



Mathematics

Applications and Concepts
Course 3
© 2006

STANDARDS	PAGE REFERENCES
Grade 8	
ALGEBRAIC REASONING: PATTERNS AND FUNCTIONS	
Patterns and functional relationships can be represented and analyzed using a variety of strategies, tools and technologies.	
How do patterns and functions help us describe data and physical phenomena and solve a variety of problems?	
Students should... 1.1 Understand and describe patterns and functional relationships.	
<p>a. Analyze physical phenomena, functions and patterns to identify relationships and make generalizations.</p> <p>(1) Write recursive and explicit functions to generalize patterns.</p> <p>(2) Identify relationships that are linear and nonlinear and compare and contrast their properties using tables, graphs, equations and verbal descriptions.</p> <p>(3) Recognize and solve problems of direct variation.</p>	<p>Student Edition: 512-515, 517-520, 522-525, 530 #4-#6, #14, 534, 560, 563, 593, 597 #16-#20, 659 <i>Graphing Calculator Investigation</i> 532 <i>Hands-on Lab</i> 516, 521 <i>Problem-Solving Strategy</i> 96-97, 123-124, 226-227</p> <p>Teacher Wraparound Edition: A 515, 525, 563; B 512; DI 96, 99, 513; IE 523 See Glencoe's <i>Pre-Algebra</i> © 2005 page 394 for direct variation.</p>

STANDARDS	PAGE REFERENCES
<p>1.2 Represent and analyze quantitative relationships in a variety of ways.</p>	
<p>a. Describe the effects of characteristics of linear relationships on the way the relationships are represented verbally and in tables, graphs and equations.</p> <p>(1) Determine the constant rate of change in a linear relationship and recognize this as the slope of a line.</p> <p>(2) Compare and contrast the graphs of lines with the same slope versus those with different slopes.</p> <p>(3) Interpret slope and y-intercepts from contextual situations, graphs and linear equations.</p> <p>(4) Given two linear relationships in context, recognize that they may have a common solution.</p>	<p>Student Edition: 160-164, 166-169, 173 #47, 517-520, 522-525, 533-536, 544-547</p> <p><i>Graphing Calculator Investigation</i> 532 <i>Hands-on Lab</i> 521 <i>Spreadsheet Investigation</i> 165</p> <p>Teacher Wraparound Edition: A 519, 536, 547; B 166; DI 167, 518; IE 167, 523</p>
<p>1.3 Use operations, properties and algebraic symbols to determine equivalence and solve problems.</p>	
<p>a. Solve problems using various algebraic methods and properties.</p> <p>(1) Solve multistep equations using algebraic properties.</p> <p>(2) Use tables, graphs and equations to represent mathematical relationships and solve real-world problems.</p>	<p>Student Edition: 13-15, 32 #1, 48-49, 53, 59 #18, 92-95, 474-477, 484-487, 490 #10-#15, 529</p> <p>Teacher Wraparound Edition: A 53; DI 475, 485</p>
<p>NUMERICAL AND PROPORTIONAL REASONING: Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technologies.</p>	
<p>How are quantitative relationships represented by numbers?</p>	
<p>Students should...</p>	
<p>2.1 Understand that a variety of numerical representations can be used to describe quantitative relationships.</p>	
<p>a. Compare and order integers, powers and roots using number lines and grids.</p> <p>(1) Compare, locate, label and order rational numbers on number lines, scales, coordinate grids and measurement tools.</p> <p>(2) Identify another rational number between any two rational numbers.</p> <p>(3) Solve a variety of problems involving integers, powers, roots and scientific notation.</p>	<p>Student Edition: 17-21, 25 #8, 31 #43, #44, 67-70, 98-101, 104-107, 116-119, 125-129, 142-145, 150 #5, 151 #9</p> <p><i>Hands-on Lab</i> 22 <i>WebQuest</i> 3</p> <p>Teacher Wraparound Edition: A 70, 107; DI 105, 117; IE 18, 105</p>

STANDARDS	PAGE REFERENCES
<p>b. Extend the understanding of scientific notation to very small numbers.</p> <p>(1) Use powers of ten and negative exponents to write decimal fractions.</p> <p>(2) Use powers of ten and positive and negative exponents to express and compare magnitude of very large and very small numbers and connect to scientific notation.</p> <p>(3) Find the results of multiplication and division with powers of ten using patterns in operating with exponents.</p> <p>(4) Develop, describe and use a variety of methods to operate with very large and very small numbers.</p>	<p>Student Edition: 99, 104-107, 119 #51, 415 #8, 584-587</p> <p>Teacher Wraparound Edition: A 107</p>
<p>2.2 Use numbers and their properties to compute flexibly and fluently, and to reasonably estimate measures and quantities.</p>	
<p>a. Solve problems involving fractions, decimals, ratios and percents.</p> <p>(1) Estimate and solve problems involving percent of increase and decrease.</p>	<p>Student Edition: 66, 80, 85, 112-113, 156-159, 202-203, 206-209, 210-214, 236-240</p> <p><i>The Game Zone</i> 87</p> <p>Teacher Wraparound Edition: A 209, 240; DI 237; IE 237</p>
<p>b. Make generalizations about operations with very large and very small numbers.</p> <p>(1) Use the rules for exponents to multiply and divide with powers of ten, including negative exponents.</p> <p>(2) Develop, describe and use a variety of methods to estimate and calculate mentally with very large and very small numbers.</p>	<p>Student Edition: 98-101, 104-107, 584-587</p> <p><i>WebQuest</i> 3, 465</p> <p>Teacher Wraparound Edition: A 101, 107; B 104; DI 99, 105; IE 99</p>
<p>c. Connect the exponential growth and decay models to repeated multiplication by the same factor.</p> <p>(1) Solve problems that involve repetitive patterns and iterations, such as compound interest, using tables, spreadsheets and calculators.</p>	<p>Student Edition: <i>Hands-on Lab</i> 516</p> <p><i>Spreadsheet Investigation</i> 245</p> <p>See Glencoe's <i>Pre-Algebra</i> © 2005 page 180 for exponential growth and decay.</p>

STANDARDS	PAGE REFERENCES
<p>GEOMETRY AND MEASUREMENT</p>	
<p>Shapes and structures can be analyzed, visualized, measured and transformed using a variety of strategies, tools and technologies.</p>	
<p>How do geometric relationships and measurements help us to solve problems and make sense of our world?</p>	
<p>Students should...</p>	
<p>3.1 Use properties and characteristics of two- and three-dimensional shapes and geometric theorems to describe relationships, communicate ideas and solve problems.</p>	
<p>a. Explore the relationships among sides, angles, perimeters, areas, surface areas and volumes of congruent and similar polygons and solids.</p> <p>(1) Explore the effect of scale factors on the length, area and volume ratios of similar polygons, circles and solids.</p> <p>(2) Make and test conjectures about the relationships among angles, sides, perimeters and areas of congruent and similar polygons, including the Pythagorean Theorem.</p>	<p>Student Edition: 132-136, 137-140, 178-182, 184-187, 188-191, 200, 202 #6, 203 #13, 279-282, 284 #8, 289 #25, 311, 314-318, 319-323, 335-339 <i>Hands-on Lab</i> 279, 283 <i>Problem-Solving Strategy</i> 177 #14 <i>Spreadsheet Investigation</i> 356-357 Teacher Wraparound Edition: A 182, 282; DI 179, 280; IE 133, 179, 180; PS 201; TNT 138, 347</p>
<p>3.2 Use spatial reasoning, location and geometric relationships to solve problems.</p>	
<p>a. Model geometric relationships in a variety of ways.</p> <p>(1) Use coordinate geometry to explore and test geometric relationships of parallel and perpendicular lines and polygons and their transformations.</p>	<p>Student Edition: 194-196, 290-294, 296-299, 308, 311 #17 <i>Hands-on Lab</i> 304-305 Teacher Wraparound Edition: IE 195, 297</p>
<p>3.3 Develop and apply units, systems, formulas and appropriate tools to estimate and measure.</p>	
<p>a. Use a variety of concrete methods, including displacement, to find volumes of solids.</p> <p>(1) Develop measurement strategies to find the surface area and volume of pyramids, cones, spheres and irregular solids.</p> <p>(2) Use estimation and measurement strategies to solve problems involving the volumes of solids.</p>	<p>Student Edition: 312, 335-339, 342-345, 352-355, 365, 367, 369 #17 Teacher Wraparound Edition: A 355; B 335; DI 343; WM 344</p>
<p>b. Solve problems involving measurement through the use of appropriate tools, techniques and strategies.</p> <p>(1) Use the Pythagorean Theorem to solve indirect measurement problems.</p> <p>(2) Describe the accuracy of estimates and measures and the precision of measurement tools.</p> <p>(3) Solve dimensional analysis problems.</p>	<p>Student Edition: 73, 78, 107 #37, 121 #2, 132-136, 137-140, 145 #23, 169 #20, 186 #15, 188-191, 338 #27-#29, 358-362, 520 #28, 529 #36, 586 #38, #39 Teacher Wraparound Edition: DI 359; PS 149, TNT 360</p>

STANDARDS	PAGE REFERENCES
WORKING WITH DATA: PROBABILITY AND STATISTICS	
Data can be analyzed to make informed decisions using a variety of strategies, tools and technologies.	
How can collecting, organizing and displaying data help us analyze information and make reasonable predictions and informed decisions?	
Students should...	
4.1 Collect, organize and display data using appropriate statistical and graphical methods.	
<p>a. Construct appropriate representations of data based on the size and kind of data set and the purpose for its use.</p> <p>(1) Collect, organize, display, compare and analyze large data sets.</p> <p>(2) Construct a variety of data displays, including box-and-whisker plots, and identify where measures of central tendency and dispersion are found in graphical displays.</p>	<p>Student Edition: 36 #8, 44 #8, 69 #32, 173 #45, 403 #24, 406-409, 412 #46-#49, 420-424, 430-433, 435-438, 451 #3, 459 #12, #13, #14, 462 #7, 463 #17, 426-429, 508 #5, 557 #17</p> <p><i>Graphing Calculator Investigation</i> 425, 543 <i>Hands-on Lab</i> 22, 435, 521 <i>Problem-Solving Strategy</i> 123-124, 176-177, 378-379, 418-419 <i>Spreadsheet Investigation</i> 165, 439 <i>WebQuest</i> 3, 153, 371</p> <p>Teacher Wraparound Edition: B 426, 430, 450; DI 430, 431, 436, 447, 451; IE 36, 431, 436; PA 541</p>
4.2 Analyze data sets to form hypotheses and make predictions.	
<p>a. Make and evaluate statistical claims and justify conclusions with evidence.</p> <p>(1) Make predictions from scatter plots using or estimating a line-of-best-fit.</p> <p>(2) Make inferences and evaluate reasonable hypotheses based on experimental data.</p> <p>(3) Analyze and interpret data using descriptive statistics, including range, mode, median, quartiles, outliers and mean.</p> <p>(4) Determine the accuracy of statistical claims.</p> <p>(5) Describe the role of random sampling, random number generation and the effects of sample size in statistical claims.</p>	<p>Student Edition: 36 #8, 163 #11-#14, 406-409, 414 #7, 420-424, 429 #16, 435-438, 442-445, 450-453, 539-542, 551 #33, 557 #17</p> <p><i>Graphing Calculator Investigation</i> 425, 543 <i>Hands-on Lab</i> 22 <i>Problem-Solving Strategy</i> 44 #13, 123-124, 276-277, 418-419, 537 <i>Spreadsheet Investigation</i> 165, 439, 543</p> <p>Teacher Wraparound Edition: A 542; DI 443, 540; IE 436, 451, 540; PS 539, 555</p>

STANDARDS

PAGE REFERENCES

4.3 Understand and apply basic concepts of probability.

a. Determine possible outcomes using a variety of counting techniques.

(1) Distinguish between combinations and permutations as ways to predict possible outcomes in certain situations.

(2) Use combinations and permutations, trees and networks (counting strategies) in a variety of contexts, and identify when order is irrelevant in determining a solution.

Student Edition:

374-377, 380-383, 384-387, 388-391, 414 #6, 415 #13

Graphing Calculator Investigation 404-405

Hands-on Lab 392-393

Problem-Solving Strategy 378-379

Web Quest 371

Teacher Wraparound Edition:

A 387, 403; B 384; DI 378, 385; IE 375, 381, 401