

# A Practical Guide for the Teaching of Literacy to Adults With Learning Difficulties

Part VI

MAY 2002

# **A Practical Guide for the Teaching of Literacy to Adults With Learning Difficulties**

**Diagnosis and Intervention Strategies**

**VI — Remedial Field  
Module: Arithmetic (Reading)**

**MAY 2002**

**Direction de la formation générale des adultes**

English version

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## **VI—REMEDIAL FIELD**

### **MODULE: ARITHMETIC (READING)**

#### **INTRODUCTION**

The interventions suggested in Part VI address learning problems related to arithmetic. They were informed by reflection on how arithmetic is learned and taught as well as on the needs of adults participating in training activities. A number of principles that emerged from this process of reflection underpin these intervention strategies.

The importance of associating the learning of arithmetic with everyday activities cannot be over-emphasized. Adult learners must understand in what ways arithmetic can be useful and how mathematical concepts can be applied in concrete ways. Every opportunity should be seized to apply what has been learned (either during group activities or in the learners' everyday activities). This will contribute to demystifying arithmetic and helping adult learners overcome a phobia of numbers that can be paralyzing.

To do so, real-life, concrete material is used as much as possible, as are situations that correspond to the learners' everyday reality. Learning by manipulation is emphasized. Problems proposed by adult learners are used as a basis for learning, and calculating sums of money is stressed, as this is the most common mathematical operation carried out on a daily basis. Always remember, the ultimate goal is the adult's autonomy.

To effectively intervene among adults with learning problems, it is necessary to clearly identify their difficulties by means of ongoing observation. It is also very important to regularly review the material; to repeat, while varying the examples; to schedule daily exercise periods; to present difficult concepts in different ways; and to break up the learning units. Adult learners do, however, require assistance in relating the various basic concepts being learned. For instance, numeration cannot be dissociated from place value. Similarly, the four basic operations cannot be learned independently of place value and problem-solving.

Adult students should gradually learn how to explain their reasoning, using words to describe their mental exercises. This expectation of them should be clearly communicated with simple instructions that are reformulated as necessary. This approach provides valuable indications of what learners have acquired and where they are having difficulties with regard to specific concepts. Pooling the strategies employed by the adult learners in the group should also be encouraged.

In addition, it is important to foster the learner's ability to estimate, that is, to determine the order of magnitude of an answer in order, for example, to assess the plausibility of a solution to a problem.

Furthermore, there are a number of “tricks” that can be employed when learning arithmetic. Always show adult learners when to use these tricks, for honesty's sake and to prevent their misuse in later learning.

Role-playing is another excellent intervention strategy. There are numerous activities, sometimes involving friendly competition, that can be very effective.

## REMEDIAL FIELD

<b>ARITHMETIC</b>
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<b>READING</b>
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1. Does the adult learner know the symbols 0 to 9?		
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top; padding-right: 20px;"> <p><b>YES:</b> The adult learner can identify the symbols 0 to 9.</p> </td> <td style="width: 50%; vertical-align: top;"> <p><b>NO:</b> The adult learner cannot identify the symbols 0 to 9. <b>It is therefore necessary to verify if he or she has already learned</b> these symbols:</p> <ul style="list-style-type: none"> <li>• <b>If so:</b> Investigate and try to determine why the adult learner does not recognize these symbols. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li>• <b>If not:</b> Proceed to teach the adult learner how to identify the symbols 0 to 9.</li> </ul> </td> </tr> </table>	<p><b>YES:</b> The adult learner can identify the symbols 0 to 9.</p>	<p><b>NO:</b> The adult learner cannot identify the symbols 0 to 9. <b>It is therefore necessary to verify if he or she has already learned</b> these symbols:</p> <ul style="list-style-type: none"> <li>• <b>If so:</b> Investigate and try to determine why the adult learner does not recognize these symbols. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li>• <b>If not:</b> Proceed to teach the adult learner how to identify the symbols 0 to 9.</li> </ul>
<p><b>YES:</b> The adult learner can identify the symbols 0 to 9.</p>	<p><b>NO:</b> The adult learner cannot identify the symbols 0 to 9. <b>It is therefore necessary to verify if he or she has already learned</b> these symbols:</p> <ul style="list-style-type: none"> <li>• <b>If so:</b> Investigate and try to determine why the adult learner does not recognize these symbols. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li>• <b>If not:</b> Proceed to teach the adult learner how to identify the symbols 0 to 9.</li> </ul>	

### SUGGESTED INTERVENTIONS

- In collaboration with the adult learner, identify situations in which it would be useful to know the symbols 0 to 9. Use these situations to begin the intervention. Encourage the learners to contribute by asking them to point out or bring to class material related to these situations.

**SUGGESTED INTERVENTIONS (cont.)**

- Use anything in the adult learners' environment that will help them identify the symbols 0 to 9, such as:
  - ◇ important telephone numbers
  - ◇ numbers on their identity cards
  - ◇ numbers on the clock
  - ◇ page numbers in a short book
  - ◇ playing cards
  - ◇ lottery tickets
  - ◇ bank notes
  
- Have the adult learners do numerous activities in which they must identify symbols by their name or identify the symbol that corresponds to something that is requested of them. For example:
  - ◇ Dictate a telephone number and ask the adult learners to dial it on a telephone number pad (real or simulated).
  - ◇ Ask the adult learner to locate a page in a short book by the page number.
  
- On a daily basis, ask the adult learners to identify the symbols 0 to 9 by means of brief activities and simple material. For example, ask them to name numbers on cards or to locate a card featuring a specific number. Vary the size of the numbers and their font so that the adults learn how to recognize the symbols in different types of print.
  
- Then take advantage of every opportunity to ask the adult learners to identify the symbols 0 to 9.
  
- Since the objective here is recognition of the symbols 0 to 9, it would be preferable to progressively introduce the symbols 0 to 9 right from the beginning of the intervention and in sequence, and for the time being to disregard numbers composed of two or more digits. Even if numerical order is not always respected, it is useful to learn their sequence as this can facilitate the reading of symbols and may simplify the learning. Similarly, once the symbols are known, a value must be associated with each one, in order to move from numerals to numbers.

2. 2.1.	Can the adult learner count: from 1 to 10?		
<b>YES:</b>	The adult learner can count from 1 to 10.	<b>NO:</b>	The adult learner cannot count from 1 to 10. <b>It is therefore necessary to verify if he or she has already learned how</b> to count from 1 to 10:
		• <b>If so:</b>	Investigate and try to determine why the adult learner cannot count from 1 to 10. Based on your findings, you may <b>suspect</b> a learning difficulty.
		• <b>If not:</b>	Proceed to teach the adult learner how to count from 1 to 10.

2. 2.2.	Can the adult learner count: from 1 to 100?		
<b>YES:</b>	The adult learner can count from 1 to 100.	<b>NO:</b>	The adult learner cannot count from 1 to 100. <b>It is therefore necessary to verify if he or she has already learned how</b> to count from 1 to 100:
		• <b>If so:</b>	Investigate and try to determine why the adult learner cannot count from 1 to 100. Based on your findings, you may <b>suspect</b> a learning difficulty.
		• <b>If not:</b>	Proceed to teach the adult learner how to count from 1 to 100.

## SUGGESTED INTERVENTIONS

- In collaboration with the adult learner, identify situations in which it would be useful to know how to count from 1 to 10, and from 1 to 100. These will undoubtedly be counting situations. Use these situations to begin the intervention.
- Present the symbols 1 to 9, **which the adult learner already knows**, in sequential order. Make sure that the terms “before” and “after,” which are essential to acquiring the concept of order, are well understood.
- Teach the adult learner how to count from 1 to 9, and then teach numeration in groups of ten, that is, from 10 to 19, from 20 to 29, and so on, up to 100. Only present a new group of numbers once the previous group has been acquired.
- Assist the adult learner to count from 1 to 100 through daily repetition of one or more groups of ten.
- Vary the exercises by asking the adult learner to:
  - ◇ count in ascending order
  - ◇ count in descending order
  - ◇ count up to..., starting from...
  - ◇ identify the number that comes before...
  - ◇ identify the number that comes after...
  - ◇ identify the number between... and...
  - ◇ count in teams of two: the team members alternate in saying the numbers, while respecting order and rhythm:
 

1	
	2
3	
	4
5	
  - ◇ count by 10s, once the adult learner has acquired the necessary knowledge

**SUGGESTED INTERVENTIONS (cont.)**

- Associate rhythm with the activity. Ask the adult learners to mark the rhythm by clapping their hands, tapping their feet or tapping their pencil against the table, while they count out loud. This will help them acquire numbers in sequence.
- Vary the rhythm in different ways. For example, pause after 9, 19, 29, etc.
- Verbal activities are most effective in helping students learn to count from 1 to 100. They call on memory and rhythm and require knowledge of spatial and temporal concepts, such as “before” and “after.” However, verbal activities must not be dissociated from activities related to reading numbers, counting, place value, written representation of numbers, and so on. It is therefore important to gradually increase the difficulty of the learning objectives, without isolating them.

2. 2.3.	Can the adult learner count: from one group of 10 to the next without difficulty?	
<b>YES:</b>	The adult learner can count from one group of 10 to the next without difficulty. For example: 28-29-30-31, 88-89-90-91.	<p data-bbox="1058 321 1927 472"><b>NO:</b> The adult learner cannot, or has great difficulty, counting from one group of 10 to the next. <b>It is therefore necessary to verify if he or she has already learned</b> how to count from one group of 10 to the next:</p> <ul data-bbox="1003 509 1927 764" style="list-style-type: none"> <li data-bbox="1003 509 1927 656">• <b>If so:</b> Investigate and try to determine why the adult cannot count from one group of 10 to the next without difficulty. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li data-bbox="1003 693 1927 764">• <b>If not:</b> Proceed to teach the adult learner how to count from one group of 10 to the next.</li> </ul>

2. 2.4.	Can the adult learner count: from one group of 100 to the next without difficulty?	
<b>YES:</b>	The adult learner can count from one group of 100 to the next without difficulty. For example: 299-300-301, 899-900-901.	<p data-bbox="1058 993 1915 1144"><b>NO:</b> The adult learner cannot, or has great difficulty, counting from one group of 100 to the next. <b>It is therefore necessary to verify if he or she has already learned</b> how to count from one group of 100 to the next:</p> <ul data-bbox="1003 1182 1915 1443" style="list-style-type: none"> <li data-bbox="1003 1182 1915 1328">• <b>If so:</b> Investigate and try to determine why the adult learner cannot count from one group of 100 to the next without difficulty. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li data-bbox="1003 1365 1915 1443">• <b>If not:</b> Proceed to teach the adult learner how to count from one group of 100 to the next.</li> </ul>

## SUGGESTED INTERVENTIONS

- Help the adult learner become aware of the order and regularity that underpins a numeration system. Refer to the written representation of numbers, using the number table. This is further addressed in 3.2, 3.3, 3.4 and 3.5 below. Be sure that the adult learner fully understands the terms “before” and “after,” which are essential to acquiring the concept of order.
- Teach the adult learners to count by 10s, for example: 10, 20, 30, etc. If they know the value of coins, you can use dimes for this exercise.
- Teach the adult learners how to count from 1 to 9, and then teach numeration in groups of ten, that is, from 10 to 19, 20 to 29, etc., up to 100. Only present a new group of numbers once the preceding group have been acquired.
- Point out that groups of 10 are sequenced in the same order as the numbers 1 to 9.
- Vary the exercises by asking the adult learner to:
  - ◇ count in ascending order, for example, from 23 to 33
  - ◇ count in descending order, for example, from 33 to 23
  - ◇ count up to..., beginning from...
  - ◇ identify the number that comes before 40, 50, 60, etc.
  - ◇ identify the number that comes after 29, 39, 49, etc.
  - ◇ identify the number that is between 29 and 31, 59 and 61, etc.
  - ◇ count in teams of two: the team members alternate in saying the numbers, while respecting order and rhythm. Carefully monitor them as they change from one group of 10 to the next
- Guide the adult learners to correct themselves, using number sequences recorded on a cassette. At the end of each group of nine or ten, for example, 9, 19, 29, the adult learner should stop the cassette player and predict the next number, which can then be verified by listening to the next recorded sequence. This exercise also promotes the acquisition of rhythm.
- Point out that the number 9 signals the end of a sequence (group of nine or ten) and, therefore, the beginning of a new sequence (group of nine or ten).

**SUGGESTED INTERVENTIONS (cont.)**

- Use daily repetition to teach the adult learner to count from 1 to 100, for example, of one or more groups of nine or ten each day, paying special attention when the adult learner counts from one group of ten to the next.
- Once the adult learner can count from 1 to 99, easily proceeding from one group of nine or ten to the next, higher numbers can be tackled. Adapt the intervention strategies discussed above to teach adult learners how to count easily from one group of 100 to the next. Draw their attention to the fact that the number 99 signals the end of one sequence (group of 100) and, therefore, the beginning of a new sequence (group of 100).

All of these activities should also be associated with reading numbers, counting, place value—in short everything related to numeration.

3. 3.1.	Can the adult learner read: the numbers 0 to 9?	
<b>YES:</b>	The adult learner can identify and read the numbers 0 to 9	<p data-bbox="1052 306 1917 467"><b>NO:</b> The adult learner cannot read the numbers 0 to 9. <b>It is therefore necessary to verify if he or she has already learned</b> to read the numbers 0 to 9:</p> <ul data-bbox="1052 472 1917 695" style="list-style-type: none"> <li data-bbox="1052 472 1917 597">• <b>If so:</b> Investigate and try to determine why the adult learner cannot read the numbers 0 to 9. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li data-bbox="1052 602 1917 695">• <b>If not:</b> Proceed to teach the adult learner how to read the numbers 0 to 9.</li> </ul>

### SUGGESTED INTERVENTIONS

- In collaboration with the adult learner, identify situations in which it would be useful to know how to read the numbers 0 to 9. Use these situations to begin the intervention.
- Since the adult learner must associate a value with each symbol, it is necessary to ensure that the concept of numbers is well understood.
- Facilitate the acquisition of the concept of numbers by studying the numbers one at a time, illustrating each number by its symbol as well as by a group of objects, and having the learner do numerous exercises in which groups containing the proper number of elements are located in his or her immediate environment.

## SUGGESTED INTERVENTIONS (cont.)

- Present the adult learners with situations in which they must count a small number of objects and associate the number obtained with its symbol. It is important to ensure that they are able to make the link between the two, a skill that is necessary for counting and understanding the concept of numbers. For example:  
 “Pick up five pencils.” The adult learner must pick up the right number of pencils and identify the corresponding symbol “5.”  
 “How many windows are there in this room?” The adult learner must count the number of windows and identify the corresponding symbol.
- Use material the adult learners are familiar with (for example, playing cards, dominoes, dice) to guide them to identify a number while associating it with its corresponding value.

- Have the learners do numerous association exercises:

name	-	symbol	-	value
↓		↓		↓
two		2		••

- Play “connect the dots,” whereby each dot has a number, and the learner constitutes a drawing or shape by connecting the dots in proper numerical order.
- If the adult learner can read, present 10 association exercises where the symbol (numeral) must be matched with its name. For example: 1 with “one,” 2 with “two,” etc.
- Present the learners with situations in which numbers must be placed in order. For example:
  - ◇ Organize playing cards in ascending order (1 to 9).
  - ◇ Place numbered pages in order.

Make sure the adult learner understands the concepts “smaller than,” “greater than,” “before,” “after,” etc.

**SUGGESTED INTERVENTIONS (cont.)**

- Play the card game “war” using the cards ace to 9. The adult learner must identify the symbols and associate them with their value in order to determine who won the “war.”
- Take advantage of everyday situations to encourage the adult learner to read numbers, for example: telling time, determining the date on a calendar, reading winning lottery numbers, etc.
- Promote the acquisition of important numeration concepts (more, less, as much as, a lot, a little, several, a few, etc.) by asking the adult learner to compare numbers by means of manipulation or observation exercises. For example:
  - ◇ Compare the number of objects contained in two distinct sets.
  - ◇ Compare the number of adults in one group to the number in another group.

3. 3.2.	Can the adult learner read: the numbers 10 to 99?	
<b>YES:</b>	The adult learner can read the numbers 10 to 99 without difficulty.	<p data-bbox="1052 310 1915 435"><b>NO:</b> The adult learner cannot read the numbers 10 to 99. <b>It is therefore necessary to verify if he or she has already learned to read the numbers 10 to 99:</b></p> <ul style="list-style-type: none"> <li data-bbox="1010 472 1915 581">• <b>If so:</b> Investigate and try to determine why the adult learner cannot read the numbers 0 to 99. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li data-bbox="1010 618 1915 693">• <b>If not:</b> Proceed to teach the adult learner how to read the numbers 10 to 99.</li> </ul>

### SUGGESTED INTERVENTIONS

- Approach the reading of the numbers 10 to 99 in groups of 10, that is, from 10 to 19, 20 to 29, etc., only presenting a new group of 10 once the previous one has been acquired.
- Use the number table (p. 21) to demonstrate to the adult learner the regularity of the succession of sequences (groups of 10) and the succession of numbers within a sequence. This table can be used for a wide range of exercises:
  - ◇ Read the numbers in ascending order, from left to right.
  - ◇ Read the numbers in the same column, from top to bottom. Guide the adult learner in observing what these numbers have in common.
  - ◇ Locate in the table a number that has been dictated.
  - ◇ Carry out number reading exercises each day using a number table that has been recorded on cassette. Have the adult learner match the numbers heard with those on the table.

**SUGGESTED INTERVENTIONS (cont.)**

- ◇ Read the number table, in part or in whole, in teams of two. Or, have one member name a number and the other locate it on the table, and then read the one that precedes and follows it.
- ◇ Count by 10s, beginning with a given number.
- Take advantage of everyday situations to encourage the adult learner to read numbers: telling time, determining the date on a calendar, reading winning lottery numbers or amounts on a receipt, locating a page number in a book, reading a bus number, etc.
- Play bingo as a number reading exercise.
- Identify the numbers that the adult learner is having difficulty reading and include these numbers in learning activities.
- Present a variety of exercises in which the adult learner must take into account the value associated with each symbol. For example:
  - ◇ Organize numbers in ascending or descending order, using the age of the adults in the group or some other significant information.
  - ◇ Complete a sequence of numbers by choosing a number from among several choices.
  - ◇ Compare two numbers using illustrations or groups of objects.
- Guide the adult learner in reading and comparing numbers composed of the same symbols, for example, 24 and 42. Then compare digits to letters: two different arrangements of the same letters form two different words, and two different arrangements of the same digits form two different numbers.

3.	Can the adult learner read:	
3.3.	the numbers 100 to 1000?	
<b>YES:</b>	The adult learner can read the numbers 100 to 1000 without difficulty.	
		<b>NO:</b> The adult learner cannot read the numbers 100 to 1000. <b>It is therefore necessary to verify if he or she has already learned</b> to read the numbers 100 to 1000:
		<ul style="list-style-type: none"> <li>• <b>If so:</b> Investigate and try to determine why the adult learner cannot read the numbers 100 to 1000. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li>• <b>If not:</b> Proceed to teach the adult learner how to read the numbers 100 to 1000.</li> </ul>

### SUGGESTED INTERVENTIONS

- Approach the reading of the numbers 100 to 1000 by groups of 100, that is, 100 to 199, 200 to 299, etc., only presenting a new group of 100 once the previous one has been acquired.
- Take advantage of everyday situations to encourage the adult learner to read numbers: amounts on a receipt, classroom numbers, addresses, page number in a book, etc.
- Adapt the number table (p. 21) for the numbers 100 to 199. The exercises suggested in 3.2 can also be adapted and used for the numbers 100 to 1000.
- Adapt the game bingo so as to teach adult learners to read three-digit numbers.
- Present association exercises: for example, have the adult learners associate a number with a statement:

the number of days in a year		365
the number that comes before	748	747

**SUGGESTED INTERVENTIONS (cont.)**

- Identify the numbers that the adult learner is having difficulty reading and include these numbers in learning activities.
- Present a variety of exercises in which the adult learner must take into account the value associated with each symbol (see 3.2).
- Guide the adult learner in reading and comparing numbers composed of the same numerals, for example, 108 and 180.
- Pay particular attention to numbers with 0 in the tens digit; if these numbers cause difficulties, use place value exercises or break down the numbers, for example:

$$\begin{array}{r} 108 \\ = \\ + \quad 8 \\ \hline 108 \end{array}$$

- To do these exercises, the adult learner must have prior knowledge of place values. See the suggested intervention strategies in 5.1, 5.2 and 5.3.

3.	Can the adult learner read:	
3.4.	from one group of 10 to the next without difficulty?	
<b>YES:</b>	The adult learner can read from one group of 10 to the next without difficulty.	<b>NO:</b> The adult learner has difficulty reading from one group of 10 to the next. <b>It is therefore necessary to verify if he or she has already learned</b> how to read from one group of 10 to the next:
		<ul style="list-style-type: none"> <li>• <b>If so:</b> Investigate and try to determine why the adult learner cannot read from one group of 10 to the next. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li>• <b>If not:</b> Teach the adult learner how to read from one group of 10 to the next.</li> </ul>

### SUGGESTED INTERVENTIONS

- Use a number table (p. 21) to demonstrate to the adult learner the regularity of the succession of numbers in a same sequence (group of ten) and in a succession of sequences (groups of ten). Highlight the numbers that end a group of nine or ten: 9, 19, 29, etc., and those that begin a group of ten: 10, 20, 30, etc., by colouring them in.
- This table can be used for a wide range of exercises to help the adult learner proceed from one group of 10 to the next. For example:
  - ◇ Locate, on the table, the number that comes before 50, after 39, etc.
  - ◇ Organize a group of numbers in ascending or descending order, with some of the numbers being in consecutive order in the number table, but belonging to different groups of ten. For example: 49-50-63-69-70, etc.
  - ◇ Complete the following number sequences using the number table:
    - 47, 48, 49, \_\_\_\_\_, 51
    - 28, 29, \_\_\_\_\_, 31

### SUGGESTED INTERVENTIONS (cont.)

- Identify where the adult learner has difficulties proceeding from one group of 10 to the next and include these problem areas in the learning activities.
- Use a manual counter so that the adult learner can clearly see that numbers ending in 9 indicate the end of a group of 9 or 10 and are followed by a number ending in 0 which indicates the beginning of a new group of 10.
- Use a Robinson Crusoe counter, once the principle of a manual counter has been understood. The adult learner manipulates the symbols to proceed from one group of 10 to the next.
- Teach the adult learner how to count by 10s (10, 20, 30, etc.).
- Use the principle of adding ones to facilitate the change from one group of 10 to the next, for example:

$$\begin{array}{r} 49 \\ + \quad 1 \\ \hline 50 \end{array}$$

- For this type of intervention to be effective, the adult learner must have prior knowledge of the principle of addition and the concept of place value.
- Place value can be a useful concept for helping the adult learner understand how the change from one group of 10 to the next occurs. This can be done through manipulation by asking the learners to group 10 scattered objects (ones) into a pack of 10, that is, a group of ten.

Thus, 4 groups of 10 and 9 ones, to which a one is added, becomes 5 groups of 10 or 4 groups of 10 and 10 ones. Represented on a counting board, these 5 groups of 10 are equivalent to the number 50.

- Of course, an understanding of the values associated with digit places in a number requires a lot of manipulation and a conceptual shift from the concrete to the symbolic. See 5.1, 5.2 and 5.3 below for suggested interventions in this area.

3.	Can the adult learner read:	
3.5.	from one group of 100 to the next without difficulty?	
<b>YES:</b>	The adult learner can read from one group of 100 to the next without difficulty.	<p><b>NO:</b> The adult learner has difficulty reading from one group of 100 to the next. <b>It is therefore necessary to verify if he or she has already learned</b> how to read from one group of 100 to the next:</p> <ul style="list-style-type: none"> <li>• <b>If so:</b> Investigate and try to determine why the adult learner cannot read from one group of 100 to the next. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li>• <b>If not:</b> Teach the adult learner how to read from one group of 100 to the next.</li> </ul>

### SUGGESTED INTERVENTIONS

- In collaboration with the adult learner, put together a large number table presenting the numbers 1 to 200. Use this table to demonstrate the regularity of the succession of numbers within a sequence (group of ten) and in a succession of sequences (groups of ten). Highlight the numbers that end a group of ten: 9, 19, 29, etc., and those that begin one: 10, 20, 30, etc, as well as those that end a group of 100: 99, 199, etc., and those that begin one: 100, 200, etc.
- This table (p. 21) can be used for a wide range of exercises to help the adult learner proceed from one group of 100 to the next; for example:
  - ◇ Locate in the table the number that comes before 200, after 99, etc.
  - ◇ Complete the following number sequences using the number table:
    - 97, 98, 99, \_\_\_\_, \_\_\_\_
    - 197, 198, \_\_\_\_, \_\_\_\_, \_\_\_\_
  - ◇ Organize numbers in ascending or descending order, using numbers that cause the adult learner difficulties.

**SUGGESTED INTERVENTIONS (cont.)**

- Use a manual counter so that the adult learner can clearly see that numbers ending in 99 indicate the end of a group of 100 and are followed by a number ending in 00 which indicates the beginning of a new group of 100.
- Use a Robinson Crusoe counter, once the principle of a manual counter has been understood. The adult learner manipulates the symbols to proceed from one group of 100 to the next.
- Teach the adult learner how to count by 100s (100, 200, 300, etc.).
- Use the principle of adding ones to facilitate the change from one group of 100 to the next. For example:

$$\begin{array}{r} 199 \\ + 1 \\ \hline 200 \end{array}$$

For this type of intervention to be effective, the adult learner must have prior knowledge of the principle of addition and the concept of place value, and understand how the change from one group of 100 to the next occurs.

- Have the adult learners manipulate objects in groups of 10s and 100s (concrete mode), then represent objects on a counting board (illustrated mode), then change from one group of 100 to the next by reading numbers (symbolic mode).
- For intervention strategies to teach values associated with digit places in a number, see 5.1, 5.2 and 5.3 below.

## NUMBER TABLE

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

4. When reading numbers, does the adult learner:	
4.1. hesitate?	
<p><b>YES:</b> When the adult learner reads numbers, he or she is uncertain as to their correctness and sometimes makes errors. It is therefore necessary to verify if the learner made this type of error during his or her childhood or adolescence and determine if he or she already received remedial help or other assistance:</p> <ul style="list-style-type: none"> <li>• <b>If so:</b> Investigate and try to determine if the intervention was effective. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li>• <b>If not:</b> Propose corrective exercises.</li> </ul>	<p><b>NO:</b> The adult learner does not have this problem.</p>

4. When reading numbers, does the adult learner:	
4.2. confuse different numbers?	
<p><b>YES:</b> The adult learner reads numbers, but they are not the ones illustrated. It is therefore necessary to verify if the learner made this type of error during his or her childhood or adolescence and determine if he or she already received remedial help or other assistance:</p> <ul style="list-style-type: none"> <li>• <b>If so:</b> Investigate and try to determine if the intervention was effective. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li>• <b>If not:</b> Suggest corrective exercises.</li> </ul>	<p><b>NO:</b> The adult learner does not have this problem.</p>

4.	When reading numbers, does the adult learner:	
4.3.	make inversions?	
<b>YES:</b>	The adult learner can read numbers, but inverts them (for example, 13 for 31). It is therefore necessary to verify if the learner made this type of error during his or her childhood or adolescence and determine if he or she already received remedial help or other assistance:	<b>NO:</b> The adult learner does not have this problem.
• <b>If so:</b>	Investigate and try to determine if the intervention was effective. Based on your findings, you may suspect a learning difficulty.	
• <b>If not:</b>	Suggest corrective exercises.	

### SUGGESTED INTERVENTIONS

- Clearly identify the difficulties:
  - ◇ which numbers does the adult learner have difficulty recognizing?
  - ◇ in what situations does the adult learner have difficulty recognizing numbers: problem-solving, using real-life material?
  - ◇ is there a consistency in the errors made when reading numbers?
  - ◇ is confusion due to problems of visual discrimination?
  - ◇ can the adult learner distinguish between two numerals that are similar in appearance, such as 6 and 9 or 3 and 8?
- Begin by systematically assessing the adult learner's knowledge of groups of ten: 10, 20, 30, 40, etc., by calling both on memory (counting without visual support) and the ability to locate written numerals.

## SUGGESTED INTERVENTIONS (cont.)

- When the adult learner is having difficulties, have him or her break down the number. For example:

$$\begin{array}{r} 45 = 40 \\ + 5 \\ \hline 45 \end{array}$$

The adult learner must, however, possess prior knowledge of the concept of place value and the principle of addition to carry out this exercise.

- Take advantage of everyday situations to encourage the adult learner to:
  - ◇ read numbers (winning lottery numbers, addresses, amounts on a receipt, etc.);
  - ◇ assess the plausibility of his or her answers when reading numbers, for example: the adult learner reads 18 for 108 in the following sentence: “There are 108 adults attending the school.” Knowing that there are 12 adults in his or her own group and a few other such groups in the school, the adult learner should be able to evaluate his or her answer.
- Play bingo from time to time.
- Use the number table in various ways, placing special emphasis on exercises that involve numbers that are causing problems. For example:
  - ◇ Have the adult learner read numbers in sequence, in ascending order, from left to right.
  - ◇ Have the adult learner read numbers in the same column, from top to bottom. Point out to the adult learner what these numbers have in common, in terms of appearance and sound.
  - ◇ Have the adult learner locate a number that is dictated.
  - ◇ For brief periods each day, have the adult learner read numbers, using a number table that has been recorded on cassette. The adult learner must match the numbers on the table with those dictated on the cassette.

**SUGGESTED INTERVENTIONS (cont.)**

- Guide the adult learner in comparing and observing the numbers that are most often confused:
  - ◇ How are they similar?
  - ◇ How do they differ?
  - ◇ Where are they located on the number table?
  - ◇ What sequence of numbers does each one belong to?
  
- Present a series of numbers that contain one or more of the same numerals (for example, 3, 13, 30, 31, 33), or that contain numerals which resemble each other (for example, 30 and 80, 61 and 91):
  - ◇ Point out the graphic similarities and differences.
  - ◇ Explore how the numbers differ in terms of value by associating each number with a set of objects.
  - ◇ Break down each of these numbers (the adult learner must have prior knowledge of place value) and compare the results obtained.
  - ◇ Have the adult learner locate, in the series, a number that is dictated.
  - ◇ Teach the adult learner to quickly identify each number in a given series by presenting each of the numbers one at a time in random order.
  - ◇ Have the adult learner associate numbers with their written form, that is, their letter form, provided he or she understands these words.
  
- When the adult learner inverts numbers, show him or her that numbers read like words, that is, from left to right, and just as different combinations of letters produce different words, different combinations of numerals produce different numbers.
  
- Verify if the adult learner is able:
  - ◇ to read from left to right
  - ◇ to identify each digit in a number
  - ◇ to identify the number that is different from among a group of numbers composed of the same numerals. For example: 37, 37, 37, 73, 37

### SUGGESTED INTERVENTIONS (cont.)

- Guide the adult learner in comparing, through manipulation, numbers composed of the same numerals. The concept of place value is relevant here.
- While emphasis has not been placed on interventions designed to facilitate the reading of numbers, the learner should not dissociate the concept of place value from a number's written representation. Numeration is complex and is acquired in successive stages. It is therefore necessary to have a grasp of the principles of the decimal number system.

◇ The decimal number system is based on two processes:

⇒ Objects are grouped into equipotent sets (sets of 10).

⇒ Each set is exchanged with another.

◇ The main characteristics of the decimal number system are as follows:

⇒ The two processes cited above take place **successively** until it is no longer possible to make a new set or a new exchange.

⇒ Notation in the decimal number system is a notation of place, for example:

$$\begin{array}{r} 4567 \\ 456 \\ 45 \\ 4 \end{array}$$

⇒ The digit 4 in these numbers indicates a different quantity depending on its place.

⇒ The values of the places are **added together** to produce the total quantity represented.

For example:

$$\begin{array}{r} 4567 = \\ + \\ + \\ + \\ \hline 4567 \end{array} \quad \begin{array}{l} 4000 \\ 500 \\ 60 \\ 7 \end{array} \quad \begin{array}{l} \rightarrow \\ \rightarrow \\ \rightarrow \\ \rightarrow \end{array} \quad \begin{array}{l} 4 \text{ X } 1000 \\ 5 \text{ X } 100 \\ 6 \text{ X } 10 \\ 7 \text{ X } 1 \end{array}$$

⇒ Use of the decimal number system requires that the 9 numerals (1, 2, 3, 4, 5, 6, 7, 8, 9) be understood and combined; there is an infinite number of such combinations.

**SUGGESTED INTERVENTIONS (cont.)**

⇒ The numeral “0” conserves the place value of the other positions; for example, the following numbers,

405

45

do not represent the same quantity.

- ◇ Groups are created in 10s, and exchanges are made after each group of 10; this is why it is important to have nine numerals.

5.	Does the adult learner know the place value of digits in a number, in terms of:	
5.1.	ones?	
<b>YES:</b>	The adult learner recognizes the place value of the ones digit.	<p data-bbox="1058 321 1927 537"><b>NO:</b> The adult learner does not know the concept of ones and makes errors in the “spatial” recognition of digits. <b>It is therefore necessary to verify if the learner made this type of error during his or her childhood or adolescence and determine if he or she already received</b> remedial help or other assistance:</p> <ul data-bbox="1003 581 1927 764" style="list-style-type: none"> <li data-bbox="1003 581 1927 683">• <b>If so:</b> Investigate and try to determine if the intervention was effective. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li data-bbox="1003 727 1927 764">• <b>If not:</b> Suggest corrective exercises.</li> </ul>

5.	Does the adult learner know the place value of digits in a number, in terms of:	
5.2.	tens?	
<b>YES:</b>	The adult learner recognizes the place value of the tens digit.	<p data-bbox="1058 958 1927 1174"><b>NO:</b> The adult learner does not know the concept of tens and makes errors in the “spatial” recognition of digits. <b>It is therefore necessary to verify if the learner made this type of error during his or her childhood or adolescence and determine if he or she already received</b> remedial help or other assistance:</p> <ul data-bbox="1003 1218 1927 1401" style="list-style-type: none"> <li data-bbox="1003 1218 1927 1320">• <b>If so:</b> Investigate and try to determine if the intervention was effective. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li data-bbox="1003 1364 1927 1401">• <b>If not:</b> Suggest corrective exercises.</li> </ul>

5.	Does the adult learner know the place value of digits in a number, in terms of:	
5.3.	hundreds?	
<b>YES:</b>	The adult learner recognizes the place value of the hundreds digit.	<b>NO:</b> The adult learner does not know the concept of hundreds and makes errors in the “spatial” recognition of numbers. <b>It is therefore necessary to verify if the learner made this type of error during his or her childhood or adolescence and determine if he or she already received</b> remedial help or other assistance:
		<ul style="list-style-type: none"> <li>• <b>If so:</b> Investigate and try to determine if the intervention was effective. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> </ul>
		<ul style="list-style-type: none"> <li>• <b>If not:</b> Suggest corrective exercises.</li> </ul>

### SUGGESTED INTERVENTIONS

- Present manipulation activities to the adult learners that will help them discover the necessity and utility of grouping numbers in order to count objects. Together, review possible strategies: counting elements one at a time, grouping them by 2s, by 10s, etc. For example, use pennies as manipulatives. Ask the learners to count out a certain number. Interrupt the counting a few times. The learners may have to start their counting over each time which will help them discover the utility of making groups.

**SUGGESTED INTERVENTIONS (cont.)**

- Have the adult learners make groups of 10 pennies. Exchange 10 pennies for 1 dime: 42 pennies = 4 dimes + 2 pennies; repeat the exercise several times, each time exchanging 10 pennies for 1 dime. Repeat the exercise with 8¢: exchanging it for a dime is not possible.
- Have the adult learner count 13¢ first, and then count 31¢. In each case, exchange 10 pennies for 1 dime. Help the learner see that:

$$13¢ = 1 \text{ dime} + 3 \text{ pennies}$$

$$\text{and } 31¢ = 3 \text{ dimes} + 1 \text{ penny}$$

Have the learners write the numbers 13 and 31. Draw their attention to the fact that these two numbers are composed of the same numerals, that is 1 and 3, but that the numerals are placed in a different order. At this point, introduce the place value table or a counting board, to represent the numbers:

	10¢	1¢	
	1	3	→ 13¢
	3	1	→ 31¢

- Repeat the same exercise with other numbers composed of the same numerals, using “neutral” material such as straws grouped into bundles of 10 with a rubber band. After each set of objects has been counted, have the adult learner write down the corresponding number and record it on the place value table. At this stage, introduce the concepts of **ones** and **tens**, where ones are like pennies, and tens are like dimes.

	Tens	Ones

**SUGGESTED INTERVENTIONS (cont.)**

Ensure that the adult learners make the connection between the number written in the “ones” column and the number of straws that have not been assembled into bundles; and between the number written in the “tens” column and the number of bundles of 10 they have created. Then introduce the concept of **hundreds** in the same manner, hundreds being groups of 10 bundles of 10.

- Have the adult learners do numerous exercises involving the symbolic representation of numbers. Ask them to name or write the number presented on the counting board. Successively use numbers with two and three digits, for example:

Hundreds	Tens	Ones
	2	4

- Then do the opposite, that is, use the counting board to represent a number.
- Vary the exercises. For instance, ask the adult learners to:
  - ◇ form a number composed of 3 hundreds, 4 tens and 7 ones. Change the order of presentation—for example: 4 tens, 3 hundreds and 7 ones—to encourage the learners to use the counting board
  - ◇ break down a number, for example:  
 $75 = 7 \text{ tens and } 5 \text{ ones}$
  - ◇ identify the different numbers that can be formed by the same numerals, for example:  
 $2, 5 \text{ and } 1 \text{ can form } 251, 215, 521, 512, 125, 152$
  - ◇ resolve equations, using the counting board:  
 $2 \text{ hundreds} + 5 \text{ tens} + 1 \text{ one} = \underline{\hspace{2cm}}$
  - ◇ identify different ways to represent the same number, for example:  
 $43 = 4 \text{ tens and } 3 \text{ ones}$   
 $= 3 \text{ tens and } 13 \text{ ones}$   
 $= 2 \text{ tens and } 23 \text{ ones}$

**SUGGESTED INTERVENTIONS (cont.)**

The *Challenging Math* series (see bibliography) contains a number of exercises on the concept of place value. These exercises help learners move from the concrete (manipulation) to the illustrated (counting board) to the symbolic form (representation of numbers by numerals).

- Always associate the words “ones,” “tens,” and “hundreds” to the value they represent:

one	→	1
ten	→	10
hundred	→	100

For adult learners to understand the concept of place value, they must have knowledge, even if intuitive, of addition and multiplication. For instance, the equation  $28 = 2 \text{ tens and } 8 \text{ ones}$  can also be represented as  $28 = (2 \times 10) + (8 \times 1)$ .

Similarly, the learners must have mastered the concept of place value to understand the techniques of the four basic operations. In other words, they go hand in hand.

6.	Does the adult learner know the symbols for the four basic operations:	
6.1.	addition (+)?	
<b>YES:</b>	The adult learner knows the graphic symbol for addition and can name it.	<p><b>NO:</b> The adult learner does not know the graphic symbol for addition and cannot name it. <b>It is therefore necessary to verify if he or she has already learned this symbol:</b></p> <ul style="list-style-type: none"> <li>• <b>If so:</b> Investigate and try to determine why the adult learner cannot recognize the symbol. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li>• <b>If not:</b> Proceed to teach him or her how to recognize the addition symbol.</li> </ul>

6.	Does the adult learner know the symbols for the four basic operations:	
6.2.	subtraction (-)?	
<b>YES:</b>	The adult learner knows the graphic symbol for subtraction and can name it.	<p><b>NO:</b> The adult learner does not know the graphic symbol for subtraction and cannot name it. <b>It is therefore necessary to verify if he or she has already learned this symbol:</b></p> <ul style="list-style-type: none"> <li>• <b>If so:</b> Investigate and try to determine why the adult learner cannot recognize the symbol. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li>• <b>If not:</b> Proceed to teach him or her how to recognize the subtraction symbol.</li> </ul>

6. 6.3.	Does the adult learner know the symbols for the four basic operations: multiplication (x)?	
<b>YES:</b>	The adult learner knows the graphic symbol for multiplication and can name it.	<p><b>NO:</b> The adult learner does not know the graphic symbol for multiplication and cannot name it. <b>It is therefore necessary to verify if he or she has already learned this symbol:</b></p> <ul style="list-style-type: none"> <li>• <b>If so:</b> Investigate and try to determine why the adult learner cannot recognize the symbol. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li>• <b>If not:</b> Proceed to teach him or her how to recognize the multiplication symbol.</li> </ul>

6. 6.4.	Does the adult learner know the symbols for the four basic operations:: division (÷)?	
<b>YES:</b>	The adult learner knows the graphic symbol for division and can name it..	<p><b>NO:</b> The adult learner does not know the graphic symbol for division and cannot name it. <b>It is therefore necessary to verify if he or she has already learned this symbol:</b></p> <ul style="list-style-type: none"> <li>• <b>If so:</b> Investigate and try to determine why the adult learner cannot recognize the symbol. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li>• <b>If not:</b> Proceed to teach him or her how to recognize the division symbol.</li> </ul>

## SUGGESTED INTERVENTIONS

- Approach the symbols one at a time.
- Present each symbol in a simple mathematical equation to help the adult learners understand that the symbol transforms the numbers in the equation.
- Ensure that the learners distinguish the operation symbols from other symbols (numerals and letters).
- Discuss the presence of these symbols in our everyday environment, such as in acronyms and logos: Hertel Plus, Premium Plus, etc.
- Present each symbol along with its word form:
  - + plus
  - minus
  - x times (or “multiplied by”)
  - ÷ divided by
- Present the learners with statements in which they must replace the words “plus,” “minus,” “times,” and “divided by” with the appropriate symbol, for example:

$$\begin{array}{rclcl} 1 & \text{plus} & 1 & = & 2 \\ 1 & + & 1 & = & 2 \end{array}$$

- Help the adult learner acquire an automatism by associating the symbol with a very simple equation that he or she knows. For example:

$$\begin{array}{rclcl} & 1 & & 8 & & 2 \\ + & \frac{1}{2} & - & \frac{4}{4} & \times & \frac{2}{4} \end{array}$$

- Take advantage of everyday opportunities to help the adult learner recognize the basic operation symbols. Material such as advertising brochures, receipts and bank statements are effective.

**N.B.:** With division, various symbols can be used and the students may have learned different symbols depending on the technique they are familiar with. It is therefore important to present the most commonly used symbol ( $\div$ ) as well as the symbol appropriate to the technique that will be taught.

7. 7.1.	Does the adult learner have a sufficient understanding of the symbol to carry out the operation of: addition (+)?	
<b>YES:</b>	The adult learner understands the graphic symbol of addition and how it is used, and is able to explain the operation by means of manipulation or verbally.	<p data-bbox="1050 316 1942 617"><b>NO:</b> The adult learner does not understand how the symbol is used. <b>It is therefore necessary to verify if he or she already learned how to use the symbol before hypothesizing a learning difficulty.</b> Furthermore, <b>it is necessary to determine if the learner made this type of error in his or her childhood or adolescence and if he or she already received</b> remedial help or other assistance:</p> <ul style="list-style-type: none"> <li data-bbox="1008 649 1942 771">• <b>If so:</b> Investigate and try to determine if the intervention was effective. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li data-bbox="1008 795 1942 852">• <b>If not:</b> Suggest corrective exercises.</li> </ul>

## SUGGESTED INTERVENTIONS

### Addition (+):

- Begin with oral activities such as manipulation and role-playing to help the adult learner understand what occurs when one quantity is added to another. For example:  
  
“There are 2 pencils on the table. I add 1 pencil. Now there are more (or a greater quantity of) pencils on the table.”
- Conduct manipulation exercises using the vocabulary associated with addition: I add, plus, in all, the total, the sum, etc.

### SUGGESTED INTERVENTIONS (cont.)

- Help the adult learner understand that the written symbols are an exact representation of the manipulation exercise. For example:

$$\begin{array}{r r r r r r r} 2 \text{ pencils} & + & 1 \text{ pencil} & = & 3 \text{ pencils} \\ 2 & + & 1 & = & 3 \end{array}$$

At this stage, it is not necessary to stress the fact that  $2 + 1 = 3$ . It is important, however, that the adult learners understand that the total is greater than each of the quantities being added. They must therefore have acquired the concept of numbers and some knowledge of numeration.

- Present the adult learners with simple situations in which they must use manipulation to add one quantity to another. Help them represent each situation with symbols. For instance:  
“I’m holding 3 books. I pick up an additional 2 books. Now how many books am I holding?” The learner must write:  $3 + 2$ .

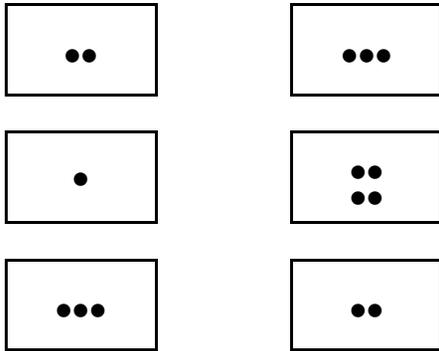
If the learners are unable to calculate the total, show them how to do so using a calculator.

- Present, in symbols, the addition of small numbers, such as:  $4 + 5$ . Have the learners use manipulation to concretely represent the mathematical expression.
- Ask the adult learner, as often as necessary, to verbally explain what he or she should do with the “+” symbol between two numbers.
- *SOS MATH* (see bibliography) proposes a simple activity that will help the learners acquire the concept of addition.

Sit facing the adult learner. Take 5 identical coins (or tokens), show them to the learner, then hide 1 coin in one hand and 4 in the other.

**SUGGESTED INTERVENTIONS (cont.)**

Ask the learner to arrange 5 identical coins (or tokens) in his or her hands, trying to divide them the same way you have. Compare your solutions. Help the learner discover all of the possible combinations. Example:



Then translate each of these combinations into mathematical equations:

$$2 + 3 = 5$$

$$1 + 4 = 5$$

$$3 + 2 = 5$$

- Repeat the same exercise with small numbers of other types of objects.
- Then use situations that are directly related to the learner's immediate environment. Verbally present problems that involve low numbers. Ask the learner to explain the operation that must be carried out to resolve the problem. At this stage, it is not necessary to do the calculation. For example:

“There are 12 people in our group. In the class next door, there are 10 people. How many people are there in total in the 2 groups?”

The adult learner should answer:  $12 + 10$ .

7. 7.2.	Does the adult learner have a sufficient understanding of the symbol to carry out the operation of: subtraction (-)?	
<b>YES:</b>	The adult learner understands the graphic symbol of subtraction and how it is used, and is able to explain the operation by means of manipulation or verbally.	<p data-bbox="1052 321 1934 618"><b>NO:</b> The adult learner does not understand how the symbol is used. <b>It is therefore necessary to verify if he or she already learned</b> how to use the symbol before hypothesizing a learning difficulty. Furthermore, <b>it is necessary to determine if the learner made this type of error in his or her childhood or adolescence and if he or she already received</b> remedial help or other assistance:</p> <ul style="list-style-type: none"> <li data-bbox="1003 656 1934 764">• <b>If so:</b> Investigate and try to determine if the intervention was effective. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li data-bbox="1003 802 1934 841">• <b>If not:</b> Propose corrective exercises.</li> </ul>

## SUGGESTED INTERVENTIONS

### Subtraction (-):

- Present subtraction immediately after addition to help the adult learners see that subtraction is the inverse operation of addition.
- Begin with oral activities such as manipulation and role-playing to help the adult learner understand what occurs when one quantity is removed from another. For example:  
  
“There are 3 pencils on the table. I remove 1 pencil. Now there are fewer (or a lesser quantity) of pencils on the table.”
- Conduct manipulation exercises using the vocabulary associated with subtraction: I remove, I subtract, I take away, less, the remainder, etc.

## SUGGESTED INTERVENTIONS (cont.)

- Help the adult learner to understand that the written symbols are an exact representation of the manipulation exercise. For example:

$$\begin{array}{r r r r r} 3 \text{ pencils} & - & 1 \text{ pencil} & = & 2 \text{ pencils} \\ 3 & & 1 & & 2 \end{array}$$

At this stage, it is not necessary to stress the fact that  $3 - 1 = 2$ . It is important, however, that the adult learners understand that the remainder is less than the initial number. They must therefore have acquired concept of numbers and some knowledge of numeration.

- Present the adult learners with simple situations in which, through manipulation, they must subtract one quantity from another. Guide them in representing each situation using symbols. For example: “I have 4 apples in a bag. I give away 2. How many apples do I have left?” The learner should write:  $4 - 2$ .

If the learners are unable to calculate the remainder, show them how to do so using a calculator.

- Present, in symbols, the subtraction of small numbers, such as:  $8 - 3$ . Have the learners use manipulation to concretely represent the mathematical expression.
- Ask the adult learner, as often as necessary, to verbally explain what he or she should do with the “-” symbol between two numbers.
- *SOS MATH* (see bibliography) proposes the inverse of the manipulation activity suggested for the acquisition of the concept of addition.

Arrange 5 identical coins (or 5 tokens) in your hands. Show the adult learner the coins in one hand and ask him or her to identify how many coins are in your other hand.

Help the learner represent this situation in a mathematical equation. For example:

$$5 - 3 = 2$$

- Repeat the same exercise with small numbers of other types of objects.

**SUGGESTED INTERVENTIONS (cont.)**

- Then use situations that are directly related to the learner's immediate environment. Verbally present problems that involve low numbers. Ask the learner to explain the operation that must be carried out to resolve the problem. At this stage, it is not necessary to do the calculation. For example:

“There are 12 people in our group. Today, 2 people are absent. How many people are remaining in the group?”

The adult learner should answer:  $12 - 2$ .

7. 7.3.	Does the adult learner have a sufficient understanding of the symbol to carry out the operation of: multiplication (x)?	
<b>YES:</b>	The adult learner understands the graphic symbol of multiplication and how it is used, and is able to explain the operation by means of manipulation or verbally.	<p data-bbox="1052 321 1934 618"><b>NO:</b> The adult learner does not understand how the symbol is used. <b>It is therefore necessary to verify if he or she already learned</b> how to use the symbol before hypothesizing a learning difficulty. Furthermore, <b>it is necessary to determine if the learner made this type of error in his or her childhood or adolescence and if he or she already received</b> remedial help or other assistance:</p> <ul data-bbox="1003 656 1934 841" style="list-style-type: none"> <li data-bbox="1003 656 1934 764">• <b>If so:</b> Investigate and try to determine if the intervention was effective. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li data-bbox="1003 802 1934 841">• <b>If not:</b> Suggest corrective exercises.</li> </ul>

## SUGGESTED INTERVENTIONS

### **Multiplication (x):**

- Begin with oral activities such as manipulation and role-playing to help the adult learner understand what occurs when the same quantity is added several times. Example:
 

“There are 2 pencils on the table. I add 2 more pencils. Then I add another 2 pencils. Now there are more (or a greater quantity of) pencils on the table.”
- Conduct manipulation exercises using the vocabulary associated with addition and multiplication: I add, plus, in all, the total, x times more, etc.

### SUGGESTED INTERVENTIONS (cont.)

- Help the adult learner to understand that the written symbols are an exact representation of the manipulation exercise. Example:

$$\begin{array}{rcl}
 2 \text{ pencils} & + & 2 \text{ pencils} + 2 \text{ pencils} = 6 \text{ pencils} \\
 2 \text{ pencils} & & 3 \text{ times} \qquad \qquad \qquad = 6 \text{ pencils} \\
 2 \text{ pencils} & \times & 3 \qquad \qquad \qquad \qquad \qquad = 6 \text{ pencils} \\
 2 & \times & 3 \qquad \qquad \qquad \qquad \qquad = 6
 \end{array}$$

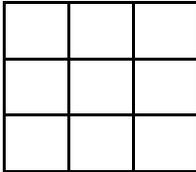
At this stage, it is not necessary to stress the fact that  $3 \times 2 = 6$ . It is important, however, that the adult learners understand that the total is greater than each of the numbers multiplied. They must therefore have acquired the concept of numbers and some knowledge of numeration.

- Present the adult learners with simple situations in which, through manipulation, they must add the same quantity several times. Guide them in representing each situation using symbols. If the learners are unable to calculate the product, show them how to do so using a calculator.
- Present, in symbols, the multiplication of small numbers, such as:  $4 \times 3$ . Through manipulation, have the learners concretely represent the mathematical expression.
- Present multiplication as a repeated addition, **specifying, however, that this only applies to whole numbers.**
- Ask the adult learner, as often as necessary, to verbally explain what he or she should do with the “x” symbol between two numbers.
- *SOS MATH* (see bibliography) proposes an activity that will help the learners acquire the concept of multiplication.

### SUGGESTED INTERVENTIONS (cont.)

Using small cardboard squares, measuring at least 1 cm x 1 cm, ask the adult learner to build a square “floor” with 9 tiles.

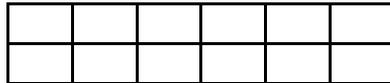
The learner should construct the following:



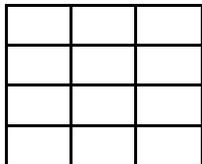
Using 12 tiles, ask the adult learner to construct a rectangular floor.

With 12 other tiles, ask the learner to build another rectangular floor that is different from the first.

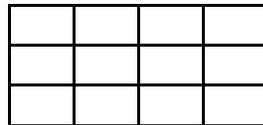
The result:



and



or



Once the adult learner has understood that the same number of tiles can be used to construct several different floors, present the mathematical expression corresponding to each floor, by counting the number of tiles used. Then use mathematical language to describe the situation:  $4 \times 3 = 12$ .

- Repeat the same exercise with other numbers.
- Then use situations that are directly related to the learner’s immediate environment. Verbally present problems that involve low numbers. Ask the learner to explain the operation that must be carried out to resolve the problem. At this stage, it is not necessary to do the calculation. For example:  
 “There are five groups in this training centre. Each group is made up of ten people. What is the total number of people in the centre?”  
 The adult learner should answer:  $5 \times 10$ .

7. 7.4.	Does the adult learner have a sufficient understanding of the symbol to carry out the operation of: division (+)?	
<b>YES:</b>	The adult learner understands the graphic symbol of division and how it is used, and is able to explain the operation by means of manipulation or verbally.	<b>NO:</b> The adult learner does not understand how the symbol is used. <b>It is therefore necessary to verify if he or she already learned</b> how to use the symbol before hypothesizing a learning difficulty. Furthermore, <b>it is necessary to determine if the learner made this type of error in his or her childhood or adolescence and if he or she already received</b> remedial help or other assistance:.
		<ul style="list-style-type: none"> <li>• <b>If so:</b> Investigate and try to determine if the intervention was effective. Based on your findings, you may <b>suspect</b> a learning difficulty.</li> <li>• <b>If not:</b> Suggest corrective exercises.</li> </ul>

## SUGGESTED INTERVENTIONS

### Division (+):

- Present division immediately after multiplication to help the adult learners see that division is the inverse operation of multiplication.
- Begin with oral activities such as manipulation and role-playing to help the adult learner understand what occurs when a quantity is separated into parts. For example:
 

“There are 6 pencils on the table. I give them to 3 people. Each person receives the same number of pencils. Each person will have a smaller quantity of pencils.”
- Conduct manipulation exercises using the vocabulary associated with division: how many times..., divided by, how many times does...go into..., etc.

## SUGGESTED INTERVENTIONS (cont.)

- Help the adult learner understand that the written symbols are an exact representation of the manipulation exercise. For example:

$$\begin{array}{rclcl} 6 \text{ pencils} & \div & 3 & = & 2 \text{ pencils} \\ 6 & \div & 3 & = & 2 \end{array}$$

At this stage, it is not necessary to stress the fact that  $6 \div 3 = 2$ . It is important, however, that the adult learners understand that the number resulting from the division is smaller than the initial number. They must therefore have acquired the concept of numbers and some knowledge of numeration.

- Present the adult learners with simple situations in which, through manipulation, they must divide a quantity into equal parts. Guide them in representing each situation using symbols. If the adult learners are unable to calculate the quotient, show them how to do so using a calculator.
- Present, in symbols, the division of small numbers, such as:  $8 \div 2$ . Through manipulation, have the learners concretely represent the mathematical expression.
- Ask the adult learner, as often as necessary, to verbally explain what he or she should do with the “ $\div$ ” symbol between two numbers.

*SOS MATH* (see bibliography) proposes the inverse of the manipulation activity suggested for the acquisition of the concept of multiplication.

Using the “tiles” (small cardboard squares), present the adult learner with problems. For example: “Use 12 tiles to construct a floor that is 2 tiles in width. What will its length be?”

- Then use situations that are directly related to the learner’s immediate environment. Verbally present problems that involve low numbers. Ask the learner to explain the operation that must be carried out to resolve the problem. At this stage, it is not necessary to do the calculation. Example: “There are 50 learners in this centre, divided into 5 equal groups. How many people are in each group?”  
The adult learner should answer:  $50 \div 5$ .

**N.B.: Acquiring the concepts related to the four basic operations precedes the acquisition of calculation techniques and tables, but requires problem-solving. Consequently, problem-solving must be presented concurrently with the teaching of these concepts.**

**VI—REMEDIAL FIELD****MODULE: ARITHMÉTIC (READING)****BIBLIOGRAPHY**

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