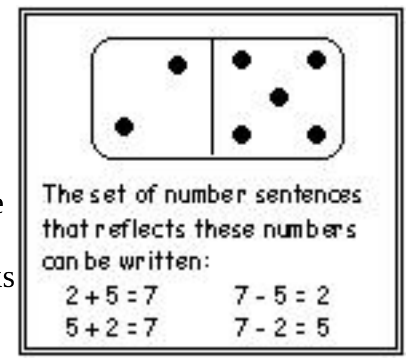
NOTTINGAM WEST ELEMENTARY SCHOOL

Everyday Mathematics Parent Handbook

Everyday Mathematics Activities

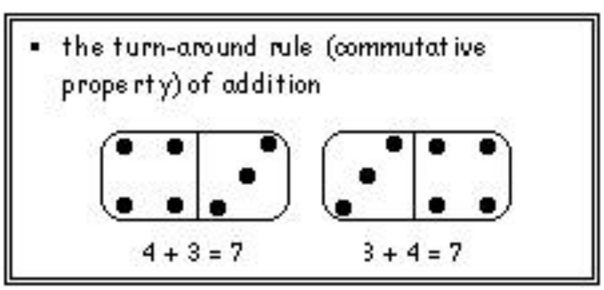
(Developed by Ann Arbor Michigan Curriculum & Instruction Department)

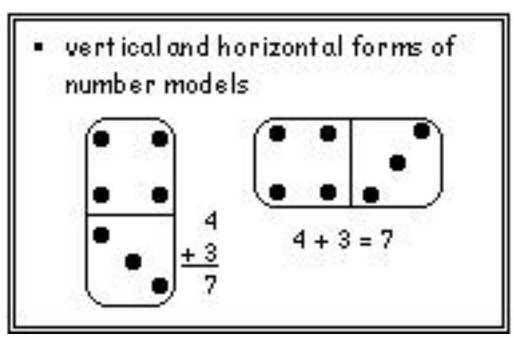
Dominoes

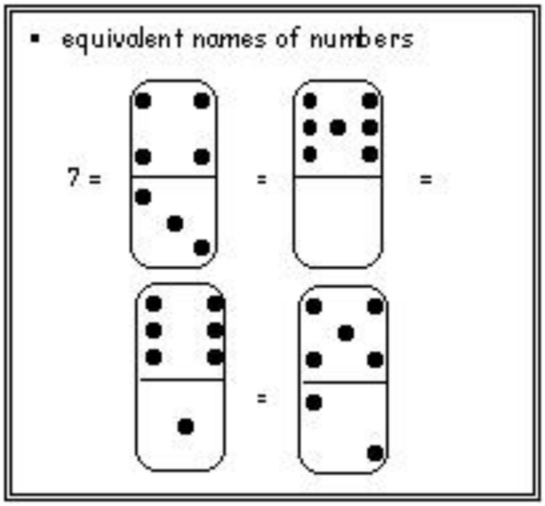


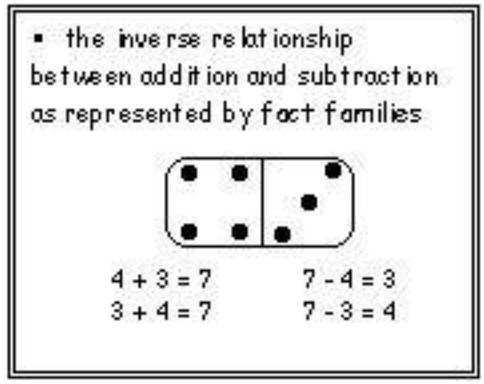
Double-nine dominoes, which extend the range of numbers children use in working with dice, are a wonderful concrete model of the addition/subtraction facts through 9 + 9. Dominoes help children visualize facts and develop an understanding of the meaning of addition and subtraction and the relationship between the two operations. The domino example shows one side with three dots and the other with eight. Your child thinks of the three numbers associated with the domino, (the two and the five are the addends, and the seven is the sum). Your child can then use dominoes to learn and practice a variety of concepts and skills.
The three numbers on most dominoes can be used to write two addition facts and two subtraction facts. Such a collection of related facts is called a Fact Family.

Dominoes can be used in a variety of ways to build early number concepts such as:



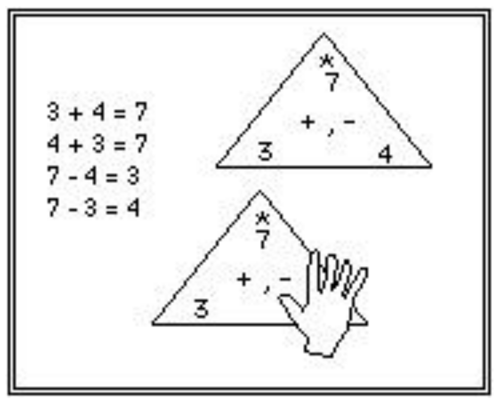






Fact Triangles

Your child will also practice fact mastery through the use of triangle fact cards. A triangle fact is pictured here. Fact triangles are a more effective device for memorizing the facts than ordinary flashcards because of their emphasis on fact families. Three numbers involved in an addition fact are placed on the corners of the fact triangle. The sum (answer) is at the top, under the asterisk (*).

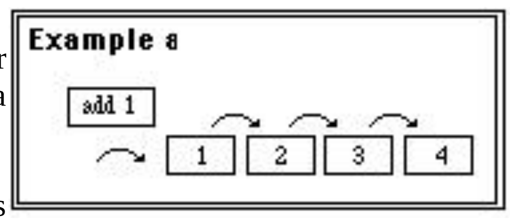


You cover one of the corners of the triangle. Your child gives an addition or subtraction fact that uses the number you are concealing.

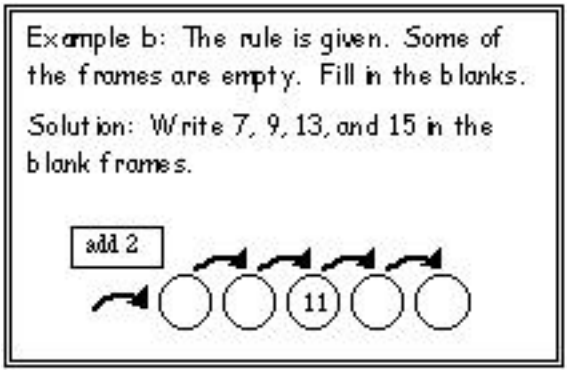
For example, in the covered fact triangle pictured, your child would say either “4 + 3 = 7” or “7 - 3 = 4.”

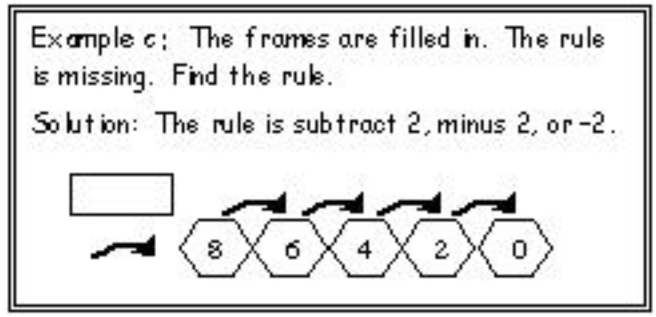
Similar fact triangle cards are used for multiplication and division.

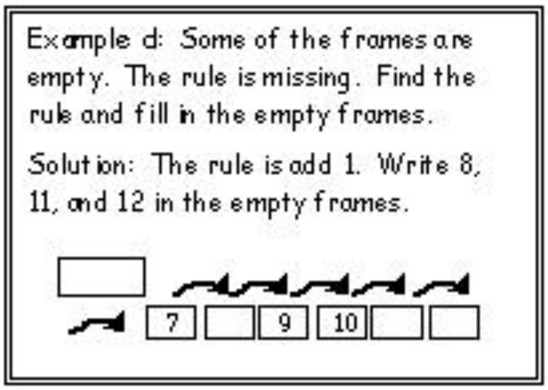
Frames-and-Arrows Diagrams: Frames-and-Arrows diagrams consist of “frames” (rectangles, squares, circles or other shapes) connected by arrows to show the path for moving from one frame to another. Each frame contains a number in the sequence; each arrow represents a rule that determines what number goes in the next frame. Frames-and-Arrows diagrams are also called chains. *Example a* is a Frames-and-Arrows diagram for the rule “Add 1.”

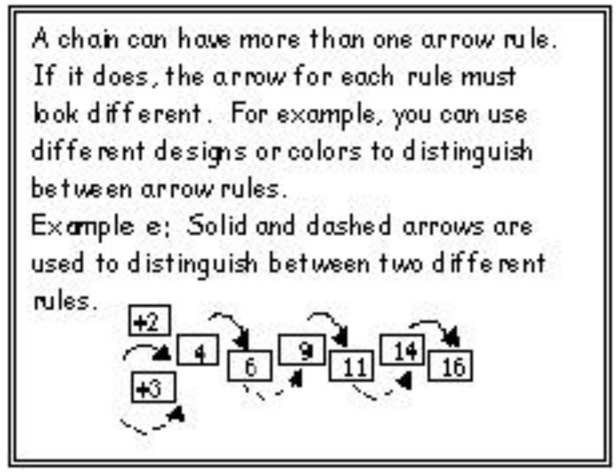


In Frames-and-Arrows problems, some of the information has been left out of the diagram. Children solve the problem by supplying the missing information. Here are a few sample problems.



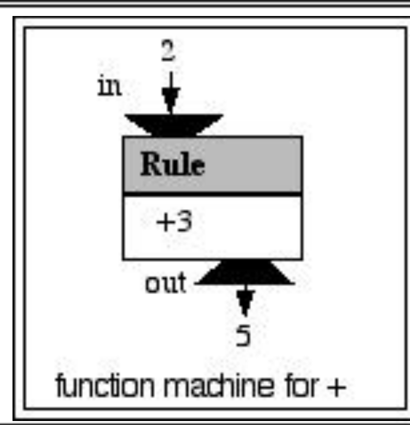


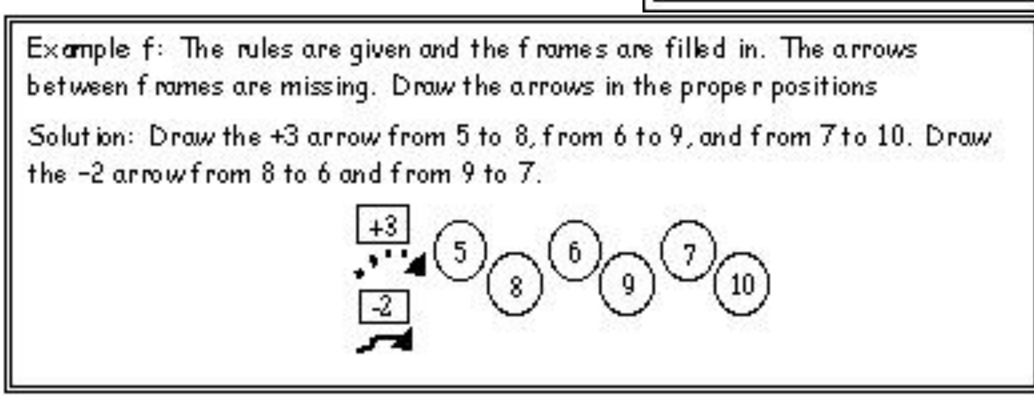




Function Machines

Function machines such as the one below help students visualize how a rule associates each input value with an output value. The activity for organizing this concept development is called **What's My Rule?**

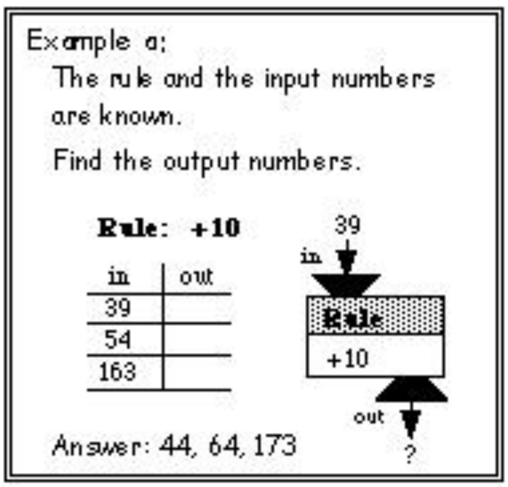


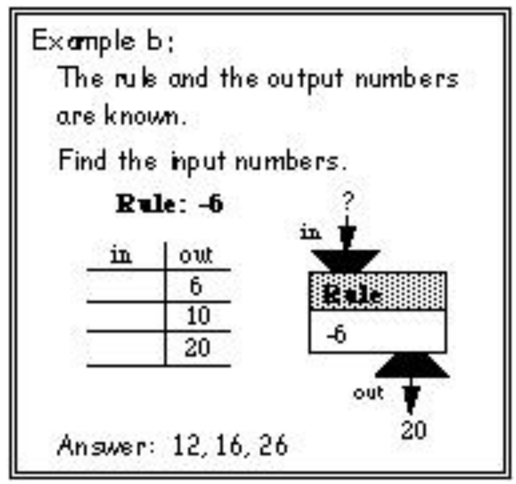


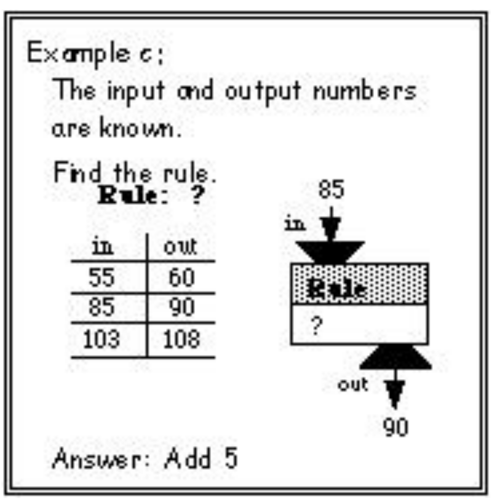
What's My Rule? games begin in Kindergarten. The first type are attribute or rule activities that determine whether or not children belong to a specified group. For example, children with Velcro™ shoe closures belong to the group, while children with laces, buckles, and so forth, do not.

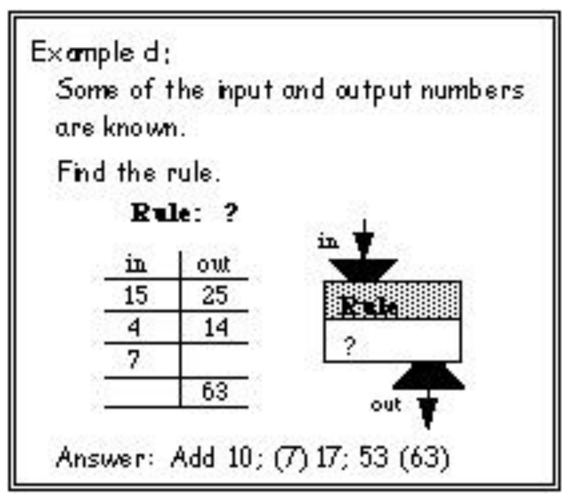
This idea is extended to include numbers and rules for determining which numbers belong to specific sets of numbers, for example, odd numbers, even numbers, one-digit numbers, numbers with zero in the ones place, and so on. This idea evolves further to incorporate sets of number pairs in which the numbers in -each pair are related to each other according to the same rule. The connections between input, output, and the rule can be represented by a function machine and pairings are displayed in a table of values.

In a What's My Rule? problem two of the three parts (input, output, and rule) are known. The goal is to find the unknown part. There are three types of What's My Rule? problems.





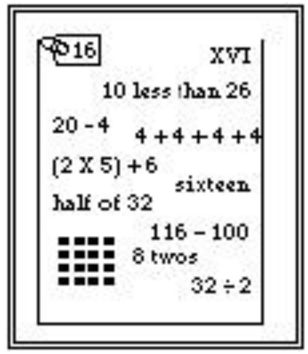




You can combine more than one type of problem in a single table. For instance, you could give the table in example b above but give the input value 26 and replace the 20 with a blank. If you give enough input and output clues, children can fill in blanks as well as figure out the rule, as in Example d.

Name-Collection Boxes

Name-Collection Boxes are used to help students manage equivalent names for numbers. These devices offer a simple way for students to experience the notion that numbers can be expressed in many different ways.



In K - 3 a Name-Collection Box diagram is an open-top box with a label attached to it. The name on the label identifies the number whose names are collected in the box. For example, the box shown here is a 16-box, a Name-Collection Box for the number 16.

Names can include sums, differences, products, quotients, the results of combining several operations, words in English or other languages, tally marks, arrays, Roman numerals, and so on.

Number Grids

A number grid consists of rows of boxes, ten to each row, containing a set of consecutive whole numbers. Students are introduced to the number grid below for 0 to 110 in First Grade Everyday Mathematics.

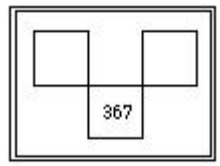
									0
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110

The grid lends itself to a number of activities that reinforce place-value concepts. By exploring the patterns in the digits in rows and columns, children discover that for any number on the number grid, the number that is:

- 1 more is 1 square to its right;
- 10 more is 1 square down;
- 1 less is 1 square to its left;
- 10 less is 1 square up.

Stated another way, as you move from left to right in any one row, the ones digit increases by 1 while the tens digit remains unchanged. As you move down any one column, the tens digit increases by 1 while the ones digit remains unchanged. This is true not only for the numbers in the 100-grid, but for any 10-across number grid consisting of a set of consecutive whole numbers.

Children practice these place-value concepts by solving number-grid puzzles. These are pieces of a number grid in which some, but not all, of the numbers are missing. For example, in this puzzle, the missing numbers are 356 and 358.



Number grids can also be used to explore number patterns that are not necessarily related to base-10 concepts. For example, children can color the appropriate boxes as they count by 2s. If they start with 0, they will color the even numbers; if they start with 1, the odd numbers. If they count by 5s, starting at 0, they will color the boxes containing numbers with 0 and 5 in the ones place

Number grids are also useful as an aid for finding the difference between two numbers. For example, to find the difference between 84 and 37, you could start at 37, count the number of tens going down to 77 (4 tens, or 40), and then count the ones going from 77 to 84 (7 ones or 7). The difference between 84 and 37 is, thus, 4 tens and 7 ones, or 47. This difference is sometimes referred to as the distance between the points 37 and 84 on a number line (or grid).

Number grids may also be extended to negative numbers. This is especially useful when illustrating the order of negative numbers or as an aid for finding differences.

-19	-18	-17	-16	-15	-14	-13	-12	-11	-10
-9	-8	-7	-6	-5	-4	-3	-2	-1	0
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

Unit Boxes

Children are helped in their symbolic thinking if they think of numbers as quantities or measurements of real objects. For this reason, encourage children to attach appropriate labels or units of measure such as cents or feet to the numbers with which they are working.

Because labeling each number can become tedious, Everyday Mathematics suggests that you and the children use unit boxes for addition and subtraction problems. These rectangular boxes can be displayed beside the problem or at the top of a page of problems. Unit boxes contain the labels or units of measure used in the problem(s).	Unit Cents ¢