GLENCOE CORRELATION

MATHEMATICS: APPLICATIONS AND CONNECTIONS

COURSE 1

New York

Learning Standards for Mathematics, Science, and Technology

Intermediate

STANDARDS		LESSON REFERENCES
Standard 1 - Analysis, Inquiry, and Design **MATHEMATICAL ANALYSIS**		
1.	***Abstraction and symbolic representation are used to communicate mathematically.*** ***Students:***	
a.	extend mathematical notation and symbolism to include variables and algebraic expressions in order to describe and compare quantities and express mathematical relationships.	1-5A, 1-5, 1-5B, 1-7
2.	***Deductive and inductive reasoning are used to reach mathematical conclusions.*** ***Students:***	
a.	use inductive reasoning to construct, evaluate, and validate conjectures and arguments, recognizing that patterns and relationships can assist in explaining and extending mathematical phenomena.	4-4B, 5-4B, 9-1B, 11-8A, 12-5A, 13-1A
3.	***Critical thinking skills are used in the solution of mathematical problems.*** ***Students:***	
a.	apply mathematical knowledge to solve real-world problems and problems that arise from the investigation of mathematical ideas, using representations such as pictures, charts, and tables.	2-1, 2-3B, 2-5, 5-3A, 8-3A, 10-5A, 12-5, 13-1A
Standard 2 - Information Systems **INFORMATION SYSTEMS**		
1.	***Information technology is used to retrieve, process, and communicate information and as a tool to enhance learning.*** ***Students:***	
a.	use a range of equipment and software to integrate several forms of information in order to create good quality audio, video, graphic, and text-based presentations.	*Chapter Project* Chapters 1–13
b.	use spreadsheets and data-base software to collect, process, display, and analyze information. Students access needed information from electronic data bases and on-line telecommunication services.	4-3B, 7-8B, 8-2B *Chapter Project* Chapters 1, 3, 5, 7, 8, 9, 10, 12

STANDARDS		LESSON REFERENCES
c.	systematically obtain accurate and relevant information pertaining to a particular topic from a range of sources, including local and national media, libraries, museums, governmental agencies, industries, and individuals.	*Chapter Project* Chapters 1–13
d.	collect data from probes to measure events and phenomena.	2-4, 2-7B, 7-8B
e.	use simple modeling programs to make predictions.	7-8B, 8-2B, 10-6B, 13-3B *Chapter Project* Chapter 10
2.	***Knowledge of the impacts and limitations of information systems is essential to its effective and ethical use.*** ***Students:***	
a.	understand the need to question the accuracy of information displayed on a computer because the results produced by a computer may be affected by incorrect data entry.	4-3
b.	identify advantages and limitations of data-handling programs and graphic programs.	1-5B
c.	understand why electronically stored personal information has greater potential for misuse than records kept in conventional form.	See Glencoe's *Mathematics: Applications and Connections,* Course 3 *Chapter Project* Chapter 1.
Students will access, generate, process, and transfer information using appropriate technologies.		
3.	***Information technology can have positive and negative impacts on society, depending on how it is used.*** ***Students:***	
a.	use graphical, statistical, and presentation software to present project to fellow classmates.	*Chapter Project* Chapters 1–13
b.	describe applications of information technology in mathematics, science, and other technologies that address needs and solve problems in the community.	*Interdisciplinary Investigation*, Chapters 4, 7, 10, 13
c.	explain the impact of the use and abuse of electronically generated information on individuals and families.	*School to Career* Chapter 5
Standard 3 - Mathematics MATHEMATICAL REASONING		
1.	***Students use mathematical reasoning to analyze mathematical situations, make conjectures, gather evidence, and construct an argument.*** ***Students:***	
a.	apply a variety of reasoning strategies.	1-7A, 4-5A, 7-8A, 9-1B, 11-6A
b.	make and evaluate conjectures and arguments using appropriate language.	4-4B, 5-4A, 9-1B, 13-1A, 13-4B

STANDARDS		LESSON REFERENCES
c.	make conclusions based on inductive reasoning.	9-1B
d.	justify conclusions involving simple and compound (i.e., and/or) statements.	9-1B
NUMBER AND NUMERATION		
2.	***Students use number sense and numeration to develop an understanding of the multiple uses of numbers in the real world, the use of numbers to communicate mathematically, and the use of numbers in the development of mathematical ideas.*** ***Students:***	
a.	understand, represent, and use numbers in a variety of equivalent forms (integer, fraction, decimal, percent, exponential, expanded and scientific notation).	1-6, 3-1A, 3-1, 5-4A, 5-4, 5-4B, 9-5, 8-4, 8-5, 11-1
b.	understand and apply ratios, proportions, and percents through a wide variety of hands-on explorations.	5-4A, 8-1A, 8-1, 8-1B, 8-2, 8-4A, 8-4, 8-5
c.	develop an understanding of number theory (primes, factors, and multiples).	5-2, 5-3, 5-7
d.	recognize order relations for decimals, integers, and rational numbers.	3-3, 5-8, 11-2
Students will understand mathematics and become mathematically confident by communicating and reasoning mathematically, by applying mathematics in real-world settings, and by solving problems through the integrated study of number systems, geometry, algebra, data analysis, probability, and trigonometry.		
OPERATIONS		
3.	***Students use mathematical operations and relationships among them to understand mathematics.*** ***Students:***	
a.	add, subtract, multiply, and divide fractions, decimals, and integers.	3-6, 4-1, 4-3, 4-6, 4-7, 6-3, 6-4A, 6-4, 6-5, 6-6, 7-2, 7-3, 7-5A, 7-5, 7-6, 11-3A, 11-3, 11-4, 11-5, 11-6
b.	explore and use the operations dealing with roots and powers.	1-6
c.	use grouping symbols (parentheses) to clarify the intended order of operations.	1-4, 4-2
d.	apply the associative, commutative, distributive, inverse, and identity properties.	4-2
e.	demonstrate an understanding of operational algorithms (procedures for adding, subtracting, etc.).	4-1A, 4-3A, 4-6A, 6-3, 6-4A, 6-5, 11-3A

STANDARDS		LESSON REFERENCES
f.	develop appropriate proficiency with facts and algorithms.	3-6, 4-1, 4-3, 4-6, 4-7, 6-3, 6-4A, 6-4, 6-5, 6-6, 7-2, 7-3, 7-5A, 7-5, 7-6, 11-3A, 11-3, 11-4, 11-5, 11-6
g.	apply concepts of ratio and proportion to solve problems.	8-1, 8-1B, 8-2, 8-3
MODELING/MULTIPLE REPRESENTATION		
4.	***Students use mathematical modeling/multiple representation to provide a means of presenting, interpreting, communicating, and connecting mathematical information and relationships.*** ***Students:***	
a.	visualize, represent, and transform two- and three-dimensional shapes.	9-4, 9-4B, 10-4, 10-4B, 11-8
b.	use maps and scale drawings to represent real objects or places.	8-3
c.	use the coordinate plane to explore geometric ideas.	2-9, 11-7, 11-8
d.	represent numerical relationships in one- and two-dimensional graphs.	3-3, 11-2, 12-6
e.	use variables to represent relationships.	1-5A, 1-5, 1-5B, 1-7, 12-3, 12-5
f.	use concrete materials and diagrams to describe the operation of real-world processes and systems.	10-5A *Chapter Project* Chapter 9
g.	develop and explore models that do and do not rely on chance.	13-3, 13-3B, 13-4B, 13-5
h.	investigate both two- and three-dimensional transformations.	9-6B, 10-4B, 11-8A, 11-8
i.	use appropriate tools to construct and verify geometric relationships.	9-1, 9-2, 9-3A, 9-4A, 9-4B
j.	develop procedures for basic geometric construction.	9-3A, 9-3, 9-4A
MEASUREMENT		
5.	***Students use measurement in both metric and English measure to provide a major link between the abstractions of mathematics and the real world in order to describe and compare objects and data.*** ***Students:***	
a.	estimate, make, and use measurements in real-world situations.	3-2A, 3-2, 4-4, 4-4B, 4-8, 4-9, 5-6, 7-7, 7-7B, 10-5, 10-6, 10-6B

STANDARDS		LESSON REFERENCES
b.	select appropriate standard and nonstandard measurement units and tools to measure to a desired degree of accuracy.	3-2, 4-8, 4-9, 5-6
c.	develop measurement skills and informally derive and apply formulas in direct measurement activities.	7-7B, 10-1, 10-2, 10-3, 10-5
d.	use statistical methods and measures of central tendencies to display, describe, and compare data.	2-7, 2-8
e.	explore and produce graphic representations of data using calculators/computers.	*Chapter Project* Chaper 2
f.	develop critical judgment for the reasonableness of measurement.	2-7, 2-8
UNCERTAINTY		
6.	***Students use ideas of uncertainty to illustrate that mathematics involves more than exactness when dealing with everyday situations.*** ***Students:***	
a.	use estimation to check the reasonableness of results obtained by computation, algorithms, or the use of technology.	1-3, 3-5, 3-6A
b.	use estimation to solve problems for which exact answers are inappropriate.	1-3, 3-5, 3-6A, 8-6, 10-1A
c.	estimate the probability of events.	5-4B, 13-3
d.	use simulation techniques to estimate probabilities.	13-1A, 13-3B, 13-4B
e.	determine probabilities of independent and mutually exclusive events.	13-5
Students will understand mathematics and become mathematically confident by communicating and reasoning mathematically, by applying mathematics in real-world settings, and by solving problems through the integrated study of number systems, geometry, algebra, data analysis, probability, and trigonometry.		
PATTERNS/FUNCTIONS		
7.	***Students use patterns and functions to develop mathematical power, appreciate the true beauty of mathematics, and construct generalizations that describe patterns simply and efficiently.*** ***Students:***	
a.	recognize, describe, and generalize a wide variety of patterns and functions.	1-2, 7-8A, 12-5, 12-6

STANDARDS		LESSON REFERENCES
b.	describe and represent patterns and functional relationships using tables, charts, and graphs, algebraic expressions, rules, and verbal descriptions.	1-2, 12-5, 12-6
c.	develop methods to solve basic linear and quadratic equations.	1-7, 12-1, 12-2, 12-3, 12-4
d.	develop an understanding of functions and functional relationships: that a change in one quantity (variable) results in change in another.	12-5, 12-6
e.	verify results of substituting variables.	1-5A, 1-5, 1-5B, 1-6
f.	apply the concept of similarity in relevant situations.	8-3, 9-6
g.	use properties of polygons to classify them.	9-4A, 9-4
h.	explore relationships involving points, lines, angles, and planes.	9-1, 9-3
i.	develop and apply the Pythagorean principle in the solution of problems.	10-2
j.	explore and develop basic concepts of right triangle trigonometry.	See Glencoe's *Mathematics: Applications and Connections,* Course 3 Lesson 8-8B.
k.	use patterns and functions to represent and solve problems.	1-2, 7-8A, 12-5, 12-6
Standard 6 - Interconnectedness: Common Themes SYSTEM THINKING		
1.	***Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions.*** ***Students:***	
a.	describe the differences between dynamic systems and organizational systems.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 *Chapter Project* Chapter 20.
b.	describe the differences and similarities between engineering systems, natural systems, and social systems.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 *Chapter Project* Chapter 20.
c.	describe the differences between open- and closed-loop systems.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 *Chapter Project* Chapter 20.
d.	describe how the output from one part of a system (which can include material, energy, or information) can become the input to other parts.	12-5A, 12-5

STANDARDS		LESSON REFERENCES
MODELS		
2.	***Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design.*** ***Students:***	
a.	select an appropriate model to begin the search for answers or solutions to a question or problem.	1-1, 1-7A, 2-3B, 3-6A, 4-5A, 6-2B, 7-8A, 8-3A, 13-2A
b.	use models to study processes that cannot be studied directly (e.g., when the real process is too slow, too fast, or too dangerous for direct observation).	5-4B, 13-1A
c.	demonstrate the effectiveness of different models to represent the same thing and the same model to represent different things.	2-8, 10-4B
Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.		
MAGNITUDE AND SCALE		
3.	***The grouping of magnitudes of size, time, frequency, and pressures or other units of measurement into a series of relative order provides a useful way to deal with the immense range and the changes in scale that affect the behavior and design of sytems.*** ***Students:***	
a.	cite examples of how different aspects of natural and designed systems change at different rates with changes in scale.	2-2, 2-5, 2-8
b.	use powers of ten notation to represent very small and very large numbers.	4-9
EQUILIBRIUM AND STABILITY		
4.	***Equilibrium is a state of stability due either to a lack of changes (static equilibrium) or a balance between opposing forces (dynamic equilibrium).*** ***Students:***	
a.	describe how feedback mechanisms are used in both designed and natural systems to keep changes within desired limits.	See the *Science and Math Lab Manual* TE page 44e.
b.	describe changes within equilibrium cycles in terms of frequency or cycle length and determine the highest and lowest values and when they occur.	See the *Science and Math Lab Manual* TE page 308e.

STANDARDS		LESSON REFERENCES
PATTERNS OF CHANGE		
5.	***Identifying patterns of change is necessary for making predictions about future behavior and conditions.*** ***Students:***	
a.	use simple linear equations to represent how a parameter changes with time.	12-5A, 12-5, 12-6
b.	observe patterns of change in trends or cycles and make predictions on what might happen in the future.	2-5
OPTIMIZATION		
6.	***In order to arrive at the best solution that meets criteria within constraints, it is often necessary to make trade-offs.*** ***Students:***	
a.	determine the criteria and constraints and make trade-offs to determine the best decision.	*Chapter Project* Chapter 7
b.	use graphs of information for a decision making problem to determine the optimum solution.	2-5, 4-4B
Standard 7 - Interdisciplinary Problem Solving **CONNECTIONS**		
1.	***The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems, especially those relating to issues of science/technology/society, consumer decision making, design, and inquiry into phenomena.*** ***Students:***	
a.	analyze science/technology/society problems and issues at the local level and plan and carry out a remedial course of action.	*Chapter Project* Chapter 13
b.	make informed consumer decisions by seeking answers to appropriate questions about products, services, and systems; determining the cost/benefit and risk/benefit trade-offs; and applying this knowledge to a potential purchase.	*Chapter Project* Chapter 1
c.	design solutions to real-world problems of general social interest related to home, school, or community using scientific experimentation to inform the solution and applying mathematical concepts and reasoning to assist in developing a solution.	*Chapter Project* Chapter 11
d.	describe and explain phenomena by designing and conducting investigations involving systematic observations, accurate measurements, and the identification and control of variables; by inquiring into relevant mathematical ideas; and by using mathematical and technological tools and procedures to assist in the investigation.	*Chapter Project* Chapter 10

STANDARDS		LESSON REFERENCES
STRATEGIES		
2.	***Solving interdisciplinary problems involves a variety of skills and strategies, including effective work habits; gathering and processing information; generating and analyzing ideas; realizing ideas; making connections among the common themes of mathematics, science, and technology; and presenting results.*** ***Students participate in an extended, culminating mathematics, science, and technology project. The project would require students to:***	
a.	work effectively	*Interdisciplinary Investigation*, Chapters 4, 7, 10, 13
b.	gather and process information	*Interdisciplinary Investigation*, Chapters 4, 7, 10, 13
c.	generate and analyze ideas	*Interdisciplinary Investigation*, Chapters 4, 7, 10, 13
d.	observe common themes	*Interdisciplinary Investigation*, Chapters 4, 7, 10, 13
e.	realize ideas	*Interdisciplinary Investigation*, Chapters 4, 7, 10, 13
f.	present results	*Interdisciplinary Investigation*, Chapters 4, 7, 10, 13

GLENCOE CORRELATION

MATHEMATICS: APPLICATIONS AND CONNECTIONS

COURSE 1

New York

Mathematics Core Curriculum

Intermediate Grades 5–6

KEY IDEAS	LESSON REFERENCES
1. MATHEMATICAL REASONING	
Students use mathematical reasoning to analyze mathematical situations, make conjectures, gather evidence, and construct an argument.	
1A. Apply a variety of reasoning strategies.	
a. Apply basic computational skills to problems from other subject areas and real-world situations.	1-1
b. Solve problems that illustrate the use of fractions and decimals.	3-4, 3-5, 3-6A, 3-6, 4-1, 4-3, 4-6, 6-2, 6-3, 6-4, 6-5, 6-6
c. Write and solve open sentences while working with word problems.	12-3, 12-4, 12-4B
d. Use a variety of problem-solving strategies.	1-7A, 2-3B, 3-6A, 4-5A, 6-2B, 7-8A, 8-3A, 9-1B, 11-6A, 12-4B
e. State problems in own words.	1-7A, 2-3B, 3-6A, 4-5A, 6-2B, 7-8A, 8-3A, 9-1B, 11-6A, 12-4B
f. Construct physical representations for complex problems.	8-3A, 10-5A
1B. Make and evaluate conjectures and arguments, using appropriate language.	
a. Use computation skills in investigation studies in other subject areas and games.	*Interdiscliplinary Investigation,* Chapters 4, 7, 10, 13
b. Participate in extended record-keeping projects involving data gathering.	Chapter Project Chapters 1–13
c. Make attempts to verify solutions or results in situations in which it is warranted.	1-3, 1-7, 3-6A, 6-2B
d. Clarify problems with peers.	1-5A, 1-5B, 4-6A, 5-4B, 7-2A, 8-4A, 11-3A, 11-8A
1C. Make conclusions based on inductive reasoning.	
a. Develop formulas for area and perimeter of rectangles and squares.	4-4
1D. Justify conclusions involving simple and compound (i.e., and/or) statements.	
a. Use Venn diagrams to demonstrate simple and compound statements (and/or). May include set ideas and terms such as *element*, *subset*, *intersection*, and *union*.	9-1B

KEY IDEAS		LESSON REFERENCES
2. NUMBER AND NUMERATION		
Students use number sense and numeration to develop an understanding of the multiple uses of numbers in the real world, the use of numbers to communicate mathematically, and the use of numbers in the development of mathematical ideas.		
2A.	***Understand, represent, and use numbers in a variety of equivalent forms (integer, fraction, decimal, percent, exponential, and expanded notation).***	
a.	Read and write numerals to one billion.	3-1
b.	Express large numbers using powers of 10.	1-6, 4-9
c.	Reinforce place value concepts by using exponential notation.	1-6
d.	Place value concepts to thousandths.	3-1
e.	Proper and improper fractions.	5-5
f.	Simplest form of a fraction.	5-4
g.	Change improper fractions to mixed numbers and vice versa.	5-5
h.	Convert common fractions to decimal form.	5-10
i.	Convert common fractions and decimals to percent.	8-4, 8-5
j.	Understand the basic role of place value in decimal fractions.	3-1A, 3-1
k.	Use the number line to model a variety of numbers.	1-3, 3-3, 3-4, 11-1, 11-2
l.	Use exponential notation to reinforce place value concepts.	1-6
m.	Use the exponential form of powers of 2, 3, 5, and 10 and relate these forms to factoring.	1-6, 5-2
2B.	***Understand and apply ratios, proportions, and percents through a wide variety of hands-on explorations.***	
a.	Circle graphs to explore the concept of percent.	2-4, 10-3B
b.	Relate fractional notation to ratio and probability.	8-1, 8-1B, 13-1
c.	Integrate the study of fractions and ratio with the study of shape and area.	5-4A, 5-4, 8-1B
d.	Identify representations of a given percent and describe orally and in writing the equivalence relationship between fractions, decimals, and percents.	8-4A, 8-4, 8-5
e.	Describe and compare two sets of data, using ratios, and use appropriate notation such as $\frac{a}{b}$; a to b; a:b.	8-1A, 8-1

KEY IDEAS	LESSON REFERENCES
2C. Develop an understanding of number theory (primes, factors, and multiples).	
a. Factoring techniques to determine common denominators.	5-4
b. Explain orally and in writing the concepts of prime and composite numbers.	5-2
2D. Recognize order relations for decimals, integers, and rational numbers.	
a. Explore negative number notation to fractions on the number line.	6-1, 11-1, 11-2
b. Compare decimals and common fractions, using the terms greater than, less than, between or equivalent.	3-3, 5-8
c. Understand that zero can mean none of something or that it can represent a point on a scale and any other number can be depicted on the scale.	11-1, 11-3A
d. Compare size of fractions, using several methods.	5-8
3. OPERATIONS	
Students use mathematical operations and relationships among them to understand mathematics.	
3A. Add, subtract, multiply, and divide fractions, decimals, and integers.	
a. Multiply and divide by three-digit numbers.	1-3, 4-1, 4-3
b. Experience adding and subtracting integers on the number line.	11-3A, 11-3, 11-4
c. Add and subtract mixed numbers.	6-5, 6-6
d. Add and subtract decimals to thousandths.	3-6
e. Multiply and divide common fractions.	7-2A, 7-2, 7-5A, 7-5
f. Multiply and divide mixed numbers.	7-3, 7-6
g. Multiply decimals to hundredths, and divide decimals to hundredths, using whole number divisors.	4-3A, 4-3, 4-5, 4-6A, 4-6, 4-7
h. Solve problems in which fractions are used in everyday life.	6-3, 6-4, 6-5, 7-2, 7-3, 7-5, 7-6
3B. Use grouping symbols (parentheses) to clarify the intended order of operations.	
a. Use the conventional rule for order of operations (1-parentheses, 2-exponents, 3-multiplication and division, 4-addition and subtraction).	1-4, 1-6
3C. Apply the associative, commutative, distributive, inverse, and identity properties.	
a. Use the distributive property to multiply mixed numbers.	4-2, 7-3

KEY IDEAS		LESSON REFERENCES
b.	The role of the multiplicative inverse (reciprocal) in division of fractions.	7-5, 7-6
c.	The role of additive inverse in the set of integers.	11-1, 11-3
3D.	***Demonstrate an understanding of operational algorithms (procedures for adding, subtracting, etc.).***	
a.	Divide fractions, using a variety of approaches: factor product, partitioning, measurement, common denominator, and multiply by the reciprocal.	7-5A, 7-5
b.	When asked, accurately state the purpose for each step in basic calculations.	1-5A
3E.	***Develop appropriate proficiency with facts and algorithms.***	
a.	Ensure quick recall of basic addition, subtraction, multiplication, and division facts.	*Extra Practice: Basic Skills* pages 549-556
b.	Develop strategies for mental math.	4-2
3F.	***Apply concepts of ratio and proportion to solve problems.***	
a.	Use ratio and proportion concepts to solve problems.	5-4A, 8-1A, 8-1, 8-1B, 8-2, 8-3
4. MODELING/MULTIPLE REPRESENTATION		
Students use mathematical modeling/multiple representations to provide a means of presenting, interpreting, communicating, and connecting mathematical information and relationships.		
4A.	***Visualize, represent, and transform two- and three-dimensional shapes.***	
a.	Analyze the effects of combining, subdividing, and changing basic shapes.	9-6, 9-6B
b.	Use geometric ideas to solve problems.	9-1B, 9-2, 9-4B
c.	Understand the basic characteristics of the concept of three dimensions.	10-4, 10-4B
d.	Sketch, construct models, and classify prisms, cones, cylinders, and pyramids.	10-4, 10-4B, 10-5A
4B.	***Use maps and scale drawings to represent real objects or places.***	
a.	Make scale drawings like floor plans, using centimeter grids to relate scale to ratio.	8-3
4C.	***Use the coordinate plane to explore geometric ideas.***	
a.	Explore measurement and vocabulary of geometric figures, using a concrete discovery approach with geoboards and graph paper.	9-4A, 10-1A, 10-1, 10-2, 10-4B
b.	Graph ordered pairs of numbers.	2-9, 11-7
4D.	***Represent numerical relationships in one- and two-dimensional graphs.***	
a.	Graphs: circle, bar, histogram, line, pictograph, and stem-and-leaf.	2-3, 2-3B

KEY IDEAS	LESSON REFERENCES
b. Compare histogram, line, picture, circle graphs, and stem-and-leaf as to what information each presents, and note the advantages and disadvantages of each.	2-3B
4E. Use variables to represent relationships.	
a. Write and solve open sentences dealing with inverse operations, using letters as well as frames as placeholders.	1-7, 12-1, 12-2, 12-3, 12-4, 12-4B
b. Create a problem situation based on a given open sentence, using a single variable.	12-4B
c. Have an understanding of the basic characteristics of a variable.	1-5A, 1-5, 1-7
4F. Use concrete materials and diagrams to describe the operation of real-world processes and systems.	
a. Discover the multiplication principle through experiences with tree diagrams or lists of possible events taken in order.	13-4, 13-4B
4G. Develop and explore models that do and do not rely on change.	
a. Represent and count the elements in a sample space.	13-1, 13-4B
b. Identify events with a probability equal to zero, events that are certain, and events that happen sometimes.	13-1
4H. Investigate both two- and three-dimensional transformations.	
a. Use concrete and artistic activities to explore the concept of symmetry.	9-5, 11-8A, 11-8
b. Understand that symmetry can be analyzed by performing reflections, turns, or slides.	9-5, 11-8A, 11-8
4I. Use appropriate tools to represent and verify geometric relationships.	
a. Draw and measure plane geometric figures, using rulers, compasses, and protractors.	10-1, 10-2
b. Using a protractor and a ruler, draw a perpendicular bisector of a line segment and an angle bisector.	9-3
5. MEASUREMENT	
Students use measurement in both metric and English measure to provide a major link between the abstractions of mathematics and the real world in order to describe and compare objects and data.	
5A. Estimate, make, and use measurements in real-world situations.	
a. Measure temperatures of familiar substances.	12-2

KEY IDEAS		LESSON REFERENCES
b.	Relate volume to capacity in terms of metric and English system measure (cubic centimeter, kilogram, liter, cubic inch, cup, fluid ounce).	4-8, 7-7
c.	Determine whether measurements of length, area, volume, weight, or time are reasonable by referring to typical values.	3-2A, 3-2, 4-4, 4-8, 5-6, 6-7, 7-7, 10-5
5B.	***Select appropriate standard and nonstandard measurement units and tools to measure to a desired degree of accuracy.***	
a.	Be familiar with prefixes *milli, centi, kilo* and symbols *g, mg, kg, ml, L, mm, km,* and *cm* and the tools to measure them.	3-2, 4-8, 4-9
b.	Introduce measurement of angles with a protractor.	9-1
c.	Measure volume and capacity, using cubic centimeter blocks, cubic inch blocks, English system and metric measuring tools.	4-8, 7-7, 7-7B, 10-5
d.	Operations with metric units.	4-9
e.	Make effective use of ruler, thermometer, and scale for making measurements.	3-2A, 3-2, 5-6
f.	Estimate and then determine length, weight/mass, area, and liquid volume/capacity, using standard and nonstandard units of measure.	3-2A, 3-2, 4-4, 4-8, 5-6, 7-7, 7-7B *Chapter Project* Chapter 10
g.	Understand that measurements are likely to give slightly different numbers when measured multiple times.	3-2A, 3-2, 4-8, 5-6, 7-7B
5C.	***Develop measurement skills and informally derive and apply formulas in direct measurement activities.***	
a.	Measure volume of prisms, using cubic units in metric and English system.	10-5
b.	Measure the area and perimeter of triangles, circles, and irregular polygons, using manipulative materials and informal methods.	4-4, 4-4B, 10-1A, 10-1, 10-2, 10-3
c.	Identify acute, obtuse, and right angles.	9-1
d.	Explore the volume of cylinders empirically.	10-4
e.	Approximate the area of rectangles and triangles.	4-4, 10-1A, 10-2
5D.	***Use statistical methods and measures of central tendencies to display, describe, and compare data.***	
a.	Consider the difference between mode, median, and mean.	2-7
b.	Collect and organize simple data sets to answer questions.	*Chapter Project* Chapter 2

KEY IDEAS	LESSON REFERENCES
c. Understand that a summary of data should include where the middle is and how much spread is around it.	2-7, 2-7B
5E. Explore and produce graphic representations of data (calculators/computers may be used.)	
a. Compare graphs that can be demonstrated by the teacher on a graphing calculator: bar, histogram, line.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lesson 11-4.
b. Use pictographs and other graphic representations to model problems.	2-3, 2-3B, 2-4, 2-6, 2-7B
c. Understand that spreading data out on a number line helps to see what the extremes are, where they pile up, and where the gaps are located.	2-7B
5F. Develop critical judgment for the reasonableness of measurement.	
a. Relate metric units to customary units via approximations.	3-2A, 3-2, 4-8, 5-6, 7-7, 7-7B, 7-8A
b. Make real-world comparisons of measurements.	3-2A, 3-2, 4-8, 5-6, 7-7, 7-7B 7-8A
6. UNCERTAINTY	
Students use ideas of uncertainty to illustrate that mathematics involves more than exactness when dealing with everyday situations.	
6A. Use estimation to check the reasonableness of results obtained by computation, algorithms, or the use of technology.	
a. Round numbers to the nearest hundredth and up to 10,000.	1-3, 3-4
b. Relate rounding skills to estimation.	3-5, 3-6A, 6-2, 7-1
c. Round fractional and decimal numbers for estimates in computation.	3-5, 6-2, 7-1
d. Determine the effects of addition, subtraction, multiplication, and division, on size and order of numbers.	3-5, 3-6A, 6-2, 7-1
6B. Use estimation to solve problems for which exact answers are inappropriate.	
a. Develop an awareness of when an estimation is more appropriate than an exact answer.	3-5, 3-6A, 6-2, 7-1
6C. Estimate the probability of events.	
a. Make predictions based on simple data.	13-2
b. Arrangements and combinations.	13-4
c. Understand that when predictions are based on what is known about the past, one must assume that the conditions stay the same from the past event to the predicted future event.	13-2

KEY IDEAS		LESSON REFERENCES
6D.	***Use simulation techniques to estimate probabilities.***	
a.	Conduct simulations for experiments that cannot be determined theoretically and are unwieldy to determine experimentally.	13-1A, 13-4B
6E.	***Determine probabilities of independent events.***	
a.	Conduct and predict outcomes of experiments with independent events.	13-5
b.	Understand how to express probabilities as fractions, decimals, or percents for theoretical and experimental situations that: -Experimental probability is found by *number of times desired event occurs ÷ total number of traits* -Theoretical probability is found by *number of desired outcomes ÷ total number of possible outcomes*	13-1A, 13-1, 13-4B
7. PATTERNS/FUNCTIONS		
Students use patterns and functions to develop mathematical power, appreciate the true beauty of mathematics, and construct generalizations that describe patterns simply and efficiently.		
7A.	***Recognize, describe, and generalize a wide variety of patterns and functions.***	
a.	Review computation skills by describing and extending number patterns and sequences.	1-2, 7-8A
b.	Interpolate and/or extrapolate simple patterns of numbers.	1-2, 7-8A
c.	Recognize and describe simple functional relationships.	12-5, 12-6
7B.	***Describe and represent patterns and functional relationships, using tables, charts, graphs, and verbal descriptions.***	
a.	Use tables and graphs to help to identify patterns.	1-2, 12-5, 12-6
b.	Use a variety of representations for the same functional relationship.	12-5A, 12-5, 12-6
7C.	***Develop methods to solve basic linear equations.***	
a.	Find the missing value in a proportion in which three of the numbers are known.	8-2
b.	Distinguish between linear and quadratic relationships.	12-6
c.	Solve one-step linear equations in one variable.	1-7, 12-1, 12-2, 12-3
7D.	***Develop an understanding of functions and functional relationships: that a change in one quantity (variable) results in a change in another.***	
a.	Continue the study of functions and relationships with whole numbers.	12-5A, 12-5

KEY IDEAS		LESSON REFERENCES
b.	Understand that the basic function of tables and graphs is to make explicit how the values of one quantity are related to the values of another.	12-5A, 12-5
c.	Begin to recognize the characteristics of proportional relationships.	8-2, 8-2B, 8-3
7E.	***Apply the concept of similarity in relevant situations.***	
a.	Use concrete and artistic experiences to explain similarity and congruence in plane geometric figures.	9-6, 9-6B
7F.	***Use properties of polygons to classify them.***	
a.	Classify polygons by properties and develop definitions.	9-4
b.	Understand the basic properties of and the similarity and differences between a trapezoid, rhombus, and quadrilateral.	9-4
c.	Compare shapes in terms of *parallel*, *perpendicular*, *similar*, and *congruent*.	9-4, 9-6
7G.	***Explore relationships involving points, lines, angles, and planes.***	
a.	Understand the basic characteristics of angles.	9-1, 9-2
b.	Identify line segments.	9-3A
c.	Determine congruence of line segments, angles, and polygons by direct comparison given their attributes.	9-3A, 9-6
7H.	***Develop readiness for basic concepts of right triangle trigonometry.***	
a.	A right triangle contains one right angle.	9-4A
b.	The hypotenuse of a right triangle is opposite the right angle.	See Glencoe's *Mathematics: Applications and Connections*, Course 2 Lesson 10-3.
c.	The hypotenuse of a triangle is greater than either of the other two legs.	See Glencoe's *Mathematics: Applications and Connections*, Course 2 Lesson 10-3.
d.	Investigate intuitively the concept of similarity among triangles.	9-6
7I.	***Use patterns and functions to represent and solve problems.***	
a.	Use math sentences of patterns and functions to represent and solve problems.	7-8A, 12-5

GLENCOE CORRELATION

MATHEMATICS: APPLICATIONS AND CONNECTIONS

COURSE 1

New York

Mathematics Core Curriculum

Intermediate Grades 7–8

KEY IDEAS		LESSON REFERENCES
1. MATHEMATICAL REASONING		
Students use mathematical reasoning to analyze mathematical situations, make conjectures, gather evidence, and construct an argument.		
1A.	***Apply a variety of reasoning strategies.***	
a.	Apply a variety of reasoning strategies.	3-6A, 9-1B
b.	Use pictures, diagrams, or patterns.	2-3B, 7-8A, 8-3A
c.	Use trial and error (guess).	1-7A
d.	Use a simpler but related problem.	4-5A
e.	Use proportional reasoning, ratios, and rates to solve problems.	8-1A, 8-1
f.	Work backwards.	11-6A
g.	Identify similarities and differences among a wide variety of problem types and problem-solving strategies.	1-1
h.	Use mathematical sentences to solve problems.	1-7, 12-4B
1B.	***Make and evaluate conjectures and arguments, using appropriate language.***	
a.	Discriminate relevant from irrelevant information.	6-2B
b.	Discuss the effects of changing the parameters of a problem statement.	4-4B
c.	Seek a general solution.	1-1, 3-6A
d.	Study cases in which the general solution does not apply.	1-1
e.	Explain and show solution processes in a variety of ways (words, numbers, symbols, pictures, charts, graphs, tables, diagrams, and models).	5-3A, 10-5A
f.	Express solutions clearly and logically, using appropriate mathematical notation, terms, and language.	6-2B
g.	Understand that there is no one right way to solve mathematical problems, but that different methods have different advantages and disadvantages.	6-2B, 7-8A
h.	Support solutions with written and/or algebraic evidence.	12-4B

KEY IDEAS		LESSON REFERENCES
i.	Clarify problems, using discussion with peers.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lessons 1-7A, 2-6A, 3-6A, 10-7A, 12-1A.
1C.	***Make conclusions based on inductive reasoning.***	
a.	Devise formulas (surface area, volume, etc.).	4-4
b.	Identify patterns in a number sequence (includes sequences with integral terms).	7-8A
c.	Apply strategies and results from simpler problems to more complex situations.	4-5A
1D.	***Justify conclusions involving simple and compound (i.e., and/or) statements.***	
a.	Find numbers that satisfy one or more conditions.	3-3
	2. NUMBER AND NUMERATION	
	Students use number sense and numeration to develop an understanding of the multiple uses of numbers in the real world, the use of numbers to communicate mathematically, and the use of numbers in the development of mathematical ideas.	
2A.	***Understand, represent, and use numbers in a variety of equivalent forms (integer, fraction, decimal, percent, exponential, expanded, and scientific notation).***	
a.	Read and write integers, rational, and irrational numbers.	3-1
b.	Describe orally and in writing the relationship between the subsets of the real number system.	5-10
c.	Approximate integers and rational numbers, using scientific notation (positive and negative powers of 10) and explain the process.	1-6
d.	Understand the relationship between terminating and repeating decimals.	5-10
e.	Describe the equivalent relationships among representations of rational numbers (fractions, decimals, and percents) and use these representations in estimation, computation, and applications.	5-10
f.	Understand and explain a number raised to the zero power.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lesson 1-4.
g.	Using real-life situations, apply the concept of scientific notation to express and compare very large and very small numbers.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lesson 2-9.
h.	Understand the meaning of the absolute value symbol.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lesson 5-1.

KEY IDEAS		LESSON REFERENCES
i.	Calculate fraction, decimal, and percent equivalents.	5-10
2B.	***Understand and apply ratios, proportions, and percents through a wide variety of hands-on explorations.***	
a.	Interpret percent as part of 100, using a variety of manipulatives (algebra tiles, graph paper, cubes).	3-1
b.	Develop an understanding of the relationships among ratio, proportion, and percent.	8-1A, 8-1
c.	Solve real-life problems dealing with scale drawings and similar polygons.	8-1
d.	Find the percent of a number; calculate the percent of increases and decreases, rate, commissions, taxes, and simple interest.	8-7
2C.	***Develop an understanding of number theory (primes, factors, and multiples).***	
a.	Define and identify prime and composite numbers.	5-2
b.	Define and identify prime factors, using factor trees and repeated division.	5-2
c.	Factor numbers by using the rules of divisibility.	5-1
d.	Discover rules of divisibility of numbers in the context of finding prime numbers.	5-1
2D.	***Recognize order relations for decimals, integers, and rational numbers.***	
a.	Compare and understand interrelationships, similarities, and differences among integers, rational and irrational numbers.	5-10
b.	Use symbols ($<$, $>$, $=$, $\leq$, $\geq$) when recognizing numerical relationships.	3-3
c.	Develop techniques for ordering fractions and decimals including percents and scientific notation.	3-3, 5-8
d.	Given a whole number from 0 to 100, identify it as a perfect square or find the two consecutive whole numbers between which the square root lies.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lessons 10-1, 10-2.
3. OPERATIONS		
Students use mathematical operations and relationships among them to understand mathematics.		
3A.	***Add, subtract, multiply, and divide fractions, decimals, and integers.***	
a.	Consistently and accurately perform operations on integers, decimals, and rational numbers.	3-6, 4-1, 4-3, 4-5, 4-6, 6-4, 6-5, 7-2, 7-5
b.	Raise rational numbers to whole number powers.	1-6
c.	Determine the absolute value of real numbers expanded to include numerical expressions beyond a single value (e.g., $\lvert -5 + 3 \rvert$).	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lesson 5-1.

KEY IDEAS		LESSON REFERENCES
d.	Solve one- and two-step word problems.	4-5A
3B.	***Explore and use the operations dealing with roots and powers.***	
a.	Operations applying to powers of a common base.	1-6
b.	The use of powers with positive integral and zero exponents.	1-6
c.	Concept of the square of any nonzero integer is a positive number.	1-6
d.	Understand that every positive number has two square roots (introduce the ± symbol).	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lesson 10-2.
3C.	***Use grouping symbols (parentheses) to clarify the intended order of operations.***	
a.	Use the order of operations within a problem.	1-4
b.	Understand the use of parentheses and their relationship to the order of operations.	1-4
c.	Extend the order of operations to include roots.	1-6
3D.	***Apply the associative, commutative, distributive, inverse, and identity properties.***	
a.	Understand that integers consist of zero and natural numbers and their additive inverses.	11-4
b.	Simplify numerical expressions and solve word problems and equations by applying properties of real numbers.	11-4
c.	Explain why certain properties hold true or do not hold true under specific operations.	4-2
d.	Understand the inverse relationships between addition and subtraction, multiplication and division, and exponentiation and root extraction.	11-4
e.	Investigate the existence of closure under the operations with integers.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lessons 5-4, 5-5, 5-6, 5-7.
f.	Formulate properties (commutative, associative, etc.) involving operations with integers by experimenting with integers under the basic operations.	4-2
3E.	***Demonstrate an understanding of operational algorithms (procedures for adding, subtracting, etc.).***	
a.	Solve and explain the rules for the operational algorithms relative to real numbers.	11-3
b.	Solve and explain the use of absolute value in operational algorithms.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lesson 5-1.

KEY IDEAS		LESSON REFERENCES
3F.	***Develop appropriate proficiency with facts and algorithms.***	
a.	Solutions of facts and algorithms, using real numbers.	*Extra Practice: Basic Skills* pp. 549-556
3G.	***Apply concepts of ratio and proportion to solve problems.***	
a.	Use ratios and proportions to solve problems involving a change of scale in drawings or maps, recipes, etc.	8-3
b.	Determine the unit cost of items to compare prices.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lesson 8-2.
c.	Determine if triangles are similar by using ratios to show that the lengths of corresponding sides are proportional.	9-6
4. MODELING/MULTIPLE REPRESENTATION		
Students use mathematical modeling/multiple representations to provide a means of presenting, interpreting, communicating, and connecting mathematical information and relationships.		
4A.	***Visualize, represent, and transform two- and three-dimensional shapes.***	
a.	Identify and construct two-dimensional patterns for three-dimensional models.	1-2, 10-5
b.	Identify elements of three-dimensional geometric shapes.	10-5
4B.	***Use maps and scale drawings to represent real objects or places.***	
a.	Students select appropriate units of measure and use proportional reasoning to convert measures.	5-6
b.	Construct scale drawings and models with reasonable measurement accuracy.	8-3
4C.	***Use the coordinate plane to explore geometric ideas.***	
a.	Locate a point, using ordered pairs of integers, on the coordinate plane.	2-9
b.	Compare geometric measurements and computations on coordinate axes as they are applied to parallel lines, congruent and similar figures.	10-1
c.	Locate the quadrant in which an ordered pair of integers is located.	11-7
d.	Develop geometric ideas such as measurement formulas, using geoboards and graph paper.	9-4A, 9-4B
4D.	***Represent numerical relationships in one- and two-dimensional graphs.***	
a.	Use a number line graph to represent the solution of a problem with one unknown.	11-3

KEY IDEAS		LESSON REFERENCES
b.	Use two-dimensional graphs, including the coordinate plane, to represent the solution of a problem.	11-7
4E.	***Use variables to represent relationships.***	
a.	Use variables and appropriate operations to write an expression, equation, inequality, or system of equations or inequalities that represent a verbal description (three less than a number, half as large as area A).	10-6, 10-6B
b.	Interpret, demonstrate understanding, and use variables in expressions, formulas, equations, and properties.	10-6
4F.	***Use concrete materials and diagrams to describe the operation of real-world processes and systems.***	
a.	Model situations geometrically to interpret, formulate, and solve problems.	10-6
4G.	***Develop and explore models that do and do not rely on change.***	
a.	Construct an appropriate sample space (board games, spinners, dice, coins).	13-4
b.	Explore the range of probabilities (certainty, impossibility, sometimes).	13-4
c.	Consider the reliability of sampling procedures.	13-4
4H.	***Investigate two- and three-dimensional transformations.***	
a.	Recognize similarity and rotational and bilateral symmetry in two- and three-dimensional figures.	9-5
b.	Understand and use coordinate grids to plot simple figures and to determine lengths and areas related to them.	10-1
c.	Identify similar and congruent shapes and determine their image under simple transformations (translation, rotation, reflection) in the coordinate plane.	11-8
4I.	***Use appropriate tools to construct and verify geometric relationships.***	
a.	Using compasses, rulers, and protractors, identify and construct basic elements of geometric figures (altitudes, midpoints, diagonals, angle bisectors, and perpendicular bisectors; and central angles, radii, diameters, and chords of circles).	9-3
b.	Identify the properties of congruent and similar triangles.	9-6
c.	Identify corresponding sides in similar or congruent triangles.	9-6

KEY IDEAS		LESSON REFERENCES
d.	Verify that vertical angles have equal measure.	See Glencoe's *Mathematics: Applications and Connections,* Course 3 Lesson 5-1.
4J.	***Develop procedures for basic geometric constructions.***	
a.	Construct an angle with a given measure.	9-3A
b.	Bisect an angle, using a compass and a straightedge.	9-3
c.	Construct the perpendicular bisector of a line segment.	9-3
5. MEASUREMENT		
Students use measurement in both metric and English measure to provide a major link between the abstractions of mathematics and the real world in order to describe and compare objects and data.		
5A.	***Estimate, make, and use measurements in real-world situations.***	
a.	Measure the distance of objects, using scientific notation (shuttle from the Earth).	See Glencoe's *Mathematics: Applications and Connections,* Course 3 Lesson 6-9.
b.	Solve distance problems in miles per hour.	See Glencoe's *Mathematics: Applications and Connections,* Course 3 Lesson 1-5.
c.	Use measurement in everyday situations.	1-1
d.	Make an appropriate estimate relating to size, quantity, temperature, capacity, and the passage of time.	
5B.	***Select appropriate standard and nonstandard measurement units and tools to measure to a desired degree of accuracy.***	
a.	Understand the uses of units, square units, and cubic units.	4-4, 10-5
b.	Find the measure of angles, using a protractor.	9-1
c.	Determine the degree of accuracy needed in measurement situations.	See Glencoe's *Mathematics: Applications and Connections,* Course 3 Lesson 11-7.
d.	Determine significant digits in measurement.	See Glencoe's *Mathematics: Applications and Connections,* Course 3 Lesson 11-7.
e.	Determine appropriate units of measure.	4-4, 10-5
5C.	***Develop measurement skills and informally derive and apply formulas in direct measurement activities.***	
a.	Know and apply formulas for perimeter and area of polygons, volume of rectangular solids, circumference, and area of circles.	4-4, 10-5

KEY IDEAS	LESSON REFERENCES
b. Derive and use formulas for surface area of a solid, volume of right circular cylinders, spheres, cones, and pyramids.	10-5
c. Understand length, area, and volume and make relationships between the measurements.	4-4, 10-5
d. Find the measure of the sides and angles of a right triangle, using the Pythagorean theorem and trigonometric ratios.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lessons 10-3A, 10-3.
5D. Use statistical methods and measures of central tendency to display, describe, and compare data.	
a. Interpret graphs, tables, scales, and charts by making comparisons and calculations.	13-2
b. Use appropriate statistical measures to compare data.	13-2
c. Determine which measures of central tendency (mean, median, mode) best represent the sets of data.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lessons 3-4, 3-4B.
d. Organize and display collected data, using appropriate tables, charts, or graphs including histograms, broken line, circle graphs, stem-and-leaf plots, and box-and-whisker plots.	13-2
5E. Explore and produce graphic representations of data (calculators/computers may be used).	
a. Use graphic calculators and computer spreadsheets to organize and analyze data.	4-3B
b. Construct histograms and frequency polygons.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lesson 3-1.
5F. Develop critical judgment for the reasonableness of measurement.	
a. Select, use, and explain a method for comparing weights, capacities, geometric measures, times, and temperatures within and between measurement systems (e.g., miles per hour and feet per second, about how many inches in a given number of meters).	4-9
6. UNCERTAINTY	
Students use ideas of uncertainty to illustrate that mathematics involves more than exactness when dealing with everyday situations.	
6A. Use estimation to check the reasonableness of results obtained by computation, algorithms, or the use of technology.	
a. Estimate the results of a problem prior to arriving at a solution.	1-1
b. Round whole numbers, decimals, and fractions.	1-3

KEY IDEAS	LESSON REFERENCES
c. Estimate the outcomes of problems/experiments, complete the task, and compare the results with the prediction.	1-1
6B. Use estimation to solve problems for which exact answers are inappropriate.	
a. Recognize when an estimate is appropriate.	4-5
6C. Estimate the probability of events.	
a. Understand that the larger a well-chosen sample is, the more likely it is to represent the whole, and that there are many ways of choosing a sample that can make it unrepresentative of the whole.	13-2
b. Combinations and permutations.	13-2
c. Conduct and predict outcomes of experiments with independent events.	13-2
d. Understand the terms relative frequency, cumulative frequency, and cumulative relative frequency.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lesson 3-1.
6D. Use simulation techniques to estimate probabilities.	
a. Conduct a variety of simulations to represent an experiment that cannot be determined by theoretical probability or is not practical to determine experimentally.	13-4B
6E. Determine probabilities of independent and mutually exclusive events.	
a. Understand and use empirical and theoretical probability, using the formula $P(E) = \frac{f}{n}$.	
b. Develop and explore combinations and permutations.	13-5
c. Express probabilities as fractions, percents, or decimals.	13-5
d. Predict the results of a series of trials once the probability for one trial is known.	13-4B
7. PATTERNS/FUNCTIONS	
Students use patterns and functions to develop mathematical power, appreciate the true beauty of mathematics, and construct generalizations that describe patterns simply and efficiently.	
7A. Recognize, describe, and generalize a wide variety of patterns and functions.	
a. Identify, describe, represent, extend, and create patterns (numerical and geometric).	1-3
b. Describe functions and generalize by the use of rules and algebraic expressions.	1-4

KEY IDEAS		LESSON REFERENCES
7B.	***Describe and represent patterns and functional relationships, using tables, charts, graphs, algebraic expressions, rules, and verbal descriptions.***	
a.	Describe and represent numerical and geometric patterns and functions, using equations, graphs, and tables.	1-3
b.	Organize and analyze data resulting in function applications through the use of a table of values, sentence, formula, graph, and prediction.	12-6
7C.	***Develop methods to solve basic linear and quadratic equations.***	
a.	Solve multistep equations in one variable.	12-1
b.	Solve one- and two-step equations.	1-7
c.	Use five basic properties of equality in solving equations with one variable.	12-1
d.	Understand the addition, subtraction, multiplication, and division properties as they pertain to problem-solving situations with inequalities.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lesson 6-5.
e.	Model and solve multistep problems involving rate, average speed, distance and time, or direct variation.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lessons 6-3, 8-3.
f.	Use algebraic expressions, equations, and inequalities to model linear and nonlinear situations, including direct and inverse variation, exponential growth, and quadratic behavior.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lessons 6-4, 6-5, 6-6.
g.	Fundamental ideas of the quadratic equation and its graph. Students should know that linear situations "grow by adding," versus, for example, exponential situations, which "grow by multiplying," and recognize these characteristics in tables, graphs, equations, and situations.	See Glencoe's *Mathematics: Applications and Connections,* Course 3 Lesson 10-6.
7D.	***Develop an understanding of functions and functional relationships: that a change in one quantity (variable) results in a change in another.***	
a.	Examine a situation and determine if the quantities vary directly or indirectly, and represent that variation graphically, in a table and in an equation.	12-6
b.	Use a variety of representations to describe a functional relationship.	12-6
c.	Identify the input and the output in a relationship between two variables and determine whether the relationship is a function.	12-6
d.	Identify and justify proportional relationships.	12-6

KEY IDEAS		LESSON REFERENCES
7E.	***Verify results of substituting variables.***	
a.	Solve an equation and check the solution set by substitution.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lessons 6-1, 6-2, 6-3.
b.	Understand that an equation containing a variable may be true for just one value of the variable.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lesson 1-5.
7F.	***Apply the concept of similarity in relevant situations.***	
a.	Demonstrate an understanding of congruence between two geometric figures and what congruence means about the relationships between the sides and angles of the two figures.	9-6
b.	Understand the difference between similarity and congruence.	9-6
c.	Identify similar and congruent triangles and other polygons and their corresponding parts.	9-6
7G.	***Use properties of polygons to classify them.***	
a.	Apply the relationship between the interior and exterior angles of a polygon.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lesson 9-2.
b.	Use the sum of the number of degrees of measure of triangles, quadrilaterals, hexagons, etc., to solve problems.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lessons 9-2A, 9-2.
c.	Classify triangles according to angle size and/or length of sides.	9-4A
7H.	***Explore relationships involving points, lines, angles, and planes.***	
a.	Understand and use proper terminology, symbols, definitions, and formulas for undefined and defined terms.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lessons 9-1A, 9-1, 9-1B.
b.	Name, define, and measure angles and angle pairs such as complementary, supplementary, alternate interior and exterior, and vertical angles.	9-1
7I.	***Develop and apply the Pythagorean principle in the solution of problems.***	
a.	Use the Pythagorean theorem in the solution of problems (include rational and irrational numbers).	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lesson 10-3.
7J.	***Explore and develop basic concepts of right triangle trigonometry.***	
a.	Understand the relationships of the sides of a right triangle.	See Glencoe's *Mathematics: Applications and Connections,* Course 2 Lessons 10-3A, 10-3.

STANDARDS	LESSON REFERENCES
b. Explore and develop the concept that corresponding angles of similar triangles have the same measure.	9-6
c. Develop and apply the formulas for sine, cosine, and tangent.	See Glencoe's *Mathematics: Applications and Connections,* Course 3 Lesson 8-8B.
7K. Use patterns and functions to represent and solve problems.	
a. Use patterns and functions to solve problems.	12-6