

Texas Essential Knowledge and Skills for Kindergarten, Grade 1, Grade 2, Grade 3, Grade 4, Grade 5  
TOUCHMATH KITS (Page 1)

	KINDERGARTEN SET	1ST GRADE SET	2ND GRADE SET	UPPER GRADES 2007
K1	X			
K3	X			
K3A	X			
K4	X			
K6B	X			
K7A	X			
K8A	X			
K8B	X			
K8C	X			
K9B	X			
K9C	X			
K11	X			
K11D				
K13D	X			
1.1A		X		
1.1C	X	X		
1.1B		X		
1.1D		X	X	
1.2A		X		
1.3				
1.3A		X		
1.3B		X		
1.4B			X	
1.5B				
1.5C		X		
1.6A		X		
1.6B		X		
1.6C		X		
1.8		X		
1.8B	X	X		
1.11D		X		
1.13A			X	
2.1			X	
2.10				
2.10B		X		
2.12D			X	
2.2A			X	
2.2B			X	
2.3A			X	
2.3B		X	X	X
2.3C			X	
2.5B				
2.6C				
2.7A			X	
2.10			X	
2.10B				
2.12D			X	
3.1A			X	X
3.1C		X	X	X
3.2B				X
3.2C				X
3.3A				X
3.3B			X	X
3.4A				X
3.4B			X	X
3.4C				X
3.6A				X
3.6C				X
3.12B				X
3.14D				X
4.1B				X
4.2A				X
4.2C				X
4.3A				X
4.3B				X
4.4C				X
4.4D				X









































## Texas Essential Knowledge and Skills for Kindergarten

### §111.12. Mathematics, Kindergarten.

(a) Introduction.

- (1) Within a well-balanced mathematics curriculum, the primary focal points at Kindergarten are developing whole-number concepts and using patterns and sorting to explore number, data, and shape.
- (2) Throughout mathematics in Kindergarten-Grade 2, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use numbers in ordering, labeling, and expressing quantities and relationships to solve problems and translate informal language into mathematical symbols. Students use patterns to describe objects, express relationships, make predictions, and solve problems as they build an understanding of number, operation, shape, and space. Students use informal language and observation of geometric properties to describe shapes, solids, and locations in the physical world and begin to develop measurement concepts as they identify and compare attributes of objects and situations. Students collect, organize, and display data and use information from graphs to answer questions, make summary statements, and make informal predictions based on their experiences.
- (3) Problem solving, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Kindergarten-Grade 2, students use these processes together with technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve problems as they do mathematics.

(b) Knowledge and skills.

(K.1) **Number, operation, and quantitative reasoning.** The student uses numbers to name quantities.

The student is expected to:

- (A) use one-to-one correspondence and language such as more than, same number as, or two less than to describe relative sizes of sets of concrete objects;
- (B) use sets of concrete objects to represent quantities given in verbal or written form (through 9); and
- (C) use numbers to describe how many objects are in a set (through 20).

(K.2) **Number, operation, and quantitative reasoning.** The student describes order of events or objects.

The student is expected to:

- (A) use language such as before or after to describe relative position in a sequence of events or objects; and
- (B) name the ordinal positions in a sequence such as first, second, third, etc.

(K.3) **Number, operation, and quantitative reasoning.** The student recognizes that there are quantities less than a whole.

The student is expected to:

- (A) share a whole by separating it into equal parts; and
- (B) explain why a given part is half of the whole.

(K.4) **Number, operation, and quantitative reasoning.** The student models addition and subtraction.

The student is expected to:

model and create addition and subtraction problems in real situations with concrete objects.

(K.5) **Patterns, relationships, and algebraic thinking.** The student identifies, extends, and creates patterns.

The student is expected to:

identify, extend, and create patterns of sounds, physical movement, and concrete objects.

(K.6) **Patterns, relationships, and algebraic thinking.** The student uses patterns to make predictions.

The student is expected to:

- (A) use patterns to predict what comes next, including cause-and-effect relationships; and
- (B) count by ones to 100.

(K.7) **Geometry and spatial reasoning.** The student describes the relative positions of objects.

The student is expected to:

- (A) describe one object in relation to another using informal language such as over, under, above, and below; and
- (B) place an object in a specified position.

(K.8) **Geometry and spatial reasoning.** The student uses attributes to determine how objects are alike and different.

The student is expected to:

- (A) describe and identify an object by its attributes using informal language;
- (B) compare two objects based on their attributes; and
- (C) sort objects according to their attributes and describe how those groups are formed.

## Texas Essential Knowledge and Skills for Kindergarten

(K.9) **Geometry and spatial reasoning.** The student recognizes characteristics of shapes and solids.

The student is expected to:

- (A) describe and compare real-life objects or models of solids;
- (B) recognize shapes in real-life objects or models of solids; and
- (C) describe, identify, and compare circles, triangles, and rectangles including squares.

(K.10) **Measurement.** The student uses attributes such as length, weight, or capacity to compare and order objects.

The student is expected to:

- (A) compare and order two or three concrete objects according to length (shorter or longer), capacity (holds more or holds less), or weight (lighter or heavier); and
- (B) find concrete objects that are about the same as, less than, or greater than a given object according to length, capacity, or weight.

(K.11) **Measurement.** The student uses time and temperature to compare and order events, situations, and/or objects.

The student is expected to:

- (A) compare situations or objects according to temperature such as hotter or colder;
- (B) compare events according to duration such as more time than or less time than;
- (C) sequence events; and
- (D) read a calendar using days, weeks, and months.

(K.12) **Probability and statistics.** The student constructs and uses graphs of real objects or pictures to answer questions.

The student is expected to:

- (A) construct graphs using real objects or pictures in order to answer questions; and
- (B) use information from a graph of real objects or pictures in order to answer questions.

(K.13) **Underlying processes and mathematical tools.** The student applies Kindergarten mathematics to solve problems connected to everyday experiences and activities in and outside of school.

The student is expected to:

- (A) identify mathematics in everyday situations;
- (B) use a problem-solving model, with guidance, that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;
- (C) select or develop an appropriate problem-solving strategy including drawing a picture, looking for a pattern, systematic guessing and checking, or acting it out in order to solve a problem; and
- (D) use tools such as real objects, manipulatives, and technology to solve problems.

(K.14) **Underlying processes and mathematical tools.** The student communicates about Kindergarten mathematics using informal language.

The student is expected to:

- (A) explain and record observations using objects, words, pictures, numbers, and technology; and
- (B) relate everyday language to mathematical language and symbols.

(K.15) **Underlying processes and mathematical tools.** The student uses logical reasoning to make sense of his or her world.

The student is expected to:

reason and support his or her thinking using objects, words, pictures, numbers, and technology.

*Source: The provisions of this §111.12 adopted to be effective September 1, 1998, 22 TexReg 7623.*

## Texas Essential Knowledge and Skills for Grade 1

### §111.13. Mathematics, Grade 1.

(a) Introduction.

- (1) Within a well-balanced mathematics curriculum, the primary focal points at Grade 1 are adding and subtracting whole numbers and organizing and analyzing data.
- (2) Throughout mathematics in Kindergarten-Grade 2, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use numbers in ordering, labeling, and expressing quantities and relationships to solve problems and translate informal language into mathematical symbols. Students use patterns to describe objects, express relationships, make predictions, and solve problems as they build an understanding of number, operation, shape, and space. Students use informal language and observation of geometric properties to describe shapes, solids, and locations in the physical world and begin to develop measurement concepts as they identify and compare attributes of objects and situations. Students collect, organize, and display data and use information from graphs to answer questions, make summary statements, and make informal predictions based on their experiences.
- (3) Problem solving, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Kindergarten-Grade 2, students use these processes together with technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve problems as they do mathematics.

(b) Knowledge and skills.

- (1.1) **Number, operation, and quantitative reasoning.** The student uses whole numbers to describe and compare quantities.

The student is expected to:

- (A) compare and order whole numbers up to 99 (less than, greater than, or equal to) using sets of concrete objects and pictorial models;
- (B) create sets of tens and ones using concrete objects to describe, compare, and order whole numbers;
- (C) use words and numbers to describe the values of individual coins such as penny, nickel, dime, and quarter and their relationships; and
- (D) read and write numbers to 99 to describe sets of concrete objects.

- (1.2) **Number, operation, and quantitative reasoning.** The student uses pairs of whole numbers to describe fractional parts of whole objects or sets of objects.

The student is expected to:

- (A) share a whole by separating it into equal parts and use appropriate language to describe the parts such as three out of four equal parts; and
- (B) use appropriate language to describe part of a set such as three out of the eight crayons are red.

- (1.3) **Number, operation, and quantitative reasoning.** The student recognizes and solves problems in addition and subtraction situations.

The student is expected to:

- (A) model and create addition and subtraction problem situations with concrete objects and write corresponding number sentences; and
- (B) learn and apply basic addition facts (sums to 18) using concrete models.

- (1.4) **Patterns, relationships, and algebraic thinking.** The student uses patterns to make predictions.

The student is expected to:

- (A) identify, describe, and extend concrete and pictorial patterns in order to make predictions and solve problems; and
- (B) use patterns to skip count by twos, fives, and tens.

- (1.5) **Patterns, relationships, and algebraic thinking.** The student recognizes patterns in numbers and operations.

The student is expected to:

- (A) find patterns in numbers, including odd and even;
- (B) compare and order whole numbers using place value; and
- (C) identify patterns in related addition and subtraction sentences (fact families for sums to 18) such as  $2 + 3 = 5$ ,  $3 + 2 = 5$ ,  $5 - 2 = 3$ , and  $5 - 3 = 2$ .

- (1.6) **Geometry and spatial reasoning.** The student uses attributes to identify, compare, and contrast shapes and solids.

The student is expected to:

- (A) describe and identify objects in order to sort them according to a given attribute using informal language;
- (B) identify circles, triangles, and rectangles, including squares, and describe the shape of balls, boxes, cans, and cones; and
- (C) combine geometric shapes to make new geometric shapes using concrete models.

## Texas Essential Knowledge and Skills for Grade 1

(1.7) **Measurement.** The student uses nonstandard units to describe length, weight, and capacity.

The student is expected to:

- (A) estimate and measure length, capacity, and weight of objects using nonstandard units; and
- (B) describe the relationship between the size of the unit and the number of units needed in a measurement.

(1.8) **Measurement.** The student understands that time and temperature can be measured.

The student is expected to:

- (A) recognize temperatures such as a hot day or a cold day;
- (B) describe time on a clock using hours and half hours; and
- (C) order three or more events by how much time they take.

(1.9) **Probability and statistics.** The student displays data in an organized form.

The student is expected to:

- (A) collect and sort data; and
- (B) use organized data to construct real object graphs, picture graphs, and bar-type graphs.

(1.10) **Probability and statistics.** The student uses information from organized data.

The student is expected to:

- (A) draw conclusions and answer questions using information organized in real-object graphs, picture graphs, and bar-type graphs; and
- (B) identify events as certain or impossible such as drawing a red crayon from a bag of green crayons.

(1.11) **Underlying processes and mathematical tools.** The student applies Grade 1 mathematics to solve problems connected to everyday experiences and activities in and outside of school.

The student is expected to:

- (A) identify mathematics in everyday situations;
- (B) use a problem-solving model, with guidance as needed, that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;
- (C) select or develop an appropriate problem-solving strategy including drawing a picture, looking for a pattern, systematic guessing and checking, or acting it out in order to solve a problem; and
- (D) use tools such as real objects, manipulatives, and technology to solve problems.

(1.12) **Underlying processes and mathematical tools.** The student communicates about Grade 1 mathematics using informal language.

The student is expected to:

- (A) explain and record observations using objects, words, pictures, numbers, and technology; and
- (B) relate informal language to mathematical language and symbols.

(1.13) **Underlying processes and mathematical tools.** The student uses logical reasoning to make sense of his or her world.

The student is expected to:

reason and support his or her thinking using objects, words, pictures, numbers, and technology.

*Source: The provisions of this §111.13 adopted to be effective September 1, 1998, 22 TexReg 7623.*

## Texas Essential Knowledge and Skills for Grade 2

### §111.14. Mathematics, Grade 2.

(a) Introduction.

- (1) Within a well-balanced mathematics curriculum, the primary focal points at Grade 2 are comparing and ordering whole numbers, applying addition and subtraction, and using measurement processes.
- (2) Throughout mathematics in Kindergarten-Grade 2, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use numbers in ordering, labeling, and expressing quantities and relationships to solve problems and translate informal language into mathematical symbols. Students use patterns to describe objects, express relationships, make predictions, and solve problems as they build an understanding of number, operation, shape, and space. Students use informal language and observation of geometric properties to describe shapes, solids, and locations in the physical world and begin to develop measurement concepts as they identify and compare attributes of objects and situations. Students collect, organize, and display data and use information from graphs to answer questions, make summary statements, and make informal predictions based on their experiences.
- (3) Problem solving, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Kindergarten-Grade 2, students use these processes together with technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve problems as they do mathematics.

(b) Knowledge and skills.

- (2.1) **Number, operation, and quantitative reasoning.** The student understands how place value is used to represent whole numbers.

The student is expected to:

use concrete models to represent, compare, and order whole numbers (through 999), read the numbers, and record the comparisons using numbers and symbols ( $>$ ,  $<$ ,  $=$ ).

- (2.2) **Number, operation, and quantitative reasoning.** The student uses fraction words to name parts of whole objects or sets of objects.

The student is expected to:

- (A) name fractional parts of a whole object (not to exceed twelfths) when given a concrete representation; and
- (B) name fractional parts of a set of objects (not to exceed twelfths) when given a concrete representation.

- (2.3) **Number, operation, and quantitative reasoning.** The student adds and subtracts whole numbers to solve problems.

The student is expected to:

- (A) recall and apply basic addition facts (sums to 18);
- (B) select addition or subtraction and solve problems using two-digit numbers, whether or not regrouping is necessary; and
- (C) determine the value of a collection of coins less than one dollar.

- (2.4) **Number, operation, and quantitative reasoning.** The student models multiplication and division.

The student is expected to:

- (A) model, create, and describe multiplication situations in which equivalent sets of concrete objects are joined; and
- (B) model, create, and describe division situations in which a set of concrete objects is separated into equivalent sets.

- (2.5) **Patterns, relationships, and algebraic thinking.** The student uses patterns in numbers and operations.

The student is expected to:

- (A) find patterns in numbers such as in a 100s chart;
- (B) use patterns in place value to compare and order whole numbers through 999;
- (C) use patterns to develop strategies to remember basic addition facts; and
- (D) solve subtraction problems related to addition facts (fact families) such as  $8 + 9 = 17$ ,  $9 + 8 = 17$ ,  $17 - 8 = 9$ , and  $17 - 9 = 8$ .

- (2.6) **Patterns, relationships, and algebraic thinking.** The student uses patterns to describe relationships and make predictions.

The student is expected to:

- (A) generate a list of paired numbers based on a real-life situation such as number of tricycles related to number of wheels;
- (B) identify patterns in a list of related number pairs based on a real-life situation and extend the list; and
- (C) identify, describe, and extend patterns to make predictions and solve problems.

- (2.7) **Geometry and spatial reasoning.** The student uses attributes to identify, compare, and contrast shapes and solids.

The student is expected to:

- (A) identify attributes of any shape or solid;
- (B) use attributes to describe how two shapes or two solids are alike or different; and
- (C) cut geometric shapes apart and identify the new shapes made.

## Texas Essential Knowledge and Skills for Grade 2

(2.8) **Geometry and spatial reasoning.** The student recognizes that numbers can be represented by points on a line.

The student is expected to:

use whole numbers to locate and name points on a line.

(2.9) **Measurement.** The student recognizes and uses models that approximate standard units (metric and customary) of length, weight, capacity, and time.

The student is expected to:

- (A) identify concrete models that approximate standard units of length, capacity, and weight;
- (B) measure length, capacity, and weight using concrete models that approximate standard units; and
- (C) describe activities that take approximately one second, one minute, and one hour.

(2.10) **Measurement.** The student uses standard tools to measure time and temperature.

The student is expected to:

- (A) read a thermometer to gather data; and
- (B) describe time on a clock using hours and minutes.

(2.11) **Probability and statistics.** The student organizes data to make it useful for interpreting information.

The student is expected to:

- (A) construct picture graphs and bar-type graphs;
- (B) draw conclusions and answer questions based on picture graphs and bar-type graphs; and
- (C) use data to describe events as more likely or less likely such as drawing a certain color crayon from a bag of seven red crayons and three green crayons.

(2.12) **Underlying processes and mathematical tools.** The student applies Grade 2 mathematics to solve problems connected to everyday experiences and activities in and outside of school.

The student is expected to:

- (A) identify the mathematics in everyday situations;
- (B) use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;
- (C) select or develop an appropriate problem-solving strategy including drawing a picture, looking for a pattern, systematic guessing and checking, or acting it out in order to solve a problem; and
- (D) use tools such as real objects, manipulatives, and technology to solve problems.

(2.13) **Underlying processes and mathematical tools.** The student communicates about Grade 2 mathematics using informal language.

The student is expected to:

- (A) explain and record observations using objects, words, pictures, numbers, and technology; and
- (B) relate informal language to mathematical language and symbols.

(2.14) **Underlying processes and mathematical tools.** The student uses logical reasoning to make sense of his or her world.

The student is expected to:

reason and support his or her thinking using objects, words, pictures, numbers, and technology.

*Source: The provisions of this §111.14 adopted to be effective September 1, 1998, 22 TexReg 7623.*

## Texas Essential Knowledge and Skills for Grade 3

### §111.15. Mathematics, Grade 3.

- (a) Introduction.
- (1) Within a well-balanced mathematics curriculum, the primary focal points at Grade 3 are multiplying and dividing whole numbers, connecting fraction symbols to fractional quantities, and standardizing language and procedures in geometry and measurement.
- (2) Throughout mathematics in Grades 3-5, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use algorithms for addition, subtraction, multiplication, and division as generalizations connected to concrete experiences; and they concretely develop basic concepts of fractions and decimals. Students use appropriate language and organizational structures such as tables and charts to represent and communicate relationships, make predictions, and solve problems. Students select and use formal language to describe their reasoning as they identify, compare, and classify shapes and solids; and they use numbers, standard units, and measurement tools to describe and compare objects, make estimates, and solve application problems. Students organize data, choose an appropriate method to display the data, and interpret the data to make decisions and predictions and solve problems.
- (3) Problem solving, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Grades 3-5, students use these processes together with technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve problems as they do mathematics.
- (b) Knowledge and skills.
- (3.1) **Number, operation, and quantitative reasoning.** The student uses place value to communicate about increasingly large whole numbers in verbal and written form, including money.  
The student is expected to:
- (A) use place value to read, write (in symbols and words), and describe the value of whole numbers through 999,999;
  - (B) use place value to compare and order whole numbers through 9,999; and
  - (C) determine the value of a collection of coins and bills.
- (3.2) **Number, operation, and quantitative reasoning.** The student uses fraction names and symbols to describe fractional parts of whole objects or sets of objects.  
The student is expected to:
- (A) construct concrete models of fractions;
  - (B) compare fractional parts of whole objects or sets of objects in a problem situation using concrete models;
  - (C) use fraction names and symbols to describe fractional parts of whole objects or sets of objects with denominators of 12 or less; and
  - (D) construct concrete models of equivalent fractions for fractional parts of whole objects.
- (3.3) **Number, operation, and quantitative reasoning.** The student adds and subtracts to solve meaningful problems involving whole numbers.  
The student is expected to:
- (A) model addition and subtraction using pictures, words, and numbers; and
  - (B) select addition or subtraction and use the operation to solve problems involving whole numbers through 999.
- (3.4) **Number, operation, and quantitative reasoning.** The student recognizes and solves problems in multiplication and division situations.  
The student is expected to:
- (A) learn and apply multiplication facts through the tens using concrete models;
  - (B) solve and record multiplication problems (one-digit multiplier); and
  - (C) use models to solve division problems and use number sentences to record the solutions.
- (3.5) **Number, operation, and quantitative reasoning.** The student estimates to determine reasonable results.  
The student is expected to:
- (A) round two-digit numbers to the nearest ten and three-digit numbers to the nearest hundred; and
  - (B) estimate sums and differences beyond basic facts.
- (3.6) **Patterns, relationships, and algebraic thinking.** The student uses patterns to solve problems.  
The student is expected to:
- (A) identify and extend whole-number and geometric patterns to make predictions and solve problems;
  - (B) identify patterns in multiplication facts using concrete objects, pictorial models, or technology; and
  - (C) identify patterns in related multiplication and division sentences (fact families) such as  $2 \times 3 = 6$ ,  $3 \times 2 = 6$ ,  $6 \div 2 = 3$ ,  $6 \div 3 = 2$ .

### Texas Essential Knowledge and Skills for Grade 3

- (3.7) **Patterns, relationships, and algebraic thinking.** The student uses lists, tables, and charts to express patterns and relationships.  
The student is expected to:
- (A) generate a table of paired numbers based on a real-life situation such as insects and legs; and
  - (B) identify patterns in a table of related number pairs based on a real-life situation and extend the table.
- (3.8) **Geometry and spatial reasoning.** The student uses formal geometric vocabulary.  
The student is expected to:
- (A) name, describe, and compare shapes and solids using formal geometric vocabulary.
- (3.9) **Geometry and spatial reasoning.** The student recognizes congruence and symmetry.  
The student is expected to:
- (A) identify congruent shapes;
  - (B) create shapes with lines of symmetry using concrete models and technology; and
  - (C) identify lines of symmetry in shapes.
- (3.10) **Geometry and spatial reasoning.** The student recognizes that numbers can be represented by points on a line.  
The student is expected to:
- (A) locate and name points on a line using whole numbers and fractions such as halves.
- (3.11) **Measurement.** The student selects and uses appropriate units and procedures to measure length and area.  
The student is expected to:
- (A) estimate and measure lengths using standard units such as inch, foot, yard, centimeter, decimeter, and meter;
  - (B) use linear measure to find the perimeter of a shape; and
  - (C) use concrete models of square units to determine the area of shapes.
- (3.12) **Measurement.** The student measures time and temperature.  
The student is expected to:
- (A) tell and write time shown on traditional and digital clocks; and
  - (B) use a thermometer to measure temperature.
- (3.13) **Measurement.** The student applies measurement concepts.  
The student is expected to:
- (A) measure to solve problems involving length, area, temperature, and time.
- (3.14) **Probability and statistics.** The student solves problems by collecting, organizing, displaying, and interpreting sets of data.  
The student is expected to:
- (A) collect, organize, record, and display data in pictographs and bar graphs where each picture or cell might represent more than one piece of data;
  - (B) interpret information from pictographs and bar graphs; and
  - (C) use data to describe events as more likely, less likely, or equally likely.
- (3.15) **Underlying processes and mathematical tools.** The student applies Grade 3 mathematics to solve problems connected to everyday experiences and activities in and outside of school.  
The student is expected to:
- (A) identify the mathematics in everyday situations;
  - (B) use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;
  - (C) select or develop an appropriate problem-solving strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem; and
  - (D) use tools such as real objects, manipulatives, and technology to solve problems.
- (3.16) **Underlying processes and mathematical tools.** The student communicates about Grade 3 mathematics using informal language.  
The student is expected to:
- (A) explain and record observations using objects, words, pictures, numbers, and technology; and
  - (B) relate informal language to mathematical language and symbols.

### Texas Essential Knowledge and Skills for Grade 3

(3.17) **Underlying processes and mathematical tools.** The student uses logical reasoning to make sense of his or her world.

The student is expected to:

- (A) make generalizations from patterns or sets of examples and nonexamples; and
- (B) justify why an answer is reasonable and explain the solution process.

*Source: The provisions of this §111.15 adopted to be effective September 1, 1998, 22 TexReg 7623.*

## Texas Essential Knowledge and Skills for Grade 4

### §111.16. Mathematics, Grade 4.

- (a) Introduction.
- (1) Within a well-balanced mathematics curriculum, the primary focal points at Grade 4 are comparing and ordering fractions and decimals, applying multiplication and division, and developing ideas related to congruence and symmetry.
- (2) Throughout mathematics in Grades 3-5, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use algorithms for addition, subtraction, multiplication, and division as generalizations connected to concrete experiences; and they concretely develop basic concepts of fractions and decimals. Students use appropriate language and organizational structures such as tables and charts to represent and communicate relationships, make predictions, and solve problems. Students select and use formal language to describe their reasoning as they identify, compare, and classify shapes and solids; and they use numbers, standard units, and measurement tools to describe and compare objects, make estimates, and solve application problems. Students organize data, choose an appropriate method to display the data, and interpret the data to make decisions and predictions and solve problems.
- (3) Problem solving, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Grades 3-5, students use these processes together with technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve problems as they do mathematics.
- (b) Knowledge and skills.
- (4.1) **Number, operation, and quantitative reasoning.** The student uses place value to represent whole numbers and decimals.  
The student is expected to:  
(A) use place value to read, write, compare, and order whole numbers through the millions place; and  
(B) use place value to read, write, compare, and order decimals involving tenths and hundredths, including money, using concrete models.
- (4.2) **Number, operation, and quantitative reasoning.** The student describes and compares fractional parts of whole objects or sets of objects.  
The student is expected to:  
(A) generate equivalent fractions using concrete and pictorial models;  
(B) model fraction quantities greater than one using concrete materials and pictures;  
(C) compare and order fractions using concrete and pictorial models; and  
(D) relate decimals to fractions that name tenths and hundredths using models.
- (4.3) **Number, operation, and quantitative reasoning.** The student adds and subtracts to solve meaningful problems involving whole numbers and decimals.  
The student is expected to:  
(A) use addition and subtraction to solve problems involving whole numbers; and  
(B) add and subtract decimals to the hundredths place using concrete and pictorial models.
- (4.4) **Number, operation, and quantitative reasoning.** The student multiplies and divides to solve meaningful problems involving whole numbers.  
The student is expected to:  
(A) model factors and products using arrays and area models;  
(B) represent multiplication and division situations in picture, word, and number form;  
(C) recall and apply multiplication facts through  $12 \times 12$ ;  
(D) use multiplication to solve problems involving two-digit numbers; and  
(E) use division to solve problems involving one-digit divisors.
- (4.5) **Number, operation, and quantitative reasoning.** The student estimates to determine reasonable results.  
The student is expected to:  
(A) round whole numbers to the nearest ten, hundred, or thousand to approximate reasonable results in problem situations; and  
(B) estimate a product or quotient beyond basic facts.
- (4.6) **Patterns, relationships, and algebraic thinking.** The student uses patterns in multiplication and division.  
The student is expected to:  
(A) use patterns to develop strategies to remember basic multiplication facts;  
(B) solve division problems related to multiplication facts (fact families) such as  $9 \times 9 = 81$  and  $81 \div 9 = 9$ ; and  
(C) use patterns to multiply by 10 and 100.

## Texas Essential Knowledge and Skills for Grade 4

- (4.7) **Patterns, relationships, and algebraic thinking.** The student uses organizational structures to analyze and describe patterns and relationships.  
The student is expected to:
- (A) describe the relationship between two sets of related data such as ordered pairs in a table.
- (4.8) **Geometry and spatial reasoning.** The student identifies and describes lines, shapes, and solids using formal geometric language.  
The student is expected to:
- (A) identify right, acute, and obtuse angles;
  - (B) identify models of parallel and perpendicular lines; and
  - (C) describe shapes and solids in terms of vertices, edges, and faces.
- (4.9) **Geometry and spatial reasoning.** The student connects transformations to congruence and symmetry.  
The student is expected to:
- (A) demonstrate translations, reflections, and rotations using concrete models;
  - (B) use translations, reflections, and rotations to verify that two shapes are congruent; and
  - (C) use reflections to verify that a shape has symmetry.
- (4.10) **Geometry and spatial reasoning.** The student recognizes the connection between numbers and points on a number line.  
The student is expected to:
- (A) locate and name points on a number line using whole numbers, fractions such as halves and fourths, and decimals such as tenths.
- (4.11) **Measurement.** The student selects and uses appropriate units and procedures to measure weight and capacity.  
The student is expected to:
- (A) estimate and measure weight using standard units including ounces, pounds, grams, and kilograms; and
  - (B) estimate and measure capacity using standard units including milliliters, liters, cups, pints, quarts, and gallons.
- (4.12) **Measurement.** The student applies measurement concepts.  
The student is expected to:
- (A) measure to solve problems involving length, including perimeter, time, temperature, and area.
- (4.13) **Probability and statistics.** The student solves problems by collecting, organizing, displaying, and interpreting sets of data.  
The student is expected to:
- (A) list all possible outcomes of a probability experiment such as tossing a coin;
  - (B) use a pair of numbers to compare favorable outcomes to all possible outcomes such as four heads out of six tosses of a coin; and
  - (C) interpret bar graphs.
- (4.14) **Underlying processes and mathematical tools.** The student applies Grade 4 mathematics to solve problems connected to everyday experiences and activities in and outside of school.  
The student is expected to:
- (A) identify the mathematics in everyday situations;
  - (B) use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;
  - (C) select or develop an appropriate problem-solving strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem; and
  - (D) use tools such as real objects, manipulatives, and technology to solve problems.
- (4.15) **Underlying processes and mathematical tools.** The student communicates about Grade 4 mathematics using informal language.  
The student is expected to:
- (A) explain and record observations using objects, words, pictures, numbers, and technology; and
  - (B) relate informal language to mathematical language and symbols.
- (4.16) **Underlying processes and mathematical tools.** The student uses logical reasoning to make sense of his or her world.  
The student is expected to:
- (A) make generalizations from patterns or sets of examples and nonexamples; and
  - (B) justify why an answer is reasonable and explain the solution process.

Source: The provisions of this §111.16 adopted to be effective September 1, 1998, 22 TexReg 7623.

## Texas Essential Knowledge and Skills for Grade 5

### §111.17. Mathematics, Grade 5.

- (a) Introduction.
  - (1) Within a well-balanced mathematics curriculum, the primary focal points at Grade 5 are comparing and contrasting lengths, area, and volume of geometric shapes and solids; representing and interpreting data in graphs, charts, and tables; and applying whole number operations in a variety of contexts.
  - (2) Throughout mathematics in Grades 3-5, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use algorithms for addition, subtraction, multiplication, and division as generalizations connected to concrete experiences; and they concretely develop basic concepts of fractions and decimals. Students use appropriate language and organizational structures such as tables and charts to represent and communicate relationships, make predictions, and solve problems. Students select and use formal language to describe their reasoning as they identify, compare, and classify shapes and solids; and they use numbers, standard units, and measurement tools to describe and compare objects, make estimates, and solve application problems. Students organize data, choose an appropriate method to display the data, and interpret the data to make decisions and predictions and solve problems.
  - (3) Problem solving, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Grades 3-5, students use these processes together with technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve problems as they do mathematics.
- (b) Knowledge and skills.
- (5.1) **Number, operation, and quantitative reasoning.** The student uses place value to represent whole numbers and decimals.  
The student is expected to:
    - (A) use place value to read, write, compare, and order whole numbers through the billions place; and
    - (B) use place value to read, write, compare, and order decimals through the thousandths place.
  - (5.2) **Number, operation, and quantitative reasoning.** The student uses fractions in problem-solving situations.  
The student is expected to:
    - (A) generate equivalent fractions;
    - (B) compare two fractional quantities in problem-solving situations using a variety of methods, including common denominators; and
    - (C) use models to relate decimals to fractions that name tenths, hundredths, and thousandths.
  - (5.3) **Number, operation, and quantitative reasoning.** The student adds, subtracts, multiplies, and divides to solve meaningful problems.  
The student is expected to:
    - (A) use addition and subtraction to solve problems involving whole numbers and decimals;
    - (B) use multiplication to solve problems involving whole numbers (no more than three digits times two digits without technology);
    - (C) use division to solve problems involving whole numbers (no more than two-digit divisors and three-digit dividends without technology);
    - (D) identify prime factors of a whole number and common factors of a set of whole numbers; and
    - (E) model and record addition and subtraction of fractions with like denominators in problem-solving situations.
  - (5.4) **Number, operation, and quantitative reasoning.** The student estimates to determine reasonable results.  
The student is expected to:
    - (A) round whole numbers and decimals through tenths to approximate reasonable results in problem situations; and
    - (B) estimate to solve problems where exact answers are not required.
  - (5.5) **Patterns, relationships, and algebraic thinking.** The student makes generalizations based on observed patterns and relationships.  
The student is expected to:
    - (A) use concrete objects or pictures to make generalizations about determining all possible combinations;
    - (B) use lists, tables, charts, and diagrams to find patterns and make generalizations such as a procedure for determining equivalent fractions; and
    - (C) identify prime and composite numbers using concrete models and patterns in factor pairs.

## Texas Essential Knowledge and Skills for Grade 5

- (5.6) **Patterns, relationships, and algebraic thinking.** The student describes relationships mathematically.  
The student is expected to:  
(A) select from and use diagrams and number sentences to represent real-life situations.
- (5.7) **Geometry and spatial reasoning.** The student generates geometric definitions using critical attributes.  
The student is expected to:  
(A) identify critical attributes including parallel, perpendicular, and congruent parts of geometric shapes and solids; and  
(B) use critical attributes to define geometric shapes or solids.
- (5.8) **Geometry and spatial reasoning.** The student models transformations.  
The student is expected to:  
(A) sketch the results of translations, rotations, and reflections; and  
(B) describe the transformation that generates one figure from the other when given two congruent figures.
- (5.9) **Geometry and spatial reasoning.** The student recognizes the connection between ordered pairs of numbers and locations of points on a plane.  
The student is expected to:  
(A) locate and name points on a coordinate grid using ordered pairs of whole numbers.
- (5.10) **Measurement.** The student selects and uses appropriate units and procedures to measure volume.  
The student is expected to:  
(A) measure volume using concrete models of cubic units; and  
(B) estimate volume in cubic units.
- (5.11) **Measurement.** The student applies measurement concepts.  
The student is expected to:  
(A) measure to solve problems involving length (including perimeter), weight, capacity, time, temperature, and area; and  
(B) describe numerical relationships between units of measure within the same measurement system such as an inch is one-twelfth of a foot.
- (5.12) **Probability and statistics.** The student describes and predicts the results of a probability experiment.  
The student is expected to:  
(A) use fractions to describe the results of an experiment; and  
(B) use experimental results to make predictions.
- (5.13) **Probability and statistics.** The student solves problems by collecting, organizing, displaying, and interpreting sets of data.  
The student is expected to:  
(A) use tables of related number pairs to make line graphs;  
(B) describe characteristics of data presented in tables and graphs including the shape and spread of the data and the middle number; and  
(C) graph a given set of data using an appropriate graphical representation such as a picture or line.
- (5.14) **Underlying processes and mathematical tools.** The student applies Grade 5 mathematics to solve problems connected to everyday experiences and activities in and outside of school.  
The student is expected to:  
(A) identify the mathematics in everyday situations;  
(B) use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;  
(C) select or develop an appropriate problem-solving strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem; and  
(D) use tools such as real objects, manipulatives, and technology to solve problems.
- (5.15) **Underlying processes and mathematical tools.** The student communicates about Grade 5 mathematics using informal language.  
The student is expected to:  
(A) explain and record observations using objects, words, pictures, numbers, and technology; and  
(B) relate informal language to mathematical language and symbols.

## Texas Essential Knowledge and Skills for Grade 5

(5.16) **Underlying processes and mathematical tools.** The student uses logical reasoning to make sense of his or her world.

The student is expected to:

- (A) make generalizations from patterns or sets of examples and nonexamples; and
- (B) justify why an answer is reasonable and explain the solution process.

*Source: The provisions of this §111.17 adopted to be effective September 1, 1998, 22 TexReg 7623.Chapter 111. Texas Essential Knowledge and Skills for Mathematics*