Routines: Name-Collection Boxes

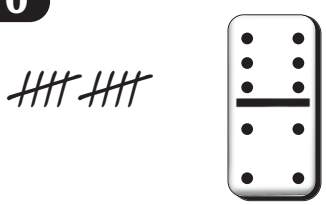
Name-collection boxes are one of many routines children work with regularly in *Everyday Mathematics*. A routine is a familiar, predictable activity that provides ongoing practice in a skill or content area.

Children use name-collection boxes to develop the idea that there are many equivalent (equal) names for one number. Because arithmetic, for the most part, involves replacing numbers or expressions with equivalent numbers or expressions (we replace $5 + 7$ with 12 or $\frac{1}{2}$ with $\frac{1}{4} + \frac{1}{4}$), this is an important concept for children to understand.

All name-collection boxes feature a label attached to a box with an open space for writing. The idea is to fill the box with different names for the number on the label. Numbers can be named using one or more operations (addition, subtraction, multiplication, and division), words in any language, tally marks, arrays, Roman numerals, and so on.

The two examples below show the variety and range of thinking children use to creatively express equivalent names.

10



$5 + 5$ $\quad$ $8 + 2$

$1 + 9$ $\quad$ $9 + 1$

$7 + 3$ $\quad$ $4 + 6$

25

twenty-five

veinticinco

$37 - 12$

$20 + 5$
$19 + 6$
$18 + 7$
$17 + 8$
$16 + 9$

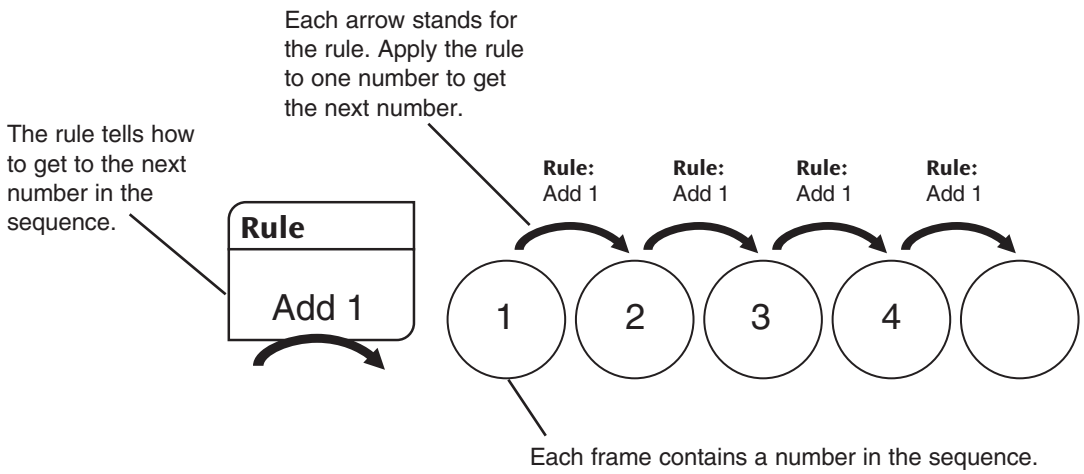
a quarter

Routines: Frames and Arrows

Frames-and-Arrows diagrams are one of many routines children work with regularly in *Everyday Mathematics*. A routine is a familiar, predictable activity that provides ongoing practice in a skill or content area.

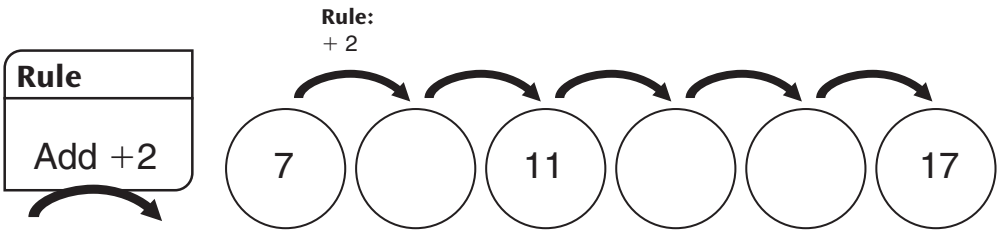
Frames-and-Arrows diagrams, also called chains, help children think and record their work with patterned number sequences, or lists of numbers. Identifying patterns and the rules that create them is an activity that prepares children for success with algebra.

Every Frames-and-Arrows diagram has three parts: a rule box, frames, and arrows. The frames in this example are circles, but they can be squares, triangles, hexagons, and so on.



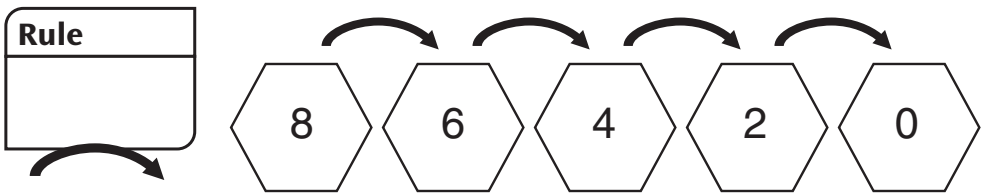
In Frames-and-Arrows problems, some information is missing. The missing information, such as the rule or the numbers in frames, can be found by using the information that *is* given. On the following page are several examples and ways to help a child find the missing information.

1. **The rule is given, but some frames are empty.** Have your child write the rule (+2) over each arrow and apply it to each frame that *does* contain a number. (Say *7 plus 2 equals what?*) Write "9" in the empty frame, then apply the rule to 11, and so on.



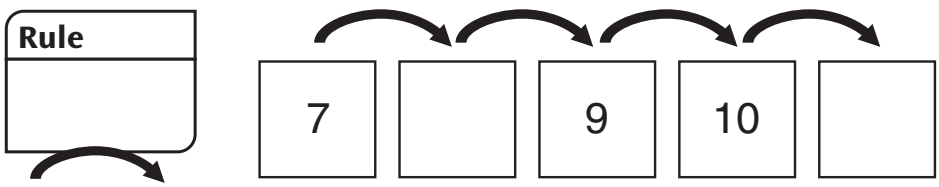
Solution: The empty frames are 9, 13, and 15.

2. **The frames are filled in, but the rule is missing.** Ask *How can you get from 8 to 6? Does this also work for getting from 6 to 4? Do you see a pattern?* Find a rule that works between all the frames.



Solution: The rule is subtract 2 (or minus 2, or –2)

3. **The rule is missing and some of the frames are empty.** Look for two frames next to each other that *do* have numbers (9 and 10 in this example). Ask *How do you get from 9 to 10?* Try that rule between other frames, filling in empty frames and trying the rule again.



Solution: The rule is add 1 (or plus 1, or +1). The empty frames are 8 and 11.

Routines: "What's My Rule?"

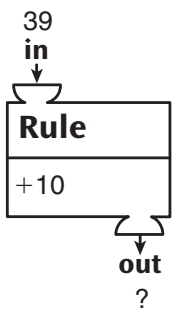
"What's My Rule?" is one of many routines children work with regularly in *Everyday Mathematics*. A routine is a familiar, predictable activity that provides ongoing practice in a skill or content area. The type of thinking children do when working with this routine prepares them for success with algebra.

In "What's My Rule?" problems, there is a diagram that represents an imaginary "function machine." The machine takes in a number, applies a rule, and puts out a new number. A table is used to keep track of "in" and "out" numbers.

To solve a "What's My Rule?" problem, some missing information (the "in" numbers, the "out" numbers, or the rule) must be found by using the information that is given. Here are several examples and ways to help your child find the missing information.

1. **The output numbers are missing.** The rule and the input numbers are given. Have your child say or write the input number and the rule as an equation, such as "39 + 10 = ?" Write the sum in the "out" column of the table.

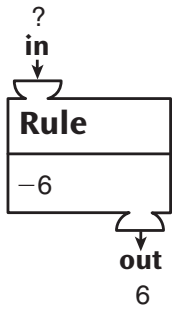
in	out
39	
54	
163	



Solution: The output numbers are 49, 64, and 173.

2. The input numbers are missing. The rule and the output numbers are given. Children will use different approaches to solving this kind of problem. Your child may want to find the "in" number by thinking, "? − 6 = 6," or perhaps want to think of the machine in reverse, such as "6 + 6 = ?"

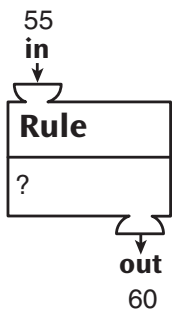
in	out
	6
	10
	20



Solution: The input numbers are 12, 16, and 26.

3. The rule is missing. The input and output numbers are given. Have your child look at the first pair of numbers in the table. Ask *How can you get from 55 to 60?* Have your child suggest a rule; try the rule with the next pair of numbers. Find a rule that works with all the pairs.

in	out
55	60
85	90
103	108



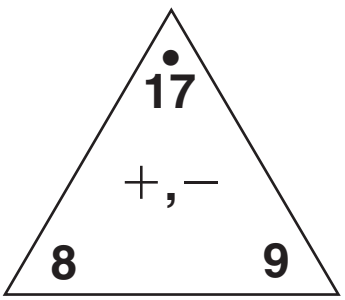
Solution: The rule is add 5 (or plus 5, or +5).

Routines: Fact Triangles

Fact Triangles are one of many routines children work with regularly in *Everyday Mathematics*. A routine is a familiar, predictable activity that provides ongoing practice in a skill or content area.

Being able to recall basic number facts, such as $7 + 6$ or 8×8, with speed and accuracy is called *fact power*. Fact power is an important part of learning mathematics, and it involves frequent practice. In addition to the games and short exercises children do in class, they also use Fact Triangles to practice and master basic number facts.

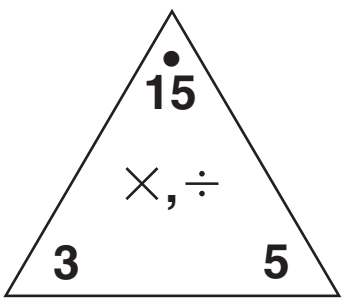
Fact Triangles are the *Everyday Mathematics* version of flash cards. Because Fact Triangles are based on *fact families*, they help children memorize facts more effectively than flash cards. Fact families are sets of related facts that link either addition and subtraction or multiplication and division. These examples show several Fact Triangles and the fact families they model.



Addition/Subtraction Fact Triangle

Fact family:

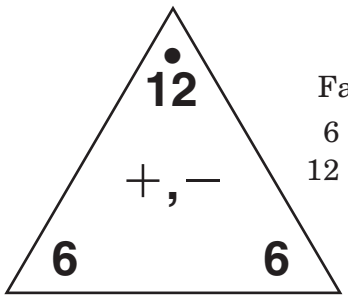
$8 + 9 = 17$
$9 + 8 = 17$
$17 - 8 = 9$
$17 - 9 = 8$



Multiplication/Division Fact Triangle

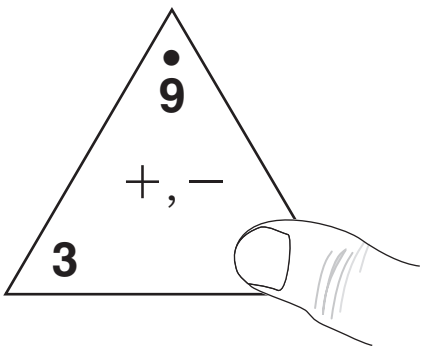
Fact family:

$3 \times 5 = 15$
$5 \times 3 = 15$
$15 \div 3 = 5$
$15 \div 5 = 3$



Fact family:
$6 + 6 = 12$
$12 - 6 = 6$

It is best to practice Fact Triangles with a partner. One person covers one corner with a finger, and the person practicing gives a number fact that has the covered number as the answer. For the triangle below, the fact would be "$9 - 3 = 6$."



This simple game makes it easy for children to play at home. Fact Triangles are often recommended in Home Links.