



WASHINGTON
Grade Level Expectations (GLE)
Mathematics Grade 8
Mathematics: Applications and Concepts Course 3 © 2006

OBJECTIVES	PAGE REFERENCES
EALR 1: The student understands and applies the concepts and procedures of mathematics.	
Component 1.1: Understand and apply concepts and procedures from number sense.	
Number and numeration	
1.1.1 Understand the concept of rational numbers including whole number powers and square roots of square numbers. W <ul style="list-style-type: none"> ■ Explain the meaning of a whole number exponent. [CU] ■ Read and use exponential notation to represent large numbers (e.g., $2500 = 50^2$). [MC] ■ Identify a square number and find its root. ■ Identify different representations of rational numbers and select the best representation in the situation (e.g., percent for sales discount or sales tax, fraction for probability, and decimals for money, distance [4.35 kilometers], batting averages). ■ Write a squared number. 	SE: 62-66, 98-101, 104-107, 116-119, 125-129, 210-214, 241-244, 374-375 TWE: A 214 B 216 DI 117 ICE 99, 117
1.1.2 Understand the relative values of rational numbers including whole number powers and square roots of square numbers. W <ul style="list-style-type: none"> ■ Compare and order rational numbers using models or implementing strategies. [RL] ■ Order different representations of rational numbers. [RL] ■ Place symbolic representations of rational numbers on a number line including whole number powers and square roots of square numbers. [CU] 	SE: 18-19, 67-70, 110 #58-#65, 127 e.g. #5 & #6, 140 #25, 649 #18-#20 TWE: A 70, 107 DI 68 ICE 68, 105
1.1.3 Apply properties of addition, multiplication, and the distributive property to the rational number system. W <ul style="list-style-type: none"> ■ Illustrate and explain the distributive property of multiplication over addition (e.g., using an area model or picture). [CU] ■ Use the distributive property to simplify expressions including those using integers. [RL] ■ Use the distributive property to factor expressions (e.g., $3 \cdot 9 + 3 = 3 \cdot (9+1)$). [RL] ■ Identify the multiplicative inverse of a number. 	SE: 13, 14 #10, 15 #49 & #50, 35 e.g. #4, 58 #3, 75 #32-#34, 76-80, 98 e.g. #1, 126 TWE: A 15, 80 ICE 77

OBJECTIVES	PAGE REFERENCES
<p>1.1.4 Apply ratio, percent, and direct proportion in situations. W</p> <ul style="list-style-type: none"> ■ Solve problems involving ratio and proportion (e.g., similar figures, scale drawings, rates, find unit pricing, increase or decrease a recipe, find the portions for a group converting between different units of measure, or finding medicinal dosages). [SP, MC] ■ Solve problems involving percentages (e.g., percent increase/decrease, tax, commission, discount). [SP, MC] ■ Explain advantages and disadvantages of different representations of ratios or percents in a given situation (e.g., using $\frac{1}{8}$ versus $12\frac{1}{2}\%$). [CU, MC] ■ Determine an unknown value for a dimension or a number of events or objects using ratio or proportion. ■ Complete a proportion in a situation. 	<p>SE: 156-159, 170-173, 178-182, 184-187, 188-191, 195 e.g. #3, 202 #4, 206-209, 216-219, 236-240, 242 e.g. #3</p> <p>TWE: A 173, 182 DI 157 ICE 157, 171, 189</p>
Computation	
<p>1.1.5 Understand the meaning of operations on rational numbers (including square roots of square numbers and whole number powers). W</p> <ul style="list-style-type: none"> ■ Create a problem situation to match a given rational number equation. [CU, MC] ■ Explain the meaning of negative and zero exponents. [CU] ■ Demonstrate or describe the meaning of multiplication and division of integers using words, visual, or physical models. [CU] ■ Create a problem situation involving multiplication or division of integers. [CU, MC] ■ Explain solutions when dividing by fractions (e.g., when dividing by a number between 0 and 1, the result is larger than the dividend). [CU] 	<p>SE: 31 #45, 34-38, 49 #45, 50-53, 76-80, 99, 100 #2 <i>Problem-Solving Strategy</i> 43-44</p> <p>TWE: A 38 B 39 ICE 99 NS 100</p>

OBJECTIVES	PAGE REFERENCES
<p>1.1.6 Apply computational procedures with fluency on rational numbers including whole number powers and square roots of square numbers. W</p> <ul style="list-style-type: none"> ■ Compute with rational numbers using order of operations. ■ Compute fluently with rational numbers in all forms except exponential. ■ Write and solve problems that involve computation with rational numbers. [CU, MC] ■ Solve problems using rational numbers with whole number powers. [SR] ■ Solve problems using rational numbers with square roots of perfect squares (e.g., given a square garden with an area of nine square meters, how much fence would be needed to encompass a garden twice the size of the original garden). [SR] 	<p>SE: 11, 14 #14-#27, 23-27, 28-31, 34-38, 39-42, 58 #2, 71-75, 76-80, 82-85, 88-91, 92-95, 116-119, 126 e.g. #2, 146 #15</p> <p>TWE: A 53 B 120 DI 129 ICE 12, 117, 324 PS 57, 111 TNT 24</p>
<p>1.1.7 Understand and apply strategies and tools to complete tasks involving computation on rational numbers.</p> <ul style="list-style-type: none"> ■ Select and justify appropriate strategies and tools (e.g., mental computation, estimation, calculators, and paper and pencil) to compute in a problem situation. [SP, RL] ■ Describe strategies for mentally solving problems involving integers and exponents. [CU] ■ Use calculators to compute with whole number powers beyond the cubed numbers. ■ Use calculators to compute square roots of perfect squares greater than 100. 	<p>SE: 6-10, 15 #41-#42, 63 e.g. #2, 67 e.g. #1, 75 #32-#34, 85 #33, 117 e.g. #4, 120-122, 127 e.g. #7, 223 #40, 228-231, 251 #15, 654 #8 <i>Problem-Solving Strategy</i> 43-44, 96-97, 176-177, 226-227, 488-489 <i>Study Tip</i> 127</p> <p>TWE: DI 68, 221, 229</p>
Estimation	
<p>1.1.8 Apply estimation strategies to predict or determine the reasonableness of answers in situations involving computation on rational numbers in any form including whole number powers and square roots of square numbers. W</p> <ul style="list-style-type: none"> ■ Identify when an approximation is appropriate. [MC] ■ Explain situations involving rational numbers where estimates are sufficient and others for which exact value is required. [CU] ■ Justify why an estimate would be used rather than an exact answer in a given situation. [CU] ■ Describe various strategies used during estimation involving integers. [CU] ■ Use estimation to predict or to verify the reasonableness of calculated results. [RL] 	<p>SE: 8, 9 #10-#12, 15 #41-#42, 64 e.g. #3, 65 #40, 120-122, 127 e.g. #7, 172 #2, 228-231, 251 #15, 600-601 <i>Problem-Solving Strategy</i> 226-227, 488-489</p> <p>TWE: DI 93, 120 ICE 121, 229 NS 172</p>

OBJECTIVES	PAGE REFERENCES
Component 1.2: Understand and apply concepts and procedures from measurement.	
Attributes, units, and systems	
<p>1.2.1 Analyze how a change in a linear dimension affects volume and surface area of rectangular prisms and right cylinders. W</p> <ul style="list-style-type: none"> ■ Compare the impact that a change in one dimension has on volume and surface area in right cylinders and rectangular prisms. [SP, RL] ■ Describe the relationships among linear dimensions, volume, and surface area (e.g., changing the length of a side affects the surface area and volume). [CU] ■ Solve problems involving the effects of changes in one dimension on area (e.g., given a box with certain dimensions, make the volume of the box y cubic units by changing only one dimension of the box). [SP] 	<p>SE: 335-339, 347-351, 355 #28 <i>Spreadsheet Investigation</i> 356-357</p> <p>TWE: B 347 DI 348 ICE 337 PS 367 TNT 347</p>
<p>1.2.2 Understand and apply derived units of measurement. W</p> <ul style="list-style-type: none"> ■ Explain the concept of a rate. [CU] ■ Explain how division of measurements produces a derived unit of measurement (e.g., miles traveled divided by hours traveled yields the derived unit [miles per hour]). [CU] ■ Find a rate of change in a situation (e.g., increase per year in stamp cost) and label the results. [SP, RL, MC] ■ Use unit analysis to find equivalent rates (e.g., miles per hour to feet per second). [MC] ■ Use rate to determine a measured outcome. 	<p>SE: 156-159, 160-164, 169 #23-#24, 198, 338 #27-#29 <i>Spreadsheet Investigation</i> 165</p> <p>TWE: ICE 93, 161, 162 WM 163</p>
<p>1.2.3 Understand why different situations require different levels of precision. W</p> <ul style="list-style-type: none"> ■ Explain the relationships among units within both the customary and metric system (e.g., kilograms to grams, feet to inches). ■ Justify the use of a unit of measure (e.g., measuring to order fencing requires a different precision than if one is selling land and needs to be precise about borders). [CU, MC] ■ Compare situations for the level of precision needed. [RL] ■ Explain and give examples of situations that require more and less precision. [CU] 	<p>SE: 73 e.g. #5, 78 e.g. #6, 184, 185, 188-191, 200, 338 #25-#26, 358-362, 604-605, 606-607</p> <p>TWE: A 362 DI 359 ICE 359 TNT 360</p>

OBJECTIVES	PAGE REFERENCES
Procedures, precision, and estimation	
<p>1.2.5 Understand and apply formulas including the Pythagorean Theorem to right prisms, right cylinders, and triangles. W</p> <ul style="list-style-type: none"> ■ Explain how to use a formula for finding the surface area and volume of a solid. [CU] ■ Find missing sides or area of right triangles (e.g., use the Pythagorean Theorem to find any of the missing values). ■ Calculate measures of objects for which no direct information is given (e.g., apply ratio, proportion, and scale to determine the area, surface area, and/or volume of a similar figure or solid). [SP, MC] ■ Compare surface areas of shapes with given volumes (e.g., compare cost of material to make various right cylinder and right prism containers with a given volume). [RL, MC] 	<p>SE: 53 #45, 122 #34, 129 #50, 132-136, 137-140, 178-182, 184-187, 188-191, 199-200, 335-339, 347-351, 352-355 <i>Hands-On Lab</i> 192-193 <i>Spreadsheet Investigation</i> 356-357</p> <p>TWE: A 136, 182 B 188, 335 ICE 93, 189 TNT 138, 186</p>
<p>1.2.6 Apply strategies to obtain reasonable estimates of volume and surface area measurements for right cylinders, right prisms, and of the lengths of sides of right triangles. W</p> <ul style="list-style-type: none"> ■ Estimate volume and surface area for right cylinders and right prisms. ■ Estimate the length of the remaining side of a right triangle given the lengths of two sides. ■ Approximate distance or height in a problem situation using similar triangles or Pythagorean relationships (e.g., height of a flagpole using proportional reasoning, distance across a lake using Pythagorean relationship). [SP] ■ Use or describe a process for finding area of a right triangle. 	<p>SE: 132-136, 137-140, 178-182, 188-191, 199, 200, 315, 335-339, 347-351, 355 #25 <i>Hands-On Mini Lab</i> 347</p> <p>TWE: ICE 316, 337</p>

OBJECTIVES	PAGE REFERENCES
Component 1.3: Understand and apply concepts and procedures from geometric sense.	
Properties and relationships	
<p>1.3.1 Apply understanding of characteristics and relationships among one-dimensional, two-dimensional, and three-dimensional figures to solve problems. W</p> <ul style="list-style-type: none"> ■ Identify and label rays, lines, end points, line segments, vertices, and angles. [CU] ■ Match or draw three-dimensional objects from different perspectives using the same properties and relationships (e.g., match to the correct net, draw the top view). [RL] ■ Draw and label with names and symbols, nets of prisms, and cylinders. [RL, CU] ■ Describe everyday objects in terms of their geometric characteristics. [CU] ■ Identify the two-dimensional components of three-dimensional figures. 	<p>SE: 256-260, 262-265, 272-275, 299 #13, #14, 331-334, 347, 348, 352 <i>Hands-On Lab</i> 278, 304-305, 330, 346 <i>Hands-On Mini Lab</i> 342 <i>Real Life Math</i> 301 <i>Web Quest</i> 253</p> <p>TWE: A 259 DI 257 PC 254F T 346 TNT 263</p>
<p>1.3.2 Apply understanding of similarity to two-dimensional figures. W</p> <ul style="list-style-type: none"> ■ Use properties of similarity to draw, describe, and compare two-dimensional figures. ■ Find the length of a missing side or the measure of a missing angle of one of the figures, given two similar figures. [SP, RL] ■ Create symmetrical, congruent, or similar figures using a variety of tools (e.g., ruler, pattern blocks, geoboards). [RL, CU] ■ Draw a similar shape to a given shape. [RL, CU, MC] ■ Use properties of circles, cylinders, and figures with rotational symmetry to compare figures. [RL, CU] ■ Create a scale drawing and label the scale and the dimensions. (SP, CU, MC). 	<p>SE: 178-182, 184-187, 188-191, 279-282, 286-289, 299 #19-#20 <i>Hands-On Lab</i> 283 <i>Problem-Solving Strategy</i> 176-177</p> <p>TWE: A 182, 187, 289 B 178, 279, 286 DI 176, 280, 287 ICE 280, 287</p>

OBJECTIVES	PAGE REFERENCES
Locations and transformations	
<p>1.3.3 Understand and apply procedures to find distance between points in two-dimensional representations. W</p> <ul style="list-style-type: none"> ■ Locate a missing vertex given the coordinates of the vertices of a regular polygon. [RL] ■ Apply the Pythagorean Theorem to find the length of a side of a right triangle or distance between two points. ■ Explain a method for finding the missing side of a triangle in a real-world setting (e.g., the height of a totem pole or building). [CU] ■ Describe the relationship of any two or more points on a coordinate grid. [CU] ■ Find the distance between two points on a coordinate grid including lines that are non-parallel with either axis (oblique). [RL, MC] 	<p>SE: 132-136, 137-140, 143 e.g. #1, 144 #3, 148, 151 #15, #17, 188-191, 203 #15, #17, 267-269, 299 #16</p> <p>TWE: A 145 ICE 143, 268</p>
<p>1.3.4 Understand and apply transformations to figures. W</p> <ul style="list-style-type: none"> ■ Identify and explain how a shape has been translated, reflected, or rotated with or without a grid (e.g., location of the North Star, rotate the Big Dipper). [CU] ■ Use transformations (rotations, reflections, and translations) to draw or locate congruent two-dimensional figures. [RL, CU] ■ Find the image of a given shape after a combination of transformations. [RL] ■ Tessellate a plane by using transformations. [RL, MC] ■ Create a design using a combination of two or more transformations with one or two two-dimensional figures. [SP, RL] 	<p>SE: 290-294, 296-299, 300-303, 311 #17 <i>Hands-On Lab</i> 304-305</p> <p>TWE: A 305 DI 291 ICE 291, 297, 301 PS 309 T 304</p>
Component 1.4: Understand and apply concepts and procedures from probability and statistics.	
Probability	
<p>1.4.1 Understand the concept of compound events. W</p> <ul style="list-style-type: none"> ■ Determine and explain when events are compound. [CU] ■ Explain the difference between compound events involving ‘and’ and ‘or’ (e.g., rolling a six and rolling an odd number vs. rolling a six or rolling an odd number). [CU] 	<p>SE: 396-399, 403 #27, 409 #25, #26, 412, 655 #10, #11</p> <p>TWE: DI 397</p>

OBJECTIVES	PAGE REFERENCES
<p>1.4.2 Understand and apply the procedures for comparing theoretical probability and empirical results for independent or compound events. W</p> <ul style="list-style-type: none"> ■ Calculate the probability of two independent events occurring simultaneously using various methods (e.g., organized list, tree diagram, counting procedures, and area model). ■ Explain the relationship between theoretical and empirical probability of compound events. [CU] ■ Predict the probability of outcomes of experiments and compare the predictions to empirical results. [RL] ■ Design or create a situation that would produce a given probability (e.g., how many of each colored marble would it take to have a given probability of selecting one particular color?). [SP, MC] ■ Design a game using compound probabilities with equal chances of winning for all players. [SP, MC] 	<p>SE: 380-383, 396, 398 #1, 400-403, 406-409, 415 #14 <i>Graphing Calculator Investigation</i> 405 <i>Hands-On Lab</i> 392-393 <i>Problem-Solving Strategy</i> 378-379</p> <p>TWE: DI 397 ICE 401</p>
Statistics	
<p>1.4.3 Analyze how different samples of a population affect the data. W</p> <ul style="list-style-type: none"> ■ Identify sources of sampling bias given a situation (e.g., interviewing only girls, only a certain age group, or too few people). [CU, MC] ■ Describe a procedure for selecting an unbiased sample. [CU, MC] ■ Compare the results of a survey given two different sample groups. [RL, CU] ■ Identify the appropriate population for a given research question. ■ Describe how sampling may have affected the resulting data. [CU] 	<p>SE: 406-409, 413 #2, 414 #7, 424 #26, 449 #25, #26, 450-453, 463 #18 <i>Web Quest</i> 371</p> <p>TWE: A 409 DI 407 ICE 451 PS 413</p>

OBJECTIVES	PAGE REFERENCES
<p>1.4.4 Analyze variations in data to determine the effect on the measures of central tendency. W</p> <ul style="list-style-type: none"> ■ Identify clusters and outliers and determine how clusters or outliers may affect measures of central tendency. [RL] ■ Alter a set of data so that the median is a more reasonable measure than the mean. [RL, CU, MC] ■ Use and interpret the most appropriate measure of central tendency and the range to describe a given set of data (e.g., the model hourly wage earned by eighth graders is \$5.75 per hour and the range is \$5.00 to \$6.50; therefore, there are very small differences in hourly wages for eighth graders). [RL, CU, MC] 	<p>SE: 416, 435-438, 442-445, 451 e.g. #2 & #3, 461 #7-#13, 656 #6-#9, 677 #8 <i>Spreadsheet Investigation</i> 439</p> <p>TWE: DI 436, 443, 451 ICE 436, 443</p>
<p>1.4.5 Understand and apply data techniques to interpret bivariate data. W</p> <ul style="list-style-type: none"> ■ Interpret graphic and tabular representations of bivariate data. ■ Use a line of best fit to predict a future value of a variable. [RL] ■ Use a line of best fit to interpolate between existing data values. [RL] ■ Draw trend lines with or without technology and make predictions about real-world situations (e.g., population trends, socio-economic trends). [CU, MC, RL] ■ Examine data in a two-column table to interpolate or extrapolate additional values. [RL] ■ Use observations about differences between two or more samples to make conjectures about the populations from which the samples were taken (e.g., age groups, regions of the U.S., genders, racial/ethnic distributions). [RL, MC, CU] 	<p>SE: 406-409, 412, 446-449, 454, 539-542, 557 #17, 676 #3 <i>Hands-On Lab</i> 22, 434 <i>Problem-Solving Strategy</i> 418-419, 537-538 <i>Study Skill</i> 81 <i>Web Quest</i> 371</p> <p>TWE: A 409, 449, 542 DI 454, 540 ICE 540 PS 555</p>

OBJECTIVES	PAGE REFERENCES
<p>1.4.6 Evaluate how statistics and graphic displays can be used to support different points of view. W</p> <ul style="list-style-type: none"> ■ Critique the use of data and data displays for bivariate data. [RL] ■ Judge the reasonableness of conclusions drawn from a set of data and support that position with evidence (e.g., from newspapers, Web sites, opinion polls). [MC, RL] ■ Determine whether a prediction is reasonable based on a trend line and explain the rationale. [RL] ■ Determine whether claims made about results are based on biased representations of data (e.g., whether a scale has been intentionally used to support a point of view). 	<p>SE: 406-409, 414 #7, 429 #16, 430-433, 450-453, 557 #17 <i>Hands-On Lab</i> 22, 434 <i>Problem-Solving Strategy</i> 488-489 <i>Web Quest</i> 371</p> <p>TWE: B 406 DI 407 PS 555</p>
Component 1.5: Understand and apply concepts and procedures from algebraic sense.	
Patterns, functions, and other relations	
<p>1.5.1 Apply understanding of linear and nonlinear relationships to analyze patterns, sequences, and situations. W</p> <ul style="list-style-type: none"> ■ Extend, represent, or create linear and non-linear patterns and sequences using tables and graphs. [RL] ■ Explain the difference between linear and non-linear relationships. [CU] ■ Predict an outcome given a linear relationship (e.g., from a graph of profit projections, predict the profit). [RL] ■ Use technology to generate linear and non-linear relationship. [SP, RL] 	<p>SE: 522-525, 534, 548-551, 553, 554, 556 #6, 560-563 <i>Graphing Calculator Investigation</i> 532</p> <p>TWE: A 551, 563 B 560 DI 549 ICE 523, 561 PS 555</p>
<p>1.5.2 Analyze a pattern, table, graph, or situation to develop a rule. W</p> <ul style="list-style-type: none"> ■ Use technology to help develop a table or graph from an iterative definition (e.g., the number of cells doubles every hour starting with one cell at noon). [CU, MC] ■ Explain the nature of changes in quantities in linear relationships using graphs, tables, or expressions. [CU, MC] ■ Develop recursive equations that describe linear relations in terms of current and previous values (e.g., start = 7; Current = Previous + 5 would give a set of values (1,7), (2,12), (3,17) ...). ■ Use words or algebraic symbols to describe a rule for a linear relationship between two sets of numbers (e.g., given a table, describe a rule). [CU] 	<p>SE: 517-520, 522-525, 534, 556 #6, 560-563 <i>Graphing Calculator Investigation</i> 532 <i>Hands-On Lab</i> 516 <i>Problem-Solving Strategy</i> 96-97, 418-419</p> <p>TWE: A 563 B 560 DI 513 ICE 523, 561 PS 555</p>

OBJECTIVES	PAGE REFERENCES
Symbols and representations	
<p>1.5.3 Understand relationships between quantities including whole number exponents, square roots, and absolute value. W</p> <ul style="list-style-type: none"> ■ Represent relationships between quantities using exponents (squares) and radicals (roots). [CU] ■ Explain the placement of numbers including square roots and exponents on a number line. [CU] ■ Model or describe a real-life situation using absolute value (e.g., the taxi-cab distance from one point to another can be represented by the sum of two absolute values). [CU, MC] ■ Use relational symbols to express relationships between rational numbers including percents, square roots, absolute value, and exponents. [CU] 	<p>SE: 19, 21 #49, #50, 98-101, 111 #21, #22, 114, 116-119, 120, 126, 127 e.g. #5, #6, 150 #5, 206-209, 212-213</p> <p>TWE: DI 117 ICE 18 TNT 99, 211</p>
<p>1.5.4 Apply understanding of concepts of algebra to represent situations involving single-variable relationships. W</p> <ul style="list-style-type: none"> ■ Represent variable quantities through expressions, linear equations, inequalities, tables, and graphs of situations. [CU] ■ Write an expression, equation, or inequality with a single variable representing a situation or real-world problem. [SP, RL, MC] ■ Identify and use variables to read and write relationships involving rational numbers. ■ Model a given description or situation involving relationships with a graph or table. [CU, MC] ■ Describe a situation involving relationships that matches a given graph. [CU, MC] ■ Create a table or graph given a description of, or an expression for, a situation involving a linear or non-linear relationship. [CU, MC] 	<p>SE: 11-15, 39-42, 48 #32-#41, 73 e.g. #4, #5, 89 e.g. #4, 93 e.g. #5, 469-473, 477 #47, 478-481, 492-495, 497 e.g. #4, 498 #30-#33, 506 #27, #28, 517-520, 522-525, 560-563, 595 #4-#6 <i>Hands-On Lab</i> 521</p> <p>TWE: A 42, 495 DI 40 ICE 479, 493, 561</p>

OBJECTIVES	PAGE REFERENCES
Evaluating and solving	
<p>1.5.5 Understand and apply the procedures for simplifying single-variable expressions. W</p> <ul style="list-style-type: none"> ■ Simplify expressions and evaluate formulas involving integers. [RL, MC] ■ Match expressions to equivalent simplified expressions. [MC] ■ Explain a simplification of an expression involving integers. [CU] ■ Simplify expressions by combining like terms. ■ Simplify expressions using mathematical properties (distributive, commutative, associative, etc.). [RL] ■ Determine the expression that represents a given situation. [MC, CU] ■ Describe a situation that fits with a given expression. [RL, MC, CU] 	<p>SE: 11-15, 25, 31 (#47), 39-42, 73 e.g. #5, 122 #35, 469-473</p> <p>TWE: A 15 B 469 DI 40, 242 ICE 470</p>
<p>1.5.6 Understand and apply a variety of strategies to solve multi-step equations and one-step inequalities with one variable. W</p> <ul style="list-style-type: none"> ■ Solve multi-step equations and one-step inequalities with one variable. ■ Solve single variable equations involving parentheses, like terms, or variables on both sides of the equal sign. ■ Solve one-step inequalities (e.g., $2x < 6$, $x + 4 > 10$). ■ Solve real-world situations involving single variable equations and proportional relationships and verify that the solution is reasonable for the problem. [SP, RL, CU] 	<p>SE: 45-49, 50-53, 171 e.g. #3, 474-477, 478-481, 484-487, 492-495, 496-499, 500-504, 509 #14 <i>Hands-On Lab</i> 482-483</p> <p>TWE: PS 507</p>

OBJECTIVES	PAGE REFERENCES																
EALR 2: The student uses mathematics to define and solve problems.																	
Component 2.1: Understand problems.																	
Example: The following information was provided to a group of students. They were asked to interpret this information for someone who has a speed of 19 feet per second and also for someone who takes 5 steps per second. How would you answer these questions?																	
<table border="0"> <tr> <td>Speed (ft/s)</td> <td>Steps per second</td> </tr> <tr> <td>15.86</td> <td>3.05</td> </tr> <tr> <td>16.88</td> <td>3.12</td> </tr> <tr> <td>17.50</td> <td>3.17</td> </tr> <tr> <td>18.62</td> <td>3.25</td> </tr> <tr> <td>19.97</td> <td>3.36</td> </tr> <tr> <td>21.06</td> <td>3.46</td> </tr> <tr> <td>22.11</td> <td>3.55</td> </tr> </table>		Speed (ft/s)	Steps per second	15.86	3.05	16.88	3.12	17.50	3.17	18.62	3.25	19.97	3.36	21.06	3.46	22.11	3.55
Speed (ft/s)	Steps per second																
15.86	3.05																
16.88	3.12																
17.50	3.17																
18.62	3.25																
19.97	3.36																
21.06	3.46																
22.11	3.55																
<p>2.1.1 Analyze a situation to define a problem. W</p> <ul style="list-style-type: none"> ■ Use strategies to become informed about the situation (e.g., listing information, asking questions). ■ Summarize the problem (e.g., we have information about the relationship between the number of steps per second and the speed in feet per second; we wish to find approximate speed or stride rates). ■ Determine whether enough information is given to find a solution (e.g., list what is needed to find the relationship between stride rate and speed; list known and unknown information). ■ Determine whether information is missing or extraneous (e.g., compare the list of known things to the list of needed things to see if there are things that are not needed — names, location). ■ Define the problem (e.g., find the relationship between the steps per second and speed). 	<p>SE: 6-10, 73, 75 #30, 121 e.g. #2, 136 #35, 161 e.g. #2, 191 #18 <i>Hands-On Lab</i> 434 <i>Problem-Solving Strategy</i> 43-44, 96-97, 124-125, 226-227, 276-277, 378-379, 488-489</p> <p>TWE: A 91 B 43, 104, 430 DI 51, 221, 407</p>																
Component 2.2: Apply strategies to construct solutions.																	
<p>2.2.1 Apply strategies, concepts, and procedures to devise a plan to solve the problem. W</p> <ul style="list-style-type: none"> ■ Organize relevant information from multiple sources. ■ Select and apply appropriate mathematical tools for a situation (e.g., plot steps per second vs. speed; check to see if model is linear; calculate successive differences or quotients to see if a pattern emerges; find an equation for a line that approximates the relationship or extend the pattern to approximate the speed at 5 steps per second). 	<p>SE: 6-10, 522-525, 560-563 <i>Graphing Calculator Investigation</i> 532 <i>Hands-On Lab</i> 271 <i>Problem-Solving Strategy</i> 43-44, 96-97, 123-124, 324-325, 378-379, 537-538 <i>Web Quest</i> 3, 371, 465</p> <p>TWE: A 169 B 220, 446 DI 123, 161 PS 461 TNT 263, 348, 408</p>																

OBJECTIVES	PAGE REFERENCES
<p>2.2.2 Apply mathematical tools to solve the problem. W</p> <ul style="list-style-type: none"> ■ Implement the plan devised to solve the problem or answer the question posed (e.g., in a table of values of lengths, widths, and areas find the one that shows the largest area; check smaller increments to see if this is the largest that works). ■ Identify when an approach is unproductive and modify or try a new approach (e.g., if an additive model didn't work, try a multiplicative model). ■ Check the solution to see if it works (e.g., if the solution for a speed of 19 feet per second is 5 steps per second, perhaps the assumption of linearity was incorrect). 	<p>SE: 6-10 <i>Hands-On Lab</i> 330 <i>Problem-Solving Strategy</i> 43-44, 103-104, 276-277, 324-325 <i>Web Quest</i> 3, 253, 465</p> <p>TWE: A 10, 44, 169, 419 B 6, 384, 430 DI 123, 221, 233 TNT 327, 348</p>
EALR 3: The student uses mathematical reasoning.	
Component 3.1: Analyze information.	
<p>3.1.1 Analyze information from a variety of sources to interpret and compare information. W</p> <ul style="list-style-type: none"> ■ Predict the probability of outcomes of experiments and compare the prediction to empirical results. [1.4.2] ■ Predict an outcome given a linear relationship and a particular input (e.g., from a graph of profit projections, predict the profit in 2005). [1.5.1] 	<p>SE: 374-377, 380-383, 400-403, 406-409, 411, 413, 539-542 <i>Web Quest</i> 371</p> <p>TWE: DI 381 ICE 401</p>
Component 3.2: Make predictions, inferences, conjectures, and draw conclusions.	
<p>3.2.1 Apply prediction and inference skills to make or evaluate conjectures. W</p> <ul style="list-style-type: none"> ■ Use observations about differences between two or more samples to make conjectures about the populations from which the samples were taken (e.g., age groups, regions of the U.S., genders, racial/ethnic distribution). [1.4.6] 	<p>SE: 231 (37-40), 406-409, 412, 434 TWE: A 173 DI 407</p>
<p>3.2.2 Apply the skills of drawing conclusions and support those conclusions using evidence. W</p> <ul style="list-style-type: none"> ■ Draw conclusions from displays, texts, or oral discussions and justify those conclusions with logical reasoning or other evidence (e.g., read an editorial or ad, draw a conclusion and support that conclusion with evidence in the article or elsewhere). 	<p>SE: <i>Hands-On Lab</i> 434 <i>Problem-Solving Strategy</i> 123-124, 226-227, 276-277 <i>Web Quest</i> 371, 465</p> <p>TWE: DI 161, 276, 348, 513 PS 555 TNT 408</p>

OBJECTIVES	PAGE REFERENCES
<p>3.2.3 Analyze procedures and results in various situations. W</p> <ul style="list-style-type: none"> ■ Critique conclusions drawn from a set of data and support with evidence (e.g., from magazines, newspapers, web sites, opinion polls). [1.4.6] 	<p>SE: <i>Hands-On Lab</i> 22 <i>Problem-Solving Strategy</i> 276-277, 488-489</p> <p>TWE: B 236 DI 161 PS 555 TNT 40, 408</p>
Component 3.3: Verify results.	
<p>3.3.1 Analyze procedures and information used to justify results using evidence. W</p> <ul style="list-style-type: none"> ■ Use estimation to predict or to verify the reasonableness of calculated results. [1.1.8] 	<p>SE: 8, 67 (WHEN), 172 #2, 251 #15 <i>Hands-On Lab</i> 22 <i>Problem-Solving Strategy</i> 226-227, 488-489</p> <p>TWE: DI 226 NS 172</p>
<p>3.3.2 Analyze thinking and mathematical ideas using models, known facts, patterns, relationships, or counterexamples. W</p> <ul style="list-style-type: none"> ■ Explain why a given rational number is greater than or less than another rational number. [1.1.2] 	<p>SE: 18 e.g. #3, #4, 67-70, 127-129, 212 e.g. #7</p> <p>TWE: A 27, 70 B 67</p>
EALR 4: The student communicates knowledge and understanding in both everyday and mathematical language.	
Component 4.1: Gather information.	
<p>4.1.1 Apply a planning process to collect information for a given purpose. W</p> <ul style="list-style-type: none"> ■ Describe a procedure for selecting an unbiased sample. [1.4.3] 	<p>SE: 6-10, 406-409, 412</p> <p>TWE: DI 7, 407 TNT 408</p>
<p>4.1.2 Synthesize information from multiple sources using reading, listening, and observation. W</p> <ul style="list-style-type: none"> ■ Compare the results of a survey given two different sample groups. [1.4.3] ■ Model the relationship with a table or graph given a description of, or an equation for, a situation involving an inequality or linear relationship. [1.5.4] 	<p>SE: 463 #17, 492-495, 509 #15-#19, 522-525, 548-551, 557 #18</p> <p>TWE: A 551 ICE 493 NS 494</p>
Component 4.2: Organize, represent, and share information.	
<p>4.2.1 Apply organizational skills for a given purpose. W</p> <ul style="list-style-type: none"> ■ Design and conduct a simulation, with and without technology, to determine the probability of an event occurring. [1.4.2] 	<p>SE: <i>Graphing Calculator Investigation</i> 404-405</p>

OBJECTIVES	PAGE REFERENCES
<p>4.2.2 Apply communication skills to clearly and effectively express or present ideas and situations using mathematical language or notation. W</p> <ul style="list-style-type: none"> ■ Articulate various strategies used during estimation involving integers. [1.1.8] ■ Clearly explain, describe, or represent mathematical information in a pictorial, tabular, graphical, two- or three-dimensional drawing, or other form as appropriate for the mathematical information (e.g., time, distance, categories), audience, and/or purpose, such as to perform or persuade, with notation and labels as needed. ■ Explain situations involving real numbers where estimates are sufficient and others for which exact value is required. [1.1.8] 	<p>SE: 15 #41-#42, 39 (WHEN), 44 #13, 53 #42-#44, #45, 59 #11, 104-107, 139 #16, 173 #45, 228-231 <i>Hands-On Lab</i> 330 <i>Problem-Solving Strategy</i> 123-124, 176-177, 276-277 <i>Study Skill</i> 295</p> <p>TWE: A 107 B 125, 137, 160</p>
EALR 5: The student understands how mathematical ideas connect within mathematics, to other subject areas, and to real-life situations.	
Component 5.1: Relate concepts and procedures within mathematics.	
<p>5.1.1 Apply concepts and procedures from a variety of mathematical areas in a given problem or situation. W</p> <ul style="list-style-type: none"> ■ Solve problems involving ratio and proportion (e.g., similar figures, scale drawings, rates, find unit pricing, increase or decrease a recipe, find the portions for a group converting between different units of measure, or finding medicinal dosages). [1.1.4] ■ Find the area of a circle given the coordinates of the center and a point on the circle. [1.3.3] 	<p>SE: 156-159, 178-182, 184-187, 188-191, 206 (WHEN), 237, 240, 241, 321-322 <i>Hands-On Mini Lab</i> 216</p> <p>TWE: A 187 ICE 179, 321 TNT 157, 186</p>
<p>5.1.2 Apply different mathematical models and representations to the same situation. W</p> <ul style="list-style-type: none"> ■ Create a problem situation to match a given rational number equation. [1.1.5] ■ Match a situation with a data set or graph. [1.5.4] 	<p>SE: 49 #45, 70 #35, 143 e.g. #2, 159, #34, 214 #72, 376 #22, 423, 445 #24, 596 #5, 656 <i>Graphing Calculator Investigation</i> 404-405 <i>Hands-On Lab</i> 434 <i>Problem-Solving Strategy</i> 378-379, 418-419 <i>Spreadsheet Investigation</i> 165 <i>Study Skill</i> 215 <i>Web Quest</i> 3</p> <p>TWE: A 391</p>

OBJECTIVES	PAGE REFERENCES
Component 5.2: Relate mathematical concepts and procedures to other disciplines.	
<p>5.2.1 Analyze mathematical patterns and ideas to extend mathematical thinking and modeling to other disciplines.</p> <ul style="list-style-type: none"> ■ Use observations about differences between two or more samples to make conjectures about the populations from which the samples were taken (e.g., age groups, regions of the U.S., genders, racial/ethnic distribution). [1.4.6] ■ Check to see if a corner is square using the Pythagorean Theorem. [1.2.5] ■ Calculate the one-repetition maximum for strength training of one muscle group. ■ Monitor/track a diet and evaluate the relationship to physical performance (e.g., does it meet daily nutritional requirements/energy for various populations and energy requirements based on lifestyle, safe-work practices, and leisure activities). 	<p>SE: 95 #32-#33, 132-136, 157 e.g. #4, 169 #20, 222 #37, 421 e.g. #3, 423 #19-#21 <i>Problem-Solving Strategy</i> 96-97, 324-325 <i>Web Quest</i> 371</p> <p>TWE: A 97 PS 249</p>
<p>5.2.2 Know the contributions of individuals and cultures to the development of mathematics.</p> <ul style="list-style-type: none"> ■ Recognize the contributions of a variety of people to the development of mathematics (e.g., research the history of the Pythagorean Theorem). 	<p>SE: 122 #34, 135, 136 #35, 139, 197 #23, #24 <i>Hands-On Lab</i> 304, 516 <i>Real Life</i> 427</p> <p>TWE: ICE 51 PS 149</p>
Component 5.3: Relate mathematical concepts and procedures to real-world situations.	
<p>5.3.1 Understand that mathematics is used in daily life and extensively outside the classroom.</p> <ul style="list-style-type: none"> ■ Use estimation to predict or to verify the reasonableness of calculated results. [1.1.8] ■ Evaluate conclusions drawn from a set of data and support with evidence (e.g., from newspapers, web sites, opinion polls). [1.4.6] ■ Analyze data from a newspaper article to see if the conclusions are reasonable. ■ Research how coding and decoding has played a part in history. 	<p>SE: 8, 102-103, 251 #15, 433 #15 <i>Hands-On Lab</i> 22, 434 <i>Problem-Solving Strategy</i> 226-227, 276-277, 418-419, 488-489</p> <p>TWE: B 418 DI 161, 229 TNT 40, 408</p>
<p>5.3.2 Understand that mathematics is used within many occupations or careers.</p> <ul style="list-style-type: none"> ■ Explain how mathematics is used in careers or occupations of interest (e.g., complete a mathematically based project). 	<p>SE: <i>Real Life</i> 51, 171, 258, 401, 581 <i>Web Quest</i> 3, 253, 371, 465</p>

Codes Used for TWE Pages

A	Assess
B	Bellringer
DI	Daily Intervention
ICE	In-Class Examples
NS	Number Sense
PC	Project Criss
PS	Portfolio Suggestion
T	Teach
TNT	Tips for New Teachers
WM	Writing Math