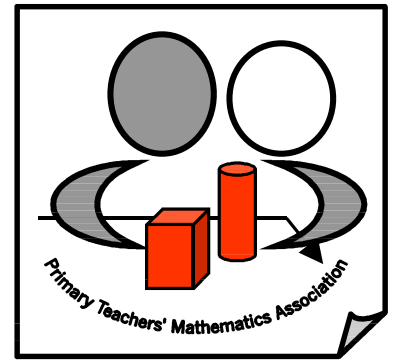


PRIMARY TEACHERS' MATHEMATICS  
ASSOCIATION

# NEWSLETTER

No. IV

September 2003



## 2<sup>nd</sup> Annual Conference: Places now available

The Committee of the Primary Teachers' Mathematics Association is proud to announce the programme for its second annual conference which will take place from 9:30 to 4:30 on Saturday, October 11<sup>th</sup> 2003. Professor Deborah Loewenberg Ball, from the University of Michigan at Ann Arbor, will deliver the keynote address, which will examine how teachers can cover the revised curriculum content while teaching in an innovative way. The programme (see page 2) also includes two sets of concurrent workshops and presentations and attendees will be able to attend two of these sessions as well as the keynote address. A number of educational suppliers will also be on hand to exhibit a wide range of mathematical equipment so it is a good time to stock up on materials for the year ahead. The Committee of the PTMA gratefully acknowledges the financial support of the In-Career Development Unit of the Department of Education and Science, under the National Development Plan, for this event.

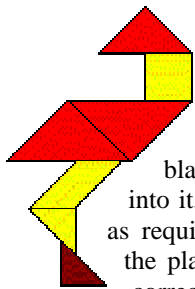


### Booking Details

To confirm a place at this primary mathematics event complete the enclosed form and return with the appropriate payment to : Bríd Ní Chualáin, Primary Teachers Mathematics Association Coláiste Mhuire, Marino Institute of Education, Griffith Avenue, Dublin 9. If you have any questions please phone 01 805 7722.

## Free Computer Tangram Game

A free tangram game written by Mark Overmars can be downloaded from <http://www.cs.uu.nl/people/markov/kids/tangram.html>. The program is completely free of charge and downloading takes approximately 3 minutes. To install the program simply run SETUP.EXE. This will start the InstallShield wizard that will guide you through the installation



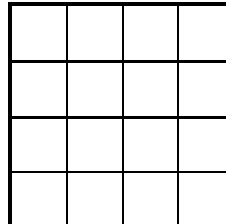
### SUMMARY

This program challenges the player to solve a huge collection of Tangram puzzles. The player is presented with a blank shape and must fit the tangram pieces into it, by dragging, rotating and flipping them as required. Different types of click sounds let the player know whether the pieces are in the correct position. Correctly solving a puzzle is greeted with applause and a new puzzle to solve.

(Item submitted by Heather Egan)

## Competition for Schools

How many squares are in the figure on the left?



To be in with a chance to win a gift token send your answer to [primarymaths@ireland.com](mailto:primarymaths@ireland.com) before October 10<sup>th</sup>. Include the class level, teacher's name

and the school's name and address. One entry only per class. The winner of the last competition was Mrs. Fennell's 5<sup>th</sup> class in St. Patrick's B.N.S., Hollypark, Blackrock, County Dublin. The solution is: 64 multilink cubes can be made into both a flat square and a cube.

## Newsletter & Website: Materials Wanted!

We are delighted to announce that our website [www.primarymaths.ie](http://www.primarymaths.ie) has undergone a major overhaul over the summer months. Thanks to Carmel Burns who is the webmaster. Thanks also to all contributors to this newsletter. If anyone has ideas, articles, teaching tips, comments etc. that they would like to submit for the newsletter or for the website, please e-mail them to [carmelburns\\_at\\_eircom.net](mailto:carmelburns_at_eircom.net) (website) or [sean.delaney\\_at\\_mie.ie](mailto:sean.delaney_at_mie.ie) (newsletter). (Replace '\_at\_' with '@' to mail).

# *Second Annual Conference(Provisional Programme)*

*Theme: Uncovering the Mathematics while Covering the Curriculum*

Saturday, October 11<sup>th</sup> 2002

Marino Institute of Education, Griffith Avenue, Dublin 9.

**9:30-10:00** Registration: Edmund Hall  
**10:00-11:00** Official Opening and Keynote Address: **Professor Deborah Ball**, University of Michigan  
**11:00-11:30** Coffee/Tea in Dining Room  
**11:30-1:00** Concurrent Sessions I

Early Mathematics	Years	Early Mathematics	Years	General Interest	Senior Classes	Special Educational Needs
Liz Dunphy		Eunice Pitt		Fiona Poole	Pat Manning	Joe Travers
What research is saying about teaching and learning addition in early years classrooms		Early Years Numeracy Project		Teaching Mathematics Using Workcards	Teaching Mathematics in a Disadvantaged Context: Using Concrete Materials	Mathematics: Assessment and Teaching Strategies for Pupils with Special Educational Needs

**1:00-1:35** Group A: Lunch Group B: Visit to Exhibitors  
**1:35-2:10** Group A: Visit to Exhibitors Group B: Lunch  
**2:15-3:45** Concurrent Sessions II

General Interest	Junior Classes	Senior Classes	Senior Classes
Deborah Ball	Mairéad Ryan	Florence Gavin	Thérèse Dooley
Adapting mathematics text books to uncover the mathematics	Approaches to Problem Solving in Junior Classes	Integrating Art and Mathematics	The Calculator as a tool for teaching and learning

**3:45-4:00** Q & A Session  
**4:00-4:15** AGM

## Logo ....but don't worry!

By John Leyden, Headfort

The computing season is back. Put down the rake and stride indoors to confront Logo. Why?

- It is a useful tool for teaching mathematical concepts. Even if you have never written a computer program before, good tutorials and demos come with it.
- It is great fun and children like doing it. Once a few basics have been mastered, they will work away happily. Once they have mastered **conditions** (see below) they are well set to write quizzes, educational routines and wherever their imagination takes them
- It will manipulate graphics they have created elsewhere (MSPaint or wherever).
- But.....you will have to spend a few evenings mastering it yourself. If you know how to operate whatever software packages your school owns, it is only a *tiny* step to writing your own in Logo. What you write will of course be better than anything that currently exists since you know your own particular group of children very well and can tailor the tasks exactly to their requirements. In the example below, round brackets are my comments and should not be typed in. See Inset box. The symbol ↵ at the end of each line stands for the Return or Enter key.
- There is an almost limitless quantity of useful information on the net. E.g.

<http://www.softronix.com/logo.html> from where you can download your own copy of Logo (It's Free).

[www.logosurvey.co.uk](http://www.logosurvey.co.uk) versions and history

[www.southwest.com.au/~jfuller/logotut/menu.htm](http://www.southwest.com.au/~jfuller/logotut/menu.htm)  
*school stuff*

- If you do decide to give it a try and then get stuck, please email me leydens\_at\_eircom.net (Replace '\_at\_' with '@' to mail). If you indicate what you are trying to get Logo to do and what steps you have taken, I *may* be able to help. There is a lot of stuff already written which you can easily modify. Any old PC will run it (100 Mhz is fine). Please email if you want copy of tableask to try. Finally good luck and try not to get addicted!

**Typical small condition program - quiz etc**

```
to tableask ↵ ( name of prog)
make "total 0 ↵ (creates a variable (total) and tells
computer total is now 0)
seth 90 ↵(sets heading of turtle at 90° to write across
the screen)
label [Multiply 7 by 16] ↵ (writes question for quiz)
ifelse rw ="112 [ cs seth 90 label "Good wait 60 cs make
"total :total +10 seth 90 label :total] [cs seth 90 label [No the
answer is 112]make "total :total + 0 wait 60 cs seth 90 label
:total] ↵
(condition to handle right/wrong answer and update total
score if answer correct. Ifelse branches to one set of
instructions if true and another if false)
(this condition copied & pasted below and
question/answer changed).
wait 60 cs seth 90 label [Multiply 7 by 26] ↵
ifelse rw ="182 [ cs seth 90 label "Good wait 60 cs make
"total :total +10 seth 90 label :total] [cs seth 90 label [No the
answer is 182]make "total :total + 0 wait 60 cs seth 90 label
:total] ↵
end (that's that, copy and paste condition again for as
many questions as you need.) ↵
```

©John Leyden, Headfort MMIII

# Classroom Tips for Teaching Measurement

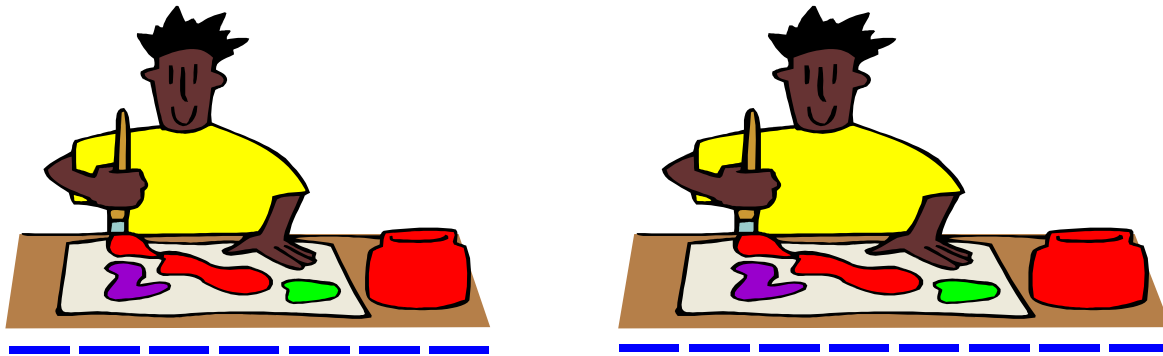
By Mairéad Ryan

A national mathematics test in 1999 found that Irish pupils performed best on items dealing with data and chance, number and algebra and poorest on items with measures and shape and space. One possible reason for this is that teachers placed considerable emphasis on teaching number and the areas that received comparatively less emphasis were the content areas on which pupils did relatively poorly. 'The availability of suitable mathematics equipment and the development of appropriate learning environments in which to use such equipment may affect the allocation of time' to non-number strands (Sheil & Kelly, 2001). Coupled with the need to allocate more time and resources to the teaching of measurement is the need to consider a better approach to teaching it.

Research in the US (Kamii and Clark, 1997) reveals that something is something clearly wrong with the instruction given in the measurement of length. Kamii and Clark suggest a better approach that presents problems and encourages children to modify their ways of thinking.

## Piaget's Research

Unit iteration is the repeated use of a non-standard or standard unit to measure (see diagram). Transitive reasoning is the ability to deduce a relationship from two or more other relationships of equality or inequality.



Which table is wider? Unit iteration to compare the widths of the tables (gaps between blue sticks are for illustrative purposes only)



Many four year olds can deduce that the stick A is longer than B at a quick glance. When A is removed and hidden and C is positioned beside B, there is again no difficulty answering that B is longer. However when asked 'is this stick (C) as long as the hidden one (A), or is this one (C) longer, or is the hidden one longer, four year olds usually answer they don't know because they cannot see A and C together. When they later become able to deduce, usually at the age of seven or eight that A is longer they are said to have transitive reasoning. (Piaget 1970)

Kamii and Clark state that the two cognitive abilities necessary for children to measure length are transitive reasoning and unit iteration. Unit iteration is constructed out of transitive reasoning. Transitive reasoning in the example given involved comparing the whole of A with the whole of C, by means of a third term, B (i.e. if A is longer than B and B is longer than C then A must be longer than C). Unit iteration, on the other hand, involves making a part-whole relationship within each of these wholes. They believe that typical instruction treats measurement as a mere empirical procedure (based only on observation) rather than as a procedure requiring reasoning. Aligning paper clips along a pencil and counting them is an empirical procedure. In contrast, transitive reasoning is the mental ability to compare two lengths using a third term. Unit iteration involves mentally making a part-whole relationship between the total length and the length of a smaller object viewed as part of the whole length.

Kamii and Clark are critical of the way measurement is presented in many textbooks. The purpose of measurement is to compare things that cannot be compared directly. This idea of comparison is absent from textbooks. The usual format is 'How many .....cms, grams, litres etc'?' and motivate only to give a number to the teacher. Skinner (1990) defines a problem as a question, which engages someone in searching for a solution. She contends that the use of

'contrived problems' that appear in textbooks is often merely gimmicky. They can become useful problems, but only if adopted by the problem-solver for some purpose beyond satisfying a teacher's requirement.

### Activities that encourage the development of transitive reasoning and unit iteration

- We want to put a chart on the door with all the children's names. The sheets of cardboard of different sizes are stored in the office. How do we find a sheet (first time) that will fit on the door?

*Possible solutions to this open-ended question:*

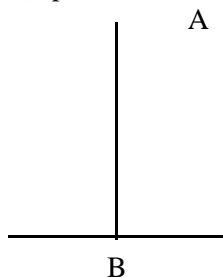
- *Transitive reasoning; a piece of string or ribbon*
  - *Transitive reasoning and unit iteration: pencil, ruler or metre stick*
- Is the doorway wide enough to bring in a large table?
  - Will a box of bricks fit on the shelf?
  - Is there room against the wall to fit the computer desk?

These questions must be answered by indirect comparison and not through an empirical procedure. Encouraging children to interpret the problems and communicate different approaches to solving the problems will develop and extend their understanding. These problems promote student engagement with authentic mathematical activity. 'Instruction must encourage children to think hard and to modify their thinking, rather than teach empirical procedures that do not take their thinking into account'. (Kamii and Clark 1997)

Giving the children a reason to measure that has relevance to them will encourage active engagement in the task. At times measurement activities can become an arduous task within the confines of the classroom so why not consider moving out into the corridor or the P.E. hall.

### Some suggestions for measuring for a reason

- How many plates will fit along a shelf?
- How much ribbon do you need to wrap around different sized boxes and tie a bow?
- Which line is longer A or B? (Optical illusions can be a good source of these questions.)



- Measure the distances to different parts of the school and design signs to display the distances.
- Arrange a skittle game with empty 2 litre and 3 litre plastic bottles and a hoop. Bottles must be placed 5 metres from the hoop. Estimate the distance. How many metre sticks do you need? Can you use just one metre stick? Could you use anything else?

### References

- Kamii, C. and Clark, F. (1997) Measurement of Length: The Need for a Better Approach to Teaching in *School Science and Mathematics* March 1997.
- Piaget, J. (1970) *Genetic Epistemology* (E. Duckworth, Trans.). New York: Columbia University Press.
- Sheil, G. and Kelly, D. (2001) *The 1999 National Assessment of Mathematics Achievement*. Dublin: Educational Research Centre
- Skinner, P. (1990) *What's Your Problem: Posing and Solving Mathematical Problems, K-2*. Victoria: Heinemann.

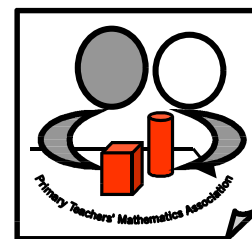
ã Mairéad Ryan, September 2003

## Limerick Conference

The last big event of the Association was our special spring conference on March 22<sup>nd</sup> when Constance Kamii, a former student of Jean Piaget, spoke to us about her theories of how children learn mathematics. The response from those present was very positive. Here are some of your comments: "The idea of logico-mathematical knowledge is enlightening. We achieved greater insight into the way a child would think mathematically when given the opportunity and the resultant benefits of this." "I will be trying to promote thinking more among the children in mathematics classes." "Some of Constance's ideas confirmed our ideas and some challenged. Gives me questions/ideas to follow up." "I would love to be able to give more children the gift of time for games and thinking but feel that the pressure of a broad curriculum and parental expectation will make this almost impossible." "Well done on getting such a provocative speaker to send us off thinking."

# PRIMARY TEACHERS MATHEMATICS ASSOCIATION 2003

(MEMBERSHIP AND 2<sup>ND</sup> ANNUAL CONFERENCE)



<b>NAME (Block Letters):</b>				
<b>SCHOOL NAME AND ADDRESS:</b>				
<b>CORRESPONDENCE ADDRESS:</b> (If different to the address above)				
<b>PHONE NUMBER</b>	Home:	School:	Mobile:	
<b>E-MAIL ADDRESS</b>	Home:		School:	
<b>CLASS TAUGHT:</b> (or category of teacher- e.g. learning support, principal)				
<b>PLEASE TICK WHICH OF THE FOLLOWING YOU REQUIRE:</b>				
			<b>WRITE AMOUNT HERE:</b>	
<input type="checkbox"/>	Individual Membership for 2003	€15	€	
<input type="checkbox"/>	Institutional Membership for 2003	€50	€	
<input type="checkbox"/>	2 <sup>nd</sup> Annual Conference (2003 member booking before September 26 <sup>th</sup> 2003)	€20	€	
<input type="checkbox"/>	2 <sup>nd</sup> Annual Conference (2003 member, booking after September 26 <sup>th</sup> or non-member)	€35	€	
<input type="checkbox"/>	2 <sup>nd</sup> Annual Conference Lunch	€10	€	
<b>TOTAL AMOUNT ENCLOSED:</b> (Please cross the cheque and make it payable to the "Primary Teachers' Mathematics Association")			€	
<b>SIGNATURE:</b>		<b>DATE:</b>		
<b>PLEASE RETURN THE FORM AND APPROPRIATE PAYMENT TO: <i>Bríd Ní Chualáin, Primary Teachers Mathematics Association, Coláiste Mhuire, Marino Institute of Education, Griffith Avenue, Dublin 9</i></b>				