Kansas State Mathematics Standards and Assessment Guide

Based on the 2005 Kansas State Curricular Standards for Mathematics
adopted by the Kansas State Board of Education on July 8, 2003

Grade 5

Developed by the Kansas State Department of Education
and
Mathematics Specialists in the Private Sector
from Kansas

2005

Standard/Benchmark/Indicator

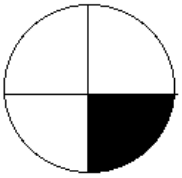
M.5.1.1.K1a-c N

Standard: Number and Computation

Benchmark: Number Sense

Indicator: Knows, explains, and uses equivalent representations for: a) whole numbers from 0 through 1,000,000; b) fractions greater than or equal to zero (including mixed numbers); c) decimals greater than or equal to zero through hundredths place and when used as monetary amounts

Explanation of Indicator


is the same as 1/4, which is the same as .25, which is the same as 4/16, etc..

Instructional Example

1. If you have two same size pizzas, one cut into eights and the other into twelfths, determine how many slices of each pizza you would need to have the same amount.
2. Writes a whole number in expanded form. For example: 125,349 is equal to 100,000 + 20,000 + 5,000 + 300 + 40 + 9.
3. If you ordered 3 pizzas, each cut into eighths, and each person gets one-eighth of a pizza. How many people can you serve?

Item Specification

Category 2: Performs Procedures: 2a. Uses numbers to count, order, or denote **2b.** Do computational procedures or algorithms

Category 3: Demonstrates an Understanding of Mathematical Ideas: 3b. Use representations to model mathematical ideas, **3e.** Shows and/or explains relationship between models/diagrams and/or other representations

Category 4: Conjecture/Generalize/Prove: 4a. Determines the truth of a mathematical pattern, a mathematical statement, and/or proposition or make predictions

Assessment Item Example

Which is ANOTHER way to write 809,260?

A. 8 hundred thousand + 9 thousand + 2 hundred + 60

B. 809 thousand, 260 hundred

C. eight hundred ninety thousand, two hundred sixty

D. 800,000 + 9,000 + 200 + 6

Correct Answer: A

Indicator					
M.5.1.1.K1a-c					

Standard/Benchmark/Indicator
M.5.1.3.K2 N
Standard: Number and Computation
Benchmark: Estimation
Indicator: Uses various estimation strategies to estimate whole number quantities from 0 through 100,000; fractions greater than or equal to zero (including mixed numbers); decimals greater than or equal to zero through hundredths place; and monetary amounts to $10,000 and explains how various strategies are used

Explanation of Indicator
Estimates using whole numbers, fractions, decimals, and money.

Instructional Example
1. Record the number of pages read in a novel for the first two days. Estimate how many pages could be read in a week.
2. Estimates the total cost of the groceries purchased and asks how they got their estimate.
3. Determine if the pocket full of change is enough to buy a wanted item.
4. Select 5 items from a catalog, estimate the total cost. Explain how they got their estimate.

Item Specification
Category 2: Performs Procedures: 2c. Follows procedures and/or instructions
Category 3: Demonstrates an Understanding of Mathematical Ideas: 3a. Communicates mathematical ideas or rules and/or explains the process, **3d.** Develops and/or explains relationships among concepts
Category 4: Conjecture/Generalize/Prove: 4f. Identify faulty arguments or identify misrepresentations of data

Assessment Item Example
The art supplies Tim wants to buy total $11.68. Tim has only bills and does not have any coins. To ESTIMATE how much money to give to the clerk, Tim should

A. round up to $11.70.

B. round up to $12.00.

C. round down to $11.00.

D. round down to $11.50.

Correct Answer: B

	Indicator				
	M.5.1.3.K2				

Standard/Benchmark/Indicator
M.5.1.4.K4 N
Standard: Number and Computation
Benchmark: Computation
Indicator: Identifies, explains, and finds the greatest common factor and least common multiple of two or more whole numbers through the basic multiplication facts from 1 x 1 through 12 x 12

Explanation of Indicator
Greatest Common Factor – Find the greatest number that will divide evenly into two different numbers (For example: 24 and 30 – the greatest common factor is 6)
Least Common Multiple – When skip counting by the two different numbers, what is the first number will appear in both patterns. (For example: 8,16,**24**,32 12, **24**, 36; 8 and 12 – the least common factor is 24)

Instructional Example
Fencing comes in 2, 3, 4, 5, 6, 8, 10, 12, and 15 unit lengths. You want to make two areas in your backyard. One area will be 24 square units and the other 30 square units. Which is the longest length of fence to do both jobs?

Item Specification
Category 1: Memorize Facts/Definitions/ Formulas: 1b. Recite or recall basic mathematics facts
Category 2: Performs Procedures: 2c. Follows procedures or instructions

Assessment Item Example
The least common multiple (LCM) of 6 and 12 is

A. the smallest non-zero number that divides both 6 and 12 evenly.

B. the greatest number that divides both 6 and 12 evenly.

C. the smallest non-zero number that is a multiple of both 6 and 12.

D. the greatest number that is a multiple of both 6 and 12.

Correct Answer: C

		Indicator			
		M.5.1.4.K4			

Standard/Benchmark/Indicator
M.5.2.2.K1
Standard: Algebra
Benchmark: Variables, Equations, and Inequalities
Indicator: Explains and uses variables and symbols to represent unknown whole number quantities from 0 through 1,000 and variable relationships

Explanation of Indicator
A variable is a shape, letter, symbol to represent an unknown value. For example, if a dog eats ¼ pound of food, he would eat ¼ ● d in d days.

Instructional Example
1. Have student write in their own words what a variable is and what its purpose is.
2. Have student write a variable expression representing something that would be happening around the house such as if your get 6 chicken nuggets from McDonalds, how many would eat in a year if your went to Mcdonalds n times.

Item Specification
Category 3: Demonstrates an Understanding of Mathematical Ideas: 3b. Use representations to model mathematical ideas, **3e.** Shows and/or explains relationship between models/diagrams and/or other representations

Assessment Item Example
Which equation shows that there are four quarters (q) in one dollar?

A. $4 + q = \$1$

B. $4 \cdot q = \$4$

C. $4q = \$1$

D. $q = \$4$

Correct Answer: C

			Indicator		
			M.5.2.2.K1		

Standard/Benchmark/Indicator
M.5.2.2.K2 N
Standard: Algebra
Benchmark: Variables, Equations, and Inequalities
Indicator: Solves one-step linear equations with one variable and a whole number solution using addition and subtraction with whole numbers from 0 through 100 and multiplication with the basic facts

Explanation of Indicator
A one step equation requires only on operation (addition, subtraction, or multiplication in this indicator) to solve for an unknown (variable). Student should solve one-step equations for that will have no remainder for numbers from 0 to 100 for addition and subtraction and 0 to 100 for multiplication.

Instructional Example
Have student solve a variety of equations that could be made from situations at home. Example: If there are x cookies in a package when you started eating, you know you at 6 cookies there were 14 left when you finished, how many were there when you started (x - 6 = 14)?

Item Specification
Category 2: Perform Procedures: 2d. Solve equations, formulas, or routine word problems

Assessment Item Example
What is the value of *x* in the equation 32=17+*x*

A. 15

B. 25

C. 39

D. 49

Correct Answer: A

				Indicator	
				M.5.2.2.K2	

Standard/Benchmark/Indicator
M.5.2.3.K4
Standard: Algebra
Benchmark: Functions
Indicator: Uses a function table (input/output machine, T-table) to identify, plot, and label whole number ordered pairs in the first quadrant of a coordinate plane

Explanation of Indicator
A function table is a table of values that has sets of points that can be graphed on a coordinate grid such as the set below. The sets called ordered pairs for this function table would be (1,5), (2,10), (3,15), (4, 20), and (5,25).

1	2	3	4	5
5	10	15	20	25

The student can graph and label these on a coordinate grid.

Instructional Example
1. Have student make a coordinate grid with graph paper and draw a map of there yard using points to represent landmarks such as the swing set, a tree, a flower bed, or other physical identifiers in the yard.
2. Have student make a function table of values for the cost of 1, 2, 3, 4, and 5 candy bars. Then graph the function table on graph paper.

Item Specification
Category 1: Memorize Facts/Definitions/ Formulas: 1b. Recite or recall basic mathematics facts
Category 2: Performs Procedures: 2c. Follows procedures and/or instructions

Assessment Item Example
The function table below represents ordered pairs for a graph.

x	*y*
1	8
7	14
10	17
15	22

Which is ANOTHER way to correctly show this information?

A. (1, 8) (7, 14) (10, 17) (15, 22)

B. (33, 61)

C. (8, 1) (14, 7) (17, 10) (22, 15)

D. (61, 33)

Correct Answer: A

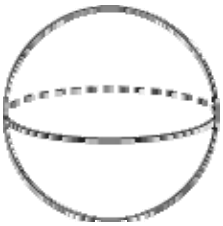
Standard/Benchmark/Indicator
M.5.3.1.K3
Standard: Geometry
Benchmark: Geometric Figures and Their Properties
Indicator: Recognizes and describes the solids (cubes, rectangular prisms, cylinders, cones, spheres, triangular prisms, rectangular pyramids, triangular pyramids) using the terms faces, edges, and vertices (corners)

Explanation of Indicator
Solids are three dimensional figures such as cube, rectangular prism (cereal box), cylinder (can), sphere (ball), triangular prism (a piece of trim that is a triangle on each end), rectangular prism (pyramids of Egypt), or triangular pyramid (pyramid with the base or bottom on have three sides). The faces are the sides of the figure, the edges are where two faces join, and the vertices are where the edges meet (a corner point).

Instructional Example
Have student identify a variety of objects around the house according to what type of figure they are, then have them write down how many faces, edges, and vertices each object has. Examples would be boxes that may be cubes or rectangular prisms, cans such as Pringles cans or oatmeal cans, etc.

Item Specification
Category 1: Memorize Facts/Definitions/ Formulas: 1b. Recite or recall basic mathematics facts
Category 3: Demonstrates an Understanding of Mathematical Ideas: 3b. Use representations to model mathematical ideas

Assessment Item Example
A sphere is shown below.



How many faces are on a sphere?

A. 0 faces

B. 1 face

C. 2 faces

D. 3 faces

Correct Answer: A

Indicator					
M.5.3.1.K3					

Standard/Benchmark/Indicator
M.5.3.2.K4a
Standard: Geometry
Benchmark: Measurement and Estimation
Indicator: Converts: a) within the customary system: inches and feet, feet and yards, inches and yards, cups and pints, pints and quarts, quarts and gallons, pounds and ounces

Explanation of Indicator
Converting means to change from one measurement to another such as 2 pounds equals 32 ounces. Convert with a variety of measurements such as inches and feet, feet and yards, inches and yards, cups and pints, pints and quarts, quarts and gallons, and pounds and ounces.

Instructional Example
Have student write several different measurements taken from around the home and then convert them into another equivalent measurement. For example how many quarts would be in a three gallon fish tank?

Item Specification
Category 2: Performs Procedures: 2b. Do computational procedures or algorithms

Assessment Item Example
How many inches are there in 8 feet?

A. 72 inches

B. 80 inches

C. 84 inches

D. 96 inches

Correct Answer: D

	Indicator				
	M.5.3.2.K4a				

Standard/Benchmark/Indicator
M.5.3.3.K3
Standard: Geometry
Benchmark: Transformational Geometry
Indicator: Recognizes three-dimensional figures (rectangular prisms, cylinders, cones, spheres, triangular prisms, rectangular pyramids) from various perspectives (top, bottom, side, corners)

Explanation of Indicator
Identify the three-dimensional figures rectangular prisms (cereal box), cylinder (can), sphere (ball), triangular prism (a piece of trim that is a triangle on each end), and rectangular prism (pyramids of Egypt) from different perspectives such as top, bottom, front, back, side, or corner.

Instructional Example
1. Student will use a variety of three-dimensional objects around the home to draw different perspectives looking only from top, bottom, front, back, side, or corner.
2. Give the student a variety of three-dimensional objects with a drawing of several different perspectives of one object and have them identify which object the drawings are from.

Item Specification
Category 3: Demonstrates an Understanding of Mathematical Ideas: 3b. Use representations to model mathematical ideas

Assessment Item Example
Which figure shows the SIDE view of a rectangular pyramid?

A. 

B. 

C. 

D. 

Correct Answer: C

		Indicator			
		M.5.3.3.K3			

Standard/Benchmark/Indicator
M.5.4.2.K3a-e
Standard: Data
Benchmark: Statistics
Indicator: Identifies, explains, and calculates or finds these statistical measures of a whole number data set of up to twenty whole number data points from 0 through 1,000: a) minimum and maximum values; b) range c) mode (no-, uni-, bi-); d) median (including answers expressed as a decimal or a fraction without reducing to simplest form); e) mean (including answers expressed as a decimal or a fraction without reducing to simplest form)

Explanation of Indicator
Find minimum, maximum, mean, median, mode, and range of a whole number set of data. Minimum is smallest value, maximum is the largest value, range is the largest value minus the smallest value, mean is the sum of the values divided by the number of values, median is middle value when all values are ordered, and mode is the value that appears the most.

Instructional Example
Have your student use a set of data such as the number of pages in a set of 20 books to compute minimum, maximum, range, mean, median, and mode.

Item Specification
Category 1: Memorize Facts/Definitions/ Formulas: 1b. Recite or recall basic mathematics facts
Category 2: Performs Procedures: 2c. Follows procedures and/or instructions
Category 3: Demonstrate Understanding of Mathematical Ideas: 3a. Communicates mathematical ideas or rules and/or explains the process

Assessment Item Example
A data set is shown below.

11 30 24 20 15 31 32 20 18 29

What is the MEDIAN of the data set?

A. 20

B. 21

C. 22

D. 23

Correct Answer: C

Standard/Benchmark/Indicator
M.5.1.3.A4
Standard: Number and Computation
Benchmark: Estimation
Indicator: Determines if a real-world problem calls for an exact or approximate answer using whole numbers from 0 through 100,000 and performs the appropriate computation using various computational methods including mental math, paper and pencil, concrete materials, and appropriate technology

Explanation of Indicator
Look at a variety of situations form real-world situations to determine if the answer should be an estimate of and exact answer by using mental math, paper and pencil, or appropriate technology (calculator, etc.).

Instructional Example
1. Have student explain if an estimate or exact answer is needed and compute using appropriate method to see if $10 is enough to purchase a loaf of bread at $1.89, a bag of apples at $2.29, and a half gallon of ice cream at $3.19.
2. Have student explain if an estimate or exact answer is needed and compute using appropriate method to see how much they should receive for working for their neighbor for 6 hours at $6.25 per hour (nothing is deducted from payment).
3. Have student explain if an estimate or exact answer is needed and compute using appropriate method to see how long it will take to drive from Hays, KS to Kansas City, KS or some other traveling distance.

Item Specification
Category 2: Performs Procedures: 2c. Follows procedures and/or instructions
Category 3: Demonstrate Understanding of Mathematical Ideas: 3a. Communicates mathematical ideas or rules and/or explains the process
Category 4: Conjecture/Generalize/Prove: 4f. Identify faulty arguments or identify misrepresentations of data
Category 5: Solve Non-routine Problems/Make Connections: 5a. Apply and adapt a variety of appropriate strategies to solve non-routine problems

Assessment Item Example
Barb is filling empty jars with pieces of candy. Each jar will hold 300 pieces of candy. Barb has 5,000 pieces of candy to put in jars. Which steps can Barb take to find the EXACT number of jars she will need to hold all the candy?

A. add 5,000 and 300 to find the number of jars needed

B. multiply 5,000 and 300 to find the number of jars needed

C. divide 5,000 by 300 and round up to find the number of jars needed

D. divide 5,000 by 300 and round down to find the number of jars needed

Correct Answer: C

				Indicator	
				M.5.1.3.A4	

Standard/Benchmark/Indicator
M.5.1.4.A1a-f N
Standard: Number and Computation
Benchmark: Computation
Indicator: Solves one- and two-step real-world problems using these computational procedures: a) adds and subtracts whole numbers from 0 through 100,000; b) multiplies through a four-digit whole number by a two-digit whole number; c) multiplies monetary amounts up to $1,000 by a one- or two-digit whole number; d) divides whole numbers through a 2-digit divisor and a 4-digit dividend with the remainder as a whole number or a fraction; e) adds and subtracts decimals from thousands place through hundredths place when used as monetary amounts

Explanation of Indicator
Solve real-world problems by using addition, subtraction, multiplication, and division with monetary and non-monetary values.

Instructional Example
Have student solve a variety of real-world problems that require one or two computational procedures using addition, subtraction, multiplication, and/or division from every day situations, with monetary and non-monetary answers.

Item Specification
Category 2: Perform Procedures: 2d. Solve equations, formulas, or routine word problems
Category 4: Conjecture/Generalize/Prove: 4f. Identify faulty arguments or identify misrepresentations of data
Category 5: Solve Non-routine Problems/Make Connections: 5b. Apply mathematics in contexts outside of mathematics (whenever possible, include diagrams/visuals

Assessment Item Example
ABC Bedspreads has received an order for 1,650 bedspreads. To make each bedspread, 78 square feet of fabric are needed. How many square feet of fabric should ABC Bedspreads order?

A. 128,700 square feet

B. 113,700 square feet

C. 24,750 square feet

D. 12,870 square feet

Correct Answer: A

					Indicator
					M.5.1.4.A1a-f

Standard/Benchmark/Indicator
M.5.3.1.A1a
Standard: Geometry
Benchmark: Geometric Figures and Their Properties
Indicator: Solves real-world problems by applying the properties of: a) plane figures (circles, squares, rectangles, triangles, ellipses, rhombi, parallelograms, hexagons, pentagons) and the line(s) of symmetry

Explanation of Indicator
Solve real-world problems that use a line of symmetry in circle, square, rectangle, triangle, ellipse, rhombus, parallelogram, hexagon, and pentagon. A line of symmetry divides a figure into two equal parts that are mirror images of each other.

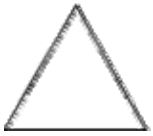
Instructional Example
1. Using only one cut, have student figure the number of ways a cake (variety of shapes) can be cut to create two equal pieces.
2. Find various shapes around the house and identify a line or lines of symmetry for the shape.

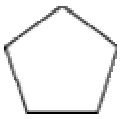
Item Specification
Category 2: Perform Procedures: 2d. Solve equations, formulas, or routine word problems
Category 4: Conjecture/Generalize/Prove: 4f. Identify faulty arguments or identify misrepresentations of data
Category 5: Solve Non-routine Problems/Make Connections: 5b. Apply mathematics in contexts outside of mathematics (whenever possible, include diagrams/visuals

Assessment Item Example
A class is planning to make a painting using a geometric shape that has EXACTLY 3 lines of symmetry. Which shape could the class use?

A. 

B. 

C. 

D. 

Correct Answer: C

Indicator					
M.5.3.1.A1a					

Standard/Benchmark/Indicator
M.5.3.2.A1a,c,f,g,h
Standard: Geometry
Benchmark: Measurement and Estimation
Indicator: Solves real-world problems by applying appropriate measurements and measurement formulas: a) length to the nearest eighth of an inch or to the nearest centimeter; c) weight to the nearest whole unit (pounds, grams, nonstandard units) f) months in a year and minutes in an hour; g) perimeter of squares, rectangles, and triangles; h) area of squares and rectangles

Explanation of Indicator
Solves real-world problems that deal with measures and formulas that include inches to the nearest 1/8 inch, metric to the nearest centimeter, weight the nearest pound or gram, perimeter of squares, rectangles, and triangles, area of squares and rectangles, and months of the year and minutes and hours.

Instructional Example
1. Have student figure are of several rooms in your house in square feet.
2. Have your student figure perimeter of several rooms in your house in feet.
3. If a movie starts at 7:35 and lasts 1 hour and 45 minutes, when will the movie end?
4. Have the student figure the number of months it will take for them reach their 16 birthday form now.

Item Specification
Category 2: Perform Procedures: 2d. Solve equations, formulas, or routine word problems
Category 3: Demonstrate Understanding of Mathematical Ideas: 3a. Communicates mathematical ideas or rules and/or explains the process
Category 5: Solve Non-routine Problems/Make Connections: 5b. Apply mathematics in contexts outside of mathematics (whenever possible, include diagrams/visuals

Assessment Item Example
The table below shows the weight per box of several types of bolts.

Bolts

Type	Weight per Box
3-inch	10 lb
5-inch	17 lb
8-inch	28 lb
10-inch	35 lb

What is the TOTAL weight of 1 box of 10-inch bolts and 2 boxes of 5-inch bolts?

A. 35lb

B. 52 lb

C. 69 lb

D. 70 lb

Correct Answer: C

	Indicator				
	M.5.3.2.A1a,c,f,g,h				

Standard/Benchmark/Indicator
M.5.4.2.A1a-f
Standard: Data
Benchmark: Statistics
Indicator: Interprets and uses data to make reasonable inferences, predictions, and decisions, and to develop convincing arguments from these data displays: a) graphs using concrete materials; b) pictographs; c) frequency tables; d) bar and line graphs; e) Venn diagrams and other pictorial displays; f) line plots; g) charts and tables; h) circle graphs

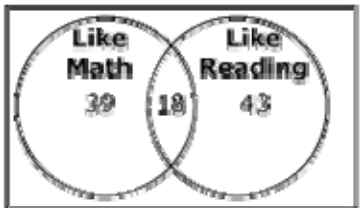
Explanation of Indicator
Uses graphs, pictographs, frequency tables, bar and line graphs, circle graphs, charts and tables, Venn diagrams, and line plots to make predictions about future events based on the data representations.

Instructional Example
Have student look through newspapers to identify different data displays to make predictions, and if possible follow up to see if predictions actually happen.

Item Specification
Category 2: Perform Procedures: 2f. Read or produce graphs and tables
Category 3: Demonstrate Understanding of Mathematical Ideas: 3c. Explain findings and/or results from data analysis strategies or experiments/simulations
Category 4: Conjecture/Generalize/Prove: 4a. Determine the truth of a mathematical pattern, a mathematical statement, and/or proposition or make predictions**, 4f.** Identify faulty arguments or identify misrepresentations of data
Category 5: Solve Non-routine Problems/Make Connections: 5c. Analyze data or recognize patterns

Assessment Item Example
Gerard asked 100 students whether they like math, reading, or both. He displayed the results in the Venn diagram shown below.

Math and Reading Preferences



How many students like math?

A. 39 students

B. 43 students

C. 57 students

D. 61 students

Correct Answer: C

		Indicator			
		M.5.4.2.A1a-f			