Activities for Learning, Inc.

RightStart™ Mathematics

by Joan A. Cotter, Ph.D.

SIMPLE ADDITION LESSON EXCERPTS

Transition Lessons

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Lesson T20 (1 to 2 days)

Using the AL Abacus

OBJECTIVE
1. To identify quantities on the AL Abacus
2. To discover strategies using the AL Abacus

MATERIALS AL Abacus

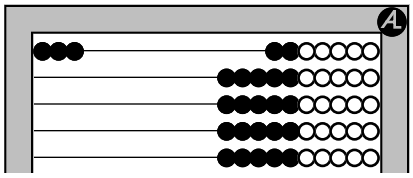
ACTIVITIES

Abacus rules. Show the child the abacus. Help him learn to handle it with respect, as due any tool. Discuss with him what the ground rules should be. Include handling it carefully and quietly, using it flat on a surface without sliding it around, moving the beads with fingers only, and storing it in its proper place.

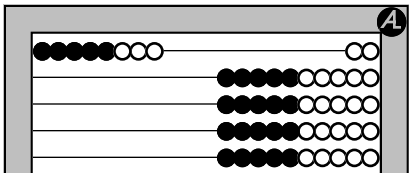
Hand the abacus to the child and give him time for free exploration; encourage him to make designs.

Quantities 1 to 10 on the abacus. Ask the child how to clear the abacus. [Move the beads toward the right.] Next ask him to enter quantities on the top wire as you say them; he need not clear between quantities. See the figures below. (He is *not* to count the beads.) Ask for quantities 1 to 10, in random order, such as 3, 2, 6, 8, 4, 9, 7, 5, 1, and 10.

Note: The child must be encouraged to find strategies other than counting. One who does not progress beyond counting will remain a low achiever in math.



The abacus displaying 3.

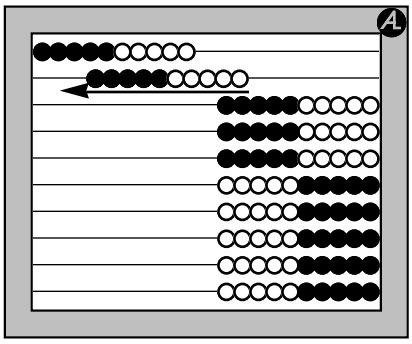


The abacus displaying 8.

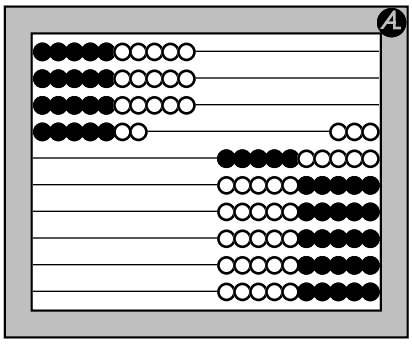
Ask how he can enter 8 without counting. [5 dark beads & 3 light beads] Repeat for 7 [5 & 2], 6 [5 & 1], and 9 [5 & 4].

Next do the inverse. Enter various quantities up to 10 on the abacus and ask the child to name them quickly.

Entering 10s on the abacus. Ask the child to show how 10s are counted on the abacus. See the figure below on the left.



Counting by 10s.



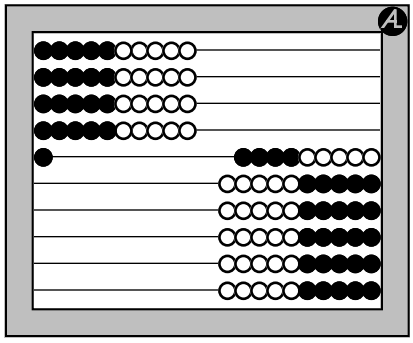
37 entered on the abacus.

Write the number 37. Ask him to explain how to enter 37 on the abacus without counting. [37 is 3 tens and 7 ones; it needs 3 rows of 10 and a 5 and a 2. See the figure above on the right.

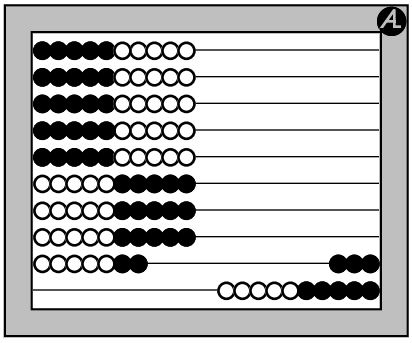
Repeat for the numbers 64 and 98.

Reading 10s on the abacus. Enter 41 on the abacus as shown below on the left; ask the child to read it without counting and to write the number. [41] Ask how he did it.

Repeat for 87. It may be helpful to point out that the color change at 50. See the below figure on the right. Repeat for 59 and 94.



41 entered on the abacus.



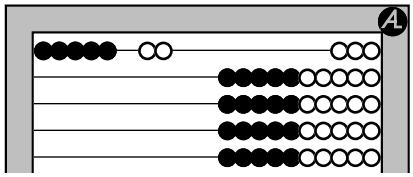
87 entered on the abacus.

Note: Do *not* use timing until the children are very familiar with the strategy. When timing, let the child do their own timeing making sure that the section is completed. This allows the child can keep better track of his time for each day.

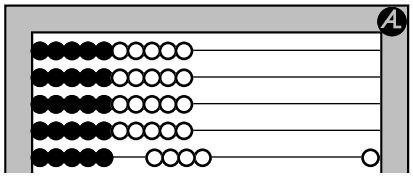
Addition strategies. These strategies are not to be taught as rules. Help the child make the discoveries. For new strategies, the child will need time to practice them without being timed. Use copies of the corresponding practice sheets, found in the back of the child's worksheets, as needed.

Adding 5 and numbers 1 to 4. Adding 5 to a number is obvious on fingers or side 1 of the abacus; it is almost a definition with sums up to ten. See the figure below. How much is 5 + 3? [8] 5 + 1? [6] 5 + 4? [9] 5 + 2? [7] Then ask him for combinations with a number 1-5 plus 5. Include combinations in the higher decades. What is 5 + 2? [7] 5 + 4? [9] 25 + 3? [28] 25 + 1? [26] 35 + 4? [39] 3 + 25? [28] 4 + 55? [59]

Note: Also teach the *names* of the strategies.

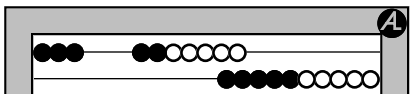


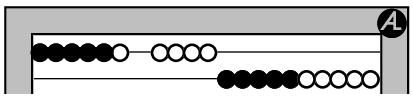
Adding 5 + 2. [7]



Adding 35 + 4. [39]

What makes 10. They are easy to see on the abacus as shown below. Ask questions similar to the following: 6 and what equals 10? [4] 16 and what equals 20? [4] 3 and what equals 30? [27] 48 and what equals 50? [2]





Seeing facts totaling 10, for example, 3 + 7 and 6 + 4.

Lesson T16 (1 to 2 days)

Addition Strategies

OBJECTIVES

1. To learn addition strategies on the abacus
2. To learn the 2-five strategy

MATERIALS

Abacus
Addition strategies practice sheets located in the back of the child's Worksheets, as needed. Copies should be made.

WARM-UP

Ask the child to count by 5s from 5 to 5-ten on both sides on the abacus.

ACTIVITIES

Addition strategies. These strategies are not to be taught as rules. Help the child make discoveries. For new strategies, the child will need time to practice them without being timed. Use the corresponding practice sheets as needed. They can be found in the back of the child's worksheets.

Note: Do *not* use timing until the children are very familiar with the strategy. When timing, let the child do their own timeing making sure that the section is completed. This allows the child can keep better track of his time for each day.

Adding 1. Adding 1 to a number is the next number. Ask the child to use his mental abacus for the following. What do you get when you add 1 to 4? [5] 1 to 7? [8] 1 to 11? [12] What is 3 + 1? [4] 6 + 1? [7] 11 + 1? [12] 38 + 1? [39] 59 + 1? [60]

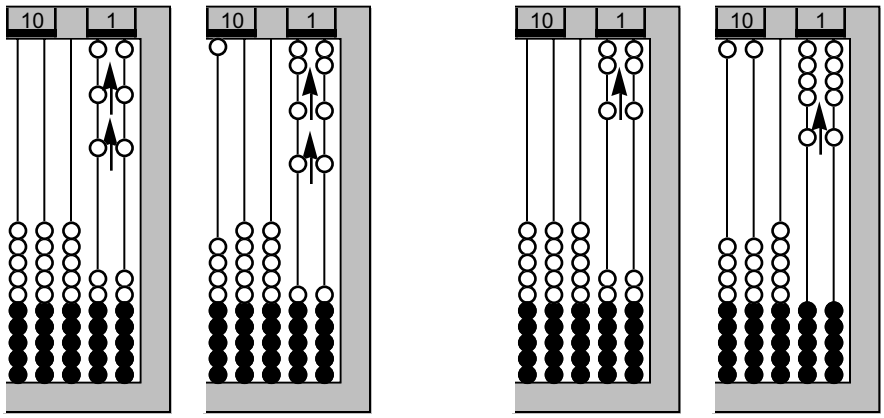
How could you add 1 + 8? [9, the same as 8 + 1] What is 1 + 6? [7] 1 + 13? [14] 1 + 34? [35]

Adding 2 to an even number. Adding 2 to an even number is the next even number. See the two examples below on the right.

Note: Also teach the *names* of the strategies.

In preparation, ask the child to count by 2s (2, 4, 6, 8, 10, 12, . . . 40) on side 2 of the abacus, trading when needed (see the left two figures below). What is special about these numbers? [The columns are always even.]

What even number comes after 4? [6] after 8? [10] after 12? [14] What is 2 + 2? [4] 4 + 2? [6] 6 + 2? [8] 8 + 2? [10] What pattern do you hear? [next even number] What is 14 + 2? [16] 26 + 2? [28] 30 + 2? [30] 48 + 2? [50] What does the picture in your mind look like? See the right two figures below.



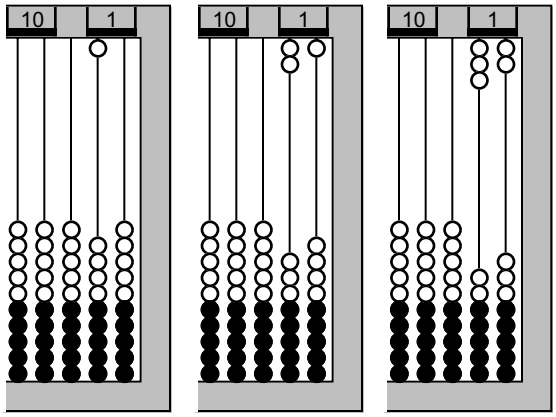
Counting by 2s: 2, 4, 6. **Counting by 2s: 14, 16, 18.** **Adding 4 + 2. [6]** **Adding 28 + 2. [30]**

How could you add 2 + 6? [8, same as 6 + 2] What is 2 + 8? [10] 2 + 4? [6] 2 + 10? [12]

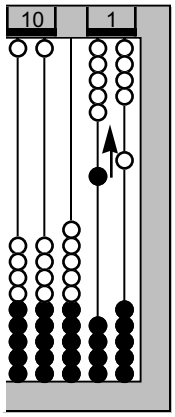
Adding 2 to an odd number. Adding 2 to an odd number is the next odd number. See the two examples on next page.

What do we call a number that is not even? [odd] Ask the child to start with 1 and to enter the odd numbers up to 39 on side 2 of the abacus. [1, 3, 5, . . . 39] See the left three figures below.

What is special about these numbers? [One of the columns has one more than the other; they are *uneven,* or *odd.*]



Entering the odd numbers.



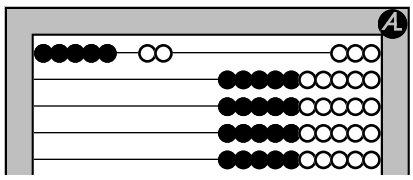
Adding 29 + 2. [31]

What is the next odd number after 3? [5] after 7? [9] after 11? [13] What is 1 + 2? [3] 3 + 2? [5] 5 + 2? [7] 7 + 2? [9] What pattern do you hear? [next odd number]

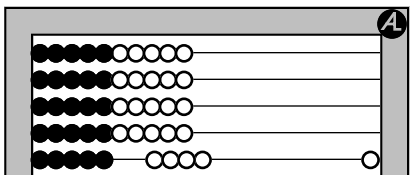
Also give him examples in the higher decades: What is 3 + 2? [5] 17 + 2? [19] (See the right figure above.) What is 29 + 2? [31] What do the pictures in your mind look like?

How can you add 2 + 5? [7, same as 5 + 2] What is 2 + 13? [15] 2 + 39? [41] 2 + 47? [49]

Adding 5 and numbers 1 to 4. Adding 5 to a number is obvious on fingers or side 1 of the abacus; it is almost a definition with sums up to ten. See the figure below. How much is 5 + 3? [8] 5 + 1? [6] 5 + 4? [9] 5 + 2? [7] Then ask him for combinations with a number 1 through 5 plus 5. Include combinations in the higher decades. What is 5 + 2? [7] 5 + 4? [9] 25 + 3? [28] 25 + 1? [26] 35 + 4? [39] 3 + 25? [28] 4 + 55? [59]

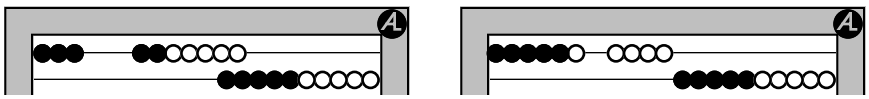


Adding 5 + 2. [7]



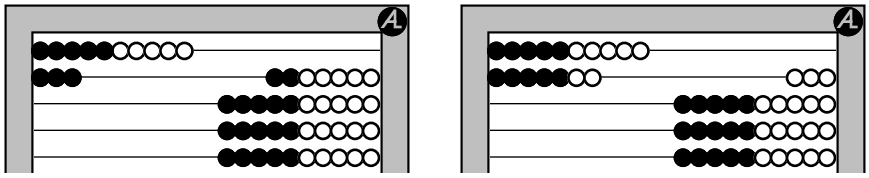
Adding 35 + 4. [39]

What makes 10. They are easy to see on the abacus as shown below. Ask questions similar to the following: 6 and what equals 10? [4] 16 and what equals 20? [4] 3 and what equals 30? [27] 48 and what equals 50? [2]



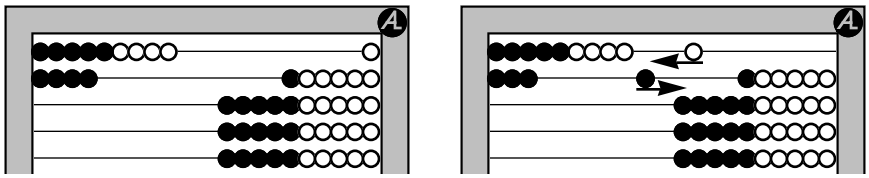
Seeing facts totaling 10, for example, 3 + 7 and 6 + 4.

Adding 10. Ask the child to add 10 + 3 [13] on the abacus; see the figure below. How much is 10 + 7? [17] 10 + 5? [15] 10 + 2? [12] 1 + 10? [11] 9 + 10? [19] 6 + 10? [16]



Adding 10 to a number, for example, 10 + 3 and 10 + 7.

Adding 9. Next ask him to add 9 + 4 by entering 9 on the first wire and 4 on the second wire as shown below. [13] Listen to suggestions and then expand on the strategy (sometimes called the nines' trick) of taking 1 from the 4 and giving it to the 9 to make 10 and 3. An alternate strategy is to add 10 and then go back 1.



The quantity 9 + 4 can be transformed into 10 + 3.

How much is 9 + 4? [13] 9 + 6? [15] 9 + 2? [11] 8 + 9? [17] 9 + 9? [18] 3 + 9? [12]

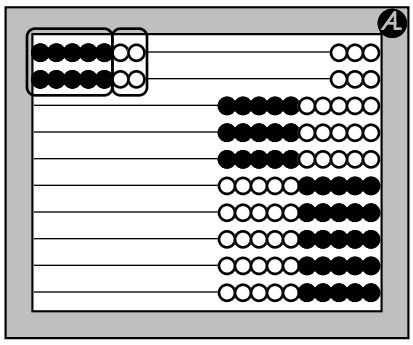
Adding 8. This strategy is similar to adding 9. Two beads are moved back, which is similar to counting by 2s backward.

Two-fives. There is a simple strategy for adding two numbers when both numbers are between 5 and 10. Enter two 7s on the wires of the abacus as shown below on the left. Can you see the 10? [the 2 groups of 5 beads, the dark-colored beads] How much is left over? [the two 2s, or 4] How much is 7 + 7? [14] Ask him to see two 7s in his mind.

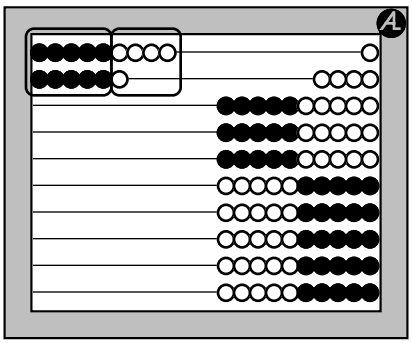
Repeat for 5 + 7; [12] ask him to see it in his head. How much is 6 + 7? [13] 8 + 5? [13] 7 + 9? [16] 5 + 9? [14] 5 + 6? [11]

Note: There are four facts that are not covered with these strategies: 6 + 3, 3 + 6, 4 + 7, and 7 + 4.

Take one of them, for example, 3 + 6, and ask the child what strategy he could use to remember it. [One possibility is to think of 4 + 6, which is 10, so 3 + 6 must be 9.]



The sum of 7 and 7 seen as 10 (2-fives, the dark beads) and 4, the number of light beads.



The sum of 9 and 6 seen as 10 (2-fives, the dark beads) and 5, the number of light beads.

Lesson T15

Adding 5s and 10s Mentally

OBJECTIVES

1. To mentally add multiples of 5 by playing the Corners™ Exercise
2. To review the sums totaling 5, 10, and 15

MATERIALS

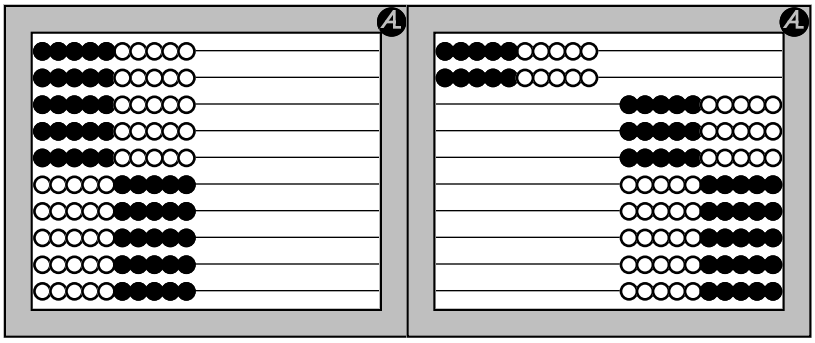
Corners™ cards
Abacus

WARM-UP

Ask the child to count by 2s from 2 to 5-ten on both sides on the abacus. Repeat using traditional names.

ACTIVITIES

Counting by 10s. Ask the child to count by 10s to 200 using side 1 of both abacuses if available. See the figure below.



Using two abacuses to show 120.

Then ask her to do it on side 2.

Also ask her to count by 10s to 100, but starting with 5. Let her choose which side of the abacus to use.

Adding 5, 10, and 15. Ask the child to write the answers to the following. Encourage her to use the abacus at first and then to switch to her mental abacus.

What is 20 + 10? [30] What is 40 + 10? [50]

What is 10 + 5? [15] What is 30 + 5? [35]

What is 75 + 10? [85] What is 65 + 10? [75]

What is 25 + 5? [30] What is 55 + 5? [60]

To add 15, first add the 10 and then add the 5.

What is 30 + 15? [40, 45] What is 50 + 15? [60, 65]

What is 65 + 15? [75, 80] What is 35 + 15? [45, 50]

Corners™ Exercise. Ask the child to take a set of four Corners cards and to combine them according to the rule for Corners Exercise, given on the next page.

Challenge the more advanced child with the question, What is the highest score you could get combining four cards? [65, three 15s and one 20] If there is time you might ask her to find four such cards.

Lesson T19 (2 days)

Adding Two-Digit Numbers

OBJECTIVES
1. To solve a problem by adding a 2-digit number
2. To play Corners™, using all the cards

MATERIALS
Abacus
Worksheet T5, Adding 2-Digit Numbers (solutions on pg. 42)
Skip counting envelopes
Place-value cards

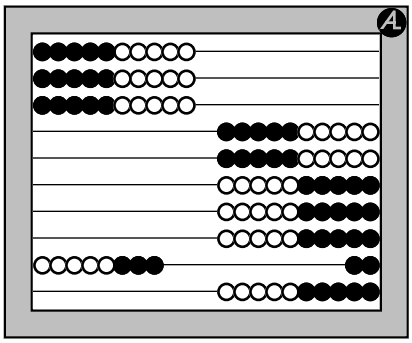
WARM-UP
Ask the child to give the ways to make 10: 1 and what? [9] 4 and what? [6] 7 and what? [3] 2 and what? [8]

Ask the child to count by 10s to 200, also to count by 5s to 200.

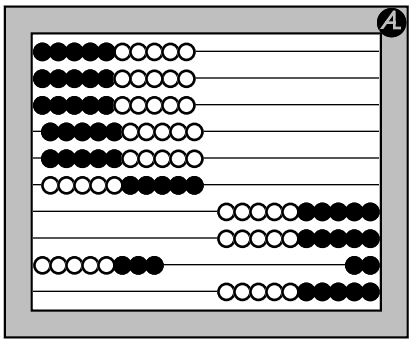
Ask the child to give the sums for 4 + 6 [10], 9 + 9 [18], 4 + 8 [12], 8 + 8 [16], and 2 + 9. [11]

ACTIVITIES
Adding multiples of 10s. Write horizontally 38 + 30 = __ [68] Ask the child to make up a story problem to fit the equation. Then ask her to find the answer and to explain how she did it. After each solution, ask if she can think of another way without counting. It can be done on either side of the abacus or mentally by first adding the tens.

One way to solve the equation on side 1 is to separate the tens and ones as shown below. Next the remaining tens are added to the first group of tens.

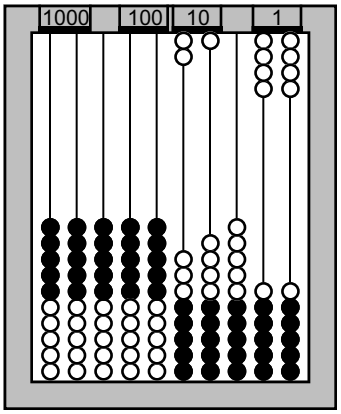


The quantity 38 entered with the tens and ones separated.

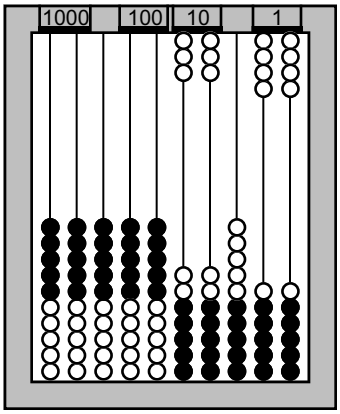


Next 30 is added to the 38 previously entered.

Using side 2 is straightforward as shown below. Discuss which way is easiest. Then ask the child to use that method to find 14 + 20 [34], 57 + 40 [97], 29 + 30 [59], and 48 + 40. [88]



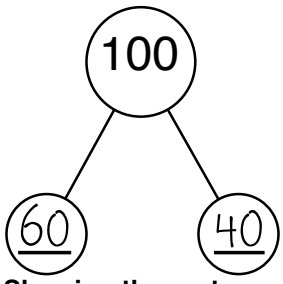
First enter 38.



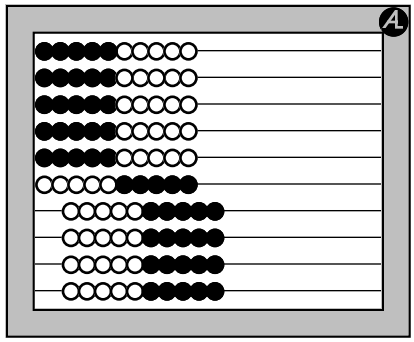
Next add 30, giving 68 as the total.

Adding tens equaling 100. Draw a part-whole circle set; write 100 in the whole circle and ask the child what tens could she write in the parts. [10 & 90, 20 & 80, 30 &70 and so forth]

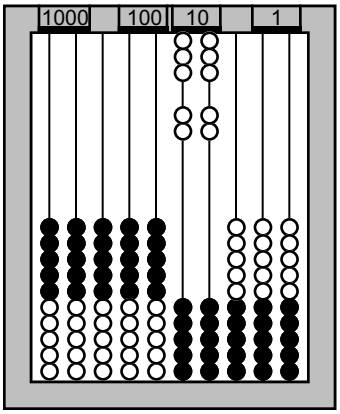
Continue until she has given several facts. Ask her to show that her answers are correct by using either side of the abacus.



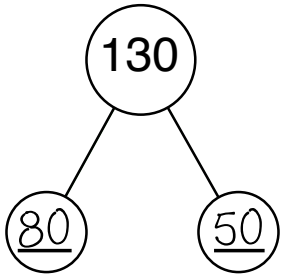
Showing the parts of 100 using tens.



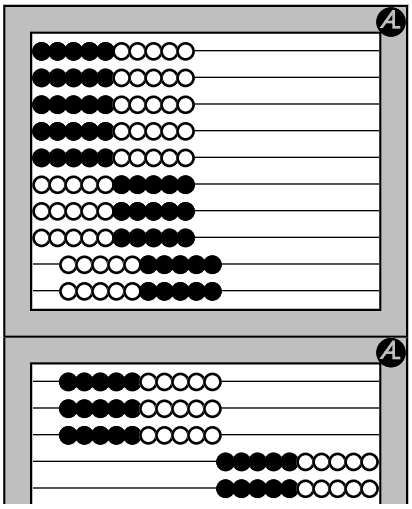
Showing 100 split into 60 and 40 on both sides of the abacus.

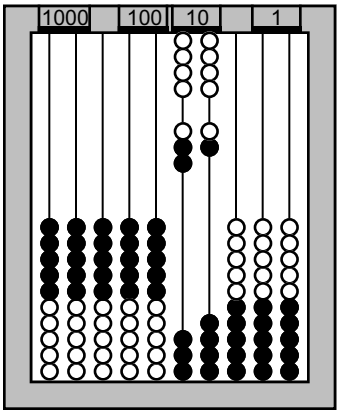


Adding tens equaling more than 100. Draw another part-whole circle set. This time, write 130 in the whole circle and ask the child to think of ways to split the 130 into tens. Ask how she could use side 1 to show the partitioning if two abacuses are available. Ask her to demonstrate it as shown below.



Partitioning 130 into 2 parts.





Showing that 130 = 80 + 50 on both sides of the abacus.

Repeat for one or two more facts.

Practice. Now ask the following or similar problems.

Problem 1. Ninety Canadian geese land on Long Lake. Two minutes later 60 more geese land. How many geese landed on the lake? [150 geese] There is an extraneous number in this problem. Only if the child wants to discuss it, you might ask, Does the 2 minutes have anything to do with the number of geese? [no]

Encourage the child to solve the problem mentally and to explain how she did it. Then ask her to show her solutions on the abacus.

Extend the problem as follows, Suppose 93 geese landed first and 60 more landed 2 minutes later. How many geese would there be? [153] Ask the child to modify her abacus solution to show the new number.