

Moving from disowning to owning Realistic Mathematics Education

Two peoples stories



Experience as teachers pre RME

- * New maths and individualisation were in vogue and investigations were starting
- * Formal algebra to word problems
- * Individualisation
- * Formal assessment
- * Explaining followed by exercises

- * Late 1980s –largely teacher-directed instruction
- * Group work (somewhat purposeless) emerging
- * Focus on mechanistic math, procedures
- * Problem solving and problem contexts found in applications at end of unit

Dilemmas with students' mathematical experience

- * Misconceptions, beliefs... .Conflict
- * Which is biggest/smallest
0.375 0.7 0.32
- * Tell you what you want to hear
- * Misconceptions develop well after teaching: re-remembering
- * Students make connections that you never know about
- * Teaching topics that took 100s of years to develop in hours

- * Textbooks organize mathematics
- * Procedural worksheets → easy of behavior management
- * Successful completion of problem sets = understanding
- * Established didactical contract over many years
- * Student push back against reasoning beyond recall, classroom discourse

Eade's First Experiences of RME

- * Fractions in Realistic Mathematics Education
- * Which is bigger or are they both the same

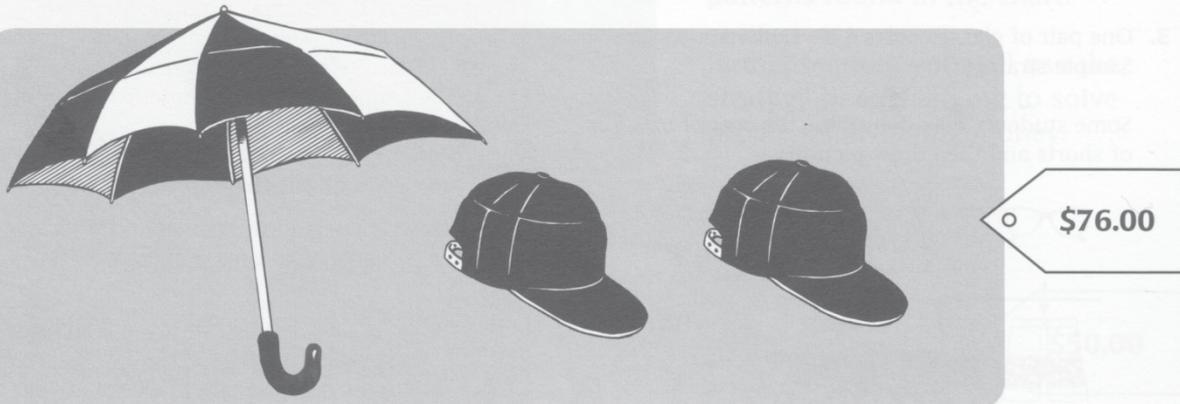
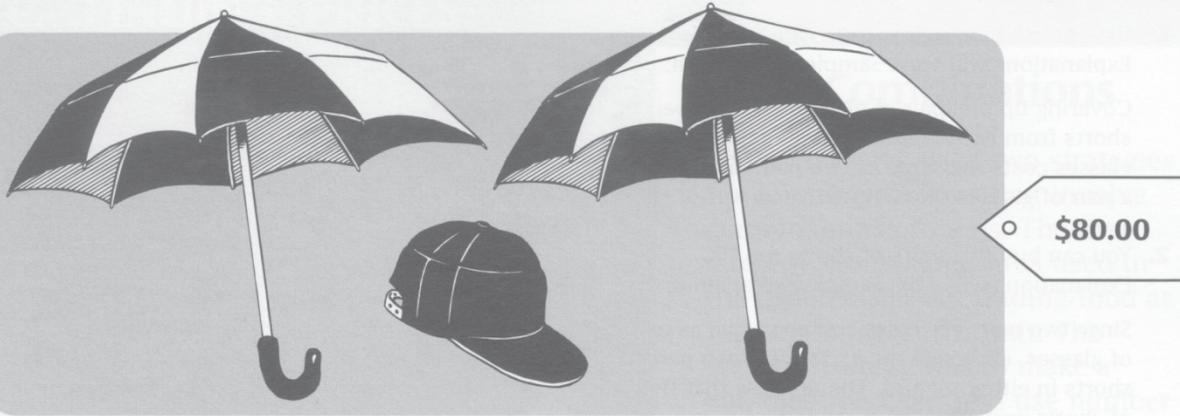
$$\frac{2}{3} \quad \text{or} \quad \frac{3}{4}$$

Manchester versus Amsterdam

- * So clearly the way we teach actually influence how students think and solve problems

Webb's First Experiences of RME

* Review of Mathematics in Context



- Contexts as entry points
- Visual representations
- Students ideas motivate teachers' questions
- New models, tools, strategies
- Deliberate focus on connections and concepts

Designing RME Curricula

- * Visited the Freudenthal Institute and was introduced to MiC
- * Got Sue Hough to trial Reallotment with her Y7
- * Funded to trail MiC over 3 years, support from FI
- * Funded to develop Making Sense of Mathematics
- * Just funded to trial Making Sense..(EEF)

Designing RME

Professional Development

- * Organized and facilitated professional development in US for *Mathematics in Context*
- * Teachers re-learning and experiencing mathematics
- * Teaching from a learner centered point of view
- * Adapting/designing lessons and units for PD

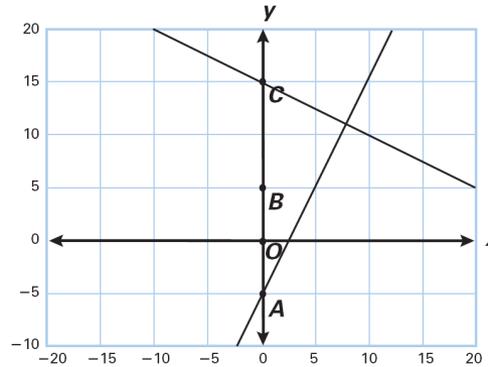
- * Contexts + Models/Tools + Progressive formalization
- * Redefining the role of the teacher & learner

$$3A + 2P = \$9.20$$

$$1A + 2P = \$5.20$$

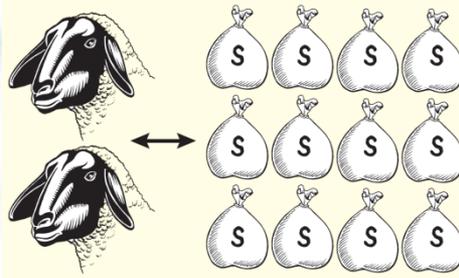
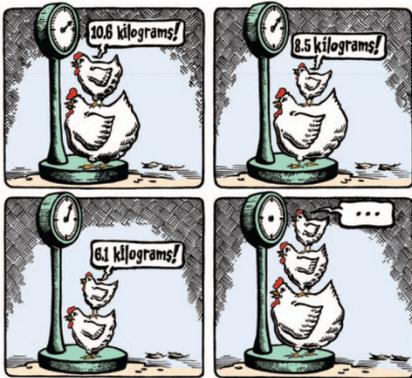
ORDER	TACO	SALAD	DRINK	TOTAL
1	2	4	--	\$10
2	1	2	3	\$8
3	3	--	3	\$9
4	1	2	--	
5	1	--	1	
6	2	2	1	
7	4	2	3	
8				
9				
10				

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Costs of Combinations (in cents)

7			155						305
6		115	140	165					
5	75	100	125	150	175	200			
4	60	85	110	135	160	185	210		
3	45	70	95	120	145	170	195		
2	30	55	80	105	130	155	180		
1	15	40	65	90	115	140	165	190	
0	0	25	50	75	100	125	150	175	
	0	1	2	3	4	5	6	7	8



Designing RME Assessment

- * Designing balanced assessments
- * Integrating instruction and classroom assessment
- * Formative assessment

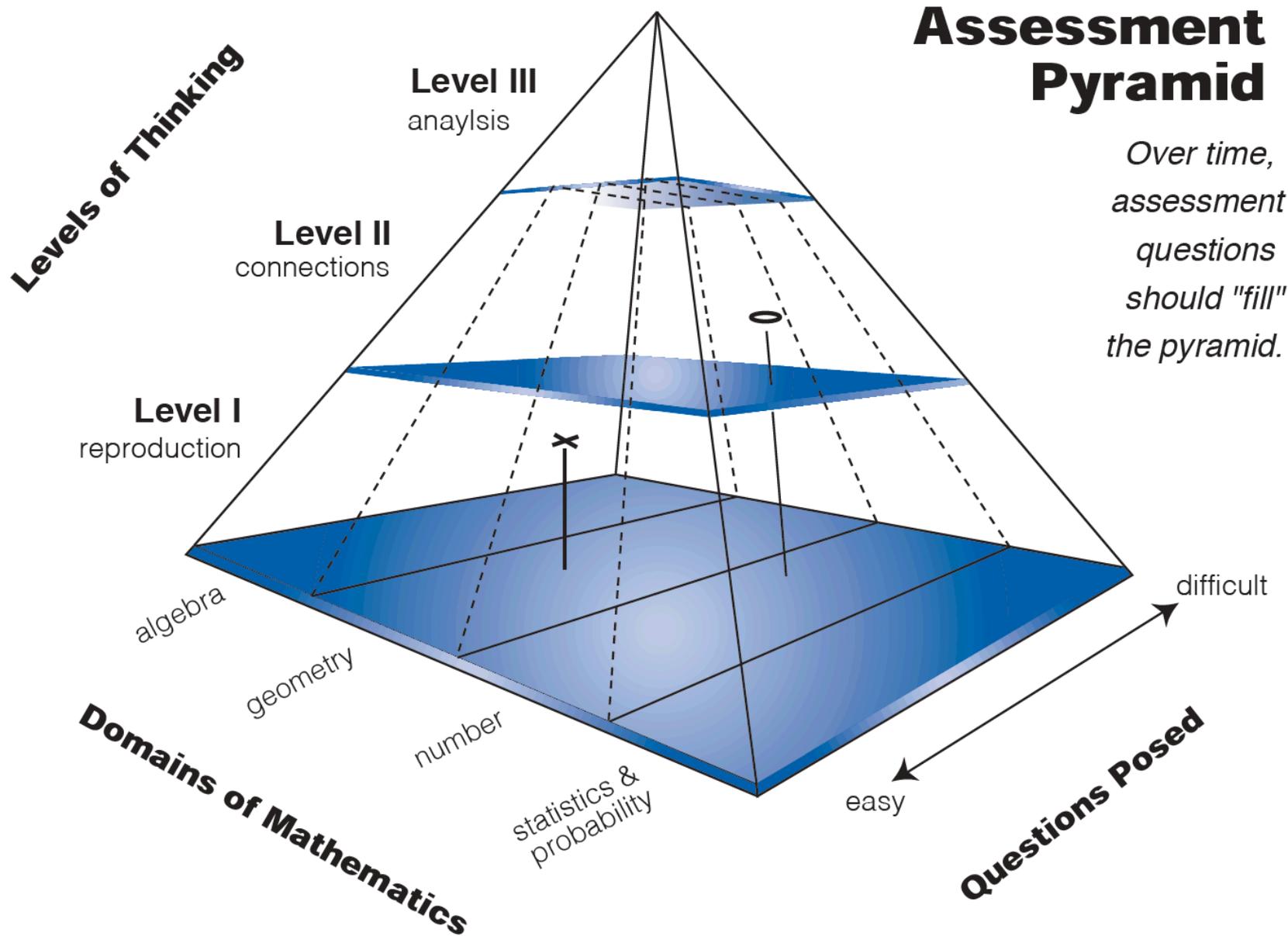


FIGURE 1 Adapted from Verhage and de Lange (1997).

Imagine that the clock face hour on Fig. A was divided into ten equal parts. The new clock face is shown in **Figure B** below. Each of these 10 parts is further divided into ten smaller parts. These smaller parts are called *metric minutes*.

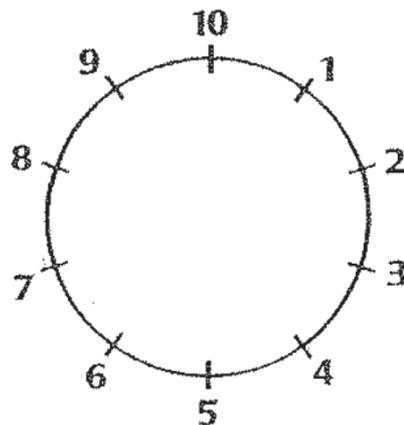


Figure B

b. How many metric minutes are there in one hour?

c. Is a metric minute shorter or longer than a regular minute?
Explain your reasoning.

"More Or Less" Final Assessment

Name _____ Date _____ Block _____

Assessment Rubric:		
0 = not yet demonstrated 1 = in progress 2 = demonstrated		
BASIC SKILLS:	Reasonable estimations (2)	_____
	Accurate calculation of % & discounts (1)	_____
	Compute total cost with tax (6)	_____
APPLICATION:	Articulate mathematical communication (1,2)	_____
	Work backward - find missing % or price (3)	_____
EXTENSION:	Compound interest (4)	_____
	Refuting common misperceptions with % (5)	_____

1. A jewelry store is having a spring sale. The salesperson needs to calculate the sale prices of some of the items in the store. Find the final sale price of each of the items and describe your strategy for finding each sale price:

a.



Discount: 25%

New sale price:

Description of Strategy:

Key features of RME

- * When we were working on *Making Sense of Mathematics, Wife*:
- * Trialing materials ideas and measuring impact is really important.
- * Setting problems in context linked to visualisations really supports effective thinking and is one aspect of differentiation
- * One student in a bottom set in Y11:
- * Y7 student in Cayman:

Differences and Similarities

- * Practice?
- * facilitating versus orchestrating
- * Isolated teaching versus integrated
- * Purpose or not?
- * Who is doing the talking?
- * Fun?
- * Using models

Supporting teachers shift to RME

- * Shifting to a new way from own childhood
- * Behaviour, listening and engagement
- * time
- * Who writes the materials?
- * Vertical Coherence is important: principals, MoE, DoE, inspectorate and politically

Cayman

- * Initial research in schools was so important
- * Staff turnover is high and recruited from many places
- * Needed to introduce Mathematics Recovery
- * Take time you can't change practices or beliefs quickly
- * Lesson study and developing ideas together helped and a lot more than RME

End of primary	Expected	Above
2011	25%	5%
2018	62%	25%