Course

Numeracy

MTH-B113-3

Literacy

“The human mind has three keys, which open everything—numbers, letters, notes.”

Victor Hugo

Presentation of the Course *Numeracy*

The course *Numeracy* is designed to help adult learners deal competently with real-life situations in which they must represent a quantity or use numbers.

This course prepares adults to use numbers in their daily lives.

By the end of the course, adults will be able to interpret and convey simple information involving numbers. They will be able to read, write and determine numbers as well as establish a connection with the quantity represented by the number. They will be able to select and perform addition and subtraction operations using concrete materials or a calculator.

Dealing With the Real-Life Situations

Dealing effectively with real-life situations is based on actions. These actions are grouped into categories and make use of a set of resources that include operational competencies and essential knowledge. During the learning process, adults are expected to construct knowledge related to these resources in order to be able to deal appropriately with their real-life situations.

The class of situations, categories of actions, operational competencies and essential knowledge constitute the compulsory elements of the course. These elements are explained in detail under their respective headings.

Class of Situations Addressed by the Course

This course addresses a single class of situations: *Representing a quantity and using numbers*.

This class consists of real-life everyday situations that require adult learners to read, write and determine numbers. In some of these situations, the numbers may be used to represent quantities. This is the case, for instance, when adults must determine a number of people, read a medication label to find out the number of tablets they must take, make a note of food portions, etc. Other situations involve using numbers. Finding an address, keeping score during a game or writing down a telephone number or a social insurance number are examples of these types of situations.

These real-life situations address the needs expressed by adults and take their interests into account. The situations can involve the personal, professional, social or cultural aspects of their lives.

Class of Situations	Examples of Real-Life Situations
Representing a quantity and using numbers	▪ Getting around on a daily basis ▪ Using medications ▪ Using public, private or community services ▪ Taking part in recreational activities ▪ Making a purchase or a sale ▪ Planning a meal ▪ Participating in a training session at school or in the workplace

Categories of Actions

The *categories of actions* are groups of actions that are appropriate for dealing with the real-life situations addressed in the course. *Examples of actions* are provided to illustrate the scope of the category in a variety of contexts.

Categories of Actions	Examples of Actions
▪ Reading numerical information	▪ Reads an address, a number ▪ Recognizes a social insurance number, a credit card number or license plate number ▪ Dials the numbers on a telephone calling card ▪ Reads the number of tablets recommended on the label of a medicine bottle ▪ Recognizes numbers on a board game ▪ Reads the number of portions suggested in a food guide ▪ Consults advertising brochures
▪ Writing numerical information	▪ Writes down an address or a telephone number ▪ Writes a social insurance number on a form ▪ Makes a note of a sum of money ▪ Makes a note of the number of food portions eaten each day ▪ Writes the prices of articles for sale (e.g. flea market, fundraiser)
▪ Interacting orally in cases involving numerical information	▪ Reads the number on a license plate or a credit card aloud ▪ Informs a family member of the dose of a medication to be taken ▪ Informs someone of a change of address ▪ Informs someone of the price of a purchase ▪ Repeats the instructions in a message containing numbers

Categories of Actions	Examples of Actions
▪ Determining a number	▪ Counts the number of tickets sold (e.g. for a raffle, a fundraiser, a show) ▪ Counts the number of compact disks he/she has ▪ Keeps score in a sports activity ▪ Counts the number of school days in a month ▪ Counts the number of people taking part in an activity ▪ Inserts the exact change in a vending machine ▪ Calculates the amount of money in his/her pocket

Compulsory Elements and End-of-Course Outcomes

The compulsory elements are those that the teacher must absolutely take into account when designing learning situations.

Class of Situations

Representing a quantity and using numbers

Categories of Actions

- Reading numerical information
- Writing numerical information
- Interacting orally in cases involving numerical information
- Determining a number

Operational Competencies

Thinks logically

- Selects information
- Distinguishes between numbers expressed orally and in writing
- Makes connections among items of information
- Uses pertinent examples

Communicates

- Listens attentively
- Decodes symbols, notations and terms related to basic arithmetic
- Asks for clarifications
- Repeats information to check comprehension
- Uses symbols, notations and terms related to basic arithmetic
- Writes numbers out legibly
- Asks for help, if necessary

Essential Knowledge

- Natural numbers
- Arithmetic operations (addition, subtraction)

The end-of-course outcomes describe how adults make use of the compulsory elements to deal with the real-life situations addressed in the course.

End-of-Course Outcomes
In order to deal with the situations in the class *Representing a quantity and using numbers*, adults learn the basic elements of number literacy as well as how to add and subtract natural numbers. When adults read, write and orally convey numerical information, they decode the symbols, notations and terms of basic arithmetic, understand the numbers they read or hear and make connections with other types of information appropriate to the situation. They are also concerned with communicating effectively. They listen attentively to information containing a quantity or a number. If necessary, they ask for clarifications and repeat what they have heard in order to check their understanding. After ensuring they have selected data that is useful in the context, they classify or compare the numbers and make connections between these numbers and the quantities they represent. When required to determine a number in a given situation, adults count by units or multiples. If necessary, they perform simple additions or subtractions using concrete materials or a calculator. They use examples to validate their work and avoid possible errors. Throughout the learning process, adults attempt to use their understanding of numbers and operations and their number skills. They express themselves by using arithmetic symbols, notations and terms correctly. They make sure they accurately and legibly write numbers and do not hesitate to ask for help if they need it.

Evaluation Criteria

- Interprets numerical information correctly
- Writes numerical information correctly and legibly
- Interacts orally in an appropriate manner in cases involving numerical information
- Correctly determines a number

Operational Competencies

The contribution of each operational competency is described in terms of the actions that are appropriate for dealing with the real-life situations in this course. These operational competencies are addressed in other courses and therefore all of the courses taken together contribute to their development.

In this course, only the following operational competencies are addressed: *Thinks logically* and *Communicates.*

Contribution of the Operational Competency *Thinks logically*	
The operational competency *Thinks logically* helps adult learners to organize their thinking and guides them in taking action to deal with real-life situations that involve *Representing a quantity and using numbers*.	Adult learners select the information they need in order to form an accurate representation of the real-life situation they are working with, whether it involves deciphering, classifying, comparing or determining numbers. When they use their knowledge of numbers and arithmetic operations, adult learners use this operational competency in order to understand numbers expressed in writing or orally and to establish connections with other types of information that give meaning to numbers. In their calculations, adult learners use relevant examples to validate their work, if necessary.

Contribution of the Operational Competency *Communicates*	
The operational competency *Communicates* makes it possible for adults to exchange meaningful information in their daily lives. It is essential to the effective interpretation and transmission of messages in various real-life situations that involve *Representing a quantity and using numbers*.	In their daily interactions involving numbers, adults must understand others and make themselves understood. They listen attentively to information containing quantities or numbers. They decode symbols, notations and terms related to arithmetic, ask for clarifications and repeat information to make sure they have understood it. They express themselves by using arithmetic language correctly, and make sure they write numbers legibly. If necessary, they do not hesitate to ask for help from someone close to them, a peer or a resource person in order to overcome a difficulty.

Essential Knowledge

Natural numbers

- Digits
- Numbers
- Numbering
- Quantities
- Natural numbers
- Even numbers and odd numbers
- Representing natural numbers (using concrete materials and a base 10 number system)
- Place value of a digit within a number
- Composing and decomposing natural numbers
- Arranging natural numbers in increasing and decreasing order
- Comparing natural numbers
- Counting
- Counting by units
- Counting by multiples
- Everyday vocabulary associated with quantity-related concepts (e.g. none, all, a few, several, little, many)
- Everyday vocabulary associated with comparing quantities (e.g. as many, equal, the same, similar, more, less, less than, greater than, the largest, the smallest)
- Positioning in space (e.g. above, below, to the right, to the left, on top and on the bottom)

Arithmetic operations

- Equality
- Understanding of addition and subtraction
- Everyday vocabulary associated with addition and subtraction (e.g. I add, more, in all, total, sum, I take away, less, remainder, difference, I share, repeated addition)
- Addition and subtraction involving natural numbers (using a calculator and concrete materials)
- Arithmetic tables: additions (0 + 0 to 10 + 10) and the corresponding subtractions

Attitudes

The following attitudes are provided as suggestions only. The development of these attitudes can help adults to become more competent in dealing with the real-life situations in this course.

Confidence in Their Abilities	Perseverance
If they are confident in their abilities, adults spring into action more readily when required by the situation and learn from their mistakes.	Persistent adults make a sustained effort and look for solutions to their difficulties. When needed, they ask for help from a resource person or seek support from a peer.

Complementary Resources

The following resources are provided as suggestions only and consist of references that may be consulted in learning situations.

Social Resources	Material Resources
▪ Public and parapublic organizations ▪ Community organizations ▪ Services provided by the training centre ▪ Commercial establishments (e.g. grocery store, drugstores)	▪ Calculator ▪ Various forms and brochures ▪ Calendar ▪ Clock ▪ Telephone directory ▪ Computer ▪ Government documentation ▪ Fake currency ▪ Various games (e.g. dice, cards, dominoes)

Contribution of the Subject Areas

The contribution of all the subject areas is also useful for dealing with the real-life situations in this course. In the Literacy level courses, the examples of real-life situations are similar in some ways and complement the essential knowledge covered in the *Computer Science* program, which also belongs to the Mathematics, Science and Technology subject area, and in the *English, Language of Instruction* program, which belongs to the Languages subject area. This makes it possible to deal with different aspects of a real-life situation and to create cross-curricular learning situations. The elements identified for each subject area are not compulsory and do not constitute prerequisites.

Andragogical Context

It is evident that one must use numbers in everyday life. To help adults deal with a variety of real-life situations, the *Numeracy* course covers concepts that are essential to the use of numbers and the arithmetic operations of addition and subtraction. More specifically, they get adults to read, write and determine numbers, make connections between a number and a quantity, and interact in different real-life situations in which they must apply their knowledge of numbers. In this regard, this course is essential to helping adults become more autonomous.

Adults are encouraged to play an active role in constructing their knowledge of mathematics. However, given the degree of autonomy needed to read task-related information or instructions, the teacher provides constant support in learning activities. Oral and team work is preferred when the context permits. The concrete materials made available to adults facilitate learning and the construction of knowledge. Frequent reflection on what has been learned allows adults to gauge their progress and to make the necessary adjustments. The teacher is concerned with creating an atmosphere of confidence that makes learning enjoyable and fuels the adult learners' determination to persevere. The teacher makes sure adult learners have the necessary resources to explore, understand and organize the data they need in order to plan and take action.

The Literacy level courses are designed to allow for the flexibility needed to adjust to the practical needs of adults. To enable adults to deal competently with real-life situations, the examples examined in the different courses are in some ways similar and involve using what was learned in English, Language of Instruction, Mathematics and Computer Science.

This is how the different facets of a real-life situation can be explored, thereby making it possible to create cross-curricular learning situations. The courses are adapted to adults' level of autonomy with respect to their ability to use written materials.

Learning Situation

The learning situation that follows is provided as an example to show teachers how the principles of the education reform can be applied in the classroom.

It is authentic in the sense that it addresses a real-life situation (taken from the class of situations in the course) that adults may find themselves in. It is sufficiently open and comprehensive to allow adult learners to explore several important aspects related to dealing with this real-life situation.

The examples of actions presented in the course help the teacher to identify those actions that an adult would take to deal with the real-life situation. The teacher can then refer to these examples in order to develop pertinent learning activities.

The learning situation is organized in terms of the three steps of the teaching-learning process, which are as follows:

- planning learning
- actual learning
- integrating and reinvesting learning

These steps highlight the principles of the education reform insofar as they encourage adults to be active, to reflect on their learning and to interact with their peers when the learning context is suitable. They include learning activities and may also include evaluation activities intended to support adults in the learning process.

These activities help learners to construct knowledge related to the compulsory elements of the course that are targeted by the learning situation concerned: one or more categories of actions, essential knowledge and the actions of the operational competencies associated with the categories of actions.

The example provided also refers to certain teaching strategies—pedagogical methods and techniques—that can be selected according to the learners, the context and the learning environment. Certain learning strategies may also be suggested, as well as a variety of material and social resources.

Example of a Learning Situation

Consulting Advertising Brochures

The learning situation involves consulting advertising brochures. It belongs to the class of situations *Representing a quantity and using numbers* and, more particularly, the real-life situation *Making a purchase*. Throughout this learning situation, adults use the operational competencies *Thinks logically* and *Communicates*.

In order to provide a context for this learning situation, the adults bring advertising brochures to complement those supplied by the teacher, who selects documents that are appropriate to the needs of adults. The teacher then leads a discussion based on the answers to the following questions: Do you use advertising brochures? If not, why not? If so, for what types of purchases? The discussion should deal with the difficulties associated with consulting advertising brochures, as well as with their advantages and disadvantages.

The teacher then has the adults examine the brochures to determine how they can use them to their advantage. The activity begins with the adult learners reading numbers, in groups or individually, depending on the number of brochures on hand. The teacher first demonstrates by pointing out the equivalences between what is read and what is written. The teacher then names some of the products advertised and the adults must read the amount that accompanies the products. After making the necessary corrections, the teacher writes the amounts on the board to maintain the interest of the class and to make sure that each person has selected the right information. During the activity, the teacher asks questions to get the adults to identify the smallest and the largest numbers. The adults are also asked to comment on the prices of the various products.

Once the reading part of the activity is completed, the teacher reviews the concept of increasing order and has the class arrange the amounts written on the board in this order. Given that the class may have difficulty with decimals, only the digits before the decimal period will be considered. The adult learners must write the numbers legibly. The results may be checked individually or in a group depending on the pace of the exercise. The teacher supports the adults in their learning, motivates them and encourages them to be confident in their abilities to learn and persevere.

The adults continue their exploration by circling other numbers in the brochure that do not represent sums of money. This activity can be done individually or in teams of two. In the class discussion, the teacher first asks the adults to read these numbers and to specify whether they represent the quantity of a product being advertised, a date, an address or another type of information. They then classify the numbers as a “number” or “quantity” and explain why. The adults then identify other common examples in everyday situations.

The teacher takes the opportunity to examine numerical concepts, notably the concepts of number, numbering and quantity. Without going into long explanations about decimals, the teacher discusses them as they pertain to sums of money.

The learning situation ends with a review of the difficulties raised in the initial discussion. The adults exchange ideas on what they have learned, the areas that need more work and the possibility of applying what they have learned in other contexts.

Elements of the Course Addressed by the Learning Situation

Class of Situations
Representing a quantity and using numbers
Learning Situation
Consulting Advertising Brochures
Categories of Actions
▪ Reading numerical information ▪ Writing numerical information ▪ Interacting orally in cases involving numerical information

Operational Competencies	Essential Knowledge
▪ Thinks logically ▪ Communicates	Natural numbers ▪ Concepts of digit, number, quantity and numbering ▪ Representing natural numbers ▪ Place value of a digit within a number ▪ Comparing and classifying numbers

Complementary Resources
▪ Various advertising brochures