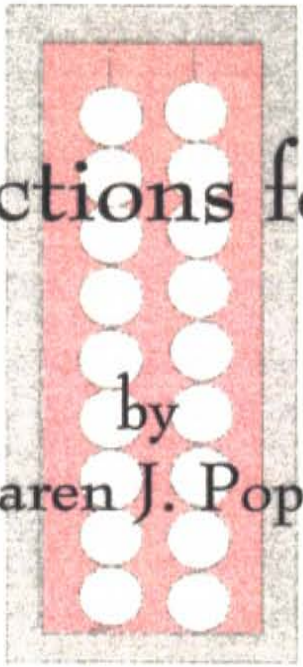
BEGINNER'S ABACUS

Instructions for Use



by

Karen J. Poppe

AMERICAN PRINTING HOUSE
FOR THE BLIND, INC.

Catalog No. 7-03180-00
Kit No. 1-03180-00

APH Staff:
Karen J. Poppe, Author
Eleanor Pester, Project Director
Loretta Curry, Layout and Design

©1997
All Rights Reserved.
American Printing House for the Blind, Inc.
1839 Frankfort Avenue
P.O. Box 6085
Louisville, KY 40206-0085

INTRODUCTION

The Beginner's Abacus is ideal for introducing visually impaired students to early math concepts and number operations, as well as to common abacus terminology. It supports concepts and skills such as one-to-one correspondence, number meaning or understanding, addition, and subtraction. It also lends itself to preparing a young student for introduction to the Cranmer Abacus (see page 13).

The structure of the Beginner's Abacus is characterized by a black rectangular frame which surrounds two columns or rods with 9 movable white beads on each. A red felt background provides a sharp visual contrast. The simple design of the Beginner's Abacus allows for direct representation of a given value and enhanced readability for "little fingers."

Positioning for Use. The Beginner's Abacus is intended to be placed on a flat, secure surface or held in one's palm with the columns of beads perpendicular to the user's body. The embossed APH logo indicates the top of the abacus.

Overview of Lessons. The lessons provided in this book are a guide to presenting the functions of the Beginner's Abacus. They present a starting point for abacus instruction and are arranged in a progressive manner from one-to-one correspondence through subtraction. A final chapter highlights the natural shift from the use of the Beginner's Abacus to the Cranmer Abacus. Lessons are as follows:

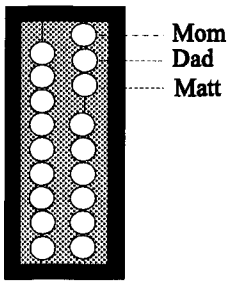
1. One-to-One Correspondence
2. Setting Numbers in the Ones Column
3. Setting Numbers in the Tens Column
4. Using Both the Tens Column and the Ones Column to Set Numbers
5. Direct Addition: Adding Directly to the Ones Column and/or the Tens Column
6. Indirect Addition: Adding to the Ones Column with Regrouping to the Tens Column
7. Direct Subtraction: Subtracting Directly from the Ones Column and/or the Tens Column
8. Indirect Subtraction: Regrouping from the Tens Column to the Ones Column
9. Transition from the Beginner's Abacus to the Cranmer Abacus

Terminology Introduced. Throughout the lessons, terms common to abacus users are encountered. When a bead is "set" or moved toward the top of the frame, it takes on value. In contrast, when a bead is "cleared" or moved away from the top of the frame, it loses its value. It is essential that the abacus always be cleared, with all beads in both columns moved toward the bottom of the frame, before the user begins setting values or performing computations.

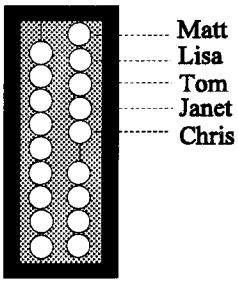
BEGINNER'S ABACUS: Lesson 1

One-To-One Correspondence

Below are pictorial examples of how to use the Beginner's Abacus to illustrate one-to-one correspondence. Individual beads can be used to represent each family member, each student sitting at a table, and so forth.



My Family Members



My School Table

Practice Activities

The suggested activities below provide further practice with one-to-one correspondence using the Beginner's Abacus. Remind the student to always clear the abacus to zero before beginning each activity.

1. Have the student name the four seasons and set a bead for each.
2. Have the student set a bead for every sound heard within a specified time.
3. Have the student use the Beginner's Abacus as a scorecard--setting a bead for each goal, basket, run, out, and so forth.
4. Have the student set a bead for each book in his/her desk.

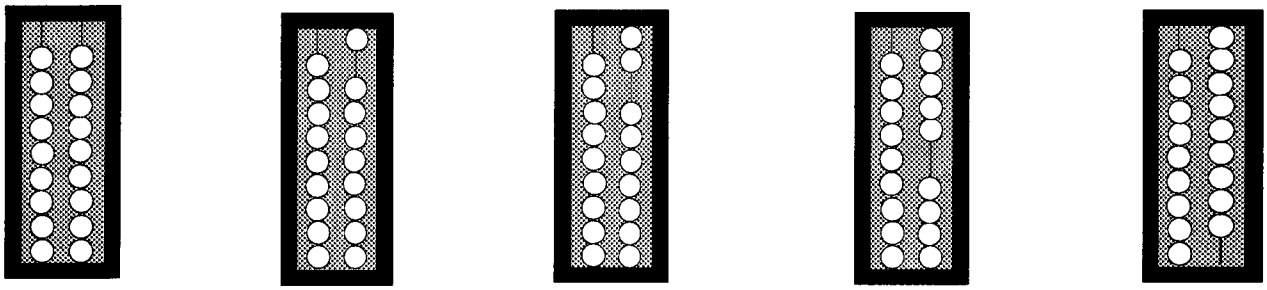
Variations

1. Help the student set the total number of days until some special event takes place on the Beginner's Abacus. Then have the student clear a bead at the same time each day until the event occurs.
2. If asked to pass out napkins (or something else) to a small group, the student could set a bead on the Beginner's Abacus for each person in the group. He or she could then clear a bead for each napkin placed in a pile to take to the group.

BEGINNER'S ABACUS: Lesson 2

Setting Numbers in the Ones Column

Below are pictorial examples of numbers set in the ones column (i.e., the right-hand column) on the Beginner's Abacus.



0 1 2 5 9

Practice Activities

Let the student practice setting the numbers given below on the Beginner's Abacus. Remind the student to always clear the abacus to zero before beginning.

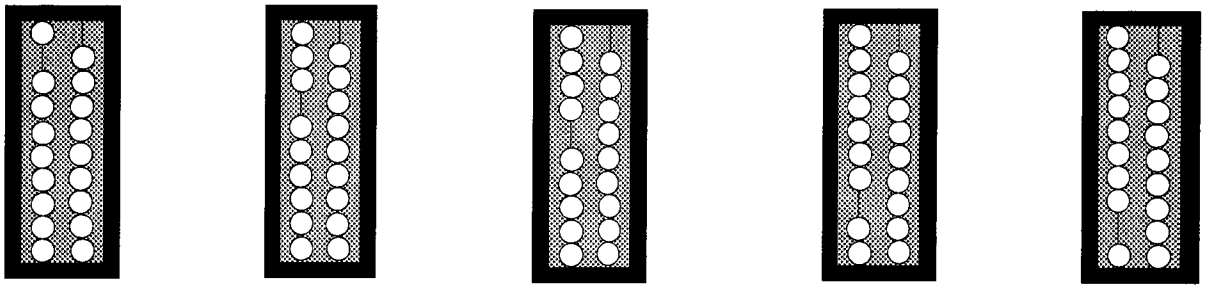
1. Set 3
2. Set 4
3. Set 6
4. Set 7
5. Set 8

Provide further practice by letting the student set numbers 0 through 9 in various random orders as well as in sequential order.

BEGINNER'S ABACUS: Lesson 3

Setting Numbers in the Tens Column

Below are pictorial examples of numbers set in the tens column (i.e., the left-hand column) on the Beginner's Abacus. Note that each bead in the tens column is equal to 10 ones.



10 30 40 70 80

Practice Activities

Let the student practice setting the numbers given below on the Beginner's Abacus. Remind the student to always clear the abacus to zero before setting the number and to begin setting the number in the left column (i.e., the tens column). Point out to the student that no beads are set in the ones column since zero is the second digit in each of these numbers.

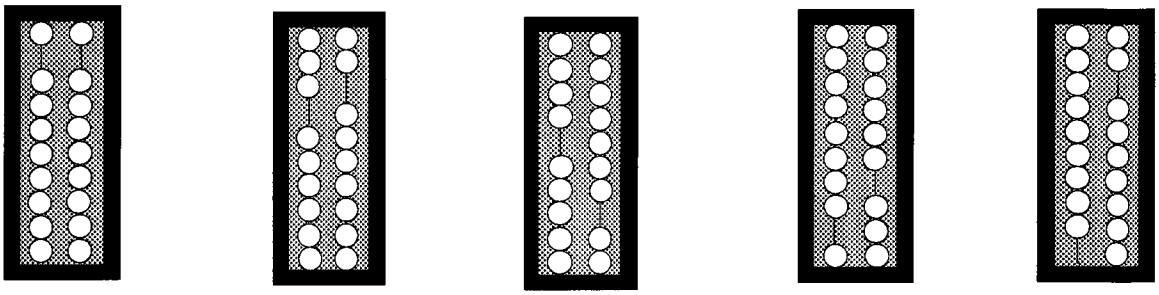
1. Set 20
2. Set 50
3. Set 60
4. Set 90

Note:
Some children might find it helpful to mark the fifth or middle bead in each column with tape to make it easy to identify as an important benchmark on the abacus.

BEGINNER'S ABACUS: Lesson 4

Using Both the Tens Column and Ones Column to Set Numbers

Below are pictorial examples of numbers set on the Beginner's Abacus using both the tens column and the ones column.



11 32 47 86 92

Practice Activities

First have the student identify the tens and ones in each number. Then let the student practice setting the numbers given below on the Beginner's Abacus. Remind the student to always clear the abacus to zero before beginning.

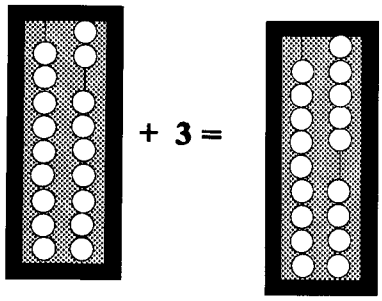
1. Set 17
2. Set 29
3. Set 65
4. Set 78
5. Set 53
6. Set 94
7. Set 41
8. Set 37
9. Set 69
10. Set 84

BEGINNER'S ABACUS: Lesson 5

Direct Addition: Adding Directly to the Ones Column and/or the Tens Column

Below are pictorial examples of addition problems solved on the Beginner's Abacus by adding directly to the ones column and/or the tens column. Notice that adding always begins on the left and moves to the right ending in the ones column.

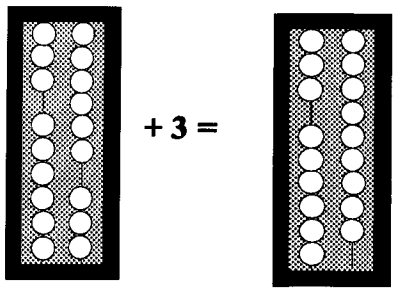
Example 1: 2 + 3 = 5



Set 2.

Add 3 ones directly to the 2 in the ones column to arrive at the sum 5.

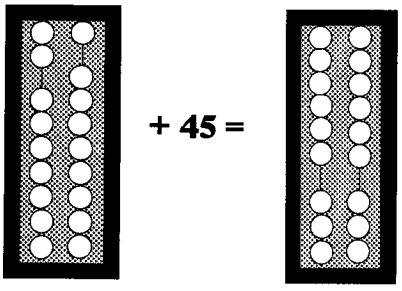
Example 2: 36 + 3 = 39



Set 36.

Add 3 ones directly to the 6 in the ones column to arrive at the sum 39.

Example 3: 21 + 45 = 66



Set 21.

Add 4 tens directly to the 2 in the tens column and 5 to the 1 in the ones column to arrive at the sum 66.

Practice Problems

Let the student solve the following addition problems using the Beginner's Abacus. Remind the student to always clear the abacus to zero before beginning.

1. 2 + 1	2. 5 + 4	3. 6 + 2	4. 3 + 3
5. 57 + 2	6. 11 + 7	7. 42 + 5	8. 71+ 8
9. 33 + 44	10. 27 + 52	11. 56 + 41	12. 30 + 40

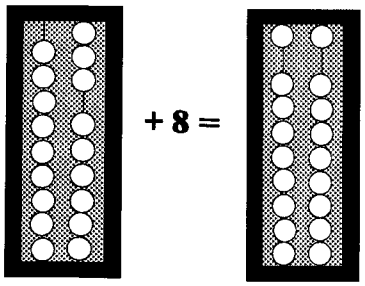
Note: When constructing your own addition problems, remember that the sum can never exceed 99 on the Beginner's Abacus.

Indirect Addition: Adding to the Ones Column with Regrouping to the Tens Column

If there are not enough beads in the ones column to add the number of beads in a problem, then regrouping to the tens column is necessary. Use the following rules to help solve addition problems on the Beginner's Abacus when you must regroup:

To add 1, set 1 ten in the tens column and clear 9 ones in the ones column.
To add 2, set 1 ten in the tens column and clear 8 ones in the ones column.
To add 3, set 1 ten in the tens column and clear 7 ones in the ones column.
To add 4, set 1 ten in the tens column and clear 6 ones in the ones column.
To add 5, set 1 ten in the tens column and clear 5 ones in the ones column.
To add 6, set 1 ten in the tens column and clear 4 ones in the ones column.
To add 7, set 1 ten in the tens column and clear 3 ones in the ones column.
To add 8, set 1 ten in the tens column and clear 2 ones in the ones column.
To add 9, set 1 ten in the tens column and clear 1 one in the ones column.

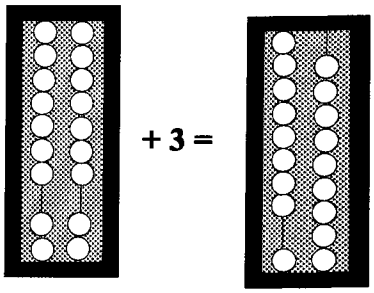
Example 1: 3 + 8 = 11



Set 3.

Add 8 by setting 1 ten to the tens column and clearing 2 ones from the ones column to arrive at the sum 11.

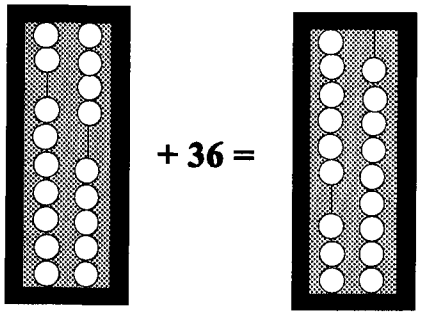
Example 2: 77 + 3 = 80



Set 77.

Add 3 by setting 1 ten to the tens column and clearing 7 ones from the ones column to arrive at the sum 80.

Example 3: 24 + 36 = 60



Set 24.

Add 3 tens directly to the tens column; then add 6 ones by setting one ten in the tens column and clearing 4 ones from the ones column to arrive at the sum 60.

Practice Problems

Let the student solve the following addition problems using the Beginner's Abacus. Remind the student to always clear the abacus to zero before beginning. *Applying one of the rules on page 8 will be necessary.*

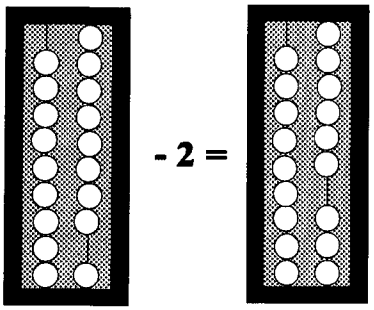
1.	8 + 2	2.	9 + 3	3.	6 + 4	4.	8 + 5	5.	5 + 6
6.	3 + 7	7.	4 + 8	8.	7 + 9	9.	21 + 9	10.	36 + 6
11.	53 + 7	12.	44 + 6	13.	75 + 5	14.	19 + 4	15.	68 + 2
16.	89 + 1	17.	66 + 24	18.	35 + 47	19.	11 + 39	20.	54 + 39
21.	45 + 26	22.	68 + 15	23.	72 + 18	24.	26 + 66		

Note: When constructing your own addition problems, remember that the sum can never exceed 99 on the Beginner's Abacus.

Direct Subtraction: Subtracting Directly from the Ones Column and/or the Tens Column

Below are pictorial examples of solving subtraction problems with the Beginner's Abacus by subtracting directly from the ones column and/or the tens column. Notice that subtracting always begins on the left and moves to the right ending in the ones column.

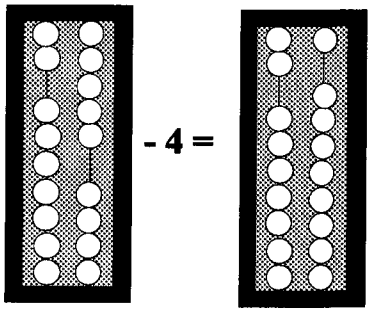
Example 1: 8 - 2 = 6



Set 8.

Subtract 2 ones directly from the 8 in the ones column to arrive at the difference 6.

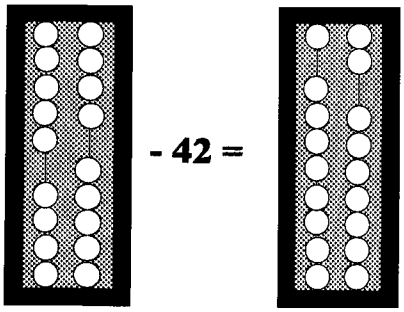
Example 2: 25 - 4 = 21



Set 25.

Subtract 4 ones directly from the 5 in the ones column to arrive at the difference 21.

Example 3: 54 - 42 = 12



Set 54.

Subtract 4 tens from the 5 in the tens column and 2 ones from the 4 in the ones column to arrive at the difference 12.

Practice Problems

Let your student solve the following subtraction problems using the Beginner's Abacus. Remind the student to always clear the abacus to zero before beginning and begin subtracting from the left.

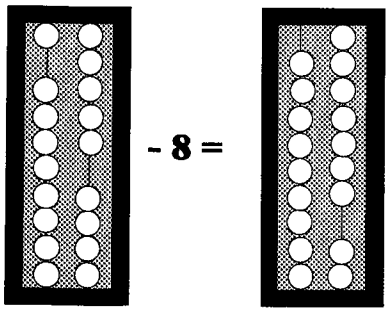
1. 4 - 3	2. 6 - 5	3. 9 - 7	4. 7 - 25	5. 44 - 3
6. 35 - 5	7. 19 - 8	8. 58 - 7	9. 63 -12	10. 99 - 47
11. 26 - 22	12. 71 - 50			

Indirect Subtraction: Regrouping from the Tens Column to the Ones Column

Use the following rules when solving subtraction problems on the Beginner's Abacus when regrouping from the tens column to the ones column is necessary.

To subtract 1, clear 1 ten from the tens column and set 9 ones in the ones column.
To subtract 2, clear 1 ten from the tens column and set 8 ones in the ones column.
To subtract 3, clear 1 ten from the tens column and set 7 ones in the ones column.
To subtract 4, clear 1 ten from the tens column and set 6 ones in the ones column.
To subtract 5, clear 1 ten from the tens column and set 5 ones in the ones column.
To subtract 6, clear 1 ten from the tens column and set 4 ones in the ones column.
To subtract 7, clear 1 ten from the tens column and set 3 ones in the ones column.
To subtract 8, clear 1 ten from the tens column and set 2 ones in the ones column.
To subtract 9, clear 1 ten from the tens column and set 1 one in the ones column.

Example 1: 15 - 8 = 7



Set 15.

Subtract 8 by clearing 1 ten from the tens column and setting 2 ones in the ones column to arrive at the difference 7.

Practice Problems

Let the student solve the following subtraction problems using the Beginner's Abacus. Remind the student to always clear the abacus to zero before beginning. *Indirect subtraction or regrouping will be necessary.*

1. 13 - 5	2. 21 - 9	3. 36 - 8	4. 54 - 6	5. 72 - 5
6. 32 -23	7. 83 - 77	8. 55 - 47	9. 42 -28	10. 64 - 7

TRANSITION FROM THE BEGINNER'S ABACUS TO THE CRANMER ABACUS

Introduction to the Cranmer Abacus is recommended as soon as the visually impaired student has mastered the addition and subtraction math facts for 5 and 10. The Cranmer Abacus will enable the student to build on the concepts and skills acquired during the use of the Beginner's Abacus, to work with values greater than 99, and to perform other mathematical operations (e.g., multiplication and division).

When first introducing the student to the Cranmer Abacus, the teacher may want to point out the physical differences between the Cranmer Abacus and the Beginner's Abacus in a side-by-side fashion. Notable changes include the following:

- increased number of columns
- decreased number of beads per column
- inclusion of a separation bar dividing a single row of beads from 4 rows below
- reduction in bead size (unless you are using the Large Abacus)
- appearance of raised dots and vertical lines along the separation bar, as well as the bottom of the frame which serve as place locators and commas or decimals, respectively.

The single row of beads above the separation bar on the Cranmer Abacus indicates the top. To set the Cranmer Abacus to zero, the single row of beads above the separation bar should be moved toward the top of the frame, and the beads below the separation bar should be moved toward the bottom of the frame. When a bead is moved closer to the separation bar it takes on value.

The single row of beads above the separation bar represent, from right to left, 5, 50, 500, and so forth. To set 5 on the Cranmer Abacus, for example, move the bead on the far right down until it is positioned next to the separation bar. This contrasts to the one-to-one correspondence allowed on the Beginner's Abacus, where 5 individual beads are set to represent the value 5.

For more information on using the Cranmer Abacus, you will find the following instruction books helpful:

- *The Abacus Made Easy* by Dr. Mae E. Davidow
- *Using the Cranmer Abacus for the Blind* by Fred Gissoni

For information on these and other related products contact:
AMERICAN PRINTING HOUSE FOR THE BLIND
1839 Frankfort Avenue
P.O. BOX 6085
Louisville, Kentucky 40206-0085
Phone: 502-895-2405
E-Mail: aph@iglou.com