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

Process of Mathematising

"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 |

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'
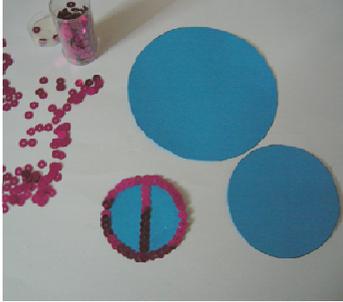
Some other examples of using Contexts and Models

- 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?
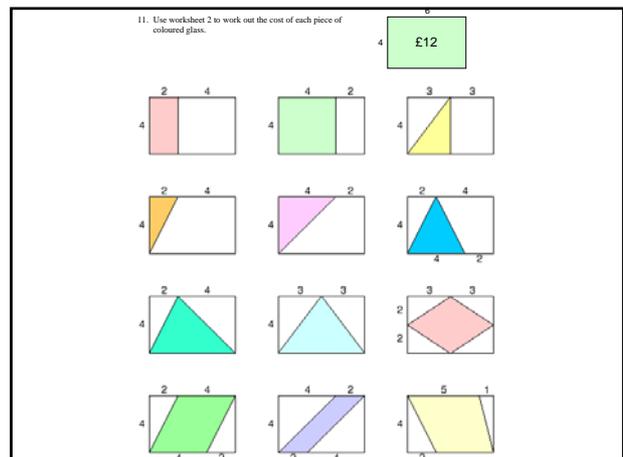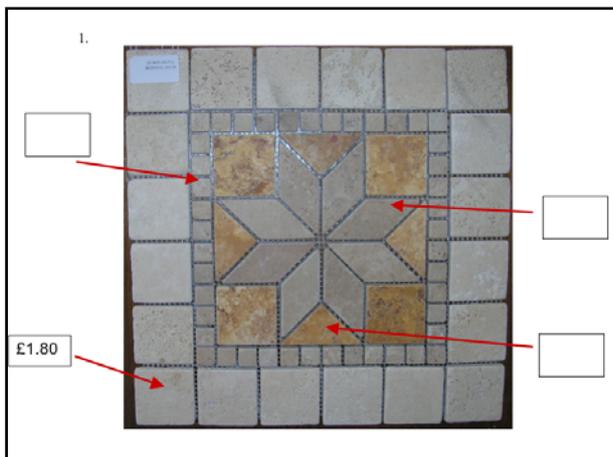
Class Activity – Touching the numbers
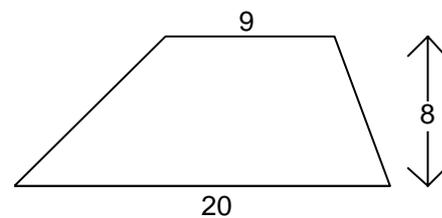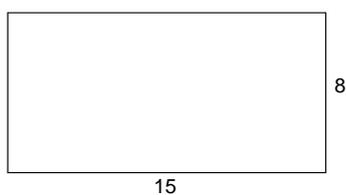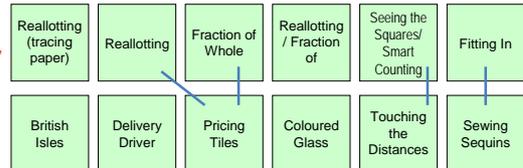
Sewing sequins

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"	Reallotting (tracing paper)	Reallotting	Fraction of Whole	Reallotting / Fraction of	Seeing the Squares/ Smart Counting	Fitting In
Contexts	British Isles	Delivery Driver	Pricing Tiles	Coloured Glass	Touching the Distances	Sewing Sequins

---

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 Mathmatics Education. Proceedings of 2001 The Netherlands and Taiwan Conference on Mathematics Education, Taipei, Taiwan (pp. 1 – 42).