

## **Texas Essential Knowledge & Skills 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.

(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.

(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.

(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) 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.

(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.

(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.

(7) Patterns, relationships, and algebraic thinking. The student uses organizational structures to analyze and describe patterns and relationships.

The student is expected to describe the relationship between two sets of related data such as ordered pairs in a table.

(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.

(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.

(10) Geometry and spatial reasoning. The student recognizes the connection between numbers and points on a number line. The student is expected to locate and name points on a number line using whole numbers, fractions such as halves and fourths, and decimals such as tenths.

(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.

(12) Measurement. The student applies measurement concepts. The student is expected to measure to solve problems involving length, including perimeter, time, temperature, and area.

(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.

(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.

(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.

(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.*