MASCONOMET REGIONAL SCHOOL DISTRICT
CURRICULUM GUIDE

COURSE NAME:	Accelerated Pre-Algebra	**DEPARTMENT:**	Mathematics		
COURSE NUMBER:	1165	**GRADE LEVEL(S):**	7		
PHASE:	N/A	**YEAR:**	X	**TRIMESTER**	

I. Course Description:

Accelerated Pre-Algebra is designed to prepare students for success in algebra and geometry. The main goal of this course is to develop mathematical thinking. This course is comprised of ten key strands. These are Algebra, Communicating Mathematics, Data Analysis/Statistics, Geometry, Interdisciplinary Applications, Measurement, Number Sense, Patterns and Functions, Probability and Technology. These strands are woven throughout the course and problems incorporating each strand appear in nearly every lesson.

Spiral learning is an important feature of this course. Students master concepts as they experience these concepts in different settings and contexts. Key concepts are previewed before formal presentation and are reviewed frequently thereafter.

Technology is used throughout the course. Use of a scientific calculator is assumed. A solar powered calculator with a hard plastic case is recommended. These scientific calculators are recommended because they use an order of operations close to that found in algebra and there are keys that are useful for working with the concepts in this course.

II. Central Objectives:

Students will be able to:

A. Recognize and extend patterns involving geometric figures, numbers and letters.
B. Calculate probabilities.
C. Find the greatest common factor and least common multiple of monomials.
D. Evaluate numerical expressions by hand and with a scientific calculator and will also be able to evaluate a variable expression, given a value to substitute for the variable.
E. Work with rates, ratios, percents, proportions, and similarity and solve problems involving these concepts.
F. Measure line segments and angles to a specified degree of accuracy and will become familiar with both the Metric and Customary Systems of measurement.
G. Draw and interpret circle graphs, bar graphs, scattergrams, histograms, pictographs, and stem-and-leaf plots.
H. Find the mean, median and mode for a data set.
I. Use formulas to find the perimeter, area, volume and surface area of two and three-dimensional geometric figures.
J. Work with signed numbers.
K. Write and graph simple and compound inequalities.

L. Solve problems involving powers of ten and scientific notation.
M. Use a rectangular coordinate system to graph equations and inequalities.
N. Recognize parallel and perpendicular lines, and adjacent and vertical angles.
O. Solve linear equations and inequalities including ones involving fractions.
Q. Recognize properties of real numbers.
R. Identify and work with certain concepts of number theory.

III. Curriculum Frameworks Standards for Mathematical Practice:

The primary goal of school mathematics programs is to assist students in becoming mathematically proficient. Mathematically proficient students are able to:

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

IV. Curriculum Frameworks Standards for Mathematics Content in Grade 7:

Ratios and Proportional Relationships:
Students will:

- Compute unit rates associated with ratios of fractions including quantities measured in like or different units.
- Recognize and represent proportional relationships between quantities.
- Use proportional relationships to solve multi-step ratio and percent problems.

The Number System:
Students will:

- Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers.
- Represent addition and subtraction on a horizontal or vertical number line
- Apply and extend previous understandings of multiplication and division of fractions to multiply and divide rational numbers.
- Solve real world and mathematical problems involving the four operations with rational numbers.

Expressions and Equations:
Students will:

- Apply properties of operations as strategies to add, subtract, factor and expand linear expressions with rational coefficients.
- Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.

- Solve multi-step real world and mathematical problems posed with positive and negative rational numbers in any form using tools strategically.
- Apply properties of operations to calculate with numbers in any form.
- Convert between forms of numbers as appropriate.
- Assess the reasonableness of answers using mental computation and estimation strategies.
- Use variables to represent quantities in a real world or mathematical problem.
- Construct simple equations and inequalities to solve problems by reasoning about the quantities.
- Solve word problems that give rise to equations of the form $px + q = r$ or $p\ x + q\ = r$ where p, q & r are specific rational numbers.
- Compare an algebraic solution to an arithmetic solution, identifying the sequence of operations used in each approach.
- Solve word problems leading to inequalities of the form $px + q < r$ or $px + q > r$ where p, q & r are specific rational numbers.
- Graph the solution set of these inequalities and interpret the solution in the context of the problem.
- Extend analysis of patterns to include analyzing, extending and determining an expression for simple arithmetic and geometric sequences.

Statistics and Probability:
Students will:

- Understand that statistics can be used to gain information about a population by examining a sample of the population.
- Understand that generalizations about a population from a sample are valid only if the sample is representation of that population.
- Understand that random sampling tends to produce representative samples and support valid inferences.
- Use data from a random sample to draw inferences about a population with an unknown characteristic of interest.
- Generate multiple samples of the same size to gauge the variation in estimates or predictions.
- Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.
- Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.
- Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring and the larger the number the greater the likelihood.
- Approximate the probability of a chance event by collecting data on the chance process that produces it and observing long run relative frequency.
- Predict the approximate relative frequency given the probability.
- Develop a probability model and use it to find the probabilities of events.
- Compare probabilities from a model to observed frequencies.

- Explain possible sources of the discrepancy if the model and observed frequencies do not agree.
- Find probabilities of compound events using organized lists, tables, tree diagrams and simulation.

V. Major Activities:

- Lecture and class discussion to explain concepts and processes.
- Individual and group work to practice skills presented in class, to apply them to various problem-solving situations and to develop the ability to work cooperatively in such situations.
- Student assignments to develop proficiency in those skills and processes presented and practiced in class.
- Group and individual investigations related to understanding and applying the concepts in the central objectives.
- Independent projects such as reports and computer work may be presented by students.

VI. General Expectations:

Textbook:

This textbook will be covered at all times. Your name and your teacher's name should be written in ink in the space provided inside the front cover. Please do not write in the text. It is your responsibility to take care of the text assigned you (reminder: replacement cost is at least $83.00).

Notebooks:

A notebook is a requirement for success. A three-ring binder should be used for all course materials. This should contain your class notes, your reading notes, classwork, activities and **all handouts from your teacher.** The curriculum guide is available online: www.masconomet.org.

Classwork:

You should come to class fully prepared to discuss the prior night's assignment and to ask questions about those concepts with which you are having difficulty. Being fully prepared also means that you should have your text, notebook, pencil, homework, and calculator with you for class each day.

Homework:

You are expected to complete homework assignments daily. A critical part of each assignment is reading the new material to supplement what was already discussed in class, prior to jumping into the homework problems. As you read through a section, you should take any filler notes to complement/complete what you already took for notes in class. Homework is acceptable only if your work accompanies your answer when appropriate. Should you have an incorrect answer, your work should provide you with the reason for the response you gave and lessen the chance of your making the same error again. Error analysis is an important part of your learning process.

Attendance:
Follow the procedures outlined in the Calendar Handbook.

Tardiness:
Being tardy to class will not be tolerated. Students who arrive late to class without an acceptable pass as determined by the teacher will be subject to detention on that same day.

Effort and Conduct:
Effort grades are very much based upon completion of daily assignments, attendance, and class participation. Conduct grades will depend upon cooperation, behavior, attitude, attentiveness, alertness, interest and participation exhibited in class.

Make-up Work:
Work missed due to a one-day absence will be completed no later than the end of the second day back. Work missed due to an absence of more than one day will be completed by a mutually agreed upon date. It is the student's responsibility to find out what work was missed. Failure to make up work will result in a zero for the given assignment, test or quiz.

Extra Help:
Extra help is available to the student Monday through Thursday from 2:20 until 2:50 in a room to be announced. Extra help sessions hold preference over all activities (including athletics) except detention.

VII. Student Evaluation:

- Daily assignments to be evaluated in light of completeness, care of presentation and the student's ability to explain the results. Late or incomplete assignments can earn at most half credit. Generally, no credit will be given for any assignment not completed within one day of the time it was due.
- Individual and group classwork/investigations to be evaluated in light of their completeness, care of presentation, student participation in the process and the student's ability to discuss the results/conclusions.
- Frequent quizzes to assess the student's progress in achieving course objectives on a short-term basis.
- Chapter tests to assess the student's ability to synthesize several classes and achieve course objectives on a long-term basis.
- Coverage of each chapter will generally involve a chapter test and one or two quizzes and at least one graded assignment.

Text: McDougal Littell Pre – Algebra
Ron Larson, Laurie Boswell, Timothy Kanold, Lee Stiff
McDougal Littell: Evanston, IL: 2005

VIII. Scope and Sequence:

Chapter 1: **Variable, Expressions, and Integers**

In this chapter, students are introduced to algebraic concepts. They write and evaluate variable expressions, perform operations with integers and plot points in the coordinate plane.

Students will be able to:

- write and evaluate numerical and variable expressions; solve real-world problems by creating verbal models which describe the problem in words, and translate this into math symbols
- express repeated multiplication as a base and exponent, and use formula which involve exponents
- evaluate numerical expressions using order of operations
- compare and order integers; solve simple absolute value problems
- perform the four basic operations with integers
- identify and plot points in a coordinate plane

Chapter 2: **Solving Equations**

Important properties of addition and multiplication are introduced and then integrated into a unit which focuses on solving equations by the use of inverse operations.

Students will be able to:

- manipulate expressions using the commutative and associative properties of addition and multiplication
- use the identity properties and unit analysis to convert from one system of measurement to another
- use the distributive property to write an equivalent variable expression
- for a given expression, identify the terms, like terms, coefficients and constant terms.
- simplify expressions by use of the distributive property and combining like terms
- solve one step equations in one variable by using inverse operations: addition, subtraction or multiplication, division
- solve real-life word problems by solving one-step equations

Chapter 3: **Multi-Step Equations and Inequalities**

The techniques for solving one-step equations which was developed in Chapter 2 are extended to solving multi-step equations and inequalities.

Students will be able to:

- solve two-step equations by using two inverse operations
- solve equations having like terms and parentheses
- solve equations which have the variable on both sides
- solve an inequality by applying inverse operations of addition, subtraction or multiplication, division of both positive and negative integers
- graph the solution to an inequality on a number line

Chapter 4: **Factors, Fractions, and Exponents**

Standard methods of factoring numbers, finding the greatest common factor and least common multiple of a pair of numbers, and simplifying fractions are reviewed and extended to the study of monomials. A study of the properties of exponents leads into looking at powers of ten and scientific notation.

Students will be able to:

- recognize prime and composite numbers and find the prime factors of a number
- find the gcf of two or more whole numbers or two or more monomials by multiplication of their common prime factors
- simplify a variable expression by factoring the numerator and denominator and dividing out the common factors
- find the lcm of two whole numbers or two monomials, and use the results to solve real-life problems
- simplify a monomial involving exponents by use of the product and quotient rules powers, including negative and zero exponents
- write numbers and perform arithmetic operations in scientific notation

Chapter 5: **Rational Numbers and Equations**

An ability to identify rational numbers and convert between fractions and decimals leads to a study of operations with fractions and solving equations and inequalities with rational numbers.

Students will be able to:

- write terminating and repeating decimals as fractions, and fractions as decimals
- add and subtract like and unlike numerical and variable fractions using a least common denominator
- multiply and divide numerical fractions and those involving variables
- use multiplicative inverses to solve equations
- solve equations and inequalities with rational numbers

Chapter 6: **Ratio, Proportion, and Probability**

This unit focuses on solving problems by setting up ratios, finding unit rates and solving proportions.

Students will be able to:

- compare two ratios and apply this to making comparisons in real-life situations
- explain the difference between a ratio and a rate, and find unit rates
- set up a proportion as an equation which states that two ratios are equivalent
- solve a proportion using equivalent ratios and by cross multiplication
- identify similar and congruent figures and use proportions to find an unknown side of a figure
- evaluate the probability of an event using the formula for probability
- find the odds in favor or against an event occurring
- use the counting principle to find probabilities

Chapter 7: **Percents**

This chapter deals with finding the percent of a number and solving problems using percents.

Students will be able to:

- use a fraction to find the percent of a number and write a probability as a percent
- use a proportion to solve a percent problem
- use decimals to solve percent problems
- use an equation to solve a percent problem
- find the percent of change in a problem
- calculate discounts, sales tax, tips and increases as a percent
- calculate interest earned by applying the simple interest formula
- compute compound interest by using a calculator

Chapter 8: **Linear Functions**

Selected topics from this chapter give the foundation needed to understand functions and to graph and solve linear equations.

Students will be able to:

- use graphs to represent functions and relations
- write an equation in function form and graph the equation
- use the x- and y- intercepts to graph linear equations
- find and interpret slopes of lines
- interpret slope as rate of change
- graph linear equations in slope-intercept form

Chapter 9: **Real Numbers**

Selected topics from this chapter include a study of the Pythagorean Theorem and square roots.

Students will be able to:

- find an approximate square root of a number
- use the Pythagorean Theorem to solve problems
- classify rational and irrational numbers

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