

Grade 8 Mathematics Item Map 2005

(1) Mathematical Reasoning Students use mathematical reasoning to analyze mathematical situations, make conjectures, gather evidence, and construct an argument.		4 items
A.	Apply a variety of reasoning strategies	32
B.	Make and evaluate conjectures and arguments using appropriate language	11
C.	Make conclusions based on inductive reasoning	4, 35
D.	Justify conclusions involving simple and compound (i.e., and/or) statements	
(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.		5 items
A.	Understand, represent, and use numbers in a variety of forms (integer, fraction, decimal, percent, exponential, expanded and scientific notation)	5, 39
B.	Understand and apply ratios, proportions, and percents through a variety of hands-on explorations	
C.	Develop an understanding of number theory (primes, factors, and multiples)	14, 33
D.	Recognize order relations for decimal, integers, and rational numbers	8
(3) Operations Students use mathematical operations and relationships among them to understand mathematics.		9 items
A.	Add, subtract, multiply, and divide fractions, decimals, and integers	7, 17, 30, 42
B.	Explore and use the operations dealing with roots and powers	2
C.	Use grouping symbols (parentheses) to clarify the intended order of operations	10
D.	Apply the associative, commutative, distributive, inverse, and identity properties	36

E.	Demonstrate an understanding of operational algorithms (procedures for adding, subtracting, etc.)	
F.	Develop appropriate proficiency with facts and algorithms	16, 26
G.	Apply concepts of ratio and proportion to solve problems	
(4) Modeling/Multiple Representation Students use mathematical modeling/multiple representation to provide a means of presenting, interpreting, communicating, and connecting mathematical information and relationships.		6 items
A.	Visualize, represent, and transform two- and three-dimensional shapes	
B.	Use maps and scale drawings to represent real objects or places	6
C.	Use the coordinate plane to explore geometric ideas	29, 37
D.	Represent numerical relationships in one- and two-dimensional graphs	25
E.	Use variables to represent relationships	18
F.	Use concrete materials and diagrams to describe the operation of real-world processes and systems	
G.	Develop and explore models that do and do not rely on chance	28
H.	Investigate both two- and three-dimensional transformations	
I.	Use appropriate tools to construct and verify geometric relationships	
J.	Develop procedures for basic geometric constructions	
(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.		6 items
A.	Estimate, make and use measurements in real-world situations	13, 21, 40

B.	Select appropriate standard and nonstandard measurement units and tools to measure to a desired degree of accuracy	9, 22
C.	Develop measurement skills and informally derive and apply formulas in direct measurement activities	
D.	Use statistical methods and measures of central tendencies to display, describe, and compare data	19
E.	Explore and produce graphic representations of data using calculators/computers	
F.	Develop critical judgment for the reasonableness of measurement	
(6) Uncertainty Students use ideas of uncertainty to illustrate that mathematics involves more than exactness when dealing with everyday situations.		4 items
A.	Use estimation to check the reasonableness of results obtained by computation, algorithms, or the use of technology	15, 34
B.	Use estimation to solve problems for which exact answers are inappropriate	44
C.	Estimate the probability of events	
D.	Use simulation techniques to estimate probabilities	
E.	Determine probabilities of independent and mutually exclusive events	3
(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.		11 items
A.	Recognize, describe, and generalize a wide variety of patterns and functions	1, 41
B.	Describe and represent patterns and functional relationships using tables, charges, and graphs, algebraic expressions, rules, and verbal descriptions	24

C.	Develop methods to solve basic linear and quadratic equations	12
D.	Develop an understanding of functions and functional relationships: that a change in one quantity (variable) results in change in another	23
E.	Verify results of substituting variables	
F.	Apply the concept of similarity in relevant situations	20, 38
G.	Use properties of polygons to classify them	
H.	Explore relationships involving points, lines, angles, and planes	27
I.	Develop and apply the Pythagorean principle in the solution of problems	43
J.	Explore and develop basic concepts of right triangle trigonometry	45
K.	Use patterns and functions to represent and solve problems	31