



Competencies and Characteristics

Mathematics

Cycle 1
2001-2002

Extracted from

The Québec Education Program

Bob Steele
The Lester B. Pearson School Board

COMPETENCY 1 • TO SOLVE A SITUATIONAL PROBLEM RELATED TO MATHEMATICS			
	Evaluation Criteria		
	Production of a correct solution (procedure and final answer)		
	Oral or written explanation of the main aspects of the solution		
COMPETENCY 2 • TO REASON USING MATHEMATICAL CONCEPTS AND PROCESSES			
	Evaluation Criteria		
	Appropriate analysis of a situation involving applications		
	Choice of mathematical concepts and processes appropriate to the given situation involving applications		
	Appropriate application of the chosen processes		
	Correct justification of actions or statements by referring to mathematical concepts and processes		
COMPETENCY 3 • TO COMMUNICATE BY USING MATHEMATICAL LANGUAGE			
	Evaluation Criteria		
	Correct interpretation of a message (oral or written) using mathematical language		
	Correct production of a message (oral or written) using mathematical language		
LEARNING AND STRATEGY			
ARITHMETIC: UNDERSTANDING AND WRITING NUMBERS	• Natural numbers		
	natural numbers less than 1000 (units, tens, hundreds): reading, writing, digit, number, counting, one-to-one correspondence, representation, comparison, classification, order, equivalent expressions, writing numbers in expanded form, patterns, properties (even numbers, odd numbers), number line		
	approximation		
	• Fractions		
	fractions related to the student's everyday life		

LEARNING AND STRATEGY (cont)				
ARITHMETIC: MEANING OF OPERATIONS INVOLVING NUMBERS	• Natural numbers			
	operation, operation sense: addition (adding, uniting, comparing), sum, subtraction (taking away, complement, comparing), difference, term, missing term, number line, multiplication (repeated addition, Cartesian product) and division (repeated subtraction, sharing, number of times x goes into y)			
	choice of operation: addition, subtraction			
	meaning of an equality relation (equation), meaning of an equivalence relation			
	relationships between the operations			
	property of operations: commutative law			
ARITHMETIC: OPERATIONS INVOLVING NUMBERS	approximating the result of an operation: addition, subtraction			
	own processes for mental computation: addition, subtraction			
	additions (0 + 0 to 10 + 10) related to the corresponding subtractions			
	own processes for written computation: addition, subtraction			
	patterns: series of numbers, family of operations			
GEOMETRY: GEOMETRIC FIGURES AND SPATIAL SENSE				
	• Space			
	locating objects and getting one's bearings in space, spatial relationships (e.g. in front, on, to the left)			
	locating objects on an axis			
	locating objects in a plane			

GEOMETRY: GEOMETRIC FIGURES AND SPATIAL SENSE (cont)			
• Solids			
comparing and constructing prisms, pyramids, spheres, cylinders, cones			
comparing objects in the environment with solids			
attributes (number of faces, base): prisms, pyramids			
• Plane figures			
comparing and constructing figures made with closed curved lines or closed straight lines			
identifying a square, rectangle, triangle, circle and rhombus			
describing a square, rectangle, triangle and rhombus			
• Frieze patterns and tessellations			
congruent figures			
MEASUREMENT			
• Lengths: estimating and measuring			
dimensions of an object			
unconventional units: comparison, construction of rulers			
conventional units (m, dm, cm)			
• Time: estimating and measuring			
conventional units, duration (day, hour, minute, second, daily cycle, weekly cycle, yearly cycle)			
STATISTICS			
Formulating questions for a survey			
Collecting, describing and organizing data using tables			
Interpreting data using a bar graph, a pictograph and a data table			
Displaying data using a bar graph, a pictograph and a data table			
PROBABILITY			
Experimentation with activities involving chance			
Predicting the likelihood of an event (certainty, possibility or impossibility)			
Enumerating the possible outcomes of a simple random experiment			

Cultural References

• Numbers			
origin and creation of numbers			
development of systems for writing numbers			
social context (e.g. price, date, telephone, address, age, quantity: mass, size)			
• Operations			
own or conventional computation processes: development, limitations, advantages and disadvantages			
technology: development (e.g. sticks, strokes, abacus, calculator, software), limitations, advantages and disadvantages			
symbols (origin, development, need, mathematicians involved): +, -, >, <, =			
interdisciplinary or social context (e.g. history, geography, science and technology)			
Geometric figures			
interdisciplinary or social context (e.g. architecture, maps, arts, decoration)			
• Measurement			
systems of measurement (historical aspect)			
symbols (origin, development, need): m, dm, cm			
symbols (origin, development, need): h, min, s			
SYMBOLS			
0 to 9, +, ., >, <, =			
Calculator keys [keys: 0 to 9, +, -, ., ÷, =, ON, OFF, AC, C, CE (all clear, clear, clear last entry)]			
Numbers written using digits			
Writing fractions (a/b)			
m, dm, cm			
h, min, s (representation of time of day: 02:00, 2:00 a.m; representation of elapsed time: 2 h 10 min, 2:10)			

Cultural References (cont)	VOCABULARY			
	addition			
	as many as			
	as much as			
	bar graph			
	base of a solid			
	centimetre			
	certain event			
	chance			
	circle			
	cone			
	cube			
	curved line			
	cylinder			
	day			
	decimetre			
	decreasing order			
	depth			
	difference			
	digit			
	even number			
	face			
	fewer			
	fraction			
	grouping			
	half			
	height			
	hour			
	hundreds place			
	impossible event			
	increasing order			
	...is bigger than...			
	...is equal to...			
	...is smaller than...			
	length			
	less			
	metre			
	minus			
	minute			
	more			
	natural number			
	none			
	number			

Cultural References (cont)

Cultural References (cont)				
	VOCABULARY (cont)			
	number line			
	odd number			
	one third			
	one-to-one correspondence			
	pictograph			
	plane figure			
	plus			
	possible event			
	prism			
	probable outcome			
	pyramid			
	quarter			
	rectangle			
	rhombus			
	second			
	series			
	side			
	solid			
	sphere			
	square			
	straight line			
	subtraction			
	sum			
	survey			
	table			
	tens place			
	triangle			
unit				
unit of measure				
width				

Suggestions for Using Information and Communications Technologies

	Becoming familiar with the basic operations of a calculator [keys: 0 to 9, +, -, ×, ÷, =, ON, OFF, AC, C, CE (all clear, clear, clear last entry), functions: recursive with the = key]			
	Using technology for operations involving numbers that go beyond the scope of the material covered in these cycles			
	Using technology to present proofs related to operations			
	Using a calculator in applying different problem-solving strategies			
	Using a calculator and a computer to explore natural numbers and operations			
	Using a computer (graphics and spreadsheet software as well as simulations) in applying different problem-solving strategies			
	Using a computer (word-processing, graphics and spreadsheet software) to present information related to the solution			
	Producing a drawing (solids, plane figures, frieze patterns and tessellations) using graphics software			