Models as Tools for Thought

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Context

- Context
  - used at the start for construction
  - a rich, truly problematic situation that is real to the pupils
  - that allows generalisation and exploration of mathematical ideas, that can be entered at many levels and supports mathematising

RME: Models

- In terms of emergent-models heuristics, the models evolve from the model of the students' informal mathematical activity to a model for more mathematical reasoning
- The shift comes about in a dynamic, reflexive process in which symbolizations and meaning co-evolve

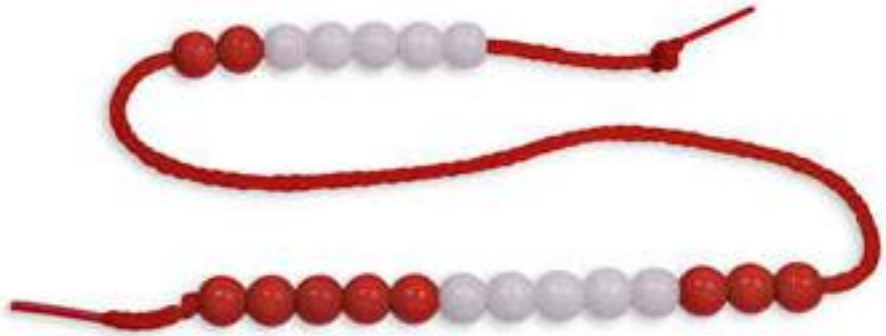
RME: Models

- The idea is that subsequent acting on these models will help the students reinvent the more formal mathematics that is aimed for.
- In RME, formal mathematics is seen as something that grows out of the students' activity not as something "out there" that pupils has to connect.

RME Models

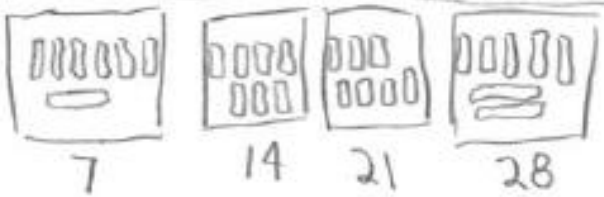
- Actual living models
- Concrete and tangible objects
- Drawing and sketches
- Photos and pictures
- Open number line, double number line
- Clock
- Ratio table, charts & graphs
- Open Array
- Symbols, text, numbers
- ICT-based

Examples of Models



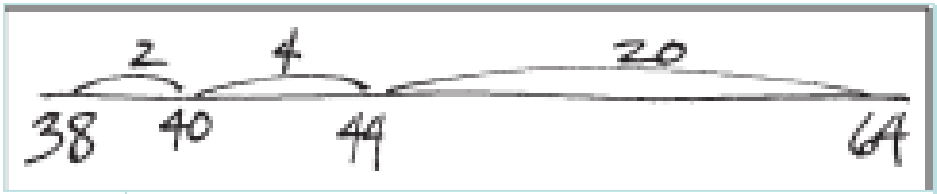
Examples of Models

7x4=28 Because all the problems have that answer.



I counted by 7 4 times.

Examples of Models



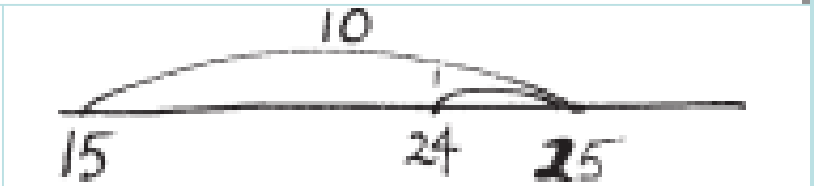
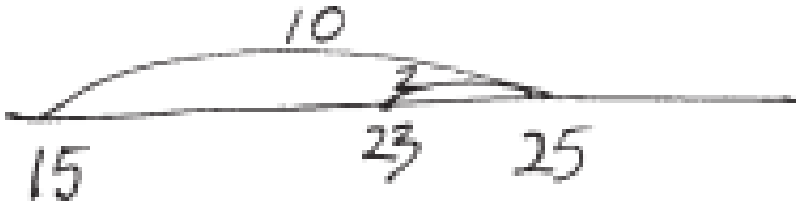
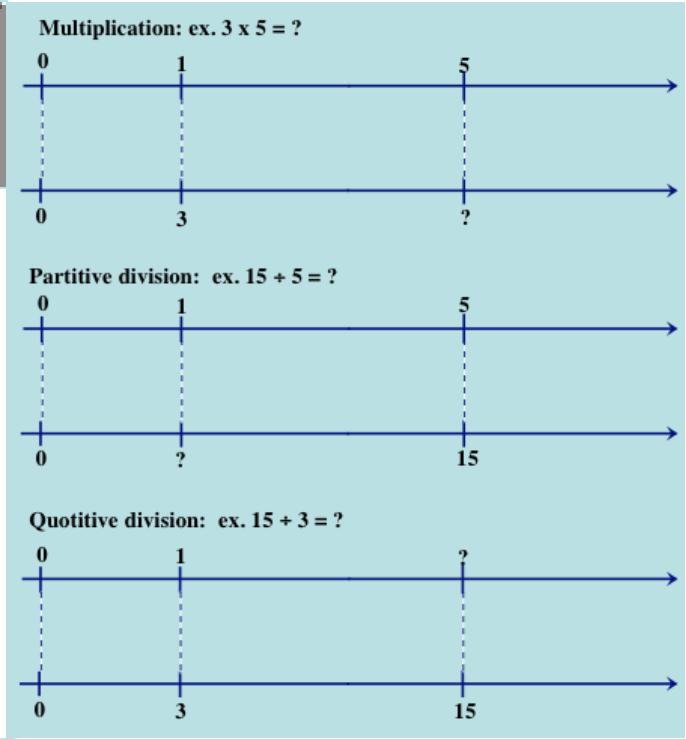
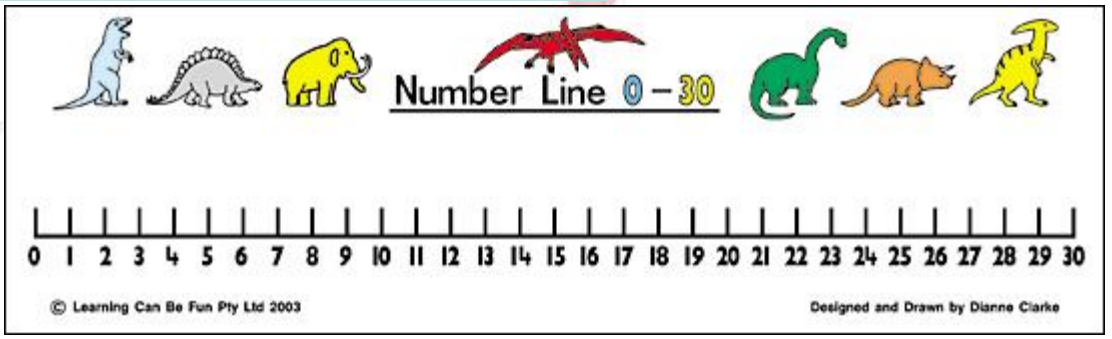


FIGURE 8.3a Luke's strategy



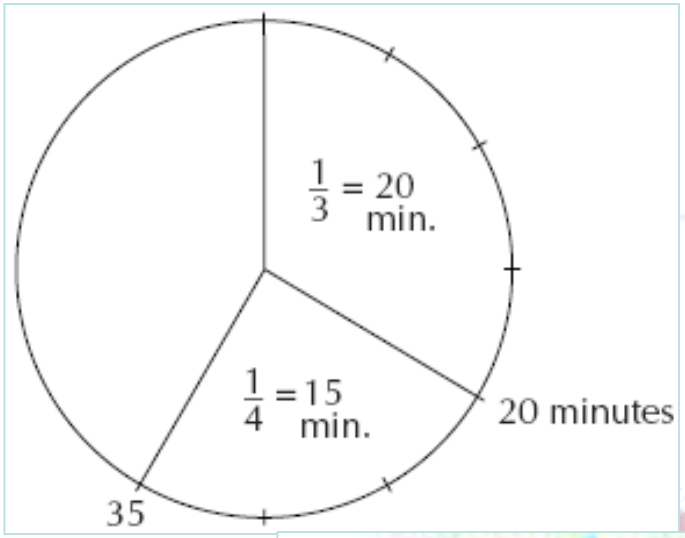


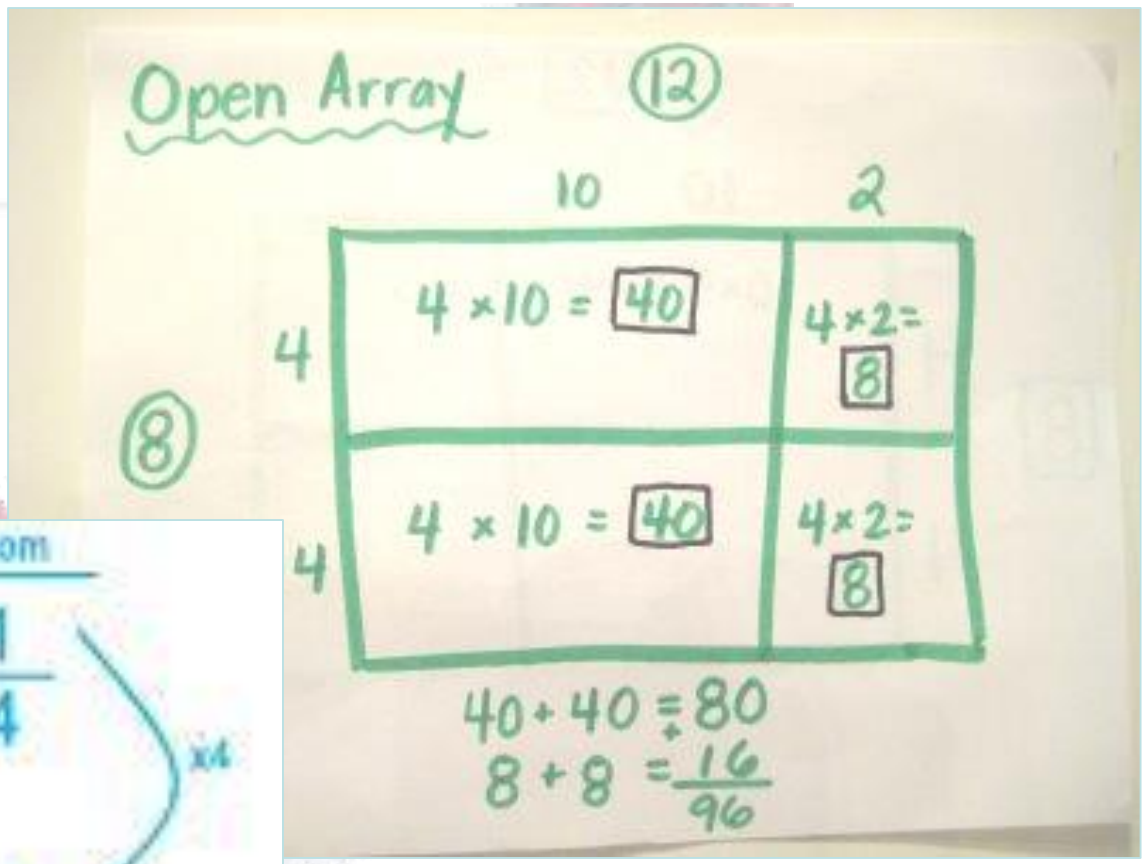


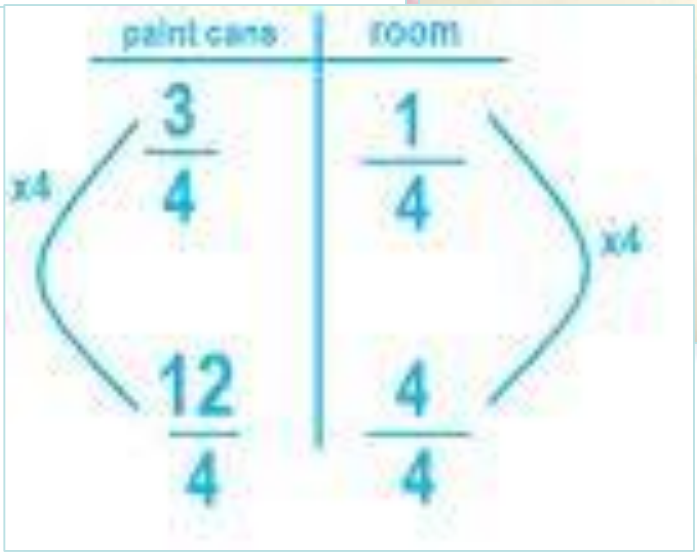
RME: Models

- Overarching concept that guides the instructional design
- There is no firm distinction between the model and what is being modelled.
- The models are not derived from the intended mathematics. Instead, the models are grounded in the way that contextual problems are solved by the pupils.
- The models in RME are related to modelling; for the pupils, the starting point is in the contextual situation of the problem that has to be solved. This problem is modelled in order to solve it with help

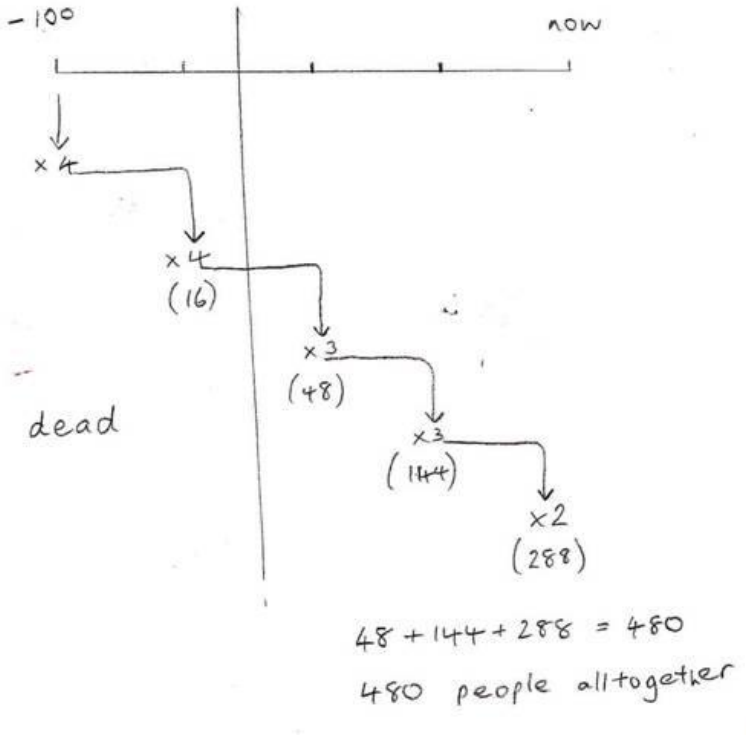
Examples of Models



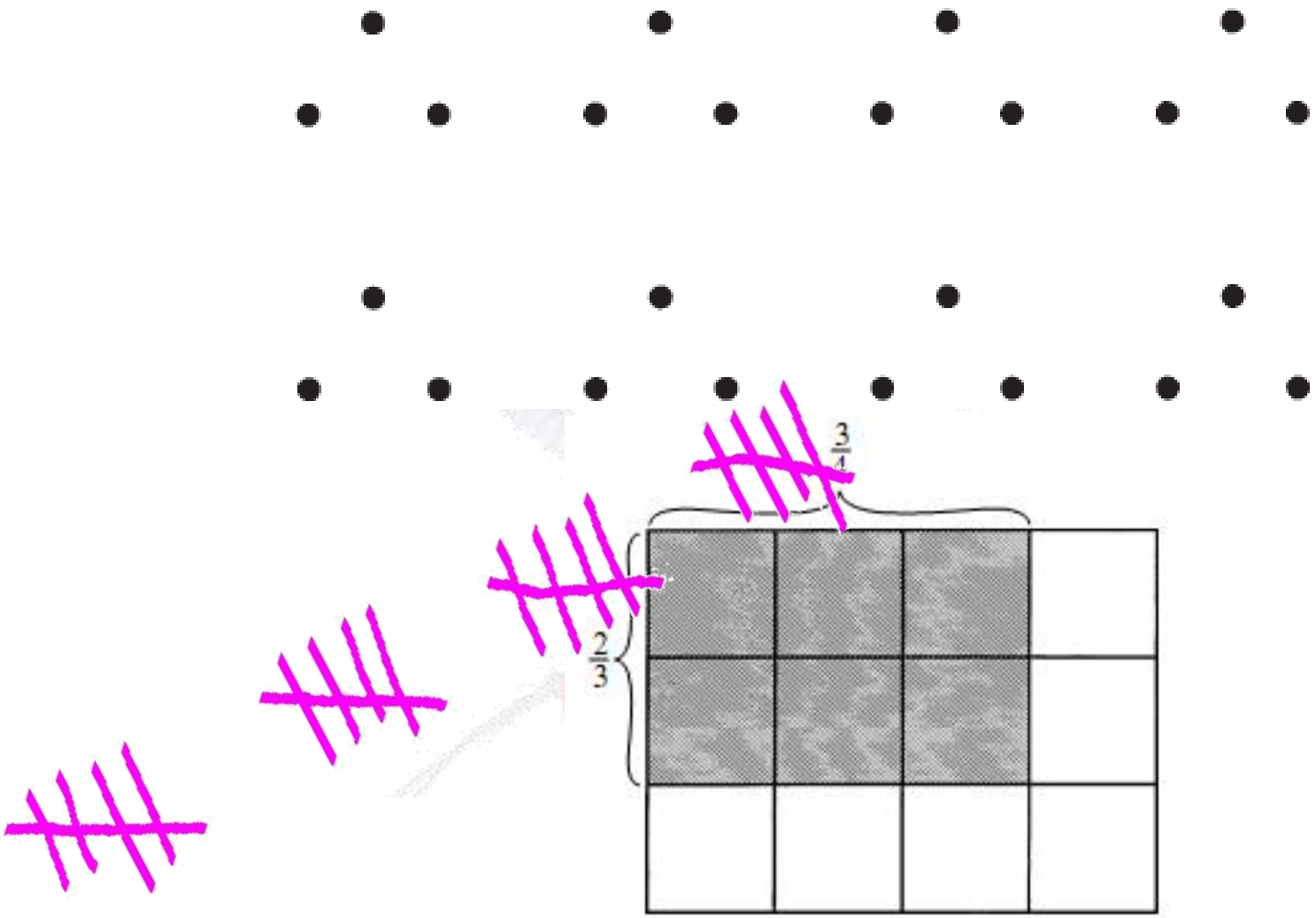




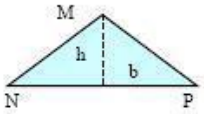
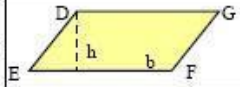
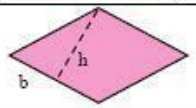
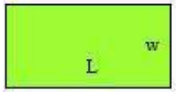
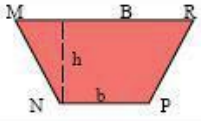
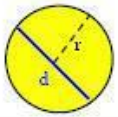
Examples of Models

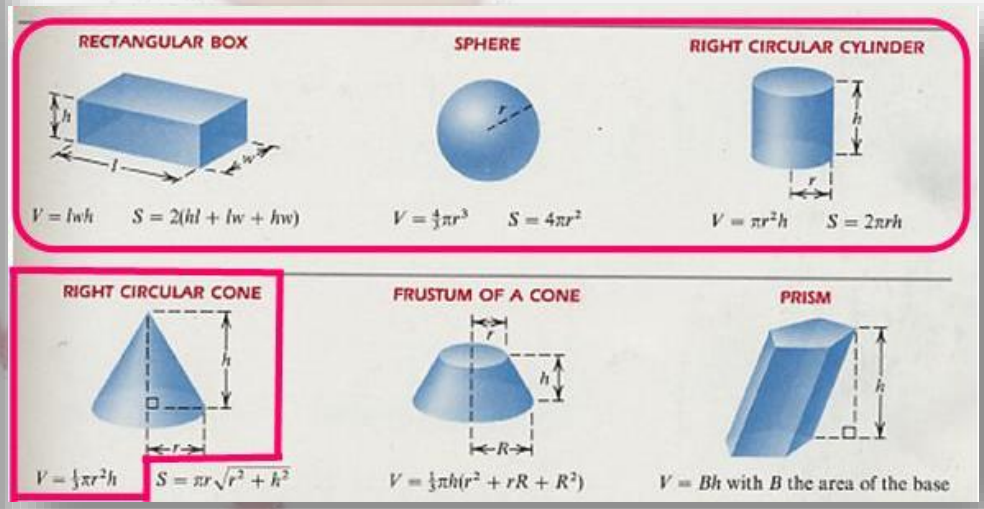


Examples of Models



Examples of Models

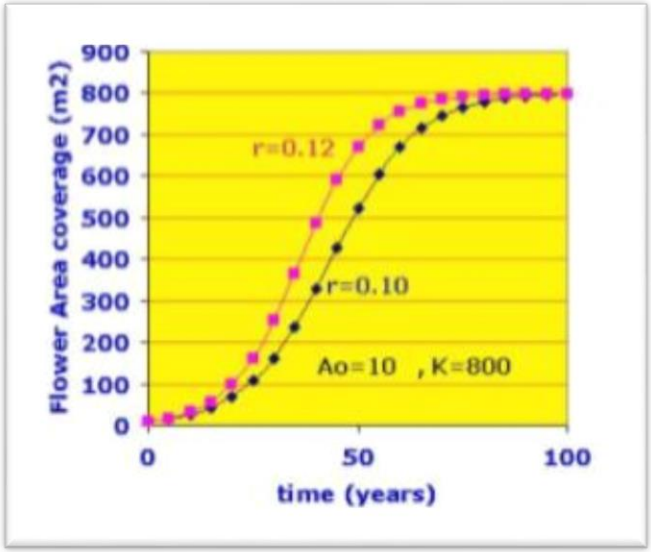
NAME	FIGURE	AREA	PERIMETER CIRCUMFERENCE
TRIANGLE		$A = \frac{b \times h}{2}$	$P=MN+NP+PM$
PARALLELOGRAM		$A = b \times h$	$P=DE+EF+FG+GD$
RHOMBUS		$A = b \times h$	$P = b+b+b+b$ $P = 4b$
RECTANGLE		$A = L \times w$	$P = L+w+L+w$ $P = 2L+2w$
SQUARE		$A = l^2$	$P = l+l+l+l$ $P = 4l$
TRAPEZOID		$A = \frac{(B+b) \times h}{2}$	$P=MN+NP+PR+RM$
CIRCLE		$A = \pi r^2$	$C = 2\pi r = \pi d$

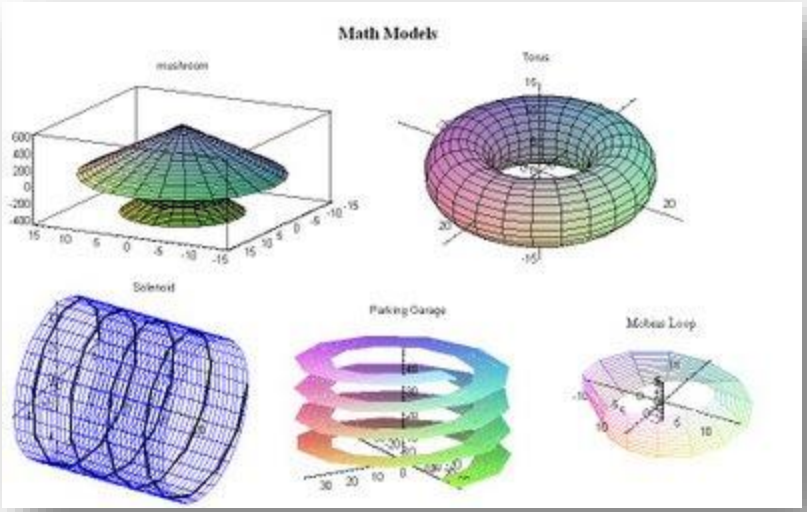


Examples of Models

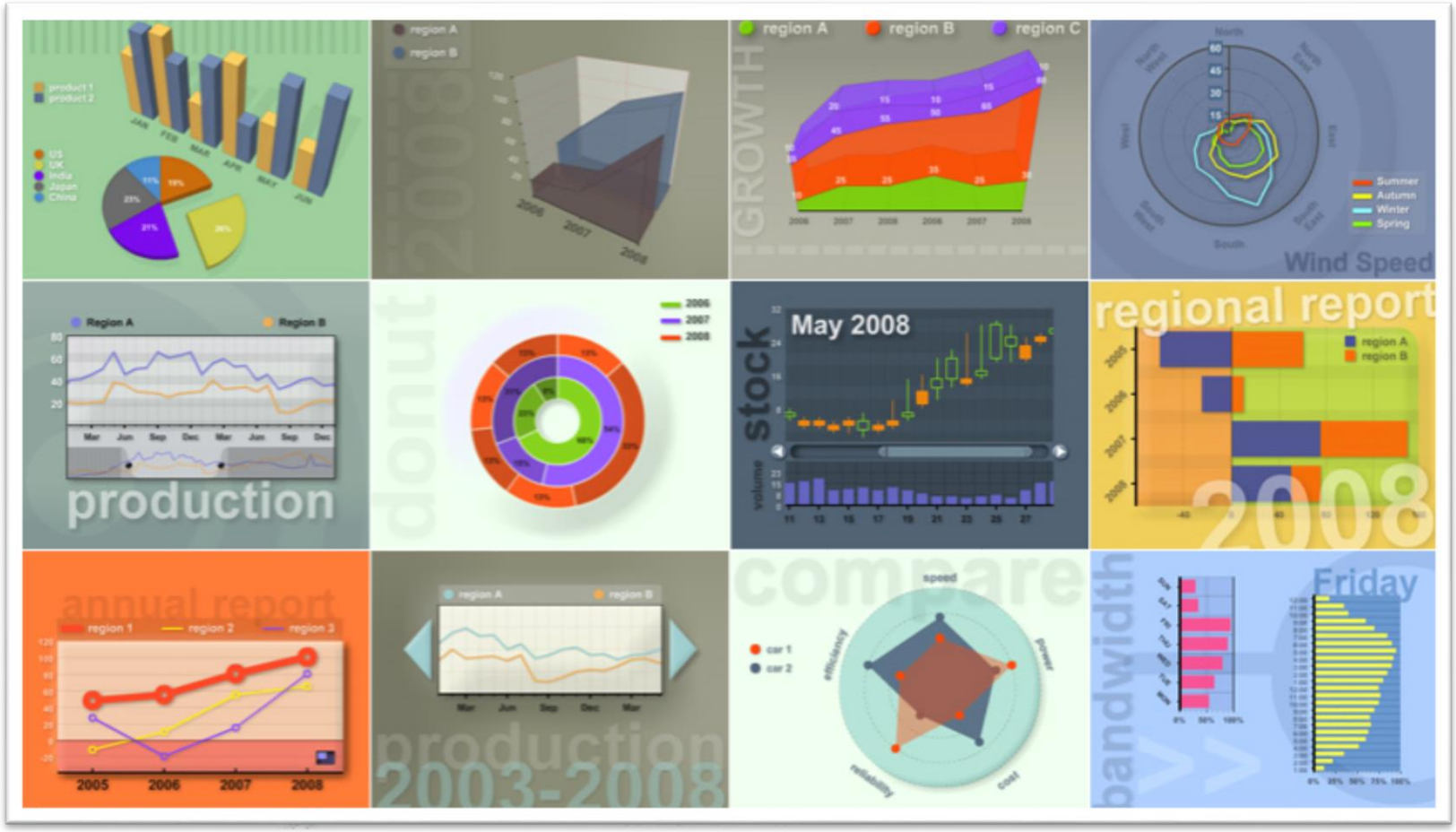
Female Height to Weight Ratio				Male Height to Weight Ratio			
Height	Low	Target	High	Height	Low	Target	High
4' 10"	100	115	131	5' 1"	123	134	145
4' 11"	101	117	134	5' 2"	125	137	148
5' 0"	103	120	137	5' 3"	127	139	151
5' 1"	105	122	140	5' 4"	129	142	155
5' 2"	108	125	144	5' 5"	131	145	159
5' 3"	111	128	148	5' 6"	133	148	163
5' 4"	114	133	152	5" 7"	135	151	167
5' 5"	117	136	156	5' 8"	137	154	171
5' 6"	120	140	160	5' 9"	139	157	175
5' 7"	123	143	164	5' 10"	141	160	179
5 '8"	126	146	167	5' 11"	144	164	183
5' 9"	129	150	170	6' 0"	147	167	187
5' 10"	132	153	173	6' 1"	150	171	192
5' 11"	135	156	176	6' 2"	153	175	197
6' 0"	138	159	179	6' 3"	157	179	202

Height = Feet and Inches - Weight = Pounds.





Examples of Models



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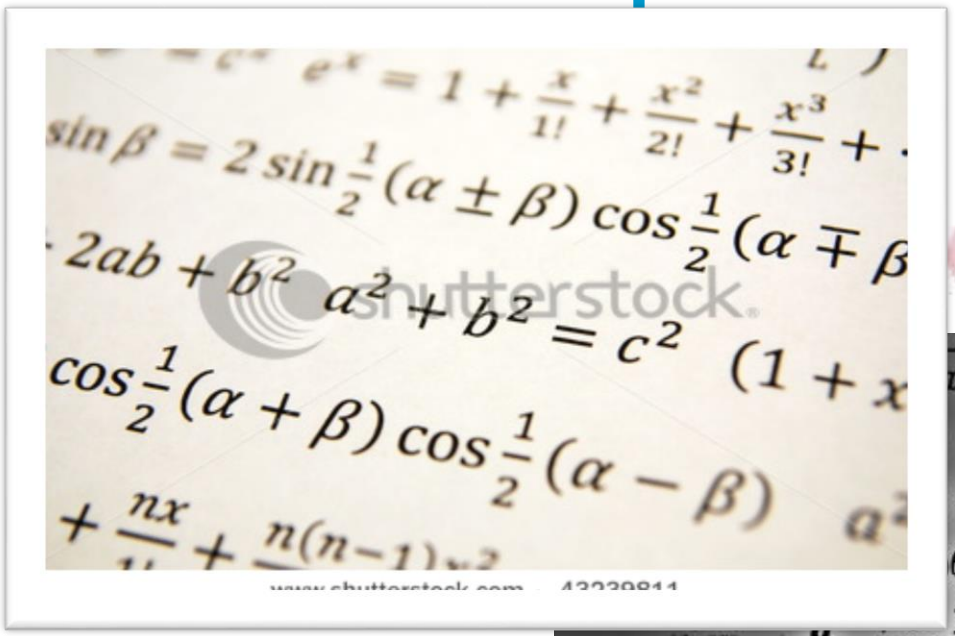

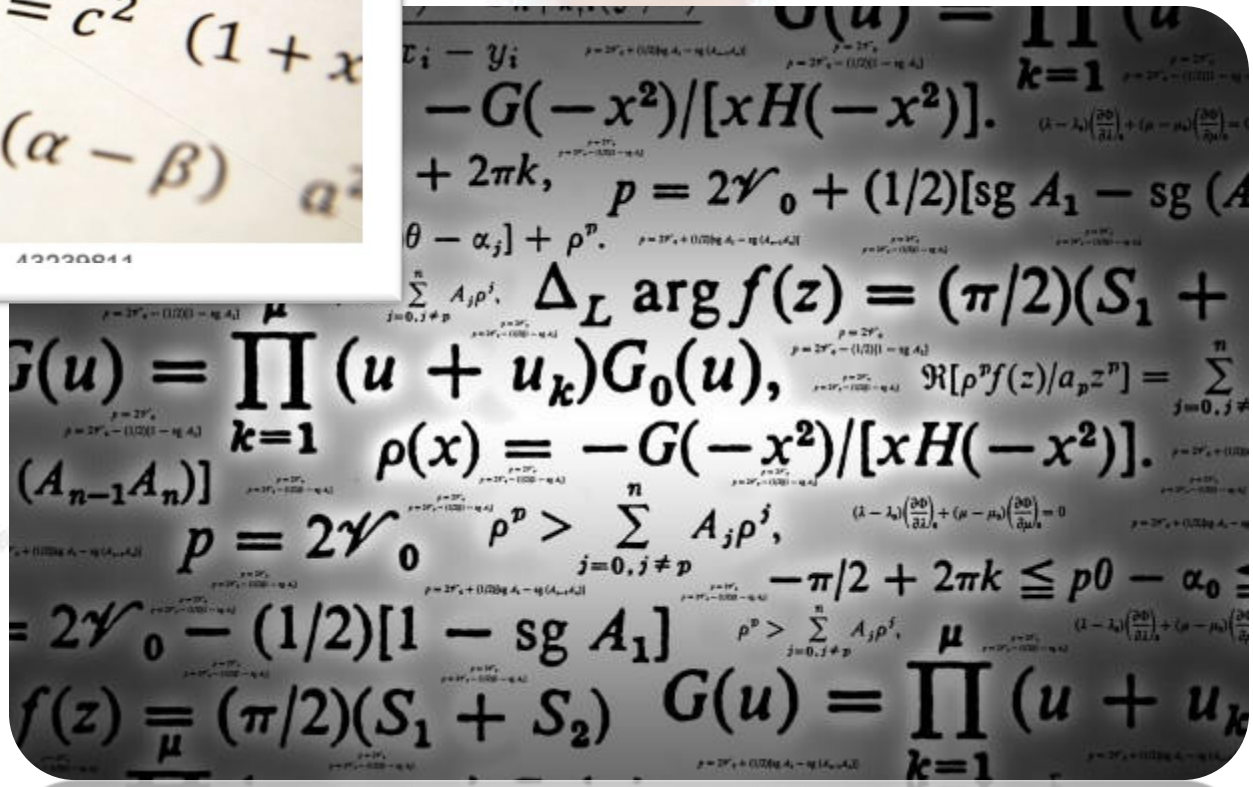


Models as Tools
for Metacognising Thoughts