisdom can be accessed through our site and Maths300.
- The framework for all is Working Mathematically.
- Working Mathematically means engaging students in learning to work like a mathematician.



A good task is the tip of an iceberg.

invitation



modelling



skills



Balancing a Working Mathematically curriculum.

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.

Mathematics Task Centre

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

Calculating Changes

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

Maths300

- Investigation lessons on the web (K - 12):
modelling how a mathematician works
- <http://www.maths300.com>