Mc Graw Hill Education

Academic Standards
Mathematics Grade 6

Indiana Academic Standards

Indiana

Common Core State Standards Edition

Everyday Mathematics®
The University of Chicago School Mathematics Project

Volume 1

Teacher's Lesson Guide

Grade 6

Everyday Mathematics®
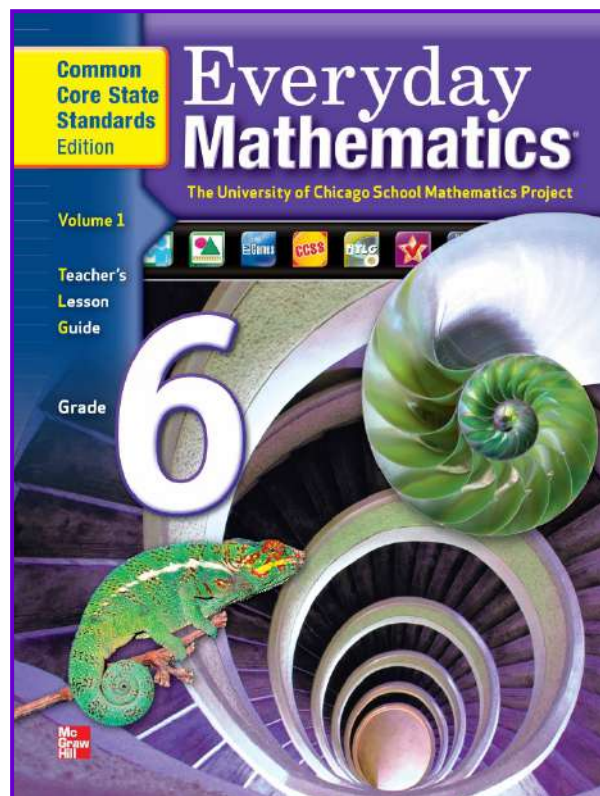
© 2012

STANDARDS	UNIT/LESSON REFERENCES

MATHEMATICS: GRADE 6

The Mathematics standards for grade 6 are supplemented by the Process Standards for Mathematics.

The Mathematics standards for grade 6 are made up of 5 strands: Number Sense; Computation; Algebraic Thinking; Geometry; Measurement; and Data Analysis and Statistics. The skills listed in each strand indicate what students in grade 6 should know and be able to do in Mathematics.

STANDARDS	UNIT/LESSON REFERENCES
NUMBER SENSE	
6.NS.1: Understand that positive and negative numbers are used to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge). Use positive and negative numbers to represent and compare quantities in real-world contexts, explaining the meaning of 0 in each situation.	**Unit/Lessons** 1•7, 3•7, 3•10, 6•3, 6•4, 6•4a, 6•6
6.NS.2: Understand the integer number system. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself (e.g., $-(-3) = 3$), and that 0 is its own opposite.	**Unit/Lessons** 3•1, 6•3, 6•5
6.NS.3: Compare and order rational numbers and plot them on a number line. Write, interpret, and explain statements of order for rational numbers in real-world contexts.	**Unit/Lessons** 1•11, 3•9, 6•3, 6•8
6.NS.4: Understand that the absolute value of a number is the distance from zero on a number line. Find the absolute value of real numbers and know that the distance between two numbers on the number line is the absolute value of their difference. Interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.	**Unit/Lessons** 6•3, 6•4a, 6•5, 6•8 *Project 10*
6.NS.5: Know commonly used fractions (halves, thirds, fourths, fifths, eighths, tenths) and their decimal and percent equivalents. Convert between any two representations (fractions, decimals, percents) of positive rational numbers without the use of a calculator.	**Unit/Lessons** 4•1, 4•8, 4•9, 4•10 *Project 6*
6.NS.6: Identify and explain prime and composite numbers.	**Unit/Lessons** 2•7, 4•1, 6•13, 7•2, 7•4
6.NS.7: Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers from 1 to 100, with a common factor as a multiple of a sum of two whole numbers with no common factor.	**Unit/Lessons** 3•7, 4•1, 4•2, 4•3, 8-9, 9•2, 9•4, 9•8
6.NS.8: Interpret, model, and use ratios to show the relative sizes of two quantities. Describe how a ratio shows the relationship between two quantities. Use the following notations: a/b, a to b, a:b.	**Unit/Lessons** 2•9, 8•1, 8•2, 8•3, 8•6, 8•9, 8•11, 8•12

STANDARDS	UNIT/LESSON REFERENCES
6.NS.9: Understand the concept of a unit rate and use terms related to rate in the context of a ratio relationship.	**Unit/Lessons** 3•5, 3•6, 8•1, 8•2, 8•3, 8•6, 8•9, 8•11 *Project 5*
6.NS.10: Use reasoning involving rates and ratios to model real-world and other mathematical problems (e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations).	**Unit/Lessons** 2•9, 3•5, 3•6, 8•1, 8•2, 8•3, 8•4, 8•6, 8•7, 8•9, 8•10, 8•11, 8•12 *Project 4*
COMPUTATION	
6.C.1: Divide multi-digit whole numbers fluently using a standard algorithmic approach.	**Unit/Lessons** 2•7, 3•3, 9•1 *Algorithm Project 4*
6.C.2: Compute with positive fractions and positive decimals fluently using a standard algorithmic approach.	**Unit/Lessons** 2•3, 2•5, 2•6, 2•8, 4•3, 4•4, 4•5, 4•6, 4•7, 6•1, 6•2, 6•12, 8•2 *Algorithm Project 1, 2, 3, 4*
6.C.3: Solve real-world problems with positive fractions and decimals by using one or two operations.	**Unit/Lessons** 2•3, 2•5, 2•6, 2•8, 4•3, 4•4, 4•5, 4•6, 4•7, 6•1, 6•2, 6•12, 8•2
6.C.4: Compute quotients of positive fractions and solve real-world problems involving division of fractions by fractions. Use a visual fraction model and/or equation to represent these calculations.	**Unit/Lessons** 6•2, 6•5
6.C.5: Evaluate positive rational numbers with whole number exponents.	**Unit/Lessons** 2•4, 2•9, 2•10, 2•11
6.C.6: Apply the order of operations and properties of operations (identity, inverse, commutative properties of addition and multiplication, associative properties of addition and multiplication, and distributive property) to evaluate numerical expressions with nonnegative rational numbers, including those using grouping symbols, such as parentheses, and involving whole number exponents. Justify each step in the process.	**Unit/Lessons** 1•5, 3•2, 4•5, 6•5, 6•6, 6•7, 9•2
ALGEBRA AND FUNCTIONS	
6.AF.1: Evaluate expressions for specific values of their variables, including expressions with whole-number exponents and those that arise from formulas used in real-world problems.	**Unit/Lessons** 3•1, 3•2, 3•3, 3•4, 3•5, 3•7, 3•8, 3•10 *Project 6*

STANDARDS	UNIT/LESSON REFERENCES
6.AF.2: Apply the properties of operations (e.g., identity, inverse, commutative, associative, distributive properties) to create equivalent linear expressions and to justify whether two linear expressions are equivalent when the two expressions name the same number regardless of which value is substituted into them.	**Unit/Lessons** 9•2, 9•3, 9•4
6.AF.3: Define and use multiple variables when writing expressions to represent real-world and other mathematical problems, and evaluate them for given values.	**Unit/Lessons** 3•3, 3•4, 3•6, 9•2, 9•3, 9•4
6.AF.4: Understand that solving an equation or inequality is the process of answering the following question: Which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.	**Unit/Lessons** 3•8, 4•1, 6•8, 6•9, 6•10, 6•11, 6•12, 8•3, 9•5, 9•6
6.AF.5: Solve equations of the form x + p = q, x - p = q, px = q, and x/p = q fluently for cases in which p, q and x are all nonnegative rational numbers. Represent real world problems using equations of these forms and solve such problems.	**Unit/Lessons** 6•8, 6•9, 6•10, 6•11, 9•5, 9•6, 9•10, 9•11
6.AF.6: Write an inequality of the form x > c, x ≥ c, x < c, or x ≤ c, where c is a rational number, to represent a constraint or condition in a real-world or other mathematical problem. Recognize inequalities have infinitely many solutions and represent solutions on a number line diagram.	**Unit/Lessons** 6•12, 7•1, 7•5, 7•7
6.AF.7: Understand that signs of numbers in ordered pairs indicate the quadrant containing the point; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. Graph points with rational number coordinates on a coordinate plane.	**Unit/Lessons** 5•4, 5•5, 5•6, 9•10, 10•2
6.AF.8: Solve real-world and other mathematical problems by graphing points with rational number coordinates on a coordinate plane. Include the use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	**Unit/Lessons** 1•7, 1•10, 3•5, 3•6, 3•10, 5•4, 5•5, 6•4a, 6•8, 8•11, 9•10, 10•2
6.AF.9: Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane.	**Unit/Lessons** 3•5, 3•10, 9•7 *Project 6*

STANDARDS	UNIT/LESSON REFERENCES
6.AF.10: Use variables to represent two quantities in a proportional relationship in a real-world problem; write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.	**Unit/Lessons** 1•10, 3•5, 3•6, 9•7
GEOMETRY AND MEASUREMENT	
6.GM.1: Convert between measurement systems (English to metric and metric to English) given conversion factors, and use these conversions in solving real-world problems.	**Unit/Lessons** *Project 1*
6.GM.2: Know that the sum of the interior angles of any triangle is 180º and that the sum of the interior angles of any quadrilateral is 360º. Use this information to solve real-world and mathematical problems.	**Unit/Lessons** 5•1, 5•2
6.GM.3: Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate; apply these techniques to solve real-world and other mathematical problems.	**Unit/Lessons** 1•6, 3•5, 5•4, 5•6
6.GM.4: Find the area of complex shapes composed of polygons by composing or decomposing into simple shapes; apply this technique to solve real-world and other mathematical problems.	**Unit/Lessons** 1•10, 6•7, 9•8 *Project 9*
6.GM.5: Find the volume of a right rectangular prism with fractional edge lengths using unit cubes of the appropriate unit fraction edge lengths (e.g., using technology or concrete materials), and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = Bh$ to find volumes of right rectangular prisms with fractional edge lengths to solve real-world and other mathematical problems.	**Unit/Lessons** 4•7, 9•9, 9•10, 9•11
6.GM.6: Construct right rectangular prisms from nets and use the nets to compute the surface area of prisms; apply this technique to solve real-world and other mathematical problems.	**Unit/Lessons** 9•8, 9•11 *Project 9*

STANDARDS	UNIT/LESSON REFERENCES
DATA ANALYSIS AND STATISTICS	
6.DS.1: Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for the variability in the answers. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.	**Unit/Lessons** 1•2, 1•3, 1•4, 1•6, 1•7, 1•8
6.DS.2: Select, create, and interpret graphical representations of numerical data, including line plots, histograms, and box plots.	**Unit/Lessons** 1•2, 1•3, 1•5a, 1•6, 1•7, 1•8, 1•9, 1•11, 1•12, 2•1, 2•3, 2•7, 3•9, 3•10 *Project 6*
6.DS.3: Formulate statistical questions; collect and organize the data (e.g., using technology); display and interpret the data with graphical representations (e.g., using technology).	**Unit/Lessons** 1•12, 3•5, 3•6, 3•7, 3•8, 3•9, 3•10, 4•10 *Project 7*
6.DS.4: Summarize numerical data sets in relation to their context in multiple ways, such as: report the number of observations; describe the nature of the attribute under investigation, including how it was measured and its units of measurement; determine quantitative measures of center (mean and/or median) and spread (range and interquartile range), as well as describe any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered; and relate the choice of measures of center and spread to the shape of the data distribution and the context in which the data were gathered.	**Unit/Lessons** 1•2, 1•3, 1•4, 1•5, 1•5a, 1•6, 1•7, 1•10, 1•11, 1•12, 2•1, 3•4, 4•10 *Project 7, 10*