

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT Skill Category and Description of Skills	Vermont Math: Grade Level Expectations 2004		
	Course/ Level	Standard	Standard ID
Algebra and Functions Solve problems using algebraic expressions and symbols to represent relationships, patterns and functions of different types.	High School	MHS:19 Solves and models problems by formulating, extending, or generalizing linear and common nonlinear functions/relations.)	MHS:19
	High School	MHS:20 Demonstrates conceptual understanding of linear relationships and linear and nonlinear functions (including $f(x) = ax^2$, $f(x) = ax^3$, absolute value function, exponential growth) through analysis of intercepts, domain, range and constant and variable rates of change in mathematical and contextual situations.	MHS:20
	High School	MHS:21 Demonstrates conceptual understanding of algebraic expressions by evaluating, simplifying, or writing algebraic expressions; and writes equivalent forms of algebraic expressions or formulas ($d = rt \rightarrow r = d/t$ or solves a multivariable equation or formula for one variable in terms of the others).	MHS:21
	High School	MHS:22 Demonstrates conceptual understanding of equality by solving linear equations, systems of two linear equations, or problems using tables, graphs, algebraic manipulation, or technology. Demonstrates conceptual understanding of inequality by solving linear inequalities, comparing values of systems of linear functions, using tables, graphs, algebraic manipulation, or technology.	MHS:22
Communication Express mathematical ideas precisely and communicate them coherently and clearly in the language and notation of mathematics.	High School	MHS:15 Measures and uses units of measures appropriately and consistently when solving problems across the content strands. Makes conversions within or across systems and makes decisions concerning an appropriate degree of accuracy in problem situations involving measurement. Uses measurement conversion strategies, such as unit/dimensional analysis or uses quotient measures, such as speed and density, that give per unit amounts, or uses product measures, such as person hours to solve problems. (See Appendix B for benchmark units and equivalences for each grade.)	MHS:15
	High School	MHS:30 Demonstrate understanding of mathematical problem solving and communication by: Mathematical Communication-The use of mathematical vocabulary and representation to communicate the solution; and	MHS:30.4
	High School	MHS:30 Demonstrate understanding of mathematical problem solving and communication by: Presentation-Effective communication of how the problem was solved, and of the reasoning used.	MHS:30.5

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT Skill Category and Description of Skills	Vermont Math: Grade Level Expectations 2004		
	Course/ Level	Standard	Standard ID
<p>Data, Statistics, and Probability</p> <p>Analyze data, understand descriptive statistics, make inferences and determine the likelihood that certain events will occur.</p>	High School	MHS:23 Interprets a given representation(s) (box-and-whisker or scatter plots, histograms, frequency charts) to make observations, to answer questions or justify conclusions, to make predictions, or to solve problems.	MHS:23
	High School	MHS:24 Analyzes patterns, trends, or distributions in single variable and two variable data in a variety of contexts by determining or using measures of central tendency (mean, median, or mode), dispersion (range or variation), outliers, quartile values, or regression line or correlation (high, low/positive, negative) to analyze situations, or to solve problems; and evaluates the sample from which the statistics were developed (bias, random, or nonrandom).	MHS:24
	High School	MHS:25 Organizes and displays data using scatter plots, histograms, or frequency distributions to answer questions related to the data, to analyze the data to formulate or justify conclusions, make predictions, or to solve problems; or identifies representations or elements of representations that best display a given set of data or situation, consistent with the representations required in MHS: 23.	MHS:25
	High School	MHS:26 Uses combinations, arrangements or permutations to solve problems or to determine theoretical probability and experimental probability.	MHS:26
	High School	MHS:27 For a probability event chooses an appropriate probability model/simulations and uses it to estimate a theoretical probability for a chance event and uses the concept of a probability distribution to determine whether an event is rare or reasonably likely.	MHS:27
	High School	MHS:28 In response to a question, designs investigations, considers how data-collection methods affect the nature of the data set (i.e., sample size, bias, randomization, control group), collects data using observations, surveys and experiments, purposes and justifies conclusions and predictions based on the data.	MHS:28
	High School	MHS:29 Compares and contrasts theoretical and experimental probabilities of events; and determines and/or interprets the expected outcome of an event.	MHS:29
<p>Geometry and Measurement</p> <p>Solve problems based on understanding the properties of shapes, such as triangles and circles, and the spatial relationships between angles and lines.</p>	High School	MHS:11 Uses the attributes, geometric properties, or theorems involving lines, polygons and circles (e.g., parallel, perpendicular, bisectors, diagonals, radii, diameters, central angles, arc length excluding radians), the Pythagorean Theorem, Triangle Inequality Theorem to solve mathematical situations or problems in context.	MHS:11
	High School	MHS:13 Applies concepts of similarity, congruency or right triangle trigonometry to determine length or angle measures and to solve problems involving scale.	MHS:13

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT Skill Category and Description of Skills	Vermont Math: Grade Level Expectations 2004		
	Course/ Level	Standard	Standard ID
Geometry and Measurement Solve problems based on understanding the properties of shapes, such as triangles and circles, and the spatial relationships between angles and lines.	High School	MHS:14 Demonstrates conceptual understanding of perimeter, circumference, or area of two-dimensional figures or composites of two-dimensional figures or surface area or volume of three-dimensional figures or composites of three-dimensional figures in problem-solving situations and uses appropriate units of measure and expresses formulas for the perimeter, and area of two-dimensional figures or composites of two-dimensional figures or surface area or volume of three-dimensional figures or composites of three-dimensional figures.	MHS:14
	High School	MHS:15 Measures and uses units of measures appropriately and consistently when solving problems across the content strands. Makes conversions within or across systems and makes decisions concerning an appropriate degree of accuracy in problem situations involving measurement. Uses measurement conversion strategies, such as unit/dimensional analysis or uses quotient measures, such as speed and density, that give per unit amounts, or uses product measures, such as person hours to solve problems. (See Appendix B for benchmark units and equivalences for each grade.)	MHS:15
	High School	MHS:17 Constructs or accurately represents congruent angles, perpendicular lines, equilateral or isosceles triangles, triangle given the side segments, or inscribe or circumscribe a figure.	MHS:17
	High School	MHS:9 Models situations geometrically to solve problems connecting to other areas of mathematics or to other disciplines (i.e., diagrams, coordinate systems, transformations).	MHS:9
Number and Operations Understand types of numbers (integers, fractions, decimals), their properties and the correct order of operations. Perform computations correctly.	High School	MHS:1 Accurately solves problems involving conceptual understanding and magnitude of real numbers, or simple vectors.	MHS:1
	High School	MHS:4 Accurately solves problems involving proportional reasoning or percents involving the effect of changing the base, rate, or percentage (the three cases of percent), or variations on order of finding percentages (10% off followed by 5% off), and compound interest.	MHS:4
	High School	MHS:7 Estimates and evaluates the reasonableness of numerical computations and solutions, including those carried out with technology.	MHS:7
	High School	MHS:8 Applies properties of numbers (greatest common factor [GCF], least common multiple [LCM], prime factorization, inverses, and identities), or properties of operations to solve problems and to simplify computations.	MHS:8

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT Skill Category and Description of Skills	Vermont Math: Grade Level Expectations 2004		
	Course/ Level	Standard	Standard ID
<p>Problem Solving</p> <p>Solve abstract and practical problems, applying and adapting a variety of strategies. Monitor progress and evaluate answers in terms of questions asked.</p>	High School	MHS:1 Accurately solves problems involving conceptual understanding and magnitude of real numbers, or simple vectors.	MHS:1
	High School	MHS:11 Uses the attributes, geometric properties, or theorems involving lines, polygons and circles (e.g., parallel, perpendicular, bisectors, diagonals, radii, diameters, central angles, arc length excluding radians), the Pythagorean Theorem, Triangle Inequality Theorem to solve mathematical situations or problems in context.	MHS:11
	High School	MHS:13 Applies concepts of similarity, congruency or right triangle trigonometry to determine length or angle measures and to solve problems involving scale.	MHS:13
	High School	MHS:14 Demonstrates conceptual understanding of perimeter, circumference, or area of two-dimensional figures or composites of two-dimensional figures or surface area or volume of three-dimensional figures or composites of three-dimensional figures in problem-solving situations and uses appropriate units of measure and expresses formulas for the perimeter, and area of two-dimensional figures or composites of two-dimensional figures or surface area or volume of three-dimensional figures or composites of three-dimensional figures.	MHS:14
	High School	MHS:19 Solves and models problems by formulating, extending, or generalizing linear and common nonlinear functions/relations.)	MHS:19
	High School	MHS:21 Demonstrates conceptual understanding of algebraic expressions by evaluating, simplifying, or writing algebraic expressions; and writes equivalent forms of algebraic expressions or formulas ($d = rt \rightarrow r = d/t$ or solves a multivariable equation or formula for one variable in terms of the others).	MHS:21
	High School	MHS:22 Demonstrates conceptual understanding of equality by solving linear equations, systems of two linear equations, or problems using tables, graphs, algebraic manipulation, or technology. Demonstrates conceptual understanding of inequality by solving linear inequalities, comparing values of systems of linear functions, using tables, graphs, algebraic manipulation, or technology.	MHS:22
	High School	MHS:24 Analyzes patterns, trends, or distributions in single variable and two variable data in a variety of contexts by determining or using measures of central tendency (mean, median, or mode), dispersion (range or variation), outliers, quartile values, or regression line or correlation (high, low/positive, negative) to analyze situations, or to solve problems; and evaluates the sample from which the statistics were developed (bias, random, or nonrandom).	MHS:24
	High School	MHS:26 Uses combinations, arrangements or permutations to solve problems or to determine theoretical probability and experimental probability.	MHS:26

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT Skill Category and Description of Skills	Vermont Math: Grade Level Expectations 2004		
	Course/ Level	Standard	Standard ID
Problem Solving Solve abstract and practical problems, applying and adapting a variety of strategies. Monitor progress and evaluate answers in terms of questions asked.	High School	MHS:27 For a probability event chooses an appropriate probability model/simulations and uses it to estimate a theoretical probability for a chance event and uses the concept of a probability distribution to determine whether an event is rare or reasonably likely.	MHS:27
	High School	MHS:30 Demonstrate understanding of mathematical problem solving and communication by: Execution-The answer and the mathematical work that supports it;	MHS:30.2
	High School	MHS:4 Accurately solves problems involving proportional reasoning or percents involving the effect of changing the base, rate, or percentage (the three cases of percent), or variations on order of finding percentages (10% off followed by 5% off), and compound interest.	MHS:4
	High School	MHS:8 Applies properties of numbers (greatest common factor [GCF], least common multiple [LCM], prime factorization, inverses, and identities), or properties of operations to solve problems and to simplify computations.	MHS:8
Reasoning Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.	High School	MHS:20 Demonstrates conceptual understanding of linear relationships and linear and nonlinear functions (including $f(x) = ax + b$, $f(x) = ax^2 + bx + c$, absolute value function, exponential growth) through analysis of intercepts, domain, range and constant and variable rates of change in mathematical and contextual situations.	MHS:20
	High School	MHS:23 Interprets a given representation(s) (box-and-whisker or scatter plots, histograms, frequency charts) to make observations, to answer questions or justify conclusions, to make predictions, or to solve problems.	MHS:23
	High School	MHS:25 Organizes and displays data using scatter plots, histograms, or frequency distributions to answer questions related to the data, to analyze the data to formulate or justify conclusions, make predictions, or to solve problems; or identifies representations or elements of representations that best display a given set of data or situation, consistent with the representations required in MHS: 23.	MHS:25
	High School	MHS:28 In response to a question, designs investigations, considers how data-collection methods affect the nature of the data set (i.e., sample size, bias, randomization, control group), collects data using observations, surveys and experiments, purposes and justifies conclusions and predictions based on the data.	MHS:28
	High School	MHS:29 Compares and contrasts theoretical and experimental probabilities of events; and determines and/or interprets the expected outcome of an event.	MHS:29

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT	Vermont Math: Grade Level Expectations 2004		
Skill Category and Description of Skills	Course/ Level	Standard	Standard ID
Reasoning Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.	High School	MHS:30 Demonstrate understanding of mathematical problem solving and communication by: Approach and Reasoning-The strategies and skills used to solve the problem, and the reasoning that supports the approach;	MHS:30.1
	High School	MHS:30 Demonstrate understanding of mathematical problem solving and communication by: Observations and Extensions-Demonstration of observation, connections, application, extensions, and generalizations;	MHS:30.3
	High School	MHS:7 Estimates and evaluates the reasonableness of numerical computations and solutions, including those carried out with technology.	MHS:7
Representation Use and translate among representations including verbal, numerical, symbolic and graphical to communicate mathematical ideas and solve problems.	High School	MHS:17 Constructs or accurately represents congruent angles, perpendicular lines, equilateral or isosceles triangles, triangle given the side segments, or inscribe or circumscribe a figure.	MHS:17
	High School	MHS:9 Models situations geometrically to solve problems connecting to other areas of mathematics or to other disciplines (i.e., diagrams, coordinate systems, transformations).	MHS:9

PSAT/NMSQT Skills Insight™ Alignment to State Standards

Executive Summary, July 2010

Purpose

PSAT/NMSQT *Skills Insight*™ is a free online tool designed to help students and educators gain a better understanding of how PSAT/NMSQT® scores relate to specific academic skills. It provides a description of the academic skills that are typical of students scoring at each score band, suggestions for improvement, and practice test questions. Learn more by visiting www.collegeboard.com/psatskills.

The information provided by PSAT/NMSQT *Skills Insight* is organized by skill category. There are five skill categories for the critical reading section, nine for the mathematics section (4 content skill categories; 5 process skill categories), and 5 for the writing skills section. This report shows the alignment between state standards in English Language Arts and Mathematics and the content and skills measured by the PSAT/NMSQT.

Using Alignment Results with PSAT/NMSQT Reports

Schools and districts that administer the PSAT/NMSQT have access to the *Summary of Answers and Skills* (SOAS) report¹. SOAS reports summarize performance on test sections, skill categories, and individual test questions, and compare local results to the state or nation. Using SOAS and the alignment information provided in this report, schools and districts can develop remediation strategies to help students improve their college readiness skills, future SAT scores, and performance on state assessments.

Mathematics: Alignment Approach and Findings

- There are nine Skills Categories in Mathematics, representing both content and process skills: *Number and Operations; Algebra and Functions; Geometry and Measurement; Data, Statistics and Probability; Problem Solving; Representation; Reasoning; Connections and Communication*.
- Only standards for grades 9-12 were considered for these alignments. Within grades 9-12, the areas with the greatest concentration of alignments are the Number and Operations, Algebra and Geometry strands of the state standards. In most cases, Precalculus and Trigonometry were excluded from the alignment study.
- The organization and hierarchy of standards varies on a state-by-state basis. During the alignment process, the College Board aligned the PSAT/NMSQT skills to the most specific level of the state's standards.
- States often integrate process and content standards. In such cases, the state standard received an alignment to both a process skill category and a content skill category.
- Generally, there is strong correspondence between the PSAT/NMSQT Skills Categories in Mathematics and state standards. Coverage of the Skills Categories across a state standards document is dependent upon the specific state standards and on the degree of specificity of language employed within the standards.
- The PSAT/NMSQT is administered to students in grades 10 and 11; consequently, the strongest areas of alignment are in the content categories of *Number and Operations, Algebra and Functions* and *Geometry and Measurement* and in the process categories of *Problem Solving, Reasoning and Representations*. Considering the design and purpose of the PSAT/NMSQT, extensive alignments in upper levels of high school mathematics standards, including Trigonometry, are not intended or expected.

¹ Using the access code printed on the PSAT/NMSQT *Roster of Student Scores and Plans*, SOAS reports can be downloaded from www.collegeboard.com/reports beginning in the first week of January.

- The College Board content specialists who conducted the alignments have a deep understanding of the PSAT/NMSQT test specifications. Therefore, although multiple Skills Categories might link to a particular standard, these alignments display only the strongest and most appropriate matches.

English Language Arts: Alignment Approach and Findings

- Reading and Writing each have five PSAT/NMSQT Skills Categories. In Reading, the categories are *Determining the Meaning of Words*, *Author’s Craft*, *Reasoning and Inferencing*, *Organization and Ideas* and *Understanding Literary Elements*. In Writing, the categories are *Manage Word Choice and Grammatical Relationships Between Words*, *Manage Grammatical Structures Used to Modify or Compare*, *Manage Phrases and Clauses in a Sentence*; *Recognize Correctly Formed Sentences* and *Manage Order and Relationships of Sentences and Paragraphs*.
- The PSAT/NMSQT is administered to students in grades 10 and 11, and the College Board targeted the English Language Arts alignments at these specific grade levels. In states where the standards are organized by grade band (grades 9-10, 11-12) or by one high school band (grades 9-12), the College Board aligned to all high school grade levels.
- Given the purpose and design of the PSAT/NMSQT, the English Language Arts alignment is focused on the areas of reading and writing and does not include state standards in speaking, listening, or media literacy. Additionally, these alignments excluded genre-specific state standards (such as those related to American, British, or World literature), although the essential PSAT/NMSQT skills in Reading can be used to support instruction in literature.
- The organization and hierarchy of standards varies on a state-by-state basis. During the alignment process, the College Board aligned the PSAT/NMSQT skills to the most specific level of the state’s standards. Coverage of the Skills Categories across a state standards document is dependent upon the specific state standards and on the degree of specificity of language employed within the standards.
- In Writing, generally there is strong correspondence between the PSAT/NMSQT Skills Categories and state standards that focus on grammar, usage, language conventions, and the role of editing and revising in writing.
- In Reading, there is strong correspondence between the PSAT/NMSQT Skills Categories and state standards in the essential areas of vocabulary development (determine the meaning of unfamiliar words or of words with multiple meanings by understanding context and by analyzing roots, prefixes, and suffixes) and reading comprehension (determine the main idea and supporting details; understand the organization of passages; analyze the various elements of an author’s craft, including purpose, perspective, word choice, and use of rhetorical and literary devices and understand literary elements such as plot, characterization, and setting).

Summary

In summary, the PSAT/NMSQT Skills Categories correspond well to state standards. Educators can use these alignments to connect the PSAT/NMSQT to their local curricula and state standards to monitor student learning and to build a coherent instructional plan for their students.