

Math 8

State Standard Number	State Standard Area/Description	Unit Name	Course Topic Description
8.PS	Problem Solving		
0	Students will build new mathematical knowledge through problem solving.		
8.PS.1	Use a variety of strategies to understand new mathematical content and to develop more efficient methods	Lesson 1 Number Sense Lesson 30 Surface Area Lesson 17 Data Analysis	Page 11 Using a Number Line, Page 12 Modeling Addition and Subtraction of Integers Using Tiles Page 5 Warm-Up, Page 9 Counting the Faces Journal Page 6 Displaying and Interpreting Data
8.PS.2	Construct appropriate extensions to problem situations	Lesson 17 Data Analysis Lesson 36 Inferential Statistics	Page 8 Choosing the Appropriate Graph Page 5 Warm-Up
8.PS.3	Understand and demonstrate how written symbols represent mathematical ideas	Lesson 1 Number Sense Lesson 2 Variables and Expressions Lesson 5 Inequalities	Page 5 Warm-Up, Page 8 Absolute Value Page 6 Variables and Expressions Page 5 Warm-Up
0	Students will solve problems that arise in mathematics and in other contexts.		
8.PS.4	Observe patterns and formulate generalizations	Lesson 16 Arithmetic and Geometric Sequences	Page 5 Warm-Up Page 6 Patterns and Sequences Pages 8-10 Sequences
8.PS.5	Make conjectures from generalizations	Lesson 36 Inferential Statistics	Page 5 Warm-Up Page 6 Inferential Statistics Page 10-11 Line Graphs, Histograms and Bar Graphs

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8.PS.6	Represent problem situations verbally, numerically, algebraically, and graphically	Lesson 1 Number Sense Lesson 4 Equations Lesson 23 Graphing Linear Equations	Page 5 Warm-Up Page 5 Warm-Up Page 6 Slope and Graphing
0	Students will apply and adapt a variety of appropriate strategies to solve problems.		
8.PS.7	Understand that there is no one right way to solve mathematical problems but that different methods have advantages and disadvantages	Lesson 32 Triangles and Triangular Prisms Lesson 35 Descriptive Statistics	Page 7 Perimeter and Area Page 8 Sampling Page 9 Research It Journal
8.PS.8	Understand how to break a complex problem into simpler parts or use a similar problem type to solve a problem	Lesson 30 Surface Area Lesson 32 Triangles and Triangular Prisms	Page 5 Warm-Up Page 6,11 Surface Area of Cubes and Prisms Page 7 Perimeter and Area
8.PS.9	Work backwards from a solution	Lesson 13 Solving Multi-Step Equations Lesson 14 Solving Multi-Step Inequalities	Page 9 Checking Equation Solutions Page 9 Checking the Solution Set

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8.PS.10	Use proportionality to model problems	Lesson 10 Ratios, Proportions and Percents Lesson 11 Similarity and Scale	Page 10 Proportions in Equations, Page 11 Tutorial, Page 13 Using Proportions in Word Problems Page 5 Warm-Up, Page 11 Indirect Measurement
8.PS.11	Work in collaboration with others to solve problems	Lesson 17 Data Analysis Lesson 35 Descriptive Statistics	Page 7 Collect It! Page 9 Research It Journal
0	Students will monitor and reflect on the process of mathematical problem solving.		
8.PS.12	Interpret solutions within the given constraints of a problem	Lesson 5 Inequalities Lesson 17 Data Analysis Lesson 14 Solving Multi-Step Inequalities	Page 6 Graphing Inequalities Page 8 Choosing the Appropriate Graph Page 9 Checking the Solution Set

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8.PS.13	Set expectations and limits for possible solutions	Lesson 14 Solving Multi-Step Inequalities Lesson 19 Probability	Page 9 Checking the Solution Set Page 1 Introduction, Page 7 Finding Probability
8.PS.14	Determine information required to solve the problem	Lesson 35 Descriptive Statistics	Page 5 Warm-Up
8.PS.15	Choose methods for obtaining required information	Lesson 35 Descriptive Statistics Lesson 20 Counting Theory	Page 8 Sampling Tutorial Pages 6-7 Tree Diagrams and Counting Principle
8.PS.16	Justify solution methods through logical argument	Lesson 35 Descriptive Statistics Lesson 36 Inferential Statistics	Page 5 Warm-Up, Page 12 Determining the Bias Journal Page 5 Warm-Up
8.PS.17	Evaluate the efficiency of different representations of a problem	Lesson 17 Data Analysis Lesson 23 Graphing Linear Equations	Page 8 Choosing the Appropriate Graph Page 9 Graphing Equations

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8.RP	Reasoning and Proof		
0	Students will recognize reasoning and proof as fundamental aspects of mathematics.		
8.RP.1	Recognize that mathematical ideas can be supported by a variety of strategies	Lesson 17 Data Analysis Lesson 20 Counting Theory Lesson 32 Triangles and Triangular Prisms	Page 8 Choosing the Appropriate Graph Pages 6-7 Tree Diagrams and Counting Principle Page 7 Perimeter and Area
0	Students will make and investigate mathematical conjectures.		
8.RP.2	Use mathematical strategies to reach a conclusion	Lesson 17 Data Analysis Lesson 24 Polygons Lesson 25 Angles	Page 8 Choosing the Appropriate Graph Page 6 What is a Polygon? Page 14 Angle Properties

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8.RP.3	Evaluate conjectures by distinguishing relevant from irrelevant information to reach a conclusion or make appropriate estimates	Lesson 19 Probability Lesson 20 Counting Theory	Page 5 Warm-Up Page 8 Self-Check
0	Students will develop and evaluate mathematical arguments and proofs.		
8.RP.4	Provide supportive arguments for conjectures	Lesson 36 Inferential Statistics	Page 5 Warm-Up, Page 12 Circle Graph Journal
8.RP.5	Develop, verify, and explain an argument, using appropriate mathematical ideas and language	Lesson 35 Descriptive Statistics Lesson 36 Inferential Statistics	Page 12 Determining the Bias Journal Page 12 Circle Graph Journal
0	Students will select and use various types of reasoning and methods of proof.		
8.RP.6	Support an argument by using a systematic approach to test more than one case	Lesson 5 Inequalities Lesson 35 Descriptive Statistics	Page 6 Graphing Inequalities Page 12 Determining the Bias Journal
8.RP.7	Devise ways to verify results or use counterexamples to refute incorrect statements	Lesson 13 Solving Multi-Step Equations Lesson 14 Solving Multi-Step Inequalities	Page 9 Checking Equation Solutions Page 9 Checking the Solution Set
8.RP.8	Apply inductive reasoning in making and supporting mathematical conjectures	Lesson 16 Arithmetic and Geometric Sequences	Page 6 Patterns and Sequences
8.CM	Communication		
0	Students will organize and consolidate their mathematical thinking through communication.		
8.CM.1	Provide a correct, complete, coherent, and clear rationale for thought process used in problem solving	Lesson 13 Solving Multi-Step Equations Lesson 14 Solving Multi-Step Inequalities	Page 6 Tutorial Page 8 Tutorial
8.CM.2	Provide an organized argument which explains rationale for strategy selection	Lesson 17 Data Analysis	Page 8 Choosing the Appropriate Graph

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8.CM.3	Organize and accurately label work	Lesson 31 Volume	Page 10 Rectangular Prism
0	Students will communicate their mathematical thinking coherently and clearly to peers, teachers, and others.		
8.CM.4	Share organized mathematical ideas through the manipulation of objects, numerical tables, drawings, pictures, charts, graphs, tables, diagrams, models and symbols in written and verbal form	Lesson 26 Circles and Pi Lesson 36 Inferential Statistics	Page 8 Create a Circle Page 12 Circle Graph Journal
8.CM.5	Answer clarifying questions from others	Lesson 19 Probability	Page 7 Finding Probability
0	Students will analyze and evaluate the mathematical thinking and strategies of others.		
8.CM.6	Analyze mathematical solutions shared by others	Lesson 35 Descriptive Statistics Lesson 36 Inferential Statistics	Page 12 Determining the Bias Journal Page 12 Circle Graph Journal
8.CM.7	Compare strategies used and solutions found by others in relation to their own work	Lesson 35 Descriptive Statistics Lesson 36 Inferential Statistics	Page 12 Determining the Bias Journal Page 12 Circle Graph Journal
8.CM.8	Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of others	Lesson 35 Descriptive Statistics Lesson 36 Inferential Statistics	Page 12 Determining the Bias Journal Page 12 Circle Graph Journal
0	Students will use the language of mathematics to express mathematical ideas precisely.		
8.CM.9	Increase their use of mathematical vocabulary and language when communicating with others	Lesson 1 Number Sense Lesson 5 Inequalities	Page 5 Warm-Up Page 6 Graphing Inequalities
8.CM.10	Use appropriate language, representations, and terminology when describing objects, relationships, mathematical solutions, and rationale	Lesson 30 Surface Area Lesson 31 Volume	Page 6 Surface Area of a Cube Page 5 Warm-Up
8.CM.11	Draw conclusions about mathematical ideas through decoding, comprehension, and interpretation of mathematical visuals, symbols, and technical	Lesson 17 Data Analysis Lesson 29 Measurement Systems	Page 10 Analyzing Data Page 16 Virtual Trip Around the World

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	writing	Lesson 36 Inferential Statistics	Page 5 Warm-Up
8.CN	Connections		
0	Students will recognize and use connections among mathematical ideas.		
8.CN.1	Understand and make connections among multiple representations of the same mathematical idea	Lesson 17 Data Analysis Lesson 22 Functions Lesson 23 Graphing Linear Equations	Page 8 Choosing the Appropriate Graph Page 9 Graphing Equations
8.CN.2	Recognize connections between subsets of mathematical ideas	Lesson 30 Surface Area Lesson 31 Volume	Page 5 Warm-Up Page 5 Warm-Up
8.CN.3	Connect and apply a variety of strategies to solve problems	Lesson 20 Counting Theory Lesson 32 Triangles and Triangular Prisms	Pages 6-7 Tree Diagrams and Counting Principle Page 7 Perimeter and Area
0	Students will understand how mathematical ideas interconnect and build on one another to produce a coherent whole.		
8.CN.4	Model situations mathematically, using representations to draw conclusions and formulate new situations	Lesson 19 Probability Lesson 36 Inferential Statistics	Page 10 Self-Check Page 5 Warm-Up
8.CN.5	Understand how concepts, procedures, and mathematical results in one area of mathematics can be used to solve problems in other areas of mathematics	Lesson 11 Similarity and Scale Lesson 15 Simple and Compound Interest	Page 7 Scale Tutorial Page 8 Compound Interest
0	Students will recognize and apply mathematics in contexts outside of mathematics.		
8.CN.6	Recognize and provide examples of the presence of mathematics in their daily lives	Lesson 10 Ratios, Proportions and Percents Lesson 25 Angles Lesson 28 Parallelograms	Page 1 Ratios, Rates, and Proportions: Introduction Page 11 Desert Island Quiz Page 5 Warm-Up
8.CN.7	Apply mathematical ideas to problem situations that develop outside of mathematics	Lesson 15 Simple and Compound Interest Lesson 19 Probability	Page 7 Self-Check Page 12 Probability in

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		Lesson 29 Measurement Systems	Sports Page 5 Warm-Up, Page 6 Customary System of Measurements
8.CN.8	Investigate the presence of mathematics in careers and areas of interest	Lesson 35 Descriptive Statistics	Page 6 Population and Samples
8.CN.9	Recognize and apply mathematics to other disciplines, areas of interest, and societal issues	Lesson 11 Similarity and Scale	Page 1 Introduction Page 6 Scale
8.R	Representation		
0	Students will create and use representations to organize, record, and communicate mathematical ideas.		
8.R.1	Use physical objects, drawings, charts, tables, graphs, symbols, equations, or objects created using technology as representations	Lesson 31 Volume	Page 8 Using Unit Cubes Journal Note: Many of the lessons have tutorials which also meet this objective.
8.R.2	Explain, describe, and defend mathematical ideas using representations	Lesson 17 Data Analysis Lesson 36 Inferential Statistics	Page 8 Choosing the Appropriate Graph Page 5 Warm-Up
8.R.3	Recognize, compare, and use an array of representational forms	Lesson 23 Graphing Linear Equations	Page 9 Graphing Equations
8.R.4	Explain how different representations express the same relationship	Lesson 23 Graphing Linear Equations	Page 9 Graphing Equations
8.R.5	Use standard and non-standard representations with accuracy and detail	Lesson 33 Square Root and Irrational Numbers	Page 7 Tutorial
0	Students will select, apply, and translate among mathematical representations to solve problems.		
8.R.6	Use representations to explore problem situations	Lesson 2 Variables and Expressions	Page 6 Variables and Expressions
8.R.7	Investigate relationships between different representations and their impact on a given problem	Lesson 23 Graphing Linear Equations	Page 9 Graphing Equations
8.R.8	Use representation as a tool for exploring and understanding mathematical ideas	Lesson 2 Variables and Expressions	Page 6 Variables and Expressions
0	Students will use representations to model and interpret physical, social, and mathematical		

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	phenomena.		
8.R.9	Use mathematics to show and understand physical phenomena (e.g., make and interpret scale drawings of figures or scale models of objects)	Lesson 11 Similarity and Scale Lesson 30 Surface Area Lesson 31 Volume	Page 5, Warm-Up, Page 6 Introduction Page 6, Surface Area of a Cube Page 8, Volume with Cubes
8.R.10	Use mathematics to show and understand social phenomena (e.g., determine profit from sale of yearbooks)	Lesson 15 Simple and Compound Interest	Page 7 Self-Check Page 9 Compound Interest Page 10 Journal
8.R.11	Use mathematics to show and understand mathematical phenomena (e.g., use tables, graphs, and equations to show a pattern underlying a function)	Lesson 17 Data Analysis Lesson 36 Inferential Statistics	Page 5 Warm-Up, Page 6 Interpreting Data, Page 7 Journal, Page 8 Choose a Graph Page 5 Warm-Up, Page 6 Inferential Statistics, Pages 7-12 Different Types of Graphs
8.N	Number Sense and Operations		
0	Students will understand meanings of operations and procedures, and how they relate to one another.		
0	Operations		
8.N.1	Develop and apply the laws of exponents for multiplication and division	Lesson 6 Exponents	Page 9 Exponents and Multiplication, Page 13 Exponents and Division
8.N.2	Evaluate expressions with integral exponents	Lesson 6 Exponents	Page 8 Self-Check
8.N.3	Read, write, and identify percents less than 1% and greater than 100%	Lesson 12 Percent and Equations	Page 1 Intro, Page 7 Matching Game, Page 12 Matching Game
8.N.4	Apply percents to:		
8.N.4.a	Tax		
8.N.4.b	Percent increase/decrease	Lesson 12 Percent and Equations	Page 13 Tutorial
8.N.4.c	Simple interest	Lesson 15 Simple and Compound Interest	Page 6 Tutorial Page 7 Self-Check
8.N.4.d	Sale price		
8.N.4.e	Commission		
8.N.4.f	Interest rates	Lesson 15 Simple and Compound Interest	Page 6 Tutorial Page 8 Compound Interest
8.N.4.g	Gratuities		
0	Students will compute accurately and make reasonable estimates.		
0	Estimation		

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8.N.5	Estimate a percent of quantity, given an application	Lesson 12 Percent and Equations	Page 8 Proportions and Percents
8.N.6	Justify the reasonableness of answers using estimation	Lesson 9 Equation with Fractions and Decimal	Page 8 Matching Activity and Practice Problems
8.A	Algebra		
0	Students will represent and analyze algebraically a wide variety of problem solving situations.		
0	Variables and Expressions		
8.A.1	Translate verbal sentences into algebraic inequalities	Lesson 5 Inequalities	Pages 8-9 Writing Inequalities
8.A.2	Write verbal expressions that match given mathematical expressions	Lesson 2 Variables and Expressions Lesson 4 Equations	Page 5 Warm-Up, Page 6 Variables and Expressions Page 5 Warm-Up
8.A.3	Describe a situation involving relationships that matches a given graph	Lesson 17 Data Analysis Lesson 23 Graphing Linear Equations	Page 5 Warm-Up, Page 6 Interpreting Data, Page 7 Journal, Page 8 Choose a Graph Page 6 Sloping and Graphing
8.A.4	Create a graph given a description or an expression for a situation involving a linear or nonlinear relationship	Lesson 17 Data Analysis Lesson 23 Graphing Linear Equations	Page 7 Journal Page 9 Graphing Equations
8.A.5	Use physical models to perform operations with polynomials	Lesson 4 Equations	Page 9 Solving Equations Using Tiles
0	Students will perform algebraic procedures accurately.		
0	Variables and Expressions		
8.A.6	Multiply and divide monomials	Lesson 1 Number Sense Lesson 4 Equations	Page 14 Multiplying Integers Page 12 Division Property of Equality Page 13 Multiplication Property of Equality
8.A.7	Add and subtract polynomials (integer coefficients)	Lesson 13 Solving Multi-Step Equations	Page 7 A Variable on Both Sides
8.A.8	Multiply a binomial by a monomial or a binomial (integer coefficients)	Lesson 13 Solving Multi-Step Equations	Page 7 A Variable on Both Sides
8.A.9	Divide a polynomial by a monomial (integer coefficients) Note: The degree of the denominator is less than or equal to the degree of the numerator for all variables.	Lesson 13 Solving Multi-Step Equations Lesson 14 Solving Multi-Step Inequalities	Page 6 Tutorial Page 8 Tutorial

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8.A.10	Factor algebraic expressions using the GCF	Lesson 6 Exponents	Page 17 Greatest Common Factor
8.A.11	Factor a trinomial in the form $ax^2 + bx + c$; $a=1$ and c having no more than three sets of factors		
0	Equations and Inequalities		
8.A.12	Apply algebra to determine the measure of angles formed by or contained in parallel lines cut by a transversal and by intersecting lines	Lesson 25 Angles	Page 12 Tutorial Page 13 Angles and Parallel Lines Page 14 Angle Properties
8.A.13	Solve multi-step inequalities and graph the solution set on a number line	Lesson 14 Solving Multi-Step Inequalities	Page 8 Tutorial
8.A.14	Solve linear inequalities by combining like terms, using the distributive property, or moving variables to one side of the inequality (include multiplication or division of inequalities by a negative number)	Lesson 14 Solving Multi-Step Inequalities	Page 6 A Set of Solutions , Page 8 Tutorial
0	Students will recognize, use, and represent algebraically patterns, relations, and functions.		
0	Patterns, Relations, And Functions		
8.A.15	Understand that numerical information can be represented in multiple ways: arithmetically, algebraically, and graphically	Lesson 23 Graphing Linear Equations	Page 9 Graphing Equations
8.A.16	Find a set of ordered pairs to satisfy a given linear numerical pattern (expressed algebraically); then plot the ordered pairs and draw the line	Lesson 23 Graphing Linear Equations	Page 9 Graphing Equations Page 10 Making Graph Tables
8.A.17	Define and use correct terminology when referring to function (domain and range)	Lesson 22 Functions	Page 1 Introduction: Functions Page 6 Relations and Functions Page 12 Function Notation
8.A.18	Determine if a relation is a function	Lesson 22 Functions	Page 7 Identifying Functions Page 8 Tutorial Page 9 Function Tests
8.A.19	Interpret multiple representations	Lesson 23 Graphing	Page 9 Graphing

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	using equation, table of values, and graph	Linear Equations	Equations
8.G	Geometry		
0	Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes.		
0	Constructions		
8.G.0	Construct the following, using a straight edge and compass:		
8.G.0.a	Segment congruent to a segment	Lesson 31 Volume	Page 8 Using Unit Cubes Journal
8.G.0.b	Angle congruent to an angle	Lesson 32 Triangles and Triangular Prisms	Page 8 Make Your own Triangles
8.G.0.c	Perpendicular bisector		
8.G.0.d	Angle bisector		
0	Students will identify and justify geometric relationships, formally and informally.		
0	Geometric Relationships		
8.G.1	Identify pairs of vertical angles as congruent	Lesson 25 Angles	Page 8 Angle Placement
8.G.2	Identify pairs of supplementary and complementary angles	Lesson 25 Angles	Page 10 Measure It!
8.G.3	Calculate the missing angle in a supplementary or complementary pair	Lesson 25 Angles	Page 10 Measure It!
8.G.4	Determine angle pair relationships when given two parallel lines cut by a transversal	Lesson 25 Angles	Page 12 Tutorial Page 13 Angles and Parallel Lines Page 14 Angle Properties
8.G.5	Calculate the missing angle measurements when given two parallel lines cut by a transversal	Lesson 25 Angles	Page 12 Tutorial Page 13 Angles and Parallel Lines Page 14 Angle Properties
8.G.6	Calculate the missing angle measurements when given two intersecting lines and an angle	Lesson 25 Angles	Page 10 Measure It!
0	Students will apply transformations and symmetry to analyze problem solving situations.		
0	Transformational Geometry		
8.G.7	Describe and identify transformations in the plane, using proper function notation (rotations,	Lesson 27 Symmetry and Translations	Page 6 Line Symmetry, Page 7 Rotational Symmetry, Page 11

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	reflections, translations, and dilations)		Transformations, Page 12 Translations, Page 14 Tutorial
8.G.8	Draw the image of a figure under rotations of 90 and 180 degrees	Lesson 27 Symmetry and Translations	Page 10 Lines of Symmetry Assignment 2
8.G.9	Draw the image of a figure under a reflection over a given line	Lesson 27 Symmetry and Translations	Page 1 Introduction Page 5 Warm-Up
8.G.10	Draw the image of a figure under a translation		
8.G.11	Draw the image of a figure under a dilation		
8.G.12	Identify the properties preserved and not preserved under a reflection, rotation, translation, and dilation	Lesson 27 Symmetry and Translations	Page 6 Line Symmetry, Page 7 Rotational Symmetry, Page 9 Symmetry and Regular Polygons, Page 11 Transformations, Page 12 Translations
0	Students will apply coordinate geometry to analyze problem solving situations.		
0	Coordinate Geometry		
8.G.13	Determine the slope of a line from a graph and explain the meaning of slope as a constant rate of change	Lesson 23 Graphing Linear Equations	Page 5 Warm-Up, Page 7 Tutorial
8.G.14	Determine the y-intercept of a line from a graph and be able to explain the y-intercept	Lesson 23 Graphing Linear Equations	Page 11 Slope-Intercept Form
8.G.15	Graph a line using a table of values	Lesson 23 Graphing Linear Equations	Page 9 Graphing Equations
8.G.16	Determine the equation of a line given the slope and the y-intercept	Lesson 23 Graphing Linear Equations	Page 14 Slopes and Their Graphs Journal
8.G.17	Graph a line from an equation in slope-intercept form ($y = mx + b$)	Lesson 23 Graphing Linear Equations	Page 9 Graphing Equations
8.G.18	Solve systems of equations graphically (only linear, integral solutions, $y = mx + b$ format, no vertical/horizontal lines)		
8.G.19	Graph the solution set of an inequality on a number line	Lesson 5 Inequalities	Page 6 Graphing Inequalities
8.G.20	Distinguish between linear and nonlinear equations $ax^2 + bx + c$; $a=1$ (only graphically)	Lesson 22 Functions	Page 9 Function Tests
8.G.21	Recognize the characteristics of quadratics in tables, graphs, equations, and situations		

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8.M	Measurement		
0	Students will determine what can be measured and how, using appropriate methods and formulas.	Lesson 30 Surface Area Lesson 31 Volume	
0	Units of Measurement	Lesson 29 Measurement Systems	
8.M.1	Solve equations/proportions to convert to equivalent measurements within metric and customary measurement systems Note: Also allow Fahrenheit to Celsius and vice versa.	Lesson 18 Transforming Formulas Lesson 29 Measurement Systems	Page 9 Converting from Celsius to Fahrenheit and Fahrenheit to Celsius Page 7 Customary Conversions