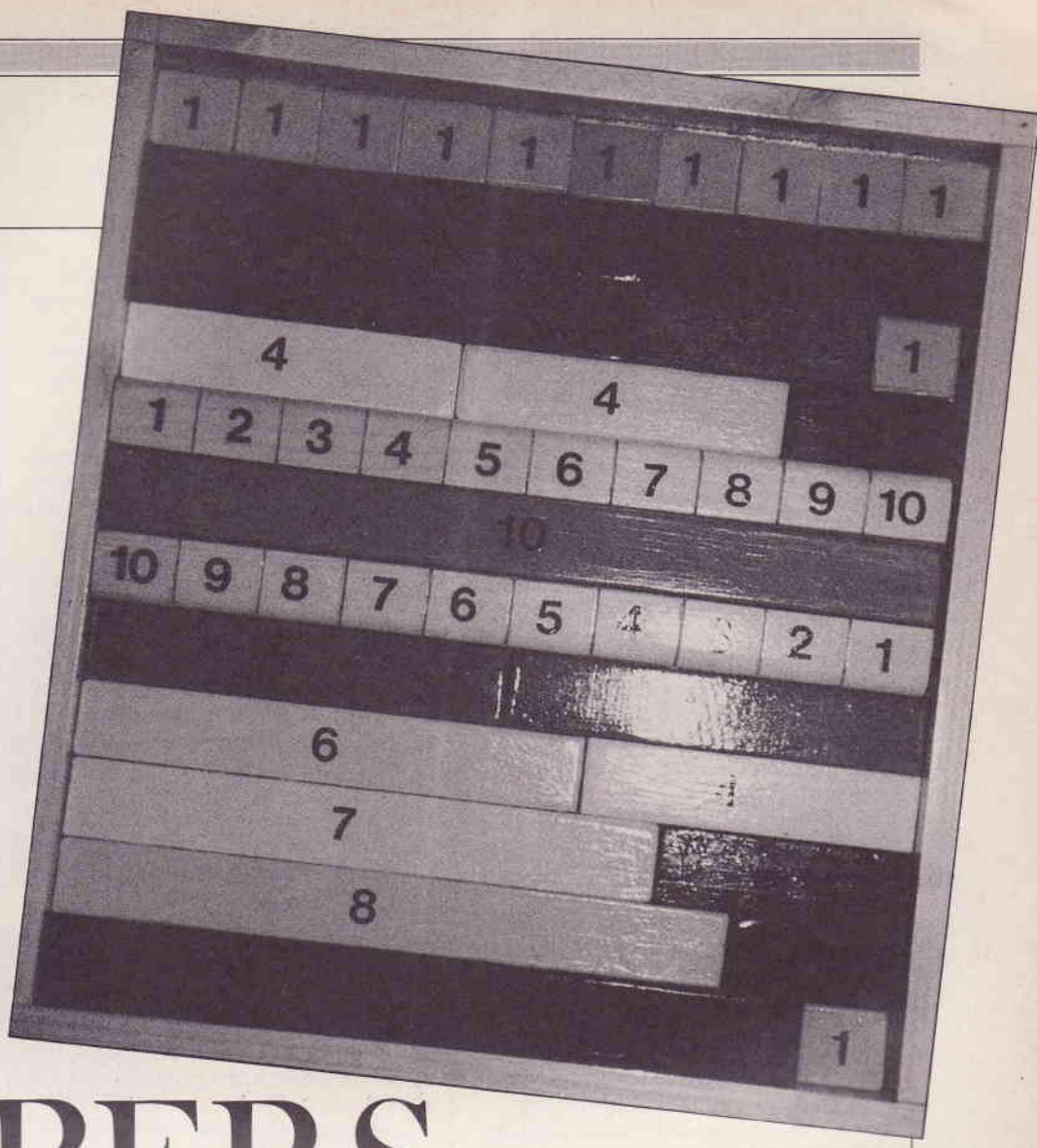

The NUMBERS Game

An aversion to numbers when at school led Penelope Clark to team up with Frederick Horler and design a game for learning numeracy that really can be fun and not fraught with misery

MY friend, Richard, the philosopher poet, is greatly interested in cogs and wheels. He will spend many hours at the tavern with Freddie, designing engines of the greatest complexity and utmost futility which Freddie then translates into wood in the depths of his workshop under the apple tree. Thus, two harmless, creative souls are happily employed and out of my way.

However, when the Design A Toy Competition was announced, they became quite animated and their excursions into fantasy began to take on a dangerous solidity as pieces of wood and explanations began to flow towards the house. . . . I had to act.

Therefore, following my father's maxim that the most successful inventions are often the simplest, I set about to fiddle around with numbers. I have always hated numbers!

I claim that I am justified in this as they do not behave like words and will not do what they are supposed to do, or, indeed, anything in the way of what I require from them.

My schooldays were fraught with misery under the regime of mathematics, and I have never recovered from my fear of it. As it is exceedingly useful to be basically numerate it has, more than once, occurred to me that it could probably have been made less mystifying. Obviously, the answer is to introduce numbers as a fun thing before ever they become frightening – to present them as a fascinating game.

Whilst I was doodling around with this thought, the idea suggested itself that I was, perhaps, the appropriate designer of such a toy, having wrestled so long upon the losing side. So, the idea grew from the kind of teaching I would like to have had and a more pleasant memory of infant school where coloured blocks and shapes were used to denote numbers. I have always liked shapes and colour.

My idea was to use the blocks within a slide to show not only the individual numbers but their interrelationship, also. In this way they could be measured against a standard to show how they work. The infant school blocks had appealed to me because of their colour and their shape and the chunky, solid, cold feel of them in the hand and the chunky, clunky, clicking sound of them in the ear. I remember thinking that I would very much like to play with them, if only they didn't have to mean sums.

With this toy I have tried to use the colours that I liked at five or six years old and I particularly remember to this day, grass green which I think was three and a lovely mauve or magenta whose value escapes me now. This memory suggested to me that colour is important in capturing the attention which is why I have used contrasts next to each other as far as possible and not only the bright, vivid colours that so many educators insist that children like to the exclusion of subtlety. At five I liked them all, especially the wonderful muted mauves.

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CONTINUED

The NUMBERS Game

The shape of the blocks was indicated by the need for children to be able to handle them with ease and was dictated by the necessity of fitting them into a manageable size slide and keeping tray. It was based on one inch. In my household proper English measurement is used. I like things that one can grab, grapple and get to grips with – whoever heard of clutching a centimetre!

Originally, I had not thought of a keeping tray, one of the privileges of the childless, I presume. But, after representations from distressed relatives, we have a tray in which the pieces fit in a certain order. Tidying up can be a game in itself; I believe some parents have overdone their gratitude.

The number slide

This toy is designed for four to five year olds although it is suitable for four to seven year olds depending on ability level.

It is a number toy intended for use in counting and simple arithmetic. It consists of: a set of blocks numbered in units one to ten with each unit block of a different length in order to denote its value and, also, coloured differently; a natural wood slide in which to use the blocks which is numbered one to ten, once across the top side and vice-versa across the lower side; a natural wood tray in which to display and keep the pieces.

The slide has been divided into equal sections for each unit up to 10 and the blocks have been cut correspondingly thus: No.1 block fills to section 1 in the slide; No.2 block fills to section 2 and so on.

Educational value

The educational purpose of the toy is to help with learning to count using the numbers one to ten and to assist with simple addition, subtraction, division and multiplication by using the blocks within the slide. For example, the blocks can be slid in from left to right to match their own unit number to show the amount of units left over to make up ten.

The blocks may also be slid into any position within the slide to show that whatever six may be the number to make up ten is always four (*Example 1*).

The vice-versa numbering on the lower side of the slide shows simple subtraction (*Example 2*).

Reading from the lower side nine from ten gives one and so on. Simple division and multiplication are shown on the same principle. Four twos make eight (whichever end you start) and, therefore, eight can be divided into four twos (*Example 3*).

Play appeal

The objective is to introduce numbers, counting and arithmetic as something which is fun; both appealing and interesting and, above all, not a chore.

To achieve this we have made the slide and blocks fit their own tray so that they look inviting (also practical for parents picking up the pieces). We have used colour as variedly as possible for visual pleasure; we have used wood in child-sized chunks which feel comfortable to handle and feel nice and slidey as well for tactile pleasure; and we have noticed that the lovely chunkety, clunkety sound of wood on wood has a great aural appeal also.

The toy has been 'road-tested' on a real four year old, just learning counting at playschool, who started to use it without any instruction (very satisfactory) and on a real six year old. Verdict: "Uncle Freddie, you're nearly a Carpenter"! It has been further tested on the designer (41), who hated sums as a child and still does – verdict: "I'm coming around to the idea."

Thus, Freddie and the Philosopher were overridden; the house is peaceful, and all is well. And, as I have first call upon the carpenter, my design was made and finished before Richard's cogs were even varnished. I do hope he forgives me, although I may have to meet him at the hostelry before I show him this article.

Construction

The construction of the toy can be divided into three stages, as follows: the tray; the number slide; the blocks.

The tray

The construction of the tray consists of making a frame of softwood out of ¾ by ⅜in. The size of the frame is 11⅛ by 12⅛in. The inner area of the frame measures 10⅜ by 11⅜in.

The base of the frame consists of a piece of plywood measuring 11⅛ by 12⅛in. which is attached to the frame by glue and small panel pins.

Finish

Because the toy is aimed at quite small children, it is doubly important to ensure safety. This means that the corners must be rounded and the whole of the tray smoothed to avoid accidents. After careful shaping and sanding, I finished with 0000 wire wool. I then varnished using three coats of gloss Ronseal varnish which is non-toxic.

The number slide

The number slide consists of a piece of softwood sized 10 by 2 by ¾in. The piece of wood is divided into ten segments of 1in., then each mark is sawn down to show each segment clearly. The wood is then divided in half and a measurement of ½in. is made either side of the centre line and chiselled out.

Finish

I then sanded the slide smoothly using 0000 wire wool to finish. Each segment was then numbered using the Edding Transfer Letterpress system, after which, the slide was varnished using three coats of gloss Ronseal varnish, taking great care not to peel the numbers with the first coat.

The number blocks

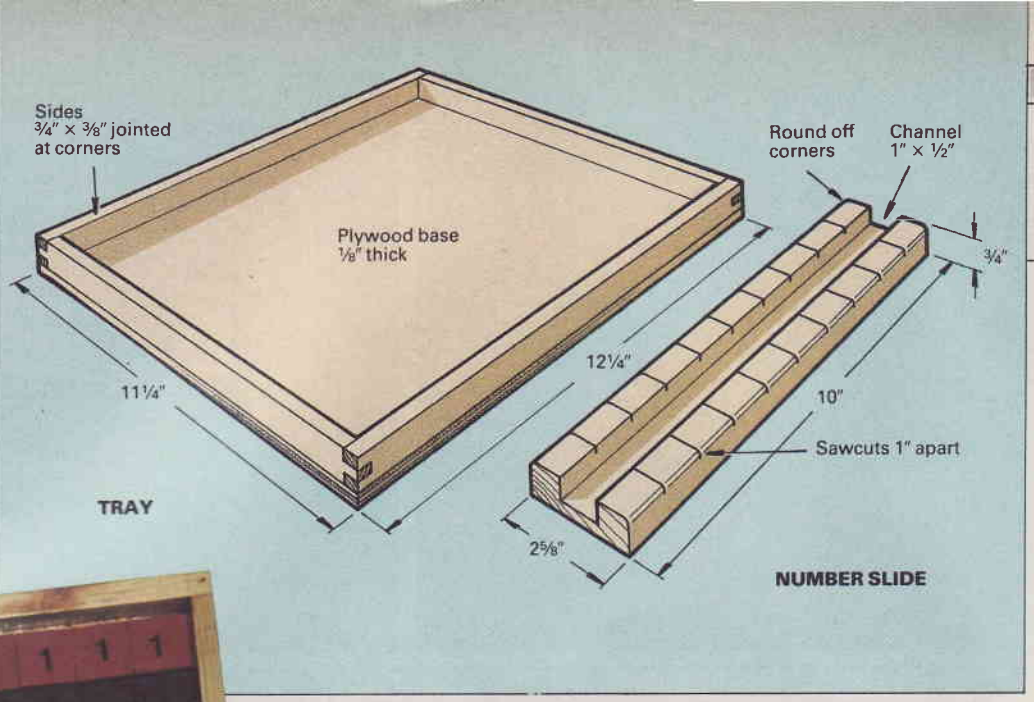
The number blocks are made of wood measuring 7/16 by ⅞in., hardwood if possible, to give the clunking noise so beloved of the designer.

The blocks are cut to the following sizes:

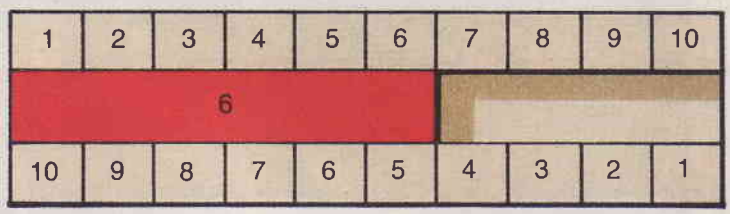
12 blocks measuring 1 by 1in.
red
7 blocks measuring 2 by 1in.
dark blue
4 blocks measuring 3 by 1in.
light green
3 blocks measuring 4 by 1in.
light yellow
2 blocks measuring 5 by 1in.
light blue
1 block measuring 6 by 1in.
pink
1 block measuring 7 by 1in.
dark yellow
1 block measuring 8 by 1in.
orange
1 block measuring 9 by 1in.
dark green
1 block measuring 10 by 1in.
mauve

The blocks are shaped, sanded and then painted; sanded again, re-touched where necessary, numbered and varnished.

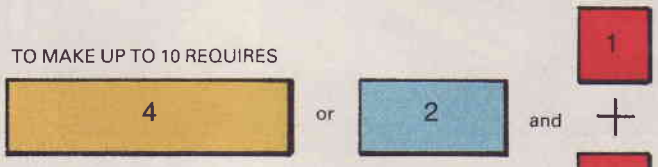
Simple in construction, the numbers game consists of a number slide which forms part of the storage tray for all the number blocks. Examples below show just how the numbers game can be used.



EXAMPLE 1 ADDITION TO 10



TO MAKE UP TO 10 REQUIRES



or

or

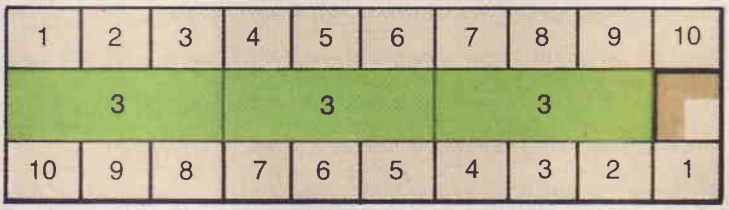
Finish

The blocks were painted with Creative Touch non-toxic craft paint, sanded with 0000 wire wool, numbered with the Edding Transfer Letterpress and varnished with gloss Ronseal varnish, two coats.

The making of the toy has been very interesting; however, not so interesting as the one we dreamed up in the cosiness of the tavern and amid the comfortable disarray of the workshop under the apple tree.

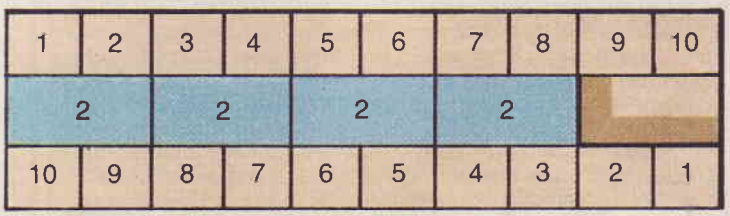
This year has been very busy for the philosopher and the carpenter as unemployment has taken up a great deal of our time. We are currently working upon the 1994 entry to the Design A Toy Competition for which we wish to use much greater technology, necessitating, of course, further visits to the hostelry. Perhaps, this time, we will be allowed to use cogs and engines.

EXAMPLE 2 SUBTRACTION FROM 10



10 take away 9 (3×3) equals

EXAMPLE 3 MULTIPLICATION



FOUR TIMES TWO EQUALS EIGHT