

Working in Context to support Mathematical Development:

Examples in Number and Shape

Sue Hough

Manchester Metropolitan University

s.hough@mmu.ac.uk

A problem in context.....or not?

In this session we will:

- Consider ways in which **context** is used in Realistic Mathematics Education (RME)
- Look at how contexts are chosen to support the development of **models** (representations and strategies)
- Look at **how students develop mathematically** through the use of contexts and models

Features of contexts and models so far

- Contexts are engaged with, to ensure that they are realisable
- Contexts are chosen deliberately to deliver particular models
- Several **different** contexts are used, which lead to the **same** model, in order to enable learners to generalise (where possible)

Context of ribbon

6 metres of ribbon costs £4.80

Per Sense

Formal
Abstract
World of Maths

Questions on %, fractions, ratio,
multiplication, division, pie charts

“Pre-formal”
“Models for”

Number Line/
Bar Model

Ratio Table

“Informal”
“Models of”

Bar Model

Bar Model

Bar Model

Double Number Line

Ratio Table

Ratio Table

Contexts

Audience Size

Scarf Size

Parking Lot

Buying Ribbon

Recipes

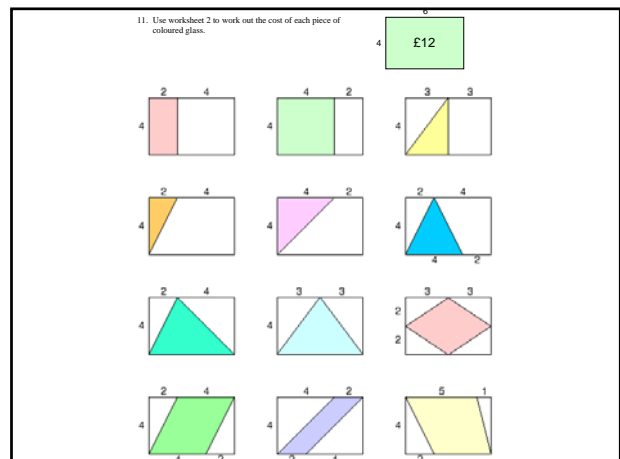
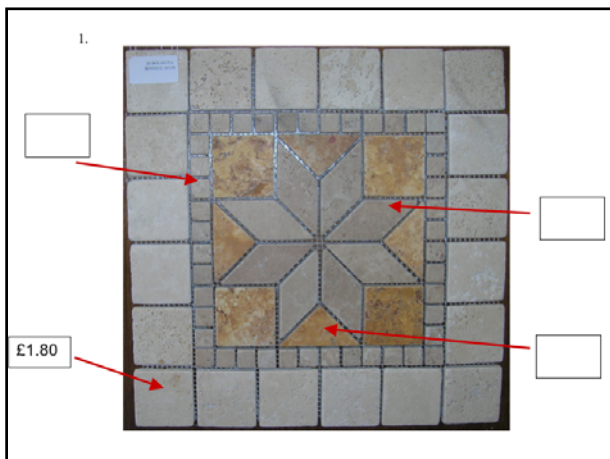
Process of Mathematizing

Using the model as a 'model for'

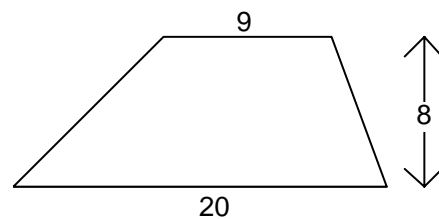
- A project teacher was quoted as saying:
'you can answer nearly half the paper using the ratio table'

Some other examples of using Contexts and Models

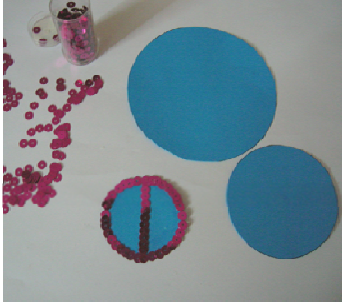
- Focus on shape, space and measures
- How is context used traditionally in shape, space and measures?
- How are contexts and models used in shape, space and measures in RME?



Class Activity – Touching the numbers



Sewing sequins



Fitting In – Section A

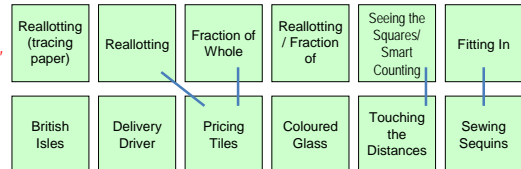
Formal
Abstract
World of Maths

Questions on perimeter, area
– various figures including circles

Pre-formal
"Models for"

Reallotting, fraction of whole, smart counting

Informal
"Models of"



Contexts

Features of contexts and models so far

- Contexts are engaged with, to ensure that they are realisable
- Contexts are chosen deliberately to deliver particular models
- Several **different** contexts are used, which lead to the **same** model, in order to enable learners to generalise (where possible)

Features of contexts and models so far

- Questions are posed which encourage learners to return from formal mathematics to context – because this is where they can make sense.

Questions

- How do you choose a good context?

Some summary points

- Embrace the context
- Delay the formal ('guided reinvention' principle)
- Work with a variety of contexts
- Pose questions which encourage learners to return from the formal back to context to enable them to make sense

Access to the classroom resources

- The 'Making Sense of Maths' units are available on the MEI VLE for a charge of £150
- To sample a taster of the materials visit the MEI website www.mei.org.uk/gcse and click on teaching resources

Associated links and reading

- For more examples of the kind included within this paper, we suggest the following websites:
- www.qcda.gov.uk/22221.aspx QCA's *Engaging mathematics for all learners*
- www.fi.uu.nl has many articles of interest and really useful applets
- www.mei.org.uk/gcse2010 under twin GCSE and then choose online resources. This has access to a variety of resources associated with this approach to teaching
- www.partnership.mmu.ac.uk/cme variety of resources and writing about approaches to teaching
- <http://mic.britannica.com> Information on MiC
- Heuvel-Panhuizen, M. van den (2003). The didactical use of models in realistic mathematics education: An example from a longitudinal trajectory on percentage. *Educational Studies in Mathematics*, 54(1), pp. 9-36.
- Van den heuvel-Panhuizen, M. (2002). Realistic Mathematics education as work in progress. In F.L.Lin (Ed) *Common Sense in Mathematics Education*. Proceedings of 2001 The Netherlands and Taiwan Conference on Mathematics Education, Taipei, Taiwan (pp. 1 – 42).