

Boston Public Schools
Course 437, Pre-Algebra
Scope and Sequence
2006-2007

The Scope and Sequence is a guide to be used by teachers when planning daily and weekly lessons. The scope and sequence sets forth the content of the mathematics curriculum and a suggested number of days for each topic. It is based on the suggested timeline developed by the publishers of our curriculum materials with adjustments made to reflect the particular needs of our district.

It is expected that the number of days that teachers and students will need to complete the topics listed in the scope and sequence will vary from class to class. Each term has unassigned days that teachers may use flexibly as the need arises to spend additional time on a topic and/or engage in enrichment activities. There are 33 discretionary days in this scope and sequence.

The scope and sequence includes key dates that teachers can use as reference points to determine the likelihood that a class will complete the mathematics curriculum for this course. Teachers and administrators should make regular use of the scope and sequence as one measure of assessing whether or not students are accessing the full curriculum for a course.

Note: Specific dates for the Formative Assessment and the Open Response section of the Final Exam will be forthcoming.

T E R M	Book	Days	Learning Outcomes After completing each section, students will be able to:
Variables and Patterns			
	Investigation		
1	1: Variables and Coordinate Graphs	1 day	<ul style="list-style-type: none"> ◦ Collect data from an experiment and make a table and a graph to organize and represent the data. ◦ Search for explanations for patterns and variations in data. ◦ Understand that a variable is a quantity that changes and recognize variables in the real world. ◦ Understand that in order to make a graph that shows the relationship between two variables, you need to identify the two variables, choose an axis for each, and select an appropriate scale for each axis. ◦ Interpret information given in a graph.
1	2: Graphing Change (omit 2.4)	2 days	<ul style="list-style-type: none"> ◦ Make sense of data given in the form of a table or a graph. ◦ Read a narrative of a situation that changes over time and make a table and graph that represent these changes. ◦ Read data given in a table and make a graph from the table. ◦ Compare tables, graphs, and narratives and understand the advantages and disadvantages of each form of representation.
1	3: Analyzing Graphs and Tables	3 days	<ul style="list-style-type: none"> ◦ Change the form of representation of data from tables to graphs and vice versa. ◦ Search for patterns of change. ◦ Describe situations that change in predictable ways, write rules in words for predicting the change. ◦ Compare forms of representation of data.
1	4: Patterns and Rules	3 days	<ul style="list-style-type: none"> ◦ Understand the relationship between rate, time, and distance. ◦ Represent information regarding rates in tables and graphs and to use tables and graphs to compare rates. ◦ Search for patterns of predictable change. ◦ Learn to express in words and symbols situations that change in predictable ways.

T E R M	Book	Days	Learning Outcomes After completing each section, students will be able to:
			o
1	Reflections	1 day	
1	End Module/Chapter Test	1 day	
	End Variables and Patterns	11days	

Stretching and Shrinking

1	1:Enlarging Figures	1 day	o To make enlargements of simple figures.
1	2: Similar Figures	4 days	o To review locating points in a coordinate system. o To graph figures using algebraic rules. o To predict how figures on a coordinate system are affected by a given table. o To learn that corresponding angles of similar figures are equal and that corresponding sides grow by the same factor. o To compare lengths and angles in similar and non-similar figures informally. o To experiment with examples and counterexamples of similar shapes.
1	3:Patterns of Similar Figures	3 days	o Recognize similar figures and to be able to tell why they are similar. o Understand that any two similar figures are related by a scale factor, which is the ratio of their corresponding size. o Build a larger, similar shape from copies of a basic shape (a rep-tile). o Find rep-tiles by dividing a large shape into smaller, similar shapes. o Understand that the sides and perimeters of similar figures grow by a scale factor and that the areas grow by the square of the scale factor. o Find a missing measurement in a pair of similar figures. o Recognize that triangles with equal corresponding angles are similar.
1	4:Using Similarity (omit 4.1)	5 days	o Use the definition of similarity to recognize when figures are similar. o Determine the scale factor between two similar figures o Use the scale factor between similar figures to find the lengths of corresponding sides. o Find a missing measurement in a pair of similar figures. o Use the relationship between scale factor and area to find the area of a figure that is similar to a figure of a known area. o Solve problems that involve scaling up and down.
1	Reflections	1 day	
1	EndModule/ChTest	1 day	

End Stretching and Shrinking 15 days

Comparing and Scaling

	Investigation		
1	1: Making Comparisons	3 days	o Explore several ways to make comparisons. o Begin to understand how to determine when comparisons can be made using multiplication or division versus addition and subtraction. o Begin to develop ways to use ratios, fractions, rates, and unit rates to answer questions involving proportional reasoning.
			o
1	2: Comparing by Finding Percents	3 days	o Further develop the ability to make sensible comparisons of data using ratios, fractions, and decimal rates, with a focus on percents. o Develop the ability to make judgments about rounding data to estimate ratio comparisons. o Observe what is common about situations that call for a certain type of ratio comparison.

1	3: Comparing by Using Ratios	3 days	<ul style="list-style-type: none"> Recognize situations in which ratios are a useful form of comparison. Form, label, and interpret ratios from numbers given or implied in a situation. Explore several informal strategies for solving scaling problems involving ratios (which is equivalent to solving proportions).
1	End Term One	45 days	<p>Term ends on November 9, 2006</p> <p>33 Instructional days</p> <p>2 End Module/Chapter Test days.</p> <p>9 Discretionary days.</p> <p>1 Formative Assessment day.</p>
2	4: Comparing by Finding Rates	5 days	<ul style="list-style-type: none"> Find unit rates. Represent data in tables and graphs. Look for patterns in tables in order to make predictions beyond the tables. Connect unit rates with a rule describing the situation. Begin to recognize that constant growth in a table will give a straight-line graph. Find the missing value in a proportion.
2	5: Estimating Populations and Population Densities	3 days	<ul style="list-style-type: none"> Use geometric scaling to estimate population counts. Apply proportional reasoning to situations in which capture-tag-recapture methods are appropriate for estimating population counts. Use ratios and scaling up or down (finding equivalent ratios) to find the missing value in a proportion. Use rates to describe population and traffic density (space per person or car).
2	6: Choosing Strategies	2 days	<ul style="list-style-type: none"> Select and apply appropriate strategies to make comparisons. Review when ratio and difference strategies are useful in solving problems. Use proportional reasoning to fairly apportion available space so that the group is representative of the larger community.
2	Reflections	1 day	
2	End Module/Chapter Test	1 day	
End Comparing and Scaling		21 days	

Accentuate the Negative

	Investigation		
2	1: Extending the Number Line	3 days	<ul style="list-style-type: none"> Explore the use of integers in applied settings. Compare integers using the symbols =, >, and <. Represent integers on a number line. Understand that an integer and its inverse are called opposites.
2	2: Adding Integers	4 days	<ul style="list-style-type: none"> Explore addition of integers using two models (a number line and a chip board). Develop strategies for adding integers. Recognize and solve problems involving addition of integers.
2	3: Subtracting Integers	6 days	<ul style="list-style-type: none"> Explore subtraction of integers using two models (a number line and a chip board). Develop strategies for subtracting integers. Recognize and use the relationship of addition and subtraction as inverse operations. Recognize and solve problems involving subtraction of integers.

2	4: Multiplying and Dividing Integers	5 days	<ul style="list-style-type: none"> Develop strategies for multiplying and dividing integers. Recognize and use the relationship of multiplication and division as inverse operations. Recognize and solve problems involving multiplication and division of integers.
2	5: Coordinate Grids	4 days	<ul style="list-style-type: none"> Locate points and lines on a coordinate grid using all four quadrants. Set up a coordinate grid on a graphing calculator by selecting an appropriate scale and maximum and minimum values of x and y. Graph linear equations using a graphing calculator. Informally observe the effects of opposite coefficients and adding a constant to $y = ax$. Answer questions using equations, tables, and graphs.
2	Reflections	1 day	
2	End Module/Chapter Test	1 day	
	End Accentuate the Negative	24 days	

Moving Straight Ahead

	Investigation		
2	1: Predicting from Patterns	2 days	<ul style="list-style-type: none"> Encounter the idea that many phenomena are constrained by linear relationships. Collect data and use patterns in tables and graphs to make predictions. Connect points on a graph of data that were collected or predicted.
2	End Term Two	47 days	Term ends on January 31, 2007 36 Instructional Days/ 2 End Module/Chapter Test days. 9 Discretionary days.
3	MID-YEAR EXAM	2 days	Administer Mid-Year Examination-Day One Review Mid-Year Examination-Day Two
3	2: Walking Rates	6 days	<ul style="list-style-type: none"> Recognize linear relationships from tables; for each unit change in one variable, there is a constant rate of change in the other variable. Determine whether a set of data is linear by examining its graph. Recognize how the rate of change between two variables is associated with its representations. Recognize that a change in rate will change the steepness of a line and the coefficient of x (the independent variable). Interpret the meaning of the coefficient of x and y-intercept of a graph of $y = mx + b$
3	3: Exploring Lines with a Graphing Calculator	5 days	<ul style="list-style-type: none"> Connect solutions in graphs and tables to solutions of equations. Find a solution common to two linear equations by graphing. Understand how the y-intercept appears in tables and equations. Understand how the rate of change (the coefficient m) appears in equations and affects the graph of a line.
3	4: Solving Equations	6 days	<ul style="list-style-type: none"> Solve an equation of the form $y = mx + b$ symbolically. Connect various methods of finding information in graphs and in tables and by solving equations.
3	5: Exploring Slope	4 days	<ul style="list-style-type: none"> Develop a more formal understanding of the concept of slope. Find the constant rate, or slope, from a table. Find the slope of a line given two points on the line. Relate the slope and the y-intercept to the equation of a line.
3	6: Writing an Equation for a Line	4 days	<ul style="list-style-type: none"> Find the equation of a line given two points. Review important ideas about linear relationships. Use knowledge about linear relationships to solve problems.
3	Reflections	1 day	

3	End Module/Chapter Test	1 day	
	End Moving Straight Ahead	29 days	
Filling and Wrapping			
	Investigation		
3	1: Building Boxes	4 days	<ul style="list-style-type: none"> ◦ Develop the concept of surface area by counting the number of unit squares needed to wrap (enclose) a rectangular box. ◦ Explore the relationship between the surface area of a box and the total area of the unit squares needed to wrap the box. ◦ Develop the concept of volume of a rectangular box, and strategies for finding it, by filling a box with unit cubes.
3	2: Designing Packages	2 days	<ul style="list-style-type: none"> ◦ Develop strategies for finding the surface area of a rectangular box. ◦ Determine which rectangular prism has the least (greatest) surface area for a fixed volume. ◦ Reason about problems involving surface area.
3	3: Finding Volumes of Boxes	4 days	<ul style="list-style-type: none"> ◦ Develop a strategy for finding the volume of a rectangular prism by filling it with unit cubes, and to recognize that the number of cubes in the bottom layer is equal to the area of the base. ◦ Determine that the total number of unit cubes in a rectangular prism is equal to the area of the base times the height (the volume), and to discover that this strategy works for any prism. ◦ Learn that the surface area of a prism is the sum of the areas of its faces, and to apply this strategy to any right prism. ◦ Reason about problems involving volume and surface area.
3	Open Response Exam	1 day	Administer Open Response Exam
3	End Term Three	46 days	Term ends on April 13, 2007 36 Instructional Days 1 End Module/Chapter Test days. 6 discretionary days. 2 mid-year exam days 1 open response exam day
4	MCAS REVIEW	5 days	
4	4: Cylinders	4 days	<ul style="list-style-type: none"> ◦ Develop strategies for finding the volume and surface area of a cylinder. ◦ Compare the process of finding the volume and surface area of cylinders and rectangular prisms. ◦ Investigate interesting problems involving the volume and surface area of cylinders and prisms.
4	5: Cones and Spheres	3 days	<ul style="list-style-type: none"> ◦ Develop strategies for finding the volume of cones and spheres. ◦ Find the relationships among the volume of cylinders, cones, and spheres. ◦ Reason about problems involving cylinders, cones, and spheres.
4	6: Scaling Boxes	3 days	<ul style="list-style-type: none"> ◦ Apply strategies for finding the volume of rectangular prisms and for designing boxes with given specifications. ◦ Investigate the effects of varying the dimensions of rectangular prisms on volume and surface area and vice versa.
4	7: Finding Volumes of Irregular Objects	1 day	<ul style="list-style-type: none"> ◦ Estimate the volume of an irregularly shaped object by measuring the amount of water it displaces. ◦ Understand the relationship between a cubic centimeter and a milliliter.
4	Reflections	1 day	
4	End Module/Chapter Test	1 day	

4	End Filling and Wrapping	23 days	
What Do You Expect?			
	Investigation		
4	1: Evaluating Games of Chance	3 days	<ul style="list-style-type: none"> ◦ Review and develop a deeper understanding of experimental and theoretical probabilities and the relationship between them. ◦ Review and extend methods of finding experimental probabilities. ◦ Review and extend methods of finding theoretical probabilities, including making an organized list, or counting tree, of all possible outcomes. ◦ Review the distinction between equally likely and unequally likely outcomes. ◦ Determine whether a game is fair or unfair. ◦ Make unfair games fair by informally applying the concept of expected value.
4	2: Analyzing Number Games	3 days	<ul style="list-style-type: none"> ◦ Review and develop a deeper understanding of experimental and theoretical probabilities and the relationship between them. ◦ Review familiar methods of finding experimental and theoretical probabilities, including experimenting and making an organized list of possible outcomes. ◦ Determine whether a game is fair and to find a way to change an unfair game to a fair game by informally applying the concept of expected value. ◦
4	3: Probability and Area	3 days	<ul style="list-style-type: none"> ◦ Review and come to a deeper understanding of experimental and theoretical probabilities and the relationship between them. ◦ Begin thinking about probabilities in terms of area on a grid as an introduction to the area model for analyzing probabilities.
4	4: Analyzing Two-Stage Games	3 days	<ul style="list-style-type: none"> ◦ Use an area model to represent the probability of two or more dependent events. ◦ Solve problems by determining the probabilities of two or more dependent events.
4	Reflections	1 day	
4	End Module/Chapter Test	1 day	
	End – What Do You Expect	14 days	
FINAL EXAM			Administer final examination
4	End Term Four	42 days	Term ends on June 21, 2007 (This date may vary as a result of school cancellations.) 30 Instructional Days/ 2 End Module/Chapter Test days. 8 discretionary days. 2 Final Exam Days.
4	End School Year	180 days	135 Instructional Day 7 End Module/Chapter Test days 33 Discretionary Days 5 District Assessments