

Vermont's Framework of Standards and Learning Opportunities Correlated to Merit Software Mathematics Programs

Science, Mathematics, and Technology Standards

Mathematical Understanding

Arithmetic, Number, and Operation Concepts

7.6 Students understand arithmetic in computation, and they select and use, in appropriate situations, mental arithmetic, pencil and paper, calculator, and computer. This is evident when students:

Prek-4	Merit Software
<p>7.6.b. Begin to use simple concepts of: negative numbers, properties of numbers (e.g., prime, square, composite, associative, commutative, distributive), three-digit and larger multipliers and divisors, rates, fractions, decimals, and percents;</p> <p>7.6.c. Describe and compare quantities by using simple fractions and decimals, and whole numbers up to 1,000,000;</p>	Fraction Shape-Up

9-12	Merit Software
7.6.bbb. Represent	

<p>numbers in decimal or fraction form and in scientific notation, and graph numbers on the number line and in the coordinate plane;</p> <p>7.6.ff. Understand and use unitary operations (e.g., opposite, reciprocal, absolute value, raising to a power, taking a root, and taking a logarithm);</p> <p>7.6.i. Understand the interrelationship of the four binary arithmetic operations, and use the properties of these operations in forming and working with algebraic expressions;</p>	Basic Algebra Shape-Up
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Function and Algebra Concepts

7.8 Students use function and algebra concepts. This is evident when students:

5-8	Merit Software
<p>7.8.aa. Discover, describe, and generalize a variety of patterns mathematically;</p> <p>7.8.bb. Understand variables in simple functions (dependent and independent variable relationships), especially linear, exponential, and simple quadratic functions; represent relationships with tables,</p>	Pre-Algebra Shape-Up

<p>graphs, and verbal or symbolic rules; analyze tables, graphs, and rules to determine relationships; and</p> <p>7.8.cc. Explore solutions of unknown quantities in equations.</p>	
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9-12	Merit Software
<p>7.8.aaa. Use functions to represent patterns;</p> <p>7.8.bbb. Represent functional relationships in formulas, tables, and graphs, and translate among these; model given situations with functions, and interpret given functions in terms of situations; understand functions as relationships in which one quantity determines another (dependent and independent variable relationships); use basic types of functions (linear, exponential, periodic, power, rational, square, square roots, cubes, and cube roots); work with properties and mechanics of functions (evaluation, inverse, slope, local maxima and minima);</p> <p>7.8.ccc. Define and use variables, parameters, constants, and unknowns in work with both functions and equations; solve equations both</p>	<p>Basic Algebra Shape-Up</p>

<p>symbolically and graphically, especially linear, quadratic, and exponential equations; use equations to represent curves such as circles, ellipses, parabolas, and hyperbolas;</p> <p>7.8.d. Understand the basic algebraic structure of number systems;</p>	
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Mathematical Problem Solving

Applications

7.10 Students use concrete, formal, and informal strategies to solve mathematical problems, apply the process of mathematical modeling, and extend and generalize mathematical concepts. This is evident when students:

5-8	Merit Software
<p>7.10.bb. Formulate and solve a variety of meaningful problems;</p> <p>7.10.cc. Create and use a variety of approaches, and understand and evaluate the approaches that others use; determine how to break down a complex problem into simpler parts; extract pertinent information from situations;</p> <p>7.10.dd. Integrate concepts and techniques from different areas of</p>	<p>Word Problem Shape-Up</p>

<p>mathematics;</p> <p>7.10.ee. Generalize solutions and strategies to new problem situations; and</p> <p>7.10.g. Formulate conjectures and argue (short of formal proof) why they must be or seem to be true.</p>	
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9-12	Merit Software
<p>7.10.aa. Formulate and solve meaningful problems in many kinds of situations using grade-related mathematical concepts and reasoning strategies;</p> <p>7.10.bbb. Formulate and carry out detailed solutions to complex problems, using appropriate problem-solving techniques;</p> <p>7.10.gg. Gather evidence for conjectures and formulate proofs for them; understand the difference between supportive examples and proof.</p>	<p>Word Problem Shape-Up</p>