

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT Skill Category and Description of Skills	Montana Math: Content Standards 1998		
	Course/ Level	Standard	Standard ID
Algebra and Functions Solve problems using algebraic expressions and symbols to represent relationships, patterns and functions of different types.	Grades: 9-12	1. use algebra to represent patterns of change.	3.1
	Grades: 9-12	2. use basic operations with algebraic expressions.	3.2
	Grades: 9-12	3. solve algebraic equations and inequalities: linear, quadratic, exponential, logarithmic, and power.	3.3
	Grades: 9-12	4. solve systems of algebraic equations and inequalities, including use of matrices.	3.4
	Grades: 9-12	5. use algebraic models to solve mathematical and real-world problems.	3.5
	Grades: 9-12	1. describe functions and their inverses using graphical, numerical, physical, algebraic, and verbal mathematical models or representations.	7.1
	Grades: 9-12	2. analyze the graphs of the families of polynomial, rational, power, exponential, logarithmic, and periodic functions.	7.2
	Grades: 9-12	3. analyze the effects of parameter changes on the graphs of functions and relations, including translations.	7.3
	Grades: 9-12	4. model real-world phenomena with a variety of functions.	7.4
Communication Express mathematical ideas precisely and communicate them coherently and clearly in the language and notation of mathematics.	Grades: 9-12	3. formulate definitions, make and justify inferences, express generalizations, and communicate mathematical ideas and relationships.	1.3
	Grades: 9-12	1. use and understand the real number system, its operations, notations, and the various subsystems.	2.1
	Grades: 9-12	2. classify figures in terms of congruence and similarity and apply these relationships.	4.2
	Grades: 9-12	5. design a statistical experiment to study a problem and communicate the outcomes.	6.5
	Grades: 9-12	6. describe, in general terms, the normal curve and use its properties to answer questions about sets of data that are assumed to be normally distributed.	6.6
	Grades: 9-12	1. describe functions and their inverses using graphical, numerical, physical, algebraic, and verbal mathematical models or representations.	7.1

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Connections Connect ideas from different areas of mathematics (particularly geometry and algebra) to state or solve abstract or applied problems.	Grades: 9-12	4. model real-world phenomena with a variety of functions.	7.4
Data, Statistics, and Probability Analyze data, understand descriptive statistics, make inferences and determine the likelihood that certain events will occur.	Grades: 9-12	1. use curve fitting to make predictions from data.	6.1
	Grades: 9-12	2. apply measures of central tendency and demonstrate understanding of the concepts of variability and correlation.	6.2
	Grades: 9-12	3. select an appropriate sampling method for a given statistical analysis.	6.3
	Grades: 9-12	4. use experimental probability, theoretical probability, and simulation methods to represent and solve problems, including expected values.	6.4
	Grades: 9-12	5. design a statistical experiment to study a problem and communicate the outcomes.	6.5
	Grades: 9-12	6. describe, in general terms, the normal curve and use its properties to answer questions about sets of data that are assumed to be normally distributed.	6.6
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.	Grades: 9-12	1. construct, interpret, and draw three-dimensional objects.	4.1
	Grades: 9-12	2. classify figures in terms of congruence and similarity and apply these relationships.	4.2
	Grades: 9-12	3. translate between synthetic and coordinate representations.	4.3
	Grades: 9-12	4. deduce properties of figures using transformations, coordinates, and vectors in problem solving.	4.4
	Grades: 9-12	1. apply concepts of indirect measurements (e.g., using similar triangles to calculate a distance).	5.1
	Grades: 9-12	2. use dimensional analysis to check reasonableness of procedures.	5.2
	Grades: 9-12	3. investigate systems of derived measures (e.g., km/sec, g/cm ²).	5.3
	Grades: 9-12	4. apply the appropriate concepts of estimates in measurement, error in measurement, tolerance, and precision.	5.4

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<p>Number and Operations</p> <p>Understand types of numbers (integers, fractions, decimals), their properties and the correct order of operations. Perform computations correctly.</p>	Grades: 9-12	1. use and understand the real number system, its operations, notations, and the various subsystems.	2.1
<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>	Grades: 9-12	1. recognize and formulate problems from situations within and outside mathematics and apply solution strategies to those problems.	1.1
	Grades: 9-12	2. select, apply, and evaluate appropriate estimation strategies throughout the problem-solving process.	1.2
	Grades: 9-12	2. use basic operations with algebraic expressions.	3.2
	Grades: 9-12	3. solve algebraic equations and inequalities: linear, quadratic, exponential, logarithmic, and power.	3.3
	Grades: 9-12	4. solve systems of algebraic equations and inequalities, including use of matrices.	3.4
	Grades: 9-12	4. deduce properties of figures using transformations, coordinates, and vectors in problem solving.	4.4
	Grades: 9-12	2. use dimensional analysis to check reasonableness of procedures.	5.2
	Grades: 9-12	3. select an appropriate sampling method for a given statistical analysis.	6.3
	Grades: 9-12	4. use experimental probability, theoretical probability, and simulation methods to represent and solve problems, including expected values.	6.4
<p>Reasoning</p> <p>Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.</p>	Grades: 9-12	1. apply concepts of indirect measurements (e.g., using similar triangles to calculate a distance).	5.1
	Grades: 9-12	3. investigate systems of derived measures (e.g., km/sec, g/cm ² i).	5.3
	Grades: 9-12	4. apply the appropriate concepts of estimates in measurement, error in measurement, tolerance, and precision.	5.4
	Grades: 9-12	1. use curve fitting to make predictions from data.	6.1

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PSAT/NMSQT	Montana Math: Content Standards 1998		
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.	Grades: 9-12	2. analyze the graphs of the families of polynomial, rational, power, exponential, logarithmic, and periodic functions.	7.2
	Grades: 9-12	3. analyze the effects of parameter changes on the graphs of functions and relations, including translations.	7.3
Representation Use and translate among representations including verbal, numerical, symbolic and graphical to communicate mathematical ideas and solve problems.	Grades: 9-12	4. apply and translate among different representations of the same problem situation or of the same mathematical concept. Model connections between problem situations that arise in disciplines other than mathematics.	1.4
	Grades: 9-12	5. select and use appropriate technology to enhance mathematical understanding. Appropriate technology may include, but is not limited to, paper and pencil, calculator, computer, and data collection devices.	1.5
	Grades: 9-12	1. use algebra to represent patterns of change.	3.1
	Grades: 9-12	5. use algebraic models to solve mathematical and real-world problems.	3.5
	Grades: 9-12	1. construct, interpret, and draw three-dimensional objects.	4.1
	Grades: 9-12	3. translate between synthetic and coordinate representations.	4.3
	Grades: 9-12	2. apply measures of central tendency and demonstrate understanding of the concepts of variability and correlation.	6.2

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.