PSAT/NMSQT Skill Category and Description of Skills	Montana Math: Content Standards 2009 Course/ Level	Standard	Standard ID
Algebra and Functions Solve problems using algebraic expressions and symbols to represent relationships, patterns and functions of different types.	Upon Graduation	1.3 Equivalence with Multiple Notation: Given a representation of a number or expression, find equivalent representations using multiple notations (e.g., x to the 1/2 power vs. square root of x and visual representation of multiplying binomials).	1.3
	Upon Graduation	1.4 Properties of Numbers and Number Systems: Analyze and apply the properties of numbers and number systems.	1.4
	Upon Graduation	1.5 Modeling Relationships and Change: Identify givens and unknowns in familiar and unfamiliar situations (e.g., finance, culture, including Montana American Indians, and nature) and describe relationships between variables.	1.5
	Upon Graduation	4.1 Representing Functions: Represent functions in a variety of ways including tables, graphs or diagrams, verbal descriptions, and symbolic expressions in recursive and explicit form. Justify the choice of an appropriate form for solving a given problem.	4.1
	Upon Graduation	4.2 Variables and Parameters: Determine the appropriate symbolic representation of a given contextual situation (e.g., variables and parameters in equations, inequalities, functions, and matrices).	4.2
	Upon Graduation	4.3 Solving Systems of Equations and Inequalities: Solve a variety of equations, inequalities and systems of equations and inequalities, justify the solution process, and interpret the solution in context.	4.3
	Upon Graduation	4.4 Families of Functions and Transformations: Analyze the effects of transformations on families of functions and recognize their characteristics. Represent and use functions in equivalent forms to identify and perform transformations.	4.4
	Upon Graduation	4.5 Analyzing and Conjecturing with Models: Given data or a problem situation, select and use an appropriate function model to analyze results or make a prediction with and without technology using cultural contexts, including those of Montana American Indians.	4.5
Communication Express mathematical ideas precisely and communicate them coherently and clearly in the language and notation of mathematics.	Upon Graduation	1.5 Modeling Relationships and Change: Identify givens and unknowns in familiar and unfamiliar situations (e.g., finance, culture, including Montana American Indians, and nature) and describe relationships between variables.	1.5
Connections Connect ideas from different areas of mathematics (particularly geometry and algebra) to state or solve abstract or applied problems.	Upon Graduation	3.2 Applications of Geometric Models: Use spatial reasoning and geometric models to solve problems with and without technology in the contexts of art, science, and culture, including Montana American Indians.	3.2

PSAT/NMSQT Skill Category and Description of Skills	Montana Math: Content Standards 2009 Course/ Level	Standard	Standard ID
Connections Connect ideas from different areas of mathematics (particularly geometry and algebra) to state or solve abstract or applied problems.	Upon Graduation	4.4 Families of Functions and Transformations: Analyze the effects of transformations on families of functions and recognize their characteristics. Represent and use functions in equivalent forms to identify and perform transformations.	4.4
Data, Statistics, and Probability Analyze data, understand descriptive statistics, make inferences and determine the likelihood that certain events will occur.	Upon Graduation	2.1 Representing and Analyzing Data: Select, create, and compare graphical or numerical representations of data sets using technology when appropriate. Reason about distributions using measures of central tendency and spread (e.g., percentiles, quartiles, inter-quartile range, and standard deviation).	2.1
	Upon Graduation	2.2 Evaluating Validity: Evaluate the validity of reports based on collected and/or published data by considering the source of the data, the design of the study, and the way data are displayed, analyzed, and interpreted.	2.2
	Upon Graduation	2.3 Rules of Probability and Expected Value: Make, evaluate, and justify decisions based on probabilities in multicultural situations, including those of Montana American Indians (e.g., finding expected value and using rules of probability).	2.3
	Upon Graduation	2.5 Curve Fitting: Model two-variable data using curve fitting with and without technology. Write an equation for a given model and decide when or if predictions based on this equation are valid.	2.5
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.	Upon Graduation	3.1 Conjectures and Inductive Reasoning: Formulate and evaluate conjectures about geometric objects and their properties, with and without technology, applying inductive reasoning when appropriate.	3.1
	Upon Graduation	3.2 Applications of Geometric Models: Use spatial reasoning and geometric models to solve problems with and without technology in the contexts of art, science, and culture, including Montana American Indians.	3.2
	Upon Graduation	3.3 Multiple Geometric Approaches: Identify, analyze, and use transformational, coordinate, and synthetic geometric approaches to solve problems.	3.3
	Upon Graduation	3.4 Indirect Measurement: Determine measures of two- and three-dimensional objects and their elements using trigonometric ratios, proportionality, the Pythagorean Theorem, and angle relationships.	3.4
	Upon Graduation	3.5 Methods of Proof: Establish the validity of geometric conjectures using deductive reasoning, indirect proof, and counterexamples, and critique arguments made by others.	3.5

PSAT/NMSQT Skill Category and Description of Skills	Montana Math: Content Standards 2009 Course/ Level	Standard	Standard ID
Number and Operations Understand types of numbers (integers, fractions, decimals), their properties and the correct order of operations. Perform computations correctly.	Upon Graduation	1.1 Quantification: Use multiple notations to perform and interpret the effects of operations on very large and very small numbers with and without technology.	1.1
	Upon Graduation	1.2 Estimation and Accuracy: Identify situations where estimation is appropriate and determine the degree of accuracy needed for a given problem situation (and the appropriate precision in which to report answers).	1.2
	Upon Graduation	2.4 Counting Methods: Use technology as needed to determine the possible number of outcomes for an event or compound event using the fundamental counting principle, permutations, combinations, and other systematic counting methods.	2.4
Problem Solving Solve abstract and practical problems, applying and adapting a variety of strategies. Monitor progress and evaluate answers in terms of questions asked.	Upon Graduation	1.2 Estimation and Accuracy: Identify situations where estimation is appropriate and determine the degree of accuracy needed for a given problem situation (and the appropriate precision in which to report answers).	1.2
	Upon Graduation	2.4 Counting Methods: Use technology as needed to determine the possible number of outcomes for an event or compound event using the fundamental counting principle, permutations, combinations, and other systematic counting methods.	2.4
	Upon Graduation	3.3 Multiple Geometric Approaches: Identify, analyze, and use transformational, coordinate, and synthetic geometric approaches to solve problems.	3.3
	Upon Graduation	3.4 Indirect Measurement: Determine measures of two- and three-dimensional objects and their elements using trigonometric ratios, proportionality, the Pythagorean Theorem, and angle relationships.	3.4
.	Upon Graduation	4.2 Variables and Parameters: Determine the appropriate symbolic representation of a given contextual situation (e.g., variables and parameters in equations, inequalities, functions, and matrices).	4.2
	Upon Graduation	4.3 Solving Systems of Equations and Inequalities: Solve a variety of equations, inequalities and systems of equations and inequalities, justify the solution process, and interpret the solution in context.	4.3
Reasoning Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.	Upon Graduation	1.4 Properties of Numbers and Number Systems: Analyze and apply the properties of numbers and number systems.	1.4
	Upon Graduation	2.2 Evaluating Validity: Evaluate the validity of reports based on collected and/or published data by considering the source of the data, the design of the study, and the way data are displayed, analyzed, and interpreted.	2.2

PSAT/NMSQT Skill Category and Description of Skills	Montana Math: Content Standards 2009		
	Course/ Level	Standard	Standard ID
Reasoning Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.	Upon Graduation	2.3 Rules of Probability and Expected Value: Make, evaluate, and justify decisions based on probabilities in multicultural situations, including those of Montana American Indians (e.g., finding expected value and using rules of probability).	2.3
	Upon Graduation	3.1 Conjectures and Inductive Reasoning: Formulate and evaluate conjectures about geometric objects and their properties, with and without technology, applying inductive reasoning when appropriate.	3.1
	Upon Graduation	3.5 Methods of Proof: Establish the validity of geometric conjectures using deductive reasoning, indirect proof, and counterexamples, and critique arguments made by others.	3.5
	Upon Graduation	4.5 Analyzing and Conjecturing with Models: Given data or a problem situation, select and use an appropriate function model to analyze results or make a prediction with and without technology using cultural contexts, including those of Montana American Indians.	4.5
Representation Use and translate among representations including verbal, numerical, symbolic, and graphical to communicate mathematical ideas and solve problems.	Upon Graduation	1.1 Quantification: Use multiple notations to perform and interpret the effects of operations on very large and very small numbers with and without technology.	1.1
	Upon Graduation	1.3 Equivalence with Multiple Notation: Given a representation of a number or expression, find equivalent representations using multiple notations (e.g., x to the 1/2 power vs. square root of x and visual representation of multiplying binomials).	1.3
	Upon Graduation	2.1 Representing and Analyzing Data: Select, create, and compare graphical or numerical representations of data sets using technology when appropriate. Reason about distributions using measures of central tendency and spread (e.g., percentiles, quartiles, inter-quartile range, and standard deviation).	2.1
	Upon Graduation	2.5 Curve Fitting: Model two-variable data using curve fitting with and without technology. Write an equation for a given model and decide when or if predictions based on this equation are valid.	2.5
	Upon Graduation	4.1 Representing Functions: Represent functions in a variety of ways including tables, graphs or diagrams, verbal descriptions, and symbolic expressions in recursive and explicit form. Justify the choice of an appropriate form for solving a given problem.	4.1

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) report[1]. 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.