

5th Grade TEKS

(1) Within a well-balanced mathematics curriculum, the primary focal points are comparing and contrasting lengths, areas, and volumes of two- and three-dimensional geometric figures; representing and interpreting data in groups, 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 two- or three-dimensional geometric figures; and they use number, 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) Throughout mathematics in Grades 3-5, students develop numerical fluency with conceptual understanding and computational accuracy. Students in Grades 3-5 use knowledge of the base ten place value system to compose and decompose numbers in order to solve problems requiring precision, estimation, and reasonableness. By the end of Grade 5, students know basic addition, subtraction, multiplication, and division facts and are using them to work flexibly, efficiently and accurately with numbers during addition, subtraction, multiplication, and division.

(4) 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 meaningful problems as they do mathematics

(5.1) Number, operation, and quantitative reasoning. The student uses place value to represent whole numbers and decimals.

5.1(A) use place value to read, write, compare, and order whole numbers through 999,999,999,999

Include:

- * Convert from standard to written (digits to words)
- * Convert from written to standard (words to digits)
- * Include expanded notation--ex. $(3 \times 100) + (5 \times 10) + (7 \times 1)$ also, $300 + 50 + 7$
- * Convert from expanded to standard
- * Convert from standard to expanded
- * Use place and value (such as 31,465 – the four is in the hundreds place and the value is 400)
- * Include using symbols and words for “greater than” (>), “less than” (<), and equal to (=)
- * Compare and order groups of numbers
- * Sequence numbers/words (such as populations and names of cities) from least to greatest
- * Sequence within a given range, such as “is 300 between 0 and 500?”
- * Include non-examples - “which of these does NOT make the sentence true? -- What could you do to make this true? --Why is this not true?”

Helpful manipulatives:

Base ten pieces, straws, paper clips, place value charts

5.1(B) use place value to read, write, compare, and order decimals through the thousandths place

Include:

- * Convert from standard to written
- * Convert from written to standard
- * Use place and value ex. 1.56, the 6 is in the hundredth place and the value is .06 or 6 hundredths
- * Use symbols and words for "greater than" (>) and "less than" (<)
- * Compare and order groups of decimal numbers using numbers in a table and number lines (also within given ranges)
- * Write in standard form from pictorial models

Vocabulary:

- * Less than/greater than; equal/equivalent

Helpful manipulatives:

Place value chart, money, base ten pieces

Note:

- * Thousandths place is introduced in 5th grade.

(5.2) Number, operation, and quantitative reasoning. The student uses fractions in problem-solving situations.

5.2(A) generate a fraction equivalent to a given fraction such as $\frac{1}{2}$ and $\frac{3}{6}$ or $\frac{4}{12}$ and $\frac{1}{3}$

Include:

- * Generate a pattern of concrete fractions
- * Students should explain the relationship between the concrete patterns
- * Students should record the abstract fractions after the relationship is understood
- * Solve problems/compare pairs of fractions and recognize reduced fractions

Vocabulary:

- * equivalent fractions, simplest form, lowest terms.

Helpful manipulatives:

- * Tiles, pattern blocks, fraction strips, Cuisenaire rods

5.2(B) generate a mixed number to a given improper fraction or generate an improper fraction equivalent to a given mixed number

Include:

- * Recognize fractions equal to, less than, and greater than one whole ($\frac{5}{5} = 1$, $\frac{7}{5} > 1$, $\frac{2}{5} < 1$)
- * Include parts of a whole and sets of objects

Vocabulary:

- * numerator and denominator, proper, improper, mixed number, equivalent

Helpful manipulatives:

- * Cuisenaire rods, egg cartons, fraction strips, pattern blocks

Note:

- * Students must connect the concrete to the pictorial to the abstract for conceptual understanding (manipulatives-pictures-numbers).
- * Students develop their own process to convert between forms of fractions by working with models.

5.2(C) compare two fractional quantities in problem-solving situations using a variety of methods, including common denominators;

Include:

- * Use fractions equal to, less than, and greater than one whole
- * Use pictorial representations and list equivalent fractions
- * Include problem solving situations

Vocabulary:

- * numerator and denominator

Note:

- * Unlike denominators are introduced in 6th grade
- * Do not teach "cross products" for checking equivalent fractions

5.2(D) use models to relate decimals to fractions that name tenths, hundredths, and thousandths

Include:

- * Symbols such as $\frac{1}{1000}$, 0.001, etc.
- * Students understand the value of $\frac{1}{1000}$ is the same as 0.001

Helpful manipulatives:

- * Base Ten Pieces for understanding, number lines, fraction bars

Note:

- * Solve problems such as a picture may show $\frac{1}{2}$ shaded and the answer may be 0.5 in the decimal form.
- * Pictorial representations of a 10th of a circle and a 10th of a 100th's grid show equivalence.

(5.3) Number, operation, and quantitative reasoning. The student adds, subtracts, multiplies, and divides to solve meaningful problems.

5.3(A) use addition and subtraction to solve problems involving whole numbers and decimals

Include:

- * Students should write the process of solving problems
- * Students should create number sentences to match the problems such as: $(16 + 12) + (9 - 8)$
- * Problem situations should include multiple operations
- * Apply addition/subtraction concepts

Vocabulary:

- * addends, sum, difference

Helpful manipulatives:

- * Base 10 pieces

5.3(B) use multiplication to solve problems involving whole numbers (no more than three digits times two digits without technology)

Include:

- * Apply multiplication concepts
- * Include all representations - concrete/pictorial/abstract

Vocabulary:

- * factor, product, multiple

Note:

- * This TEKS is sometimes tested as bubbles on a grid.

5.3(C) use division to solve problems involving whole numbers (no more than two-digit divisors and three-digit dividends without technology) including interpreting the remainder within a given context

Include:

- * Connection between multiplication/division concepts
- * Remainders written as fractions
- * Working with and making connections among the different representations (concrete/pictorial/abstract)

Vocabulary:

- * dividend, divisor, quotient, remainder

Helpful manipulatives:

- * Base 10 pieces, cubes, color tiles

5.3(D) identify common factors of a set of whole numbers

Include:

- * Apply multiplication concepts

Vocabulary:

- * factors, products, common, and arrays

Helpful manipulatives:

- * Cuisenaire rods, tiles, linear pieces (linear dimensions and area arrays are a must in developing this concept)

Note:

- * This is a new concept introduced in 5th grade.
- * Linear dimensions and area arrays are a must in developing this concept.

5.3(E) model situations using addition and/or subtraction involving fractions with like denominators using concrete objects, pictures, words, and numbers

Include:

- * Working with and making connections among the different representations (concrete/pictorial/abstract)
- * Construct and draw the models
- * Communicate with words (journals)

Helpful manipulatives:

- * Tiles, pattern blocks, fraction strips, Cuisenaire rods, egg cartons

Note:

- * Students add and subtract "like denominators" in 5th grade. Unlike denominators are introduced in 6th grade. (6.2) students add and subtract with unlike denominators.

(5.4) Number, operation, and quantitative reasoning. The student estimates to determine reasonable results.

Use strategies including rounding and compatible numbers to estimate solutions to addition, subtraction, multiplication, and division problems

Include:

- * Estimate numbers before computation
- * Use compatible numbers
- * Work with examples of real-life estimation
- * Rounding and estimation in word problems
- * Justify reasonableness
- * Single digits are not rounded
- * Addition and subtraction-round to highest place value of smallest digit (237-46 would be 240-50)
- * Multiplication and division-round to the highest place value of each number (e.g. front-end estimation)
- * Front-end estimation (237-46 would be 200-50)

Vocabulary:

*Compatible numbers are "numbers that are easy to compute mentally."

For example:

- $25 + 46 + 75$...think $(25 + 75) + 46$; which would be $100 + 46$
- $78 + 96$ can be computed as $75 + 100$ or $78 + 100$
- $4,126 \div 8$ - think $4,000 \div 8 = 500$

Helpful manipulatives:

- * Base 10 pieces, number lines

Note:

Compatible numbers do not always end in a zero.

(5.5) Patterns, relationships, and algebraic thinking. The student makes generalizations based on observed patterns and relationships.

5.5(A) describe the relationship between sets of data in graphic organizers such as lists, tables, charts, and diagrams

Include:

- * Journal writing explaining in words the relationship
- * Pictorial models illustrating the relationship
- * A variety of tables, charts, lists
- * Picture, Bar, Line graphs
- * Diagrams
- * Using both horizontal and vertical tables

5.5(B) identify prime and composite numbers using concrete objects, pictorial models, and patterns in factor pairs

Include:

- * Area arrays
- * Pictorial drawings on grid paper
- * Real-life application
- * Word problems
- * Working with and making connections among the different representations (concrete/pictorial/abstract)

Vocabulary:

- * prime, composite, factor pairs

Helpful manipulatives:

- * Base 10 pieces, tiles, linear pieces

Note:

- * Prime factorization has been taken out of 5th grade and moved to 6th grade.

(5.6) Patterns, relationships, and algebraic thinking. The student describes relationships mathematically.

5.6 Select from and use diagrams and equations such as $y=5+3$ to represent meaningful problem situations

Include:

- * Students - journal writing describes the meaning of the equation. (ex. $y=5+3$)
- * Students create pictorial models of equations
- * Tables, lists, charts
- * Working with and making connections among the different representations: concrete/pictorial/abstract
- * Real-life application requiring multi-steps

Vocabulary:

- * variable (use letters with contextual meaning ex. "h" for height and "n" for number)

Helpful manipulatives:

- * tiles, balance

Note:

- * Diagram maybe in the form of a pictorial representation such as five apples plus three apples. Relationships of patterns may be written in words.

(5.7) Geometry and spatial reasoning. The student is expected to

5.7 identify essential attributes including parallel, perpendicular, and congruent parts of two- and three-dimensional geometric figures

Include:

Two dimensional figures:

- Vertices, sides, and faces

Three dimensional figures:

- Vertices, edges, faces

Vocabulary:

- **Two-dimensional** vocabulary (circle, polygon, triangle, square, rectangle, quadrilateral, rhombus, trapezoid, parallelogram, pentagon, hexagon, octagon, side, vertex)

- **Three-dimensional** vocabulary (sphere, cone, cylinder, cube, rectangular prism, triangular prism, square pyramid, triangular pyramid, vertex, edge, face, base)

Helpful Manipulatives:

- 1) Pattern blocks
- 2) Tangrams
- 3) Geoboards
- 4) 3-D geometric shapes
- 5) Everyday items

Note:

* Teacher should state attributes of an object and students pick an object from a group of items.

(5.8) Geometry and spatial reasoning. The student models transformations.

5.8(A) sketch the results of translations, rotations, and reflections on a Quadrant I coordinate grid

Include:

- * Journal writing - students form definitions using attributes
- * Pictorial representations on geoboard grid paper
- * Real world application

Helpful manipulatives:

- * Geoboards, tangrams

Note:

* This TEKS is often tested with gridable answers.

5.8(B) identify the transformation that generates one figure from the other when given two congruent figures on a Quadrant I coordinate grid

Include:

- * Must work with and understand the concept of congruent
- * Pictorial representations on geoboard grid paper (often tested on grids)

Helpful manipulatives:

- * Geoboards and tangrams

Note:

* Students should only work in Quadrant One.

(5.9) Geometry and spatial reasoning. The student recognizes the connection between ordered pairs of numbers and locations of points on a plane.

5.9 Locate and name points on a coordinate grid using ordered pairs of whole numbers

Include:

- * Focus on concept and position of points on a coordinate grid related to written coordinate (3, 5)
- * Include pictorial representations
- * Combine the concept of x-axis, y-axis, and ordered pairs
- * Use only **positive whole numbers** in Quadrant One

Note:

- * Points on a grid is a new concept introduced in 5th grade.

(5.10) Measurement. The student applies measurement concepts involving length (including perimeter), area, capacity/volume, and weight/mass to solve problems.

5.10(A) perform simple conversions within the same measurement system (customary or SI)

Include:

- * Always estimate first
- * Measurement should be hands-on application
- * Include customary units such as: (inch, foot, yard, mile)
- * Include metric units such as: (centimeter, decimeter, meter, millimeter, kilometer)
- * Use comparison of measurements (e.g. 6 inches and 1/2 foot) in problem solving

1 meter = 1/1000 kilometer

1 decimeter = 1/10 meter

1 centimeter = 1/100 meter

1 millimeter = 1/10 centimeter

1 foot = 1/3 yard

1 inch = 1/12 foot

1 milliliter = 1/1000 of a liter

1 quart = 1/4 gallon

1 pint = 1/2 quart

1 cup = 1/2 pint

1 ounce = 1/8 cup

1 gram = 1/1000 kilogram

1 ounce = 1/16 pound

Note:

- * Metric conversion is a new concept introduced in 5th grade.
- * 5th grade converts in both metric and customary

5.10(B) connect models for perimeter, area, and volume with their respective formulas

Include:

- * Exploration students should construct models and discover formulas
- * Measure with concrete models (cubes)
- * Create and analyze pictorial model
- * Apply formula in problem situations.

Note:

- * Formula for volume is a new concept introduced in 5th grade.

5.10(C) select and use appropriate units and formulas to measure length, perimeter, area and volume

Include:

- * Students must recognize the distance around an object is perimeter, to cover the interior is area, and the amount of space inside a three dimensional figure is volume.
- * Exploration-students should measure real life objects to develop, understand, and connect formulas for perimeter and area
- * Student "measures" = hands-on
- * Working with and making connections among the different representations (concrete/pictorial/abstract)
- * Include customary units of measurement
- * Include metric units of measurement
- * Focus on formulas for area, perimeter, volume

Helpful Manipulatives:

- Area arrays with tiles, linear lines for dimensions, cubes for volume

Note:

- * The formula of volume is introduced in 5th grade.

5.10(D) estimate volume in cubic units

Include:

- * Student must use concrete models and move to pictorial
- * Student estimates and then investigates using cubes

(5.11) Measurement. The student applies measurement concepts. The student measures time and temperature (in degrees Fahrenheit and Celsius).

5.11(A) solve problems involving changes in temperature

Include:

- * Real life applications should be used in solving problems
- * Students use thermometers to measure Fahrenheit and Celsius

Vocabulary:

- * increase, decrease

Note:

- * Solving problems with changes in temperature is introduced in 5th grade.

5.11(B) solve problems involving elapsed time

Include:

- * Include both analog and digital clocks
- * Work with a range of time
- * Solve problems with real life applications

Note:

- * Fourth grade uses tools to solve problems with elapsed time.

(5.12) Probability and statistics. The student describes and predicts the results of a probability experiment.

5.12(A) use fractions to describe the results of an experiment

Include:

- * Experiments to derive data
- * Record results in lists, tables, diagrams, and graphs

Vocabulary:

- * Halves
- * Thirds
- * Fourths
- * Fifths
- * Sixths
- * Eighths
- * Tenths
- * Twelfths

Helpful manipulatives:

- * tiles, two-color counters, coins, random number generators, spinners

5.12(B) use experimental results to make predictions

Include:

- * Gather data through doing experimental activities
- * Record results in lists, tables, diagrams, and graphs

Helpful manipulatives:

tiles, two-color counters, coins, random number generators, spinners

Note:

- * Students must state and understand the concepts of "one out of four" and $1/4$.
- * Assessment answers may be in fraction form.

5.12(C) list all possible outcomes of a probability experiment such as tossing a coin

Include:

- * Gather data through doing experimental activities
- * Record results in lists, tables, diagrams, and graphs

Helpful manipulatives:

* tiles, two-color counters, coins, random number generators, spinners

Note:

- * Students must state "one out of four" and represent $1/4$.
- * Assessment answers may be in words or numbers.

(5.13) Probability and statistics. The student solves problems by collecting, organizing, displaying, and interpreting sets of data.

5.13(A) use tables of related number pairs to make line graphs

Include:

- * Coordinate grids
- * Write and read ordered pairs (2, 5).
- * Label points on grid

Note:

- * Line graphs are introduced in 5th grade.

5.13(B) describe characteristics of data presented in tables and graphs including median, mode, and range

Include:

- * Journals—to verbally "describe" the data
- * Determine median, mode, and range from tables of data
- * Determine median, mode, and range from graphs

Vocabulary:

- * Median—the middle number when numbers are arranged in order
- * Mode—the number or numbers that occur most often in a set of numbers
- * Range—can refer to the difference between the highest and the lowest number. It can also refer to any number contained in the spread of the data.

5.13(C) graph a given set of data using an appropriate graphical representation such as a picture or line graph

Include:

- * Include pictographs, bar graphs, line graphs
- * Graphs read vertically and horizontally
- * Children may need to complete a portion of graph
- * Interpret graph by combining information on graph
- * Students must construct graphs by :
 - * Collect data
 - * Organize data
 - * Record data
 - * Display data

Note:

- * Line graphs are introduced in 5th grade.

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

5.14(A) identify the mathematics in everyday situations

Note:

- * Objective 6 is tested in all strands.
- * Engage the students with real life experiences.
- * Students should not only solve problems, but create problems when given mathematical expressions.

5.14(B) solve problems that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness

Include:

- * Explore problems using concrete manipulatives
- * Draw a picture (pictorial)
- * Share thoughts with peers
- * Create questions
- * Journal thoughts
- * Record or communicate with words/pictures/numbers
- * Justify answer

5.14(C) select or develop an appropriate problem-solving plan or 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

Include:

- * Explore with concrete manipulatives
- * Draw a picture (pictorial)
- * Share thoughts with peers
- * Journal thoughts
- * Record or communicate with words/pictures/numbers
- * Justify answer

Note:

- * This is tested in other strands...such as:
 - Student assesses necessary information to solve problems
 - Missing information or sequence of steps (process)
 - What is the "known" and "unknown" of the problem?
- * Make sure students process from concrete to pictorial to written computation.

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5.14(D) use tools such as real objects, manipulatives, and technology to solve problems

Include:

- * Explore with concrete manipulatives
- * Draw a picture (pictorial)
- * Share thoughts with peers
- * Journal thoughts
- * Numerical representation
- * Justify answer
- * Work with and make connections among the different representations: concrete/pictorial/abstract
- * Use calculators

(5.15) Underlying processes and mathematical tools. The student communicates about mathematics using informal language.

5.15(A) explain and record observations using objects, words, pictures, numbers, and technology

Include:

- * Describe the process in words (written and/or orally)
- * Journal writing/drawing is imperative
- * Oral explanation is a must
- * Calculators

Note:

- * This is tested in other objectives. Solutions to problems may include the solution process in words.

5.15(B) relate informal language to mathematical language and symbols

Include:

- * Students write and understand words, numbers, and symbols
- * Journal writing is imperative
- * Oral explanation is a must (students should talk to other students, the teacher, and to the class)

Note:

- * This is tested in other objectives.

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

5.16(A) make generalizations from patterns or sets of examples and non examples

Include:

- * Identify attributes of examples
- * Explain why examples are false
- * Examples may have nonsense words

5.16(B) justify why an answer is reasonable and explain the solution process

Include:

- * Students justify and prove their solutions in written/spoken words, pictures, concrete objects, and/or numbers
- * Journal writing (may include process or explanation, etc.)
- * Peer explanations
- * Classroom discussions