

LITERACY TRAINING

ARITHMETIC

DEFINITION OF THE DOMAIN

PLACEMENT TEST

DECEMBER 1998

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1 INTRODUCTION

This definition of the domain for the placement test describes and classifies the essential and representative elements of the *Guide to Customized Literacy Training*, specifically, for the section on *Arithmetic*. It presents an overview of the program, but should by no means replace the program itself. The purpose of defining the domain is to ensure consistency between the overall program and the test that determines the level (Step 1, 2, 3 or 4) to which students are assigned.

The definition of the domain is used to prepare different versions of the placement test that are valid from one year to another and from one school board to another, taking into account the responsibilities shared by the ministère de l'Éducation and the school boards.

2 PROGRAM ORIENTATIONS AND THEIR CONSEQUENCES FOR THE PLACEMENT TEST

Orientations

Evaluation for placement purposes will take into account the students' knowledge and skills with respect to the material covered in each of the four steps in the program.

Students learn arithmetic and begin studying geometry by means of themes and concrete situations designed to help them acquire knowledge and skills suited to their needs.

The program is intended to help students develop a better understanding of the concepts related to the four arithmetic operations by applying their acquired knowledge and skills in everyday situations.

In the program, students must solve problems similar to those they will encounter in everyday life.

Using concrete situations, the program enables students to learn concepts by means of drawings, symbols and mathematical expressions.

Consequences

Students' knowledge and skills will be assessed for each step in the placement test to determine the level at which they should enter the program.

The placement test will assess the students' knowledge and skills in arithmetic and geometry. Evaluation tasks must be related to themes or situations that reflect the students' needs.

The evaluation tasks in the placement test will assess the students' knowledge of the four arithmetic operations and their ability to use them in everyday situations.

Evaluation for steps 2 and 3 of the program will involve having the students solve problems they will encounter in everyday life.

The placement test will assess the students' ability to work with drawings, symbols and mathematical expressions.

3 CONTENT AND SKILLS COVERED IN THE PROGRAM FOR PURPOSES OF THE PLACEMENT TEST

3.1 **Content**

Numbers

- Numeration and symbols
- Numbers less than 100
- Addition and subtraction involving money
- Multiplication and division involving two-digit numbers
- Proper fractions
- Decimals
- Percentage
- Rule of three

Measurements

- Metric units of length

Geometry

- Perimeter: square
- Volume: rectangle

3.2 **Skills**

Structuring

Students will be familiar with basic mathematical concepts.

Mathematizing

Students will be able to translate a concrete situation into a mathematical model.

Performing Operations

Students will be able to perform operations in a given situation.

Synthesizing

Students will be able to apply their mathematical knowledge and use it to solve problems related to everyday situations.

4 TABLE OF DIMENSIONS

STEPS IN THE PROGRAM SKILLS	STEP 1 10%	STEP 2 30%	STEP 3 40%	STEP 4 20%
STRUCTURING 15%	Numbers - Numeration and symbols (1) 5%		Numbers - Proper fractions - Decimals (5) 10%	
MATHEMATIZING 5%	Numbers - Numbers less than 100 (2) 5%			
PERFORMING OPERATIONS 40%		Numbers - Addition and subtraction involving money (3) 10%	Numbers - Proper fractions - Decimals (6) 20%	Geometry - Perimeter: square - Volume: rectangle (8) 10%
SYNTHESIZING 40%		Numbers - Multiplication and division involving two-digit numbers (4) 20%	Measurements - Metric units of length (7) 10%	Numbers - Percentage - Rule of three (9) 10%

5 OBSERVABLE BEHAVIOURS

Relative value of the items

↓ Box numbers in the table of dimensions

↓

- (1) Students will be able to:
- 3% - compare six pairs of numbers that are less than one hundred, using the $<$, $>$ and $=$ signs;
 - 4% - identify the place value of a digit that appears in different positions in each of four three-digit numbers.
- (2) When five numbers less than 100 are dictated, students will be able to write them as numerals.
- (3) Using the symbols \$ and ¢ with decimals, students will be able to do the following:
- 5% - Add two two-digit numbers without carrying over and add two three-digit numbers using carry-over.
 - 5% - Subtract two two-digit numbers without borrowing and subtract two three-digit numbers using borrowing.
- (4) Given two statements related to everyday situations, students will be able to solve the following types of problems:
- a problem involving one multiplication;
 - a problem involving one division.
- The two problems should involve two-digit multipliers and divisors.
- (5) Using the $<$ and $>$ signs, students will be able to compare five pairs of proper fractions, two of which will have the same denominator and three of which will have different denominators.
- 5% Students will be able to arrange five decimals in ascending order. Two numbers will have one digit after the decimal point and three numbers will have two digits after the decimal point.
- (6) Given five pairs of proper fractions with the same denominator ≤ 12 , students will be able to do the following:
- three additions;
 - two subtractions.

Definition of the Domain — Placement Test

- 10% Given five decimals expressed in hundredths, students will be able to round them off to the nearest whole number.
- 10% (7) Given metric units of length and using the four arithmetic operations, students will be able to solve two problems related to everyday situations. One problem involves centimetres and the other involves kilometres.
- (8) Using the appropriate formulas, students will be able to:
- 4% - calculate the perimeter of a square whose measurements are given in centimetres;
- 6% - calculate the volume of a three-dimensional rectangle whose measurements are given in metres.
- 6% (9) Students will be able to calculate a percentage in two everyday situations. One situation involves adding the percentage and the other involves subtracting the percentage.
- 4% Students will be able to apply the simple rule of three in a problem related to an everyday situation.

6 JUSTIFICATION OF CONTENT, SKILLS AND THEIR WEIGHTING

Certain objectives were designated as prerequisites (P) in accordance with the program orientations related to functional learning. These objectives are regarded as material that the students must learn to move from one step to the next in the program.

The prerequisites for each of the four steps in the program are as uniform as possible and provide the best indication of the students' knowledge and skills.

To assess the students' ability to use their mathematical knowledge to solve problems related to everyday situations, it was decided that the placement test should focus mainly on the following skills: **performing operations** and **synthesizing**.

The skills have therefore been weighted as follows:

- Structuring 15%
- Mathematizing 5%
- Performing Operations 40%
- Synthesizing 40%

As for the content, topics related to **numbers** (e.g., the four operations, proper fractions and decimals) are clearly of great importance in this program. With regard to **measurements**, the focus is on metric units of length, since they are the ones most often used in everyday life. Students are tested on their knowledge of **geometry** in Step 4 of the program. Note that steps 2 and 3 have been given more weight because they include several prerequisite objectives related to everyday situations.

The steps have therefore been weighted as follows:

- Step 1 10%
- Step 2 30%
- Step 3 40%
- Step 4 20%

7 DESCRIPTION OF THE PLACEMENT TEST

7.1 Type of Test

Each student will write this test upon entering the literacy program or at any other time deemed appropriate by the school board.

It is not necessary to administer the entire test (all four steps); it is possible to correctly determine a student's level (i.e., Step 1, 2, 3 or 4) using the results of only part of the test.

7.2 Duration

The placement test is written in a single session lasting no more than 60 minutes. The **approximate** time to be devoted to each step is as follows:

Step 1	5 minutes
Step 2	15 minutes
Step 3	25 minutes
Step 4	15 minutes

7.3 Materials

Students **are not permitted** to use a calculator.

7.4 Placement Decisions

Placement decisions are based on the minimum performance standard for each step in the test.

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