KAMM Assessment Framework Information

The Mathematics Revision Committee and the Special Education Advisory Committee, in cooperation with Kansas State Department of Education was given the task of identifying the indicators to be included on the Kansas Assessment of Multiple Measures (KAMM). In addition to simply defining which indicators would appear on the grade level tests, it was necessary to determine the number of and kind of items to be included from the General Mathematics Assessment. The desire to have individual student indicator level feedback prompted the decision to have four items per tested indicator. The two committees chose assessment items from those assessed on the General Mathematics Assessment. The cognitive descriptors of items chosen are provided later on the following page.

A summary page of information from grades three through high school KAMM mathematics assessment frameworks has been developed. That page presents a general comparison of the assessment from grade to grade. Included in the summary is:

- the number of multiple choice questions at each grade level,
- the percentage of questions for each benchmark and standard for each grade level,
- the percentage of knowledge and application questions which make up each grade level assessment, and
- the percentage of questions for each of the mathematics cognitive levels for each grade level.

The individual grade level assessment frameworks follow the assessment framework summary page. These frameworks contain information specific to the KAMM mathematics assessment developed for each grade. The information includes:

- the standard, benchmark and specific assessed indicator,
- the exact number of questions written (in parenthesis) and the sub-category at which each is to be written for the selected cognitive category(ies), [for example, if the category 2 column contains a designation " b (4)", means four questions have been written for performing procedures and specifically doing computational procedures or algorithms,
- the total number of questions to be written for each assessed indicator,
- the total number of questions and the percentage of the test for each standard,
- the percentage of the assessment devoted to knowledge level indicators,
- the percentage of the assessment devoted to application level indicators,
- the total number of multiple choice questions on the assessment
- any notes provided to the item writers to help understand the intent

Cognitive Categories for Mathematics - Grades 2 – High School

Category 1: Memorize Facts/Definitions/Formulas

a. Recite or recall basic mathematics facts
b. Recall or recognize mathematical terms, definitions, or concepts
c. Recall formulas or computational procedures

Category 2: Perform Procedures

a. Use numbers to count, order, or denote
b. Do computational procedures or algorithms
c. Follow procedures or instructions
d. Solve equations, formulas, or routine word problems
e. Organize or display data
f. Read or produce graphs and tables
g. Do geometric transformations and/or execute geometric constructions

Category 3: Demonstrate Understanding of Mathematical Ideas

a. Communicate mathematical ideas or rules and/or explain the process
b. Use representations to model mathematical ideas
c. Explain findings and/or results from data analysis strategies or experiments/simulations
d. Develop and/or explain relationships between concepts
e. Show and/or explain relationships between models, diagrams, and/or other representations

Category 4: Conjecture/Generalize/Prove

a. Determine the truth of a mathematical pattern, a mathematical statement, and/or proposition or make predictions
b. Write formal or informal proofs
c. Recognize, generate, or continue patterns
d. Find a mathematical rule to generate a pattern or number sequence
e. Make and investigate mathematical conjectures
f. Identify faulty arguments or identify misrepresentations of data
g. Reason inductively or deductively

Category 5: Solve Non-routine Problems/Make Connections

a. Apply and adapt a variety of appropriate strategies to solve non-routine problems
b. Apply mathematics in contexts outside of mathematics (whenever possible, include diagrams/visuals
c. Analyze data or recognize patterns
d. Synthesize content and ideas from several sources

Grades 3 – 9/10 KAMM Assessment Framework Summary

Standard-Benchmark	Grade Three % of Test	Grade Four % of Test	Grade Five % of Test	Grade Six % of Test	Grade Seven % of Test	Grade Eight % of Test	Grade 9/10 % of Test
Total Objective Questions	**40**	**40**	**40**	**40**	**40**	**40**	**40**
Number-Number Sense	30%		10%	10%	10%	10%	
Number-Number Systems		10%				10%	
Number-Estimation			10%	10%			10%
Number-Computation	20%	20%	10%	10%	20%	20%	
Number Subtotal	**50%**	**30%**	**30%**	**30%**	**30%**	**40%**	**10%**
Algebra-Patterns	10%			10%	10%		
Algebra-Variables		10%	10%	10%	20%	10%	20%
Algebra-Functions		10%	10%			10%	20%
Algebra-Models							
Algebra Subtotal	**10%**	**20%**	**20%**	**20%**	**30%**	**20%**	**40%**
Geometry-Figures	10%	10%	10%	10%		10%	10%
Geometry-Meas./Estim.	20%	10%	20%	10%	20%		
Geometry-Transformational		10%		10%	10%		10%
Geometry-Alg. Perspective		10%		10%		10%	
Geometry Subtotal	**30%**	**40%**	**30%**	**40%**	**30%**	**20.0%**	**20%**
Data-Probability	10%			10%		10%	
Data-Statistics		10%	20%		10%	10%	30%
Data Subtotal	**10%**	**10%**	**20%**	**10%**	**10%**	**20.0%**	**30%**
Knowledge Level Percent	**70%**	**70%**	**50%**	**60%**	**70%**	**50.0%**	**40%**
Application Level Percent	**30%**	**30%**	**50%**	**40%**	**30%**	**50.0%**	**60%**
Objective Test Cognitive Category Percentages							
Category 1 Questions	15%	15%	5%	27.5%	0%	5%	10%
Category 2 Questions	42.5%	32.5%	70%	25%	57.5%	42.5%	7.5%
Category 3 Questions	32.5%	50%	10%	15%	17.5%	30%	42.5%
Category 4 Questions	5%	0%	7.5%	15%	10%	2.5%	5%
Category 5 Questions	5%	2.5%	7.5%	17.5%	15%	20%	35%

Grade 3 KAMM Assessment Framework 3-Sessions

NOTE: Number in ( ) equals number of questions

Indicators Selected for Multiple Choice Assessment Items				Mathematics Cognitive Categories					
Standard	**Benchmark**	**Knowledge Indicator**	**Application Indicator**	**Category 1 # of ?s**	**Category 2 # of ?s**	**Category 3 # of ?s**	**Category 4 # of ?s**	**Category 5 # of ?s**	**Total # of ?s**
1 Number	1 Number Sense(4)	2a			a (2)	b (2)			4
1 Number	1 Number Sense(4)	3a			b (1)				1
		3b			b (1)	e (1)			2
		3c			b (1)				1
1 Number	1 Number Sense(4)	4			b (2)	b (2)			4
1 Number	4 Computation(4)	7		a (1)	b (2)	b (1)			4
1 Number	4 Computation(4)		1a		d (2)				2
			1b		d (2)				2
Number and Computation Standard Percentage of Test:				**50%**					**20**
2 Algebra	1 Patterns(4)		2			e (1)	c (1)	c (1)	3
							d (1)		1
Algebra Standard Percentage of Test:				**10%**					**4**
3 Geometry	1 Figures(4)	4		b (3)		b (1)			4
3 Geometry	2 Measurement(4)	2		c (2)		b (2)			4
3 Geometry	2 Measurement(4)		1a		d (1)	b(1)			2
			1b		d (1)				1
			1e					b (1)	1
Geometry and Measurement Standard Percentage of Test:				**30%**					**12**
4 Data	1 Probability(4)	2			e (2)	b (2)			4
Data Standard Percentage of Test:				**10%**					**4**
Knowledge Indicator Percentage of Test:				**70% (28)**	**Total Number of Multiple Choice Questions:**				**40**
Application Indicator Percentage of Test:				**30% (12)**					

Grade 4 KAMM Assessment Framework 3-Sessions

NOTE: Number in ( ) equals number of questions

Indicators Selected for Multiple Choice Assessment Items				Mathematics Cognitive Categories					
Standard	**Benchmark**	**Knowledge Indicator**	**Application Indicator**	**Category 1 # of ?s**	**Category 2 # of ?s**	**Category 3 # of ?s**	**Category 4 # of ?s**	**Category 5 # of ?s**	**Total # of ?s**
1 Number	2 Number Systems(4)	5a				b (1)			1
		5b				b (1)			1
		5c				b (1)			1
		5d				b (1)			1
1 Number	4 Computation(4)	6a N		a (1)					1
		6b N		a (1)					1
		6c N				e (1)			1
		6d N				e (1)			1
1 Number	4 Computation(4)		1a N		d (1)				1
			1b N		d (1)				1
			1d N		d (1)				1
			1e N		d (1)				1
	Number and Computation Standard Percentage of Test:			**30%**					**12**
2 Algebra	2 Variables(4)	2a			d (2)				2
		2b			d (1)				1
		2c			d (1)				1
2 Algebra	3 Functions(4)		1			e (3)		b (1)	4
	Algebra Standard Percentage of Test:			**20%**					**8**
3 Geometry	1 Figures(4)		2	b (2)		b(2)			4
3 Geometry	2 Measurement(4)	2a				b (1)			1
		2b				b (1)			1
		2c				b (1)			1
		2d				b (1)			1
3 Geometry	3 Transformational(4)	2		b (1)	c (1)	a (1)			3
						b (1)			1
3 Geometry	4 Alg. Perspective(4)	3		b (1)	c (1)	a (2)			4
	Geometry and Measurement Standard Percentage of Test:			**40%**					**16**
4 Data	2 Statistics(4)	1			e (2)	a (1)			3
					f (1)				1
	Data Standard Percentage of Test:			**10%**					**4**
	Knowledge Indicator Percentage of Test:			**70% (28)**		**Total Number of Multiple Choice Questions:**			**40**
	Application Indicator Percentage of Test:			**30% (12)**					

Grade 5 KAMM Assessment Framework 3-Sessions

NOTE: Number in ( ) equals number of questions

Indicators Selected for Multiple Choice Assessment Items				**Mathematics Cognitive Categories**					
Standard	**Benchmark**	**Knowledge Indicator**	**Application Indicator**	**Category 1 # of ?s**	**Category 2 # of ?s**	**Category 3 # of ?s**	**Category 4 # of ?s**	**Category 5 # of ?s**	**Total # of ?s**
1 Number	1 Number Sense(4)	1				b (1)	a (1)		2
					b (1)	e (1)			2
1 Number	3 Estimation(4)		4		c (2)	a (1)		a (1)	4
1 Number	4 Computation(4)		1b		d (1)				1
			1c		d (1)				1
			1d		d (1)				1
			1f		d (1)				1
Number and Computation Standard Percentage of Test:				**30%**					**12**
2 Algebra	2 Variables(4)	2			d (4)				4
2 Algebra	3 Functions(4)	4		b (2)	c (2)				4
Algebra Standard Percentage of Test:				**20%**					**8**
3 Geometry	1 Figures(4)		1a		d (2)		f (1)	b (1)	4
3 Geometry	2 Measurement(4)	4a			b (4)				4
3 Geometry	2 Measurement (4)		1a			a (1)			1
			1c		d (1)				1
			1f		d (1)				1
			1g		d (1)				1
Geometry and Measurement Standard Percentage of Test:				**30%**					12
4 Data	2 Statistics(4)	3b			c (1)				1
		3c			c (1)				1
		3d			c (1)				1
		3e			c (1)				1
4 Data	2 Statistics(4)		1		f (2)		a (1)	c (1)	4
Data Standard Percentage of Test:				**20%**					**8**
Knowledge Indicator Percentage of Test:				**50% (20)**	**Total Number of Multiple Choice Questions:**				**40**
Application Indicator Percentage of Test:				**50% (20)**					

Grade 6 KAMM Assessment Framework 3-Sessions

NOTE: Number in ( ) equals number of questions

Indicators Selected for Multiple Choice Assessment Items				Mathematics Cognitive Categories					
Standard	**Benchmark**	**Knowledge Indicator**	**Application Indicator**	**Category 1 # of ?s**	**Category 2 # of ?s**	**Category 3 # of ?s**	**Category 4 # of ?s**	**Category 5 # of ?s**	**Total # Of ?s**
1 Number	1 Number Sense(4)	4		b (2)		a (2)			4
1 Number	3 Estimation(4)		2				a (2)	b (2)	4
1 Number	4 Computation(4)		1b		d (2)			b (2)	4
Number and Computation Standard Percentage of Test:				**30%**					**12**
2 Algebra	1 Patterns(4)	4					d (4)		4
2 Algebra	2 Variables(4)		1b		d (2)	d (1)		b (1)	4
Algebra Standard Percentage of Test:				**20%**					**8**
3 Geometry	1 Figures(4)	7a		b (2)					2
		7b		b (2)					2
3 Geometry	2 Measurement(4)		1a		d (1)			b (2)	3
			1b		d (1)				1
3 Geometry	3 Transformational(4)	1		b (1)	c (2)	a (1)			4
3 Geometry	4 Alg. Perspective(4)	3a		b (2)					2
		3b				b (2)			2
Geometry and Measurement Standard Percentage of Test:				**40%**					**16**
4 Data	1 Probability(8)	4		b(2)	b (2)				4
Data Standard Percentage of Test:				**10%**					**4**
Knowledge Indicator Percentage of Test:				**60% (24)**	**Total Number of Multiple Choice Questions:**				**40**
Application Indicator Percentage of Test:				**40% (16)**					

Grade 7 KAMM Assessment Framework 3-Sessions

NOTE: Number in ( ) equals number of questions

Indicators Selected for Multiple Choice Assessment Items				Mathematics Cognitive Categories					
Standard	**Benchmark**	**Knowledge Indicator**	**Application Indicator**	**Category 1 # of ?s**	**Category 2 # of ?s**	**Category 3 # of ?s**	**Category 4 # of ?s**	**Category 5 # of ?s**	**Total # of ?s**
1 Number	1 Number Sense(4)		1a			b (2)		b (2)	4
1 Number	4 Computation(4)	2a			b (1)				1
		2b			b (1)				1
		2c			b (1)				1
		2d				a (1)			1
1 Number	4 Computation(4)	5			b (4)				4
Number and Computation Standard Percentage of Test:				**30%**					**12**
2 Algebra	1 Patterns(4)	1a					c (2)		2
		1b					c (2)		2
2 Algebra	2 Variables(4)	7			d (2)	a (2)			4
2 Algebra	2 Variables(4)	8			b (4)				4
Algebra Standard Percentage of Test:				**30%**					**12**
3 Geometry	2 Measurement(4)		1c		d (2)			b (2)	4
3 Geometry	2 Measurement(4)	6a			d (2)				2
		6b			d (2)				2
3 Geometry	3 Transformational(4)		3			b (2)		b (2)	4
Geometry and Measurement Standard Percentage of Test:				**30%**					**12**
4 Data	2 Statistics(4)	1a			e (1)				1
		1b			e (1)				1
		1d			e (1)				1
		1e			e (1)				1
Data Standard Percentage of Test:				**10%**					**4**
Knowledge Indicator Percentage of Test:				**70% (28)**	**Total Number of Multiple Choice Questions:**				**40**
Application Indicator Percentage of Test:				**30% (12)**					

Grade 8 KAMM Assessment Framework3-Sessions

NOTE: Number in ( ) equals number of questions

Indicators Selected for Multiple Choice Assessment Items				Mathematics Cognitive Categories					
Standard	**Benchmark**	**Knowledge Indicator**	**Application Indicator**	**Category 1 # of ?s**	**Category 2 # of ?s**	**Category 3 # of ?s**	**Category 4 # of ?s**	**Category 5 # of ?s**	**Total # of ?s**
1 Number	1 Number Sense(4)	5a			b (1)	a (1)			2
		5c				a (2)			2
1 Number	2 Number Systems(4)		1a			a (1)		b (1)	2
			1b			a (1)		b (1)	2
1 Number	4 Computation(4)	2a			b (1)	a (1)			2
		2b			b (1)	a (1)			2
1 Number	4 Computation(4)		1a					b (2)	2
			1b					b (1)	1
			1c		d (1)				1
Number and Computation Standard Percentage of Test:				**40%**					**16**
2 Algebra	2 Variables(4)	3a			d (4)				4
2 Algebra	3 Functions(4)		3		f (2)	e (1)		b (1)	4
Algebra Standard Percentage of Test:				**20%**					**8**
3 Geometry	1 Figures(4)		1a		d (3)			b (1)	4
3 Geometry	4 Alg. Perspective(4)	1a			b (1)				1
		1b		b (1)					1
		1c		b (1)					1
		1d			b (1)				1
Geometry and Measurement Standard Percentage of Test:				**20%**					**8**
4 Data	1 Probability(4)		4a			c (2)	a(1)	b (1)	4
4 Data	2 Statistics(4)	3			b (2)	c (2)			4
Data Standard Percentage of Test:				**20.0%**					**8**
Knowledge Indicator Percentage of Test:				**50% (20)**	**Total Number of Multiple Choice Questions:**				**40**
Application Indicator Percentage of Test:				**50% (20)**					

High School KAMM Assessment Framework 3-Sessions

NOTE: Number in ( ) equals number of questions

Indicators Selected for Multiple Choice Assessment Items				Mathematics Cognitive Categories					
Standard	**Benchmark**	**Knowledge Indicator**	**Application Indicator**	**Category 1 # of ?s**	**Category 2 # of ?s**	**Category 3 # of ?s**	**Category 4 # of ?s**	**Category 5 # of ?s**	**Total # of ?s**
1 Number	3 Estimation(4)		1			c (1)		b (3)	4
Number and Computation Standard Percentage of Test:				**10%**					**4**
2 Algebra	2 Variables(4)	3c		b (3)	d (1)				4
2 Algebra	2 Variables(4)		2a		d (2)	b (2)			4
2 Algebra	3 Functions(4)		2			e (3)		b (1)	4
2 Algebra	3 Functions(4)	6				e (4)			4
Algebra Standard Percentage of Test:				**40%**					**16**
3 Geometry	1 Figures(4)		1b					b (4)	4
3 Geometry	3 Transformational (4)		1			a (2)	a (2)		4
Geometry and Measurement Standard Percentage of Test:				**20%**					**8**
4 Data	2 Statistics(4)	4				c (4)			4
4 Data	2 Statistics(4)		1a					c (1)	1
			1d					c (1)	1
			1e					c (1)	1
			1f					c (1)	1
4 Data	2 Statistics(4)	5		b (1)		e (1)		c (2)	4
Data Standard Percentage of Test:				**30%**					**12**
Knowledge Indicator Percentage of Test:				**40% (16)**	**Total Number of Multiple Choice Questions:**				**40**
Application Indicator Percentage of Test:				**60% (24)**					