Grade 4 Mathematics Item Map 2004

(1) Mathematical Reasoning Students use mathematical reasoning to analyze mathematical situations, make conjectures, gather evidence, and construct an argument.		5 items
A.	use models, facts, and relationships to draw conclusions about mathematics and explain their thinking	24, 28
B.	use patterns and relationships to analyze mathematical situations	30, 45
C.	justify their answers and solution processes	
D.	use logical reasoning to reach simple conclusions	47
(2) Number and Numeration Students use number sense and numeration to develop an understanding of the multiple uses of numbers in the real world, the use of numbers to communicate mathematically, and the use of numbers in the development of mathematical ideas.		11 items
A.	use whole numbers and fractions to identify locations, quantify groups of objects, and measure distances	3
B.	use concrete materials to model numbers and number relationships for whole numbers and common fractions, including decimal fractions	7, 8, 12, 41
C.	relate counting to grouping and to place-value	22
D.	recognize the order of whole numbers and commonly used fractions and decimals	10, 19, 33
E.	demonstrate the concept of percent through problems related to actual situations	9, 42
(3) Operations Students use mathematical operations and relationships among them to understand mathematics.		10 items
A.	add, subtract, multiply, and divide whole numbers	1, 2, 13, 20, 35, 36

B.	develop strategies for selecting the appropriate computational and operational method in problem-solving situations	16, 39, 40
C.	know single digit addition, subtraction, multiplication, and division facts	
D.	understand the commutative and associative properties	46
(4) Modeling/Multiple Representation Students use mathematical modeling/multiple representation to provide a means of presenting, interpreting, communicating, and connecting mathematical information and relationships.		4 items
A.	use concrete materials to model spatial relationships	43
B.	construct tables, charts, and graphs to display and analyze real-world data	
C.	use multiple representations (simulations, manipulative materials, and diagrams) as tools to explain the operation of everyday procedures	
D.	use variables such as height, weight, and hand size to predict changes over time	
E.	use physical materials, pictures, and diagrams to explain mathematical ideas and processes and to demonstrate geometric concepts	26, 29, 32
(5) Measurement Students use measurement in both metric and English measure to provide a major link between the abstractions of mathematics and the real world in order to describe and compare objects and data.		7 items
A.	understand that measurement is approximate, never exact	
B.	select appropriate standard and nonstandard measurement tools in measurement activities	4
C.	understand the attributes of area, length, capacity, weight, volume, time, temperature, and angle	
D.	estimate and find measures such as length, perimeter, area, and volume using both standard and nonstandard units	31

E.	collect and display data	48
F.	use statistical methods such as graphs, tables, and charts to interpret data	14, 17, 21, 38
(6) Uncertainty Students use ideas of uncertainty to illustrate that mathematics involves more than exactness when dealing with everyday situations.		5 items
A.	make estimates to compare to actual results of both formal and informal measurement	
B.	make estimates to compare to actual results of computations	
C.	recognize situations where only an estimate is required	
D.	develop a wide variety of estimation skills and strategies	11, 27
E.	determine the reasonableness of results	
F.	predict experimental possibilities	34
G.	make predictions using unbiased random samples	
H.	determine probabilities of simple events	5, 44
(7) Patterns/Functions Students use patterns and functions to develop mathematical power, appreciate the true beauty of mathematics, and construct generalizations that describe patterns simply and efficiently.		6 items
A.	recognize, describe, extend, and create a wide variety of patterns	6, 18
B.	represent and describe mathematical relationships	37
C.	explore and express relationships using variables and open sentences	23, 25
D.	solve for an unknown using manipulative materials	
E.	use a variety of manipulative materials and technologies to explore patterns	

F.	interpret graphs	
G.	explore and develop relationships among two- and three-dimensional geometric shapes	15
H.	discover patterns in nature, art, music, and literature	