

Exploring the Extreme			
2004 Mathematics			
Grade Expectations			
Vermont Mathematics			
Grade K			
Activity/Lesson	State	Standards	
Finding the Center of Gravity Using Rulers	VT	MA.K.MK:15	Identifies the appropriate standard tool used to measure length, temperature, and weight.
Finding the Center of Gravity Using Rulers	VT	MA.K.MK:30.4	Mathematical Language—The use of mathematical language in communicating the solution;
Finding the Center of Gravity Using Rulers	VT	MA.K.MK:30.5	Mathematical Representation—The use of mathematical representation to communicate the solution; and
Exploring the Extreme			
2004 Mathematics			
Grade Expectations			
Vermont Mathematics			
Grade 1			
Activity/Lesson	State	Standards	
Finding the Center of Gravity Using Rulers	VT	MA.1.M1:15	Selects an appropriate tool with which to measure length, temperature, weight, and volume, and uses nonstandard units for linear measurement and weight.
Finding the Center of Gravity Using Rulers	VT	MA.1.M1:28	In response to a teacher- or student-generated question or hypothesis, collects appropriate data to answer the question or hypothesis being tested through written or verbal/scribed response.
Finding the Center of Gravity Using Rulers	VT	MA.1.M1:30.4	Mathematical Language—The use of mathematical language in communicating the solution;
Finding the Center of Gravity Using Rulers	VT	MA.1.M1:30.5	Mathematical Representation—The use of mathematical representation to communicate the solution; and
Exploring the Extreme			
2004 Mathematics			
Grade Expectations			
Vermont Mathematics			
Grade 2			
Activity/Lesson	State	Standards	
Finding the Center of Gravity Using Rulers	VT	MA.2.M2:28	In response to a teacher- or student-generated question or hypothesis, collects appropriate data, organizes the data, displays/represents the data, and makes observations about the data to draw conclusions about the question or hypothesis being tested.

Finding the Center of Gravity Using Rulers	VT	MA.2.MK:30.4	Mathematical Language—The use of mathematical language in communicating the solution;
Finding the Center of Gravity Using Rulers	VT	MA.2.MK:30.5	Mathematical Representation—The use of mathematical representation to communicate the solution; and
Exploring the Extreme			
2004 Mathematics			
Grade Expectations			
Vermont Mathematics			
Grade 3			
Activity/Lesson	State	Standards	
Finding the Center of Gravity Using Rulers	VT	MA.3.M3:30.4	Mathematical Language—The use of mathematical language in communicating the solution;
Finding the Center of Gravity Using Rulers	VT	MA.3.M3:30.5	Mathematical Representation—The use of mathematical representation to communicate the solution; and
Finding the Center of Gravity Using Plumb Lines	VT	MA.3.M3:30.4	Mathematical Language—The use of mathematical language in communicating the solution;
Finding the Center of Gravity Using Plumb Lines	VT	MA.3.M3:30.5	Mathematical Representation—The use of mathematical representation to communicate the solution; and
Changing the Center of Gravity Using Moment Arms	VT	MA.3.M3:23	Interprets a given representation (line plots, tally charts, tables, or bar graphs) to answer questions related to the data, to analyze the data to formulate conclusions, or to make predictions.
Changing the Center of Gravity Using Moment Arms	VT	MA.3.M3:25	Identifies or describes representations or elements of representations that best display a given set of data or situation, consistent with the representations required in M3:23. Organizes and displays data using bar graphs or tables to answer question related to the data, to analyze the data to formulate or justify conclusions, or to make predictions.
Changing the Center of Gravity Using Moment Arms	VT	MA.3.M3:30.4	Mathematical Language—The use of mathematical language in communicating the solution;
Changing the Center of Gravity Using Moment Arms	VT	MA.3.M3:30.5	Mathematical Representation—The use of mathematical representation to communicate the solution; and
Exploring the Extreme			
2004 Mathematics			
Grade Expectations			
Vermont Mathematics			
Grade 4			
Activity/Lesson	State	Standards	

Finding the Center of Gravity Using Rulers	VT	MA.4.M4:23	Interprets a given representation (line plots, tables, bar graphs, pictographs, or circle graphs) to answer questions related to the data, to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems. And (tally charts, frequency charts, line graphs, Venn diagrams).
Finding the Center of Gravity Using Rulers	VT	MA.4.M4:28	In response to a teacher- or student-generated question or hypothesis, collects appropriate data, organizes the data, displays/ represents the data, analyzes the data to draw conclusions about the questions or hypothesis being tested.
Finding the Center of Gravity Using Rulers	VT	MA.4.M4:30.4	Mathematical Language—The use of mathematical language in communicating the solution;
Finding the Center of Gravity Using Plumb Lines	VT	MA.4.M4:23	Interprets a given representation (line plots, tables, bar graphs, pictographs, or circle graphs) to answer questions related to the data, to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems. And (tally charts, frequency charts, line graphs, Venn diagrams).
Finding the Center of Gravity Using Plumb Lines	VT	MA.4.M4:30.4	Mathematical Language—The use of mathematical language in communicating the solution;
Changing the Center of Gravity Using Moment Arms	VT	MA.4.M4:18	Solves problems using the Cartesian coordinate system (Quadrant 1) to locate coordinates and to represent data from tables.
Changing the Center of Gravity Using Moment Arms	VT	MA.4.M4:23	Interprets a given representation (line plots, tables, bar graphs, pictographs, or circle graphs) to answer questions related to the data, to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems. And (tally charts, frequency charts, line graphs, Venn diagrams).
Changing the Center of Gravity Using Moment Arms	VT	MA.4.M4:28	In response to a teacher- or student-generated question or hypothesis, collects appropriate data, organizes the data, displays/ represents the data, analyzes the data to draw conclusions about the questions or hypothesis being tested.
Changing the Center of Gravity Using Moment Arms	VT	MA.4.M4:30.4	Mathematical Language—The use of mathematical language in communicating the solution;
Exploring the Extreme			
2004 Mathematics			

Grade Expectations			
Vermont Mathematics			
Grade 5			
Activity/Lesson	State	Standards	
Jet Propulsion	VT	MA.5.M5:21	Demonstrates conceptual understanding of algebraic expressions by using letters to represent unknown quantities to write linear algebraic expressions involving any two of the four operations; or by evaluating linear algebraic expressions using whole numbers.
Jet Propulsion	VT	MA.5.M5:28	In response to a teacher- or student-generated question or hypothesis, collects appropriate data, organizes the data, appropriately displays/represents numerical and/or categorical data, analyzes the data to draw conclusions about the questions or hypothesis being tested, and when appropriate makes predictions, asks new questions, or makes connections to real-world situations.
Jet Propulsion	VT	MA.5.M5:30.1	Approach & Reasoning—The reasoning, strategies, and skills used to solve the problem;
Jet Propulsion	VT	MA.5.M5:30.2	Connections—Demonstration of observations, applications, extensions, and generalizations;
Jet Propulsion	VT	MA.5.M5:30.4	Mathematical Language—The use of mathematical language in communicating the solution;
Jet Propulsion	VT	MA.5.M5:30.5	Mathematical Representation—The use of mathematical representation to communicate the solution; and
Vectoring	VT	MA.5.M5:28	In response to a teacher- or student-generated question or hypothesis, collects appropriate data, organizes the data, appropriately displays/represents numerical and/or categorical data, analyzes the data to draw conclusions about the questions or hypothesis being tested, and when appropriate makes predictions, asks new questions, or makes connections to real-world situations.
Vectoring	VT	MA.5.M5:30.1	Approach & Reasoning—The reasoning, strategies, and skills used to solve the problem;
Vectoring	VT	MA.5.M5:30.2	Connections—Demonstration of observations, applications, extensions, and generalizations;
Vectoring	VT	MA.5.M5:30.4	Mathematical Language—The use of mathematical language in communicating the solution;

Vectoring	VT	MA.5.M5:30.5	Mathematical Representation—The use of mathematical representation to communicate the solution; and
Center of Gravity, Pitch, Yaw	VT	MA.5.M5:1.2	positive fractional numbers (proper, mixed number, and improper) (halves, fourths, eighths, thirds, sixths, twelfths, fifths, or powers of ten [10, 100, 1000]), decimals (to thousandths), or benchmark percents (10%, 25%, 50%, 75% or 100%) as a part to whole relationship in area, set, or linear models using models, explanations, or other representations.
Exploring the Extreme			
2004 Mathematics			
Grade Expectations			
Vermont Mathematics			
Grade 6			
Activity/Lesson	State	Standards	
Jet Propulsion	VT	MA.6.M6:28	In response to a teacher- or student-generated question, makes a hypothesis, collects appropriate data, organizes the data, appropriately displays/represents numerical and/or categorical data, analyzes the data to draw conclusions about the questions or hypothesis being tested, and when appropriate makes predictions, asks new questions, or makes connection to real-world situations.
Jet Propulsion	VT	MA.6.M6:30.1	Approach & Reasoning—The reasoning, strategies, and skills used to solve the problem;
Jet Propulsion	VT	MA.6.M6:30.2	Connections—Demonstration of observations, applications, extensions, and generalizations;
Jet Propulsion	VT	MA.6.M6:30.4	Mathematical Language—The use of mathematical language in communicating the solution;
Jet Propulsion	VT	MA.6.M6:30.5	Mathematical Representation—The use of mathematical representation to communicate the solution;
Vectoring	VT	MA.6.M6:28	In response to a teacher- or student-generated question, makes a hypothesis, collects appropriate data, organizes the data, appropriately displays/represents numerical and/or categorical data, analyzes the data to draw conclusions about the questions or hypothesis being tested, and when appropriate makes predictions, asks new questions, or makes connection to real-world situations.

Vectoring	VT	MA.6.M6:30.1	Approach & Reasoning—The reasoning, strategies, and skills used to solve the problem;
Vectoring	VT	MA.6.M6:30.2	Connections—Demonstration of observations, applications, extensions, and generalizations;
Vectoring	VT	MA.6.M6:30.4	Mathematical Language—The use of mathematical language in communicating the solution;
Vectoring	VT	MA.6.M6:30.5	Mathematical Representation—The use of mathematical representation to communicate the solution
Center of Gravity, Pitch, Yaw	VT	MA.6.M6:4	Accurately solves problems involving single or multiple operations on fractions (proper, improper, and mixed), or decimals; and addition or subtraction of integers; percent of a whole; or problems involving greatest common factor or least common multiple.
Exploring the Extreme			
2004 Mathematics			
Grade Expectations			
Vermont Mathematics			
Grade 7			
Activity/Lesson	State	Standards	
Jet Propulsion	VT	MA.7.M7:28	In response to a teacher- or student-generated question, makes a hypothesis, collects appropriate data, organizes the data, appropriately displays/represents numerical and/or categorical data, analyzes the data to draw conclusions about the questions or hypothesis being tested, and when appropriate makes predictions, asks new questions, or makes connection to real-world situations.
Jet Propulsion	VT	MA.7.M7:30.1	Approach & Reasoning—The reasoning, strategies, and skills used to solve the problem;
Jet Propulsion	VT	MA.7.M7:30.2	Connections—Demonstration of observations, applications, extensions, and generalizations;
Jet Propulsion	VT	MA.7.M7:30.4	Mathematical Language—The use of mathematical language in communicating the solution;
Jet Propulsion	VT	MA.7.M7:30.5	Mathematical Representation—The use of mathematical representation to communicate the solution

Vectoring	VT	MA.7.M7:28	In response to a teacher- or student-generated question, makes a hypothesis, collects appropriate data, organizes the data, appropriately displays/represents numerical and/or categorical data, analyzes the data to draw conclusions about the questions or hypothesis being tested, and when appropriate makes predictions, asks new questions, or makes connection to real-world situations.
Vectoring	VT	MA.7.M7:30.1	Approach & Reasoning—The reasoning, strategies, and skills used to solve the problem;
Vectoring	VT	MA.7.M7:30.2	Connections—Demonstration of observations, applications, extensions, and generalizations;
Vectoring	VT	MA.7.M7:30.4	Mathematical Language—The use of mathematical language in communicating the solution;
Vectoring	VT	MA.7.M7:30.5	Mathematical Representation—The use of mathematical representation to communicate the solution
Center of Gravity, Pitch, Yaw	VT	MA.7.M7:1	Demonstrates conceptual understanding of rational numbers with respect to percents as a means of comparing the same or different parts of the whole when the wholes vary in magnitude (e.g., 8 girls in a classroom of 16 students compared to 8 girls in a classroom of 20 students, or 20% of 400 compared to 50% of 100); and percents as a way of expressing multiples of a number (e.g., 200% of 50) using models, explanations, or other representations.
Fuel Efficiency	VT	MA.7.M7:21	Demonstrates conceptual understanding of algebraic expressions by using letters to represent unknown quantities to write algebraic expressions (including those with whole-number exponents or more than one variable); or by evaluating algebraic expressions (including those with whole-number exponents or more than one variable); or by evaluating an expression within an equation (e.g., determine the value of y when $x = 4$ given $y = 5x^3 - 2$).
Fuel Efficiency	VT	MA.7.M7:30.1	Approach & Reasoning—The reasoning, strategies, and skills used to solve the problem;
Exploring the Extreme			
2004 Mathematics			
Grade Expectations			

Vermont Mathematics			
Grade 8			
Activity/Lesson	State	Standards	
Jet Propulsion	VT	MA.8.M8:22	Demonstrates conceptual understanding of equality by showing equivalence between two expressions (expressions consistent with the parameters of the left- and right-hand sides of the equations being solved at this grade level) using models or different representations of the expressions, solving formulas for a variable requiring one transformation (e.g., $d = rt$; $d/r = t$); by solving multistep linear equations with integer coefficients; by showing that two expressions are or are not equivalent by applying commutative, associative, or distributive properties, order of operations, or substitution; and by informally solving problems involving systems of linear equations in a context.
Jet Propulsion	VT	MA.8.M8:28	In response to a teacher- or student-generated question, makes a hypothesis, collects appropriate data, organizes the data, appropriately displays/represents numerical and/or categorical data, analyzes the data to draw conclusions about the questions or hypothesis being tested, and when appropriate to make predictions, asks new questions, or makes connection to real-world situations. (See also GLEs M24, M25 and M29.)
Jet Propulsion	VT	MA.8.M8:30.1	Approach & Reasoning—The reasoning, strategies, and skills used to solve the problem;
Jet Propulsion	VT	MA.8.M8:30.2	Connections—Demonstration of observations, applications, extensions, and generalizations;
Jet Propulsion	VT	MA.8.M8:30.4	Mathematical Language—The use of mathematical language in communicating the solution;
Jet Propulsion	VT	MA.8.M8:30.5	Mathematical Representation—The use of mathematical representation to communicate the solution; and

Vectoring	VT	MA.8.M8:28	In response to a teacher- or student-generated question, makes a hypothesis, collects appropriate data, organizes the data, appropriately displays/represents numerical and/or categorical data, analyzes the data to draw conclusions about the questions or hypothesis being tested, and when appropriate to make predictions, asks new questions, or makes connection to real-world situations. (See also GLEs M24, M25 and M29.)
Vectoring	VT	MA.8.M8:30.1	Approach & Reasoning—The reasoning, strategies, and skills used to solve the problem;
Vectoring	VT	MA.8.M8:30.2	Connections—Demonstration of observations, applications, extensions, and generalizations;
Vectoring	VT	MA.8.M8:30.4	Mathematical Language—The use of mathematical language in communicating the solution;
Vectoring	VT	MA.8.M8:30.5	Mathematical Representation—The use of mathematical representation to communicate the solution; and
Center of Gravity, Pitch, Yaw	VT	MA.8.M8:1	Demonstrates conceptual understanding of rational numbers with respect to percents as a way of describing change (percent increase and decrease) using explanations, models, or other representations.
Fuel Efficiency	VT	MA.8.M8:20	Demonstrates conceptual understanding of linear relationships ($y = kx$; $y = mx + b$) as a constant rate of change by solving problems involving the relationship between slope and rate of change; informally and formally determining slopes and intercepts represented in graphs, tables, or problem situations; or describing the meaning of slope and intercept in context; and distinguishes between linear relationships (constant rates of change) and nonlinear relationships (varying rates of change) represented in tables, graphs, equations, or problem situations; or describes how change in the value of one variable relates to change in the value of a second variable in problem situations with constant and varying rates of change.

Fuel Efficiency	VT	MA.8.M8:22	Demonstrates conceptual understanding of equality by showing equivalence between two expressions (expressions consistent with the parameters of the left- and right-hand sides of the equations being solved at this grade level) using models or different representations of the expressions, solving formulas for a variable requiring one transformation (e.g., $d = rt$; $d/r = t$); by solving multistep linear equations with integer coefficients; by showing that two expressions are or are not equivalent by applying commutative, associative, or distributive properties, order of operations, or substitution; and by informally solving problems involving systems of linear equations in a context.
Fuel Efficiency	VT	MA.8.M8:30.1	Approach & Reasoning—The reasoning, strategies, and skills used to solve the problem;