

Mathematics

Assessment Anchors and Eligible Content Aligned to the Pennsylvania Core Standards



Grade

3



Pennsylvania Department of Education

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Pennsylvania System of School Assessment

The Assessment Anchors, as defined by the Eligible Content, are organized into cohesive blueprints, each structured with a common labeling system that can be read like an outline. This framework is organized first by Reporting Category, then by Assessment Anchor, followed by Anchor Descriptor, and then finally, at the greatest level of detail, by an Eligible Content statement. The common format of this outline is followed across the PSSA.

Here is a description of each level in the labeling system for the PSSA:

Reporting Category

The Assessment Anchors are organized into four classifications, as listed below.

- o A = Numbers and Operations
- o B = Algebraic Concepts
- o C = Geometry
- o D = Data Analysis and Probability

These four classifications are used throughout the grade levels. In addition to these classifications, there are five Reporting Categories for each grade level. The first letter of each Reporting Category represents the classification; the second letter represents the Domain as stated in the Pennsylvania Core Standards for Mathematics. Listed below are the Reporting Categories for Grade 3.

- o A-T = Numbers and Operations in Base Ten
- o A-F = Numbers and Operations—Fractions
- o B-O = Operations and Algebraic Thinking
- o C-G = Geometry
- o D-M = Measurement and Data

The title of each Reporting Category is consistent with the title of the corresponding Domain in the Pennsylvania Core Standards for Mathematics. The Reporting Category title appears at the top of each page.

Assessment Anchor

The Assessment Anchor appears in the shaded bar across the top of each Assessment Anchor table. The Assessment Anchors represent categories of subject matter (skills and concepts) that anchor the content of the PSSA. Each Assessment Anchor is part of a Reporting Category and has one or more Anchor Descriptors unified under and aligned to it.

Anchor Descriptor

Below each Assessment Anchor is one or more specific Anchor Descriptors. The Anchor Descriptor adds a level of specificity to the content covered by the Assessment Anchor. Each Anchor Descriptor is part of an Assessment Anchor and has one or more Eligible Content statements unified under and aligned to it.

Eligible Content

The column to the right of the Anchor Descriptor contains the Eligible Content statements. The Eligible Content is the most specific description of the skills and concepts assessed on the PSSA. This level is considered the assessment limit and helps educators identify the range of the content covered on the PSSA.
Note: All Grade 3 Eligible Content statements are considered Non-Calculator.

Reference

In the space below each Assessment Anchor table is a code representing one or more Pennsylvania Core Standards for Mathematics that correlate to the Eligible Content statements.

M03.A-T Numbers and Operations in Base Ten

Reporting Category

ASSESSMENT ANCHOR

M03.A-T.1 Use place-value understanding and properties of operations to perform multi-digit arithmetic.

DESCRIPTOR

ELIGIBLE CONTENT

M03.A-T.1.1	Apply place-value strategies to solve problems.	M03.A-T.1.1.1	Round two- and three-digit whole numbers to the nearest ten or hundred, respectively.
		M03.A-T.1.1.2	Add two- and three-digit whole numbers (limit sums from 100 through 1,000) and/or subtract two- and three-digit numbers from three-digit whole numbers.
		M03.A-T.1.1.3	Multiply one-digit whole numbers by two-digit multiples of 10 (from 10 through 90).
		M03.A-T.1.1.4	Order a set of whole numbers from least to greatest or greatest to least (up through 9,999, and limit sets to no more than four numbers).

Reference:

CC.2.1.3.B.1

Apply place-value understanding and properties of operations to perform multi-digit arithmetic.

M03.A-F Numbers and Operations—Fractions

Reporting Category

ASSESSMENT ANCHOR

M03.A-F.1 Develop an understanding of fractions as numbers.

DESCRIPTOR

ELIGIBLE CONTENT

M03.A-F.1.1 Develop and apply number theory concepts to compare quantities and magnitudes of fractions and whole numbers.

- | | |
|----------------------|--|
| M03.A-F.1.1.1 | Demonstrate that when a whole or set is partitioned into y equal parts, the fraction $1/y$ represents 1 part of the whole and/or the fraction x/y represents x equal parts of the whole (limit denominators to 2, 3, 4, 6, and 8; limit numerators to whole numbers less than the denominator; and no simplification necessary). |
| M03.A-F.1.1.2 | Represent fractions on a number line (limit denominators to 2, 3, 4, 6, and 8; limit numerators to whole numbers less than the denominator; and no simplification necessary). |
| M03.A-F.1.1.3 | Recognize and generate simple equivalent fractions (limit the denominators to 1, 2, 3, 4, 6, and 8 and limit numerators to whole numbers less than the denominator).
<i>Example 1:</i> $1/2 = 2/4$
<i>Example 2:</i> $4/6 = 2/3$ |
| M03.A-F.1.1.4 | Express whole numbers as fractions, and/or generate fractions that are equivalent to whole numbers (limit denominators to 1, 2, 3, 4, 6, and 8).
<i>Example 1:</i> Express 3 in the form $3 = 3/1$.
<i>Example 2:</i> Recognize that $6/1 = 6$. |
| M03.A-F.1.1.5 | Compare two fractions with the same denominator (limit denominators to 1, 2, 3, 4, 6, and 8), using the symbols $>$, $=$, or $<$, and/or justify the conclusions. |

Reference:

CC.2.1.3.C.1

Explore and develop an understanding of fractions as numbers.

M03.B-O Operations and Algebraic Thinking

Reporting Category

ASSESSMENT ANCHOR

M03.B-O.1 Represent and solve problems involving multiplication and division.

DESCRIPTOR

ELIGIBLE CONTENT

M03.B-O.1.1 Understand various meanings of multiplication and division.

M03.B-O.1.1.1 Interpret and/or describe products of whole numbers (up to and including 10×10).
Example 1: Interpret 35 as the total number of objects in 5 groups, each containing 7 objects.
Example 2: Describe a context in which a total number of objects can be expressed as 5×7 .

M03.B-O.1.1.2 Interpret and/or describe whole-number quotients of whole numbers (limit dividends through 50 and limit divisors and quotients through 10).
Example 1: Interpret $48 \div 8$ as the number of objects in each share when 48 objects are partitioned equally into 8 shares, or as a number of shares when 48 objects are partitioned into equal shares of 8 objects each.
Example 2: Describe a context in which a number of shares or a number of groups can be expressed as $48 \div 8$.

Reference:

CC.2.2.3.A.1

Represent and solve problems involving multiplication and division.

M03.B-O Operations and Algebraic Thinking

Reporting Category

ASSESSMENT ANCHOR

M03.B-O.1 Represent and solve problems involving multiplication and division.

DESCRIPTOR

M03.B-O.1.2 Solve mathematical and real-world problems using multiplication and division, including determining the missing number in a multiplication and/or division equation.

ELIGIBLE CONTENT

M03.B-O.1.2.1 Use multiplication (up to and including 10×10) and/or division (limit dividends through 50 and limit divisors and quotients through 10) to solve word problems in situations involving equal groups, arrays, and/or measurement quantities.

M03.B-O.1.2.2 Determine the unknown whole number in a multiplication (up to and including 10×10) or division (limit dividends through 50 and limit divisors and quotients through 10) equation relating three whole numbers.
Example: Determine the unknown number that makes an equation true.

Reference:

CC.2.2.3.A.1

Represent and solve problems involving multiplication and division.

M03.B-O Operations and Algebraic Thinking

Reporting Category

ASSESSMENT ANCHOR

M03.B-O.2 Understand properties of multiplication and the relationship between multiplication and division.

DESCRIPTOR

ELIGIBLE CONTENT

M03.B-O.2.1 Use properties to simplify and solve multiplication problems.

M03.B-O.2.1.1 Apply the commutative property of multiplication (not identification or definition of the property).

M03.B-O.2.1.2 Apply the associative property of multiplication (not identification or definition of the property).

Reference:

CC.2.2.3.A.2

Understand properties of multiplication and the relationship between multiplication and division.

M03.B-O Operations and Algebraic Thinking

Reporting Category

ASSESSMENT ANCHOR

M03.B-O.2 Understand properties of multiplication and the relationship between multiplication and division.

DESCRIPTOR

ELIGIBLE CONTENT

M03.B-O.2.2 Relate division to a missing-number multiplication equation.

M03.B-O.2.2.1 Interpret and/or model division as a multiplication equation with an unknown factor.
Example: Find $32 \div 8$ by solving $8 \times ? = 32$.

Reference:

CC.2.2.3.A.2

Understand properties of multiplication and the relationship between multiplication and division.

M03.B-O Operations and Algebraic Thinking

Reporting Category

ASSESSMENT ANCHOR

M03.B-O.3 Solve problems involving the four operations, and identify and explain patterns in arithmetic.

DESCRIPTOR

ELIGIBLE CONTENT

M03.B-O.3.1 Use operations, patterns, and estimation strategies to solve problems (may include word problems).

- M03.B-O.3.1.1** Solve two-step word problems using the four operations (expressions are not explicitly stated). Limit to problems with whole numbers and having whole-number answers.
- M03.B-O.3.1.2** Represent two-step word problems using equations with a symbol standing for the unknown quantity. Limit to problems with whole numbers and having whole-number answers.
- M03.B-O.3.1.3** Assess the reasonableness of answers. Limit problems posed with whole numbers and having whole-number answers.
- M03.B-O.3.1.4** Solve two-step equations using order of operations (equation is explicitly stated with no grouping symbols).
- M03.B-O.3.1.5** Identify arithmetic patterns (including patterns in the addition table or multiplication table) and/or explain them using properties of operations.
Example 1: Observe that 4 times a number is always even.
Example 2: Explain why 6 times a number can be decomposed into three equal addends.
- M03.B-O.3.1.6** Create or match a story to a given combination of symbols (+, −, ×, ÷, <, >, and =) and numbers.
- M03.B-O.3.1.7** Identify the missing symbol (+, −, ×, ÷, <, >, and =) that makes a number sentence true.

Reference:

CC.2.2.3.A.4

Solve problems involving the four operations, and identify and explain patterns in arithmetic.

M03.C-G Geometry

Reporting Category

ASSESSMENT ANCHOR

M03.C-G.1 Reason with shapes and their attributes.

DESCRIPTOR

M03.C-G.1.1 Analyze characteristics of polygons.

ELIGIBLE CONTENT

- M03.C-G.1.1.1** Explain that shapes in different categories may share attributes and that the shared attributes can define a larger category.
Example 1: A rhombus and a rectangle are both quadrilaterals since they both have exactly four sides.
Example 2: A triangle and a pentagon are both polygons since they are both multi-sided plane figures.
- M03.C-G.1.1.2** Recognize rhombi, rectangles, and squares as examples of quadrilaterals and/or draw examples of quadrilaterals that do not belong to any of these subcategories.
- M03.C-G.1.1.3** Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.
Example 1: Partition a shape into 4 parts with equal areas.
Example 2: Describe the area of each of 8 equal parts as $\frac{1}{8}$ of the area of the shape.

Reference:

CC.2.3.3.A.1

Identify, compare, and classify shapes and their attributes.

CC.2.3.3.A.2

Use the understanding of fractions to partition shapes into parts with equal areas and express the area of each part as a unit fraction of the whole.

M03.D-M Measurement and Data

Reporting Category

ASSESSMENT ANCHOR

M03.D-M.1 Solve problems involving measurement and estimation of intervals of time, money, liquid volumes, masses, and lengths of objects.

DESCRIPTOR

ELIGIBLE CONTENT

M03.D-M.1.1 Determine or calculate time and elapsed time.

M03.D-M.1.1.1 Tell, show, and/or write time (analog) to the nearest minute.

M03.D-M.1.1.2 Calculate elapsed time to the minute in a given situation (total elapsed time limited to 60 minutes or less).

Reference:

CC.2.4.3.A.2

Tell and write time to the nearest minute and solve problems by calculating time intervals.

M03.D-M Measurement and Data

Reporting Category

ASSESSMENT ANCHOR

M03.D-M.1 Solve problems involving measurement and estimation of intervals of time, money, liquid volumes, masses, and lengths of objects.

DESCRIPTOR

ELIGIBLE CONTENT

M03.D-M.1.2 Use the attributes of liquid volume, mass, and length of objects.

M03.D-M.1.2.1 Measure and estimate liquid volumes and masses of objects using standard units (cups [c], pints [pt], quarts [qt], gallons [gal], ounces [oz.], and pounds [lb]) and metric units (liters [l], grams [g], and kilograms [kg]).

M03.D-M.1.2.2 Add, subtract, multiply, and divide to solve one-step word problems involving masses or liquid volumes that are given in the same units.

M03.D-M.1.2.3 Use a ruler to measure lengths to the nearest quarter inch or centimeter.

Reference:

CC.2.4.3.A.1

Solve problems involving measurement and estimation of temperature, liquid volume, mass or length.

M03.D-M Measurement and Data

Reporting Category

ASSESSMENT ANCHOR

M03.D-M.1 Solve problems involving measurement and estimation of intervals of time, money, liquid volumes, masses, and lengths of objects.

DESCRIPTOR

ELIGIBLE CONTENT

M03.D-M.1.3 Count, compare, and make change using a collection of coins and one-dollar bills.

M03.D-M.1.3.1 Compare total values of combinations of coins (penny, nickel, dime, and quarter) and/or dollar bills less than \$5.00.

M03.D-M.1.3.2 Make change for an amount up to \$5.00 with no more than \$2.00 change given (penny, nickel, dime, quarter, and dollar).

M03.D-M.1.3.3 Round amounts of money to the nearest dollar.

Reference:

CC.2.4.3.A.3

Solve problems and make change involving money using a combination of coins and bills.

M03.D-M Measurement and Data

Reporting Category

ASSESSMENT ANCHOR

M03.D-M.2 Represent and interpret data.

DESCRIPTOR

M03.D-M.2.1 Organize, display, and answer questions based on data.

ELIGIBLE CONTENT

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|----------------------|--|
| M03.D-M.2.1.1 | Complete a scaled pictograph and a scaled bar graph to represent a data set with several categories (scales limited to 1, 2, 5, and 10). |
| M03.D-M.2.1.2 | Solve one- and two-step problems using information to interpret data presented in scaled pictographs and scaled bar graphs (scales limited to 1, 2, 5, and 10).
<i>Example 1: (One-step) "Which category is the largest?"</i>
<i>Example 2: (Two-step) "How many more are in category A than in category B?"</i> |
| M03.D-M.2.1.3 | Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Display the data by making a line plot, where the horizontal scale is marked in appropriate units—whole numbers, halves, or quarters. |
| M03.D-M.2.1.4 | Translate information from one type of display to another. Limit to pictographs, tally charts, bar graphs, and tables.
<i>Example: Convert a tally chart to a bar graph.</i> |

Reference:

CC.2.4.3.A.4

Represent and interpret data using tally charts, tables, pictographs, line plots, and bar graphs.

M03.D-M Measurement and Data

Reporting Category

ASSESSMENT ANCHOR

M03.D-M.3 Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

DESCRIPTOR

ELIGIBLE CONTENT

M03.D-M.3.1 Find the areas of plane figures.

M03.D-M.3.1.1 Measure areas by counting unit squares (square cm, square m, square in., square ft, and non-standard square units).

M03.D-M.3.1.2 Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real-world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

Reference:

CC.2.4.3.A.5

Determine the area of a rectangle and apply the concept to multiplication and to addition.

M03.D-M Measurement and Data

Reporting Category

ASSESSMENT ANCHOR

M03.D-M.4 Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

DESCRIPTOR

ELIGIBLE CONTENT

M03.D-M.4.1 Find and use the perimeters of plane figures.

M03.D-M.4.1.1 Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, exhibiting rectangles with the same perimeter and different areas, and exhibiting rectangles with the same area and different perimeters. Use the same units throughout the problem.

Reference:

CC.2.4.3.A.6

Solve problems involving perimeters of polygons and distinguish between linear and area measures.

Mathematics

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- o A-F = Numbers and Operations—Fractions
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M04.A-T Numbers and Operations in Base Ten

Reporting Category

ASSESSMENT ANCHOR

M04.A-T.1 Generalize place-value understanding for multi-digit whole numbers.

DESCRIPTOR

ELIGIBLE CONTENT

M04.A-T.1.1 Apply place-value and numeration concepts to compare, find equivalencies, and round.	M04.A-T.1.1.1 Demonstrate an understanding that in a multi-digit whole number (through 1,000,000), a digit in one place represents ten times what it represents in the place to its right. <i>Example: Recognize that in the number 770, the 7 in the hundreds place is ten times the 7 in the tens place.</i> M04.A-T.1.1.2 Read and write whole numbers in expanded, standard, and word form through 1,000,000. M04.A-T.1.1.3 Compare two multi-digit numbers through 1,000,000 based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols. M04.A-T.1.1.4 Round multi-digit whole numbers (through 1,000,000) to any place.
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Reference:

CC.2.1.4.B.1

Apply place-value concepts to show an understanding of multi-digit whole numbers.

M04.A-T Numbers and Operations in Base Ten

Reporting Category

ASSESSMENT ANCHOR

M04.A-T.2 Use place-value understanding and properties of operations to perform multi-digit arithmetic.

DESCRIPTOR

ELIGIBLE CONTENT

M04.A-T.2.1 Use operations to solve problems.

M04.A-T.2.1.1 Add and subtract multi-digit whole numbers (limit sums and subtrahends up to and including 1,000,000).

M04.A-T.2.1.2 Multiply a whole number of up to four digits by a one-digit whole number and multiply 2 two-digit numbers.

M04.A-T.2.1.3 Divide up to four-digit dividends by one-digit divisors with answers written as whole-number quotients and remainders.

M04.A-T.2.1.4 Estimate the answer to addition, subtraction, and multiplication problems using whole numbers through six digits (for multiplication, no more than 2 digits $\times$ 1 digit, excluding powers of 10).

Reference:

CC.2.1.4.B.2

Use place value understanding and properties of operations to perform multi-digit arithmetic.

M04.A-F Numbers and Operations—Fractions

Reporting Category

ASSESSMENT ANCHOR

M04.A-F.1 Extend understanding of fraction equivalence and ordering.

DESCRIPTOR

ELIGIBLE CONTENT

M04.A-F.1.1 Find equivalencies and compare fractions.

M04.A-F.1.1.1 Recognize and generate equivalent fractions.

M04.A-F.1.1.2 Compare two fractions with different numerators and different denominators (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100) using the symbols $>$, $=$, or $<$ and justify the conclusions.

Reference:

CC.2.1.4.C.1

Extend the understanding of fractions to show equivalence and ordering.

M04.A-F Numbers and Operations—Fractions

Reporting Category

ASSESSMENT ANCHOR

M04.A-F.2 Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

DESCRIPTOR

M04.A-F.2.1 Solve problems involving fractions and whole numbers (straight computation or word problems).

ELIGIBLE CONTENT

- M04.A-F.2.1.1** Add and subtract fractions with a common denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; answers do not need to be simplified; and no improper fractions as the final answer).
- M04.A-F.2.1.2** Decompose a fraction or a mixed number into a sum of fractions with the same denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100), recording the decomposition by an equation. Justify decompositions (e.g., by using a visual fraction model).
Example 1: $\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$ OR $\frac{3}{8} = \frac{1}{8} + \frac{2}{8}$
Example 2: $2\frac{1}{12} = 1 + 1 + \frac{1}{12} = \frac{12}{12} + \frac{12}{12} + \frac{1}{12}$
- M04.A-F.2.1.3** Add and subtract mixed numbers with a common denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; no regrouping with subtraction; fractions do not need to be simplified; and no improper fractions as the final answers).
- M04.A-F.2.1.4** Solve word problems involving addition and subtraction of fractions referring to the same whole or set and having like denominators (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100).
- M04.A-F.2.1.5** Multiply a whole number by a unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100 and final answers do not need to be simplified or written as a mixed number).
Example: $5 \times (\frac{1}{4}) = \frac{5}{4}$
- M04.A-F.2.1.6** Multiply a whole number by a non-unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100 and final answers do not need to be simplified or written as a mixed number).
Example: $3 \times (\frac{5}{6}) = \frac{15}{6}$
- M04.A-F.2.1.7** Solve word problems involving multiplication of a whole number by a fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100).

Reference:

CC.2.1.4.C.2

Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

M04.A-F Numbers and Operations—Fractions

Reporting Category

ASSESSMENT ANCHOR

M04.A-F.3 Understand decimal notation for fractions and compare decimal fractions.

DESCRIPTOR

ELIGIBLE CONTENT

M04.A-F.3.1 Use operations to solve problems involving decimals, including converting between fractions and decimals (may include word problems).

M04.A-F.3.1.1 Add two fractions with respective denominators 10 and 100.
Example: Express $\frac{3}{10}$ as $\frac{30}{100}$, and add $\frac{3}{10} + \frac{4}{100} = \frac{30}{100} + \frac{4}{100} = \frac{34}{100}$.

M04.A-F.3.1.2 Use decimal notation for fractions with denominators 10 or 100.
Example: Rewrite 0.62 as $\frac{62}{100}$ and vice versa.

M04.A-F.3.1.3 Compare two decimals to hundredths using the symbols $>$, $=$, or $<$, and justify the conclusions.

Reference:

CC.2.1.4.C.3

Connect decimal notation to fractions, and compare decimal fractions (base 10 denominator, e.g., $\frac{19}{100}$).

M04.B-O Operations and Algebraic Thinking

Reporting Category

ASSESSMENT ANCHOR

M04.B-O.1 Use the four operations with whole numbers to solve problems.

DESCRIPTOR

ELIGIBLE CONTENT

M04.B-O.1.1 Use numbers and symbols to model the concepts of expressions and equations.

M04.B-O.1.1.1 Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations.
Example 1: Interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5.

Example 2: Know that the statement 24 is 3 times as many as 8 can be represented by the equation $24 = 3 \times 8$ or $24 = 8 \times 3$.

M04.B-O.1.1.2 Multiply or divide to solve word problems involving multiplicative comparison, distinguishing multiplicative comparison from additive comparison.

Example: Know that 3×4 can be used to represent that Student A has 4 objects and Student B has 3 times as many objects not just 3 more objects.

M04.B-O.1.1.3 Solve multi-step word problems posed with whole numbers using the four operations. Answers will be either whole numbers or have remainders that must be interpreted yielding a final answer that is a whole number. Represent these problems using equations with a symbol or letter standing for the unknown quantity.

M04.B-O.1.1.4 Identify the missing symbol (+, −, ×, ÷, =, <, and >) that makes a number sentence true (single-digit divisor only).

Reference:

CC.2.2.4.A.1

Represent and solve problems involving the four operations.

M04.B-O Operations and Algebraic Thinking

Reporting Category

ASSESSMENT ANCHOR

M04.B-O.2 Gain familiarity with factors and multiples.

DESCRIPTOR

M04.B-O.2.1 Develop and apply number theory concepts to represent numbers in various ways.

ELIGIBLE CONTENT

M04.B-O.2.1.1 Find all factor pairs for a whole number in the interval 1 through 100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the interval 1 through 100 is a multiple of a given one-digit number. Determine whether a given whole number in the interval 1 through 100 is prime or composite.

Reference:

CC.2.2.4.A.2

Develop and/or apply number theory concepts to find factors and multiples.

M04.B-O Operations and Algebraic Thinking

Reporting Category

ASSESSMENT ANCHOR

M04.B-O.3 Generate and analyze patterns.

DESCRIPTOR

M04.B-O.3.1 Recognize, describe, extend, create, and replicate a variety of patterns.

ELIGIBLE CONTENT

- M04.B-O.3.1.1** Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.
Example 1: Given the rule “add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms alternate between odd and even numbers.
Example 2: Given the rule “increase the number of sides by 1” and starting with a triangle, observe that the tops of the shapes alternate between a side and a vertex.
- M04.B-O.3.1.2** Determine the missing elements in a function table (limit to +, −, or × and to whole numbers or money).
- M04.B-O.3.1.3** Determine the rule for a function given a table (limit to +, −, or × and to whole numbers).

Reference:

CC.2.2.4.A.4

Generate and analyze patterns using one rule.

M04.C-G Geometry

Reporting Category

ASSESSMENT ANCHOR

M04.C-G.1 Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

DESCRIPTOR

ELIGIBLE CONTENT

M04.C-G.1.1 List properties, classify, draw, and identify geometric figures in two dimensions.

M04.C-G.1.1.1 Draw points, lines, line segments, rays, angles (right, acute, and obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

M04.C-G.1.1.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.

M04.C-G.1.1.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into mirroring parts. Identify line-symmetric figures and draw lines of symmetry (up to two lines of symmetry).

Reference:

CC.2.3.4.A.1

Draw lines and angles and identify these in two-dimensional figures.

CC.2.3.4.A.2

Classify two-dimensional figures by properties of their lines and angles.

CC.2.3.4.A.3

Recognize symmetric shapes and draw lines of symmetry.

M04.D-M Measurement and Data

Reporting Category

ASSESSMENT ANCHOR

M04.D-M.1 Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

DESCRIPTOR

ELIGIBLE CONTENT

M04.D-M.1.1 Solve problems involving length, weight (mass), liquid volume, time, area, and perimeter.

M04.D-M.1.1.1 Know relative sizes of measurement units within one system of units including standard units (in., ft, yd, mi; oz., lb; and c, pt, qt, gal), metric units (cm, m, km; g, kg; and mL, L), and time (sec, min, hr, day, wk, mo, and yr). Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. **A table of equivalencies will be provided.**

Example 1: Know that 1 kg is 1,000 times as heavy as 1 g.

Example 2: Express the length of a 4-foot snake as 48 in.

M04.D-M.1.1.2 Use the four operations to solve word problems involving distances, intervals of time (such as elapsed time), liquid volumes, masses of objects; money, including problems involving simple fractions or decimals; and problems that require expressing measurements given in a larger unit in terms of a smaller unit.

M04.D-M.1.1.3 Apply the area and perimeter formulas for rectangles in real-world and mathematical problems (may include finding a missing side length). Whole numbers only. **The formulas will be provided.**

M04.D-M.1.1.4 Identify time (analog or digital) as the amount of minutes before or after the hour.
Example 1: 2:50 is the same as 10 minutes before 3:00.
Example 2: Quarter past six is the same as 6:15.

Reference:

CC.2.4.4.A.1

Solve problems involving measurement and conversions from a larger unit to a smaller unit.

M04.D-M Measurement and Data

Reporting Category

ASSESSMENT ANCHOR

M04.D-M.2 Represent and interpret data.

DESCRIPTOR

M04.D-M.2.1 Organize, display, and answer questions based on data.

ELIGIBLE CONTENT

M04.D-M.2.1.1 Make a line plot to display a data set of measurements in fractions of a unit (e.g., intervals of $\frac{1}{2}$, $\frac{1}{4}$, or $\frac{1}{8}$).

M04.D-M.2.1.2 Solve problems involving addition and subtraction of fractions by using information presented in line plots (line plots must be labeled with common denominators, such as $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$).

M04.D-M.2.1.3 Translate information from one type of display to another (table, chart, bar graph, or pictograph).

Reference:

CC.2.4.4.A.2

Translate information from one type of data display to another.

CC.2.4.4.A.4

Represent and interpret data involving fractions using information provided in a line plot.

M04.D-M Measurement and Data

Reporting Category

ASSESSMENT ANCHOR

M04.D-M.3 Geometric measurement: understand concepts of angle; measure and create angles.

DESCRIPTOR

ELIGIBLE CONTENT

M04.D-M.3.1 Use appropriate tools and units to sketch an angle and determine angle measurements.

M04.D-M.3.1.1 Measure angles in whole-number degrees using a protractor. With the aid of a protractor, sketch angles of specified measure.

M04.D-M.3.1.2 Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems. (Angles must be adjacent and non-overlapping.)

Reference:

CC.2.4.4.A.6

Measure angles and use properties of adjacent angles to solve problems.

Mathematics

Assessment Anchors and Eligible Content Aligned to the Pennsylvania Core Standards



Grade

5



Pennsylvania Department of Education

www.pdesas.org

www.education.state.pa.us

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Pennsylvania System of School Assessment

The Assessment Anchors, as defined by the Eligible Content, are organized into cohesive blueprints, each structured with a common labeling system that can be read like an outline. This framework is organized first by Reporting Category, then by Assessment Anchor, followed by Anchor Descriptor, and then finally, at the greatest level of detail, by an Eligible Content statement. The common format of this outline is followed across the PSSA.

Here is a description of each level in the labeling system for the PSSA:

Reporting Category

The Assessment Anchors are organized into four classifications, as listed below.

- o A = Numbers and Operations
- o B = Algebraic Concepts
- o C = Geometry
- o D = Data Analysis and Probability

These four classifications are used throughout the grade levels. In addition to these classifications, there are five Reporting Categories for each grade level. The first letter of each Reporting Category represents the classification; the second letter represents the Domain as stated in the Pennsylvania Core Standards for Mathematics. Listed below are the Reporting Categories for Grade 5.

- o A-T = Numbers and Operations in Base Ten
- o A-F = Numbers and Operations—Fractions
- o B-O = Operations and Algebraic Thinking
- o C-G = Geometry
- o D-M = Measurement and Data

The title of each Reporting Category is consistent with the title of the corresponding Domain in the Pennsylvania Core Standards for Mathematics. The Reporting Category title appears at the top of each page.

Assessment Anchor

The Assessment Anchor appears in the shaded bar across the top of each Assessment Anchor table. The Assessment Anchors represent categories of subject matter (skills and concepts) that anchor the content of the PSSA. Each Assessment Anchor is part of a Reporting Category and has one or more Anchor Descriptors unified under and aligned to it.

Anchor Descriptor

Below each Assessment Anchor is one or more specific Anchor Descriptors. The Anchor Descriptor adds a level of specificity to the content covered by the Assessment Anchor. Each Anchor Descriptor is part of an Assessment Anchor and has one or more Eligible Content statements unified under and aligned to it.

Eligible Content

The column to the right of the Anchor Descriptor contains the Eligible Content statements. The Eligible Content is the most specific description of the skills and concepts assessed on the PSSA. This level is considered the assessment limit and helps educators identify the range of the content covered on the PSSA.

Reference

In the space below each Assessment Anchor table is a code representing one or more Pennsylvania Core Standards for Mathematics that correlate to the Eligible Content statements.

M05.A-T Numbers and Operations in Base Ten

Reporting Category

ASSESSMENT ANCHOR

M05.A-T.1 Understand the place-value system.

DESCRIPTOR

M05.A-T.1.1 Demonstrate understanding of place-value of whole numbers and decimals, and compare quantities or magnitudes of numbers.

ELIGIBLE CONTENT

- M05.A-T.1.1.1** Demonstrate an understanding that in a multi-digit number, a digit in one place represents $1/10$ of what it represents in the place to its left.
Example: Recognize that in the number 770, the 7 in the tens place is $1/10$ the 7 in the hundreds place.
- M05.A-T.1.1.2** Explain patterns in the number of zeros of the product when multiplying a number by powers of 10 and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
Example 1: $4 \times 10^2 = 400$
Example 2: $0.05 \div 10^3 = 0.00005$
- M05.A-T.1.1.3** Read and write decimals to thousandths using base-ten numerals, word form, and expanded form.
Example: $347.392 = 300 + 40 + 7 + 0.3 + 0.09 + 0.002 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (0.1) + 9 \times (0.01) + 2 \times (0.001)$
- M05.A-T.1.1.4** Compare two decimals to thousandths based on meanings of the digits in each place using $>$, $=$, and $<$ symbols.
- M05.A-T.1.1.5** Round decimals to any place (limit rounding to ones, tenths, hundredths, or thousandths place).

Reference:

CC.2.1.5.B.1

Apply place-value concepts to show an understanding of operations and rounding as they pertain to whole numbers and decimals.

M05.A-T Numbers and Operations in Base Ten

Reporting Category

ASSESSMENT ANCHOR

M05.A-T.2 Perform operations with multi-digit whole numbers and with decimals to hundredths.

DESCRIPTOR

ELIGIBLE CONTENT

M05.A-T.2.1 Use whole numbers and decimals to compute accurately (straight computation or word problems).

M05.A-T.2.1.1 Multiply multi-digit whole numbers (not to exceed three-digit by three-digit).

M05.A-T.2.1.2 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors.

M05.A-T.2.1.3 Add, subtract, multiply, and divide decimals to hundredths (no divisors with decimals).

Reference:

CC.2.1.5.B.2

Extend an understanding of operations with whole numbers to perform operations including decimals.

M05.A-F Numbers and Operations—Fractions

Reporting Category

ASSESSMENT ANCHOR

M05.A-F.1 Use equivalent fractions as a strategy to add and subtract fractions.

DESCRIPTOR

ELIGIBLE CONTENT

M05.A-F.1.1 Solve addition and subtraction problems involving fractions (straight computation or word problems).

M05.A-F.1.1.1 Add and subtract fractions (including mixed numbers) with unlike denominators. (May include multiple methods and representations.)
Example: $2/3 + 5/4 = 8/12 + 15/12 = 23/12$

Reference:

CC.2.1.5.C.1

Use the understanding of equivalency to add and subtract fractions.

M05.A-F Numbers and Operations—Fractions

Reporting Category

ASSESSMENT ANCHOR

M05.A-F.2 Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

DESCRIPTOR

ELIGIBLE CONTENT

M05.A-F.2.1 Solve multiplication and division problems involving fractions and whole numbers (straight computation or word problems).

M05.A-F.2.1.1 Solve word problems involving division of whole numbers leading to answers in the form of fractions (including mixed numbers).

M05.A-F.2.1.2 Multiply a fraction (including mixed numbers) by a fraction.

M05.A-F.2.1.3 Demonstrate an understanding of multiplication as scaling (resizing).

Example 1: Comparing the size of a product to the size of one factor on the basis of the size of the other factor without performing the indicated multiplication.

Example 2: Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number.

M05.A-F.2.1.4 Divide unit fractions by whole numbers and whole numbers by unit fractions.

Reference:

CC.2.1.5.C.2

Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

M05.B-O Operations and Algebraic Thinking

Reporting Category

ASSESSMENT ANCHOR

M05.B-O.1 Write and interpret numerical expressions.

DESCRIPTOR

M05.B-O.1.1 Analyze and complete calculations by applying the order of operations.

ELIGIBLE CONTENT

M05.B-O.1.1.1 Use multiple grouping symbols (parentheses, brackets, or braces) in numerical expressions and evaluate expressions containing these symbols.

M05.B-O.1.1.2 Write simple expressions that model calculations with numbers and interpret numerical expressions without evaluating them.

Example 1: Express the calculation “add 8 and 7, then multiply by 2” as $2 \times (8 + 7)$.

Example 2: Recognize that $3 \times (18,932 + 921)$ is three times as large as $18,932 + 921$ without having to calculate the indicated sum or product.

Reference:

CC.2.2.5.A.1

Interpret and evaluate numerical expressions using order of operations.

M05.B-O Operations and Algebraic Thinking

Reporting Category

ASSESSMENT ANCHOR

M05.B-O.2 Analyze patterns and relationships.

DESCRIPTOR

M05.B-O.2.1 Create, extend, and analyze patterns.

ELIGIBLE CONTENT

M05.B-O.2.1.1 Generate two numerical patterns using two given rules.
Example: Given the rule “add 3” and the starting number 0 and given the rule “add 6” and the starting number 0, generate terms in the resulting sequences.

M05.B-O.2.1.2 Identify apparent relationships between corresponding terms of two patterns with the same starting numbers that follow different rules.
Example: Given two patterns in which the first pattern follows the rule “add 8” and the second pattern follows the rule “add 2,” observe that the terms in the first pattern are 4 times the size of the terms in the second pattern.

Reference:

CC.2.2.5.A.4

Analyze patterns and relationships using two rules.

M05.C-G Geometry

Reporting Category

ASSESSMENT ANCHOR

M05.C-G.1 Graph points on the coordinate plane to solve real-world and mathematical problems.

DESCRIPTOR

ELIGIBLE CONTENT

M05.C-G.1.1 Identify parts of a coordinate grid and describe or interpret points given an ordered pair.

M05.C-G.1.1.1 Identify parts of the coordinate plane (x -axis, y -axis, and the origin) and the ordered pair (x -coordinate and y -coordinate). Limit the coordinate plane to quadrant I.

M05.C-G.1.1.2 Represent real-world and mathematical problems by plotting points in quadrant I of the coordinate plane and interpret coordinate values of points in the context of the situation.

Reference:

CC.2.3.5.A.1

Graph points in the first quadrant on the coordinate plane and interpret these points when solving real world and mathematical problems.

M05.C-G Geometry

Reporting Category

ASSESSMENT ANCHOR

M05.C-G.2 Classify two-dimensional figures into categories based on their properties.

DESCRIPTOR

M05.C-G.2.1 Use basic properties to classify two-dimensional figures.

ELIGIBLE CONTENT

M05.C-G.2.1.1 Classify two-dimensional figures in a hierarchy based on properties.
Example 1: All polygons have at least three sides, and pentagons are polygons, so all pentagons have at least three sides.
Example 2: A rectangle is a parallelogram, which is a quadrilateral, which is a polygon; so, a rectangle can be classified as a parallelogram, as a quadrilateral, and as a polygon.

Reference:

CC.2.3.5.A.2

Classify two-dimensional figures into categories based on an understanding of their properties.

M05.D-M Measurement and Data

Reporting Category

ASSESSMENT ANCHOR

M05.D-M.1 Convert like measurement units within a given measurement system.

DESCRIPTOR

M05.D-M.1.1 Solve problems using simple conversions (may include multi-step, real-world problems).

ELIGIBLE CONTENT

M05.D-M.1.1.1 Convert between different-sized measurement units within a given measurement system. **A table of equivalencies will be provided.**
Example: Convert 5 cm to meters.

Reference:

CC.2.4.5.A.1

Solve problems using conversions within a given measurement system.

M05.D-M Measurement and Data

Reporting Category

ASSESSMENT ANCHOR

M05.D-M.2 Represent and interpret data.

DESCRIPTOR

M05.D-M.2.1 Organize, display, and answer questions based on data.

ELIGIBLE CONTENT

M05.D-M.2.1.1 Solve problems involving computation of fractions by using information presented in line plots.

M05.D-M.2.1.2 Display and interpret data shown in tallies, tables, charts, pictographs, bar graphs, and line graphs, and use a title, appropriate scale, and labels. A grid will be provided to display data on bar graphs or line graphs.

Reference:

CC.2.4.5.A.2

Represent and interpret data using appropriate scale.

CC.2.4.5.A.4

Solve problems involving computation of fractions using information provided in a line plot.

M05.D-M Measurement and Data

Reporting Category

ASSESSMENT ANCHOR

M05.D-M.3 Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

DESCRIPTOR

M05.D-M.3.1 Use, describe, and develop procedures to solve problems involving volume.

ELIGIBLE CONTENT

M05.D-M.3.1.1 Apply the formulas $V = l \times w \times h$ and $V = B \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real-world and mathematical problems. **Formulas will be provided.**

M05.D-M.3.1.2 Find volumes of solid figures composed of two non-overlapping right rectangular prisms.

Reference:

CC.2.4.5.A.5

Apply concepts of volume to solve problems and relate volume to multiplication and to addition.

GENERAL DESCRIPTION OF SCORING GUIDELINES FOR MATHEMATICS OPEN-ENDED QUESTIONS

- 4 – The response demonstrates a *thorough* understanding of the mathematical concepts and procedures required by the task.**

The response provides correct answer(s) with clear and complete mathematical procedures shown and a correct explanation, as required by the task. Response may contain a minor “blemish” or omission in work or explanation that does not detract from demonstrating a *thorough* understanding.

- 3 – The response demonstrates a *general* understanding of the mathematical concepts and procedures required by the task.**

The response and explanation (as required by the task) are mostly complete and correct. The response may have minor errors or omissions that do not detract from demonstrating a *general* understanding.

- 2 – The response demonstrates a *partial* understanding of the mathematical concepts and procedures required by the task.**

The response is somewhat correct with *partial* understanding of the required mathematical concepts and/or procedures demonstrated and/or explained. The response may contain some work that is incomplete or unclear.

- 1 – The response demonstrates a *minimal* understanding of the mathematical concepts and procedures required by the task.**

- 0 – The response has no correct answer and *insufficient* evidence to demonstrate any understanding of the mathematical concepts and procedures required by the task for that grade level.**

Response may show only information copied from the question.

Special Categories within zero reported separately:

BLK (blank).....Blank, entirely erased, or written refusal to respond

OTOff task

LOEResponse in a language other than English

ILIllegible

Formulas and conversions that you may need to work questions on this test are found below. You may refer back to this page at any time during the mathematics test. 2015 Grade 4

Standard Conversions

1 yard (yd) = 3 feet (ft)

1 foot = 12 inches (in.)

1 pound (lb) = 16 ounces (oz.)

1 gallon (gal) = 4 quarts (qt)

1 quart = 2 pints (pt)

1 pint = 2 cups (c)

Metric Conversions

1 kilometer (km) = 1,000 meters (m)

1 meter = 100 centimeters (cm)

1 kilogram (kg) = 1,000 grams (g)

1 liter (L) = 1,000 milliliters (mL)

Time Conversions

1 year (yr) = 12 months (mo)

1 year = 52 weeks (wk)

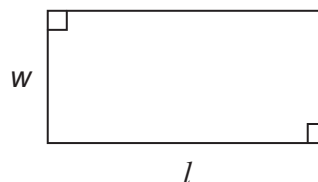
1 year = 365 days

1 week = 7 days

1 day = 24 hours (hr)

1 hour = 60 minutes (min)

1 minute = 60 seconds (sec)

Rectangle

Area = length $\times$ width

$$A = l \times w$$

Perimeter = length + length + width + width

$$P = l + l + w + w$$

Formulas and conversions that you may need to work questions on this test are found below. You may refer back to this page at any time during the mathematics test. 2015 Grade 5

Standard Conversions

1 mile (mi) = 1,760 yards (yd)

1 mile = 5,280 feet (ft)

1 yard (yd) = 3 feet (ft)

1 foot = 12 inches (in.)

1 ton (T) = 2,000 pounds (lb)

1 pound = 16 ounces (oz.)

1 gallon (gal) = 4 quarts (qt)

1 quart = 2 pints (pt)

1 pint = 2 cups (c)

1 cup = 8 fluid ounces (fl oz.)

Metric Conversions

1 kilometer (km) = 1,000 meters (m)

1 meter = 100 centimeters (cm)

1 centimeter = 10 millimeters (mm)

1 kilogram (kg) = 1,000 grams (g)

1 liter (L) = 1,000 milliliters (mL)

Time Conversions

1 century = 10 decades

1 decade = 10 years (yr)

1 year (yr) = 12 months (mo)

1 year = 52 weeks (wk)

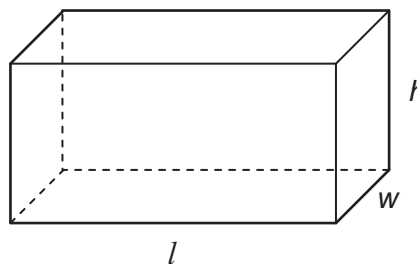
1 year = 365 days

1 week = 7 days

1 day = 24 hours (hr)

1 hour = 60 minutes (min)

1 minute = 60 seconds (sec)

Rectangular Prism

Volume = length $\times$ width $\times$ height

$$V = l \times w \times h$$

Volume = area of the base $\times$ height

$$V = B \times h$$

Volume = area of the base $\times$ width

$$V = B \times w$$

Volume = area of the base $\times$ length

$$V = B \times l$$

Pennsylvania Common Core Standards
Mathematics

INTRODUCTION

The Pennsylvania Common Core Standards in Mathematics in grades PreK-5 lay a solid foundation in whole numbers, addition, subtraction, multiplication, division, fractions, and decimals. Taken together, these elements support a student’s ability to learn and apply more demanding math concepts and procedures. The middle school and high school standards call on students to practice applying mathematical ways of thinking to real world issues and challenges; they prepare students to think and reason mathematically. Additionally, they set a rigorous definition of college and career readiness by demanding that students develop a depth of understanding and ability to apply mathematics to novel situations, as college students and employees regularly do. Although the **standards** are **not a curriculum** or a prescribed series of activities, school entities will use them to develop a local school curriculum that will meet local students’ needs.

This document includes PA Common Core Standards for **Mathematics Content** and **Mathematical Practice**. The mathematics standards define what students should understand and be able to do. Mathematical Practice Standards describes the habits of mind required to reach a level of mathematical proficiency.

PA Common Core Standards Mathematical Content and Mathematical Practice	
Standards for Mathematical Content	Standards for Mathematical Practice
2.1 Numbers and Operations A) Counting and Cardinality B) Number and Operations in Base Ten C) Number and Operations—Fractions D) Ratios and Proportional Relationships E) The Number System F) Number and Quantity	• Make sense of problems and persevere in solving them. • Reason abstractly and quantitatively. • Construct viable arguments and critique the reasoning of others. • Model with mathematics. • Use appropriate tools strategically. • Attend to precision. • Look for and make use of structure. • Look for and make sense of regularity in repeated reasoning.
2.2 Algebraic Concepts A) Operations and Algebra Thinking B) Expressions & Equations C) Functions D) Algebra	
2.3 Geometry A) Geometry	
2.4 Measurement, Data and Probability A) Measurement and Data B) Statistics and Probability	