

Correlation to South Carolina Academic Standards Mathematics – 2007

Fifth Grade Developing Measurement Benchmarks: Tools and Time

In this module, measuring with precision using a range of units is the focus. Tools such as scales, clocks, balances, timers, and thermometers are analyzed for accuracy. Students make and test estimates of area, perimeter, and volume. Problems and the strategies used to solve them are investigated using a variety of tools and units.

This correlation was developed by the Math Out of the Box Staff.

Send email to mootb@clemson.edu with questions and comments.



Correlation Information

The purpose of this document is to provide a correlation of Math Out of the Box lessons to the South Carolina Academic Standards for Mathematics, 2007. These correlations are intended to aid classroom teachers with lesson planning, schools with vertical planning, and districts with curriculum planning.

The correlation document is arranged in the following order:

Process Standards

Process standards that are used in the lessons of the subconcept to develop conceptual understanding of mathematics are listed in this column. It is recommended that one process standard be selected for formative assessment in each subconcept.

Content Standards

The content standards listed in this column are those that are addressed in one or more of the phases of the learning cycle in the listed lessons. Standards are connected by subconcept because conceptual knowledge is built in sets of lessons in the Math Out of the Box curriculum. These subconcepts are connected to a big idea of mathematics. The first lesson of a subconcept is an embedded pre-assessment, connecting to prior learning. The final lesson in a subconcept is designed to be formative and summative.

Horizontal Connections

Connections to mathematics standards in other strands are listed here to show the horizontal weave of the Math Out of the Box curriculum. These connections provide opportunities for the development of connections between mathematical concepts, maintenance of skills, and additional practice.

Vertical Connections

Foundation standards show the vertical articulation of the lessons. At times, an investigation is planned in a lesson to specifically build a foundation for the standards in the next grade or grades. These lessons, or parts of lessons, are essential so that concepts are connected from grade to grade.

Cross Curricular Connections

Connections to standards from other subject areas are listed to aid in cross curricular integration and the development of curriculum maps.



Big Idea: Systems of measurement can be used to solve problems in the world around us.

Subconcept: Attributes of length can be analyzed and described.

Lessons 1, 2, 3, 4

Focus Question: What strategies can be used to convert among units of length in the metric system?

Process Standards	Content Standards	Horizontal Connections
<p>Mathematics Standard 5-1 (Process): The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation. Indicators 5-1.1 Analyze information to solve increasingly more sophisticated problems. 5-1.2 Construct arguments that lead to conclusions about general mathematical properties and relationships. 5-1.3 Explain and justify based on mathematical properties, structures, and relationships. 5-1.4 Generate descriptions and mathematical statements about relationships between and among classes of objects. 5-1.5 Use correct, clear, and complete, oral and written mathematical language to pose questions, communicate ideas, and extend problem situations. 5-1.6 Generalize connections between new mathematical ideas and related concepts and subjects that have been previously considered. 5-1.7 Use flexibility in mathematical representations. 5-1.8 Recognize the limitations of various forms of mathematical representations.</p>	<p>Mathematics Standard 5-5 (Measurement): The student will demonstrate through the mathematical processes an understanding of the units and systems of measurement and the application of tools and formulas to determine measurement. Indicators 5-5.1 Use appropriate tools and units to measure objects to the precision of one-eighth inch. 5-5.3 Use equivalencies to convert units of measure within the metric system: converting length in millimeters, centimeters, meters, and kilometers; converting liquid volume in milliliters, centiliters, liters, and kiloliters; and converting mass in milligrams, centigrams, grams, and kilograms. 5-5.8 Recall equivalencies associated with length, liquid volume, and mass: 10 millimeters = 1 centimeter, 100 centimeters = 1 meter, 1000 meters = 1 kilometer; 10 milliliters = 1 centiliter, 100 centiliters = 1 liter, 1000 liters = 1 kiloliter; and 10 milligrams = 1 centigram, 100 centigrams = 1 gram, 1000 grams = 1 kilogram.</p>	<p>Mathematics Standard 5-2: (Numbers and Operations) The student will demonstrate through the mathematical processes an understanding of the place value system; the division of whole numbers; the addition and subtraction of decimals; the relationships among whole numbers, fractions, and decimals; and accurate, efficient, and generalizable methods of adding and subtracting fractions. Indicators 5-2.2 Apply an algorithm to divide whole numbers fluently. 5-2.3 Understand the relationship among the divisor, dividend, and quotient. 5-2.8 Generate strategies to add and subtract fractions with like and unlike denominators.</p>

Notes:

<p style="text-align: center;">Vertical Connections</p>	<p style="text-align: center;">Cross Curricular Connections</p>
<p>Mathematics</p> <p>Standard 6-5 (Measurement): The student will demonstrate through the mathematical processes an understanding of surface area; the perimeter and area of irregular shapes; the relationships among the circumference, diameter, and radius of a circle; the use of proportions to determine unit rates; and the use of scale to determine distance.</p> <p>Indicators 6-5.6 Use proportions to determine unit rates. 6-5.7 Use a scale to determine distance.</p> <p>Standard 7-5 (Measurement): The student will demonstrate through the mathematical processes an understanding of how to use ratio and proportion to solve problems involving scale factors and rates and how to use one-step unit analysis to convert between and within the U.S. Customary System and the metric system.</p> <p>Indicators 7-5.1 Use ratio and proportion to solve problems involving scale factors and rates. 7-5.4 Recall equivalencies associated with length, mass and weight, and liquid volume: 1 square yard = 9 square feet, 1 cubic meter = 1 million cubic centimeters, 1 kilometer = $\frac{5}{8}$ mile, 1 inch = 2.54 centimeters; 2.2 kilograms = 1 pound; and 1.06 quarts = 1 liter. 7-5.5 Use one-step unit analysis to convert between and within the U.S. Customary System and the metric system.</p> <p>Standard 8-5 (Measurement): The student will demonstrate through the mathematical processes an understanding of the proportionality of similar figures; the necessary levels of accuracy and precision in measurement; the use of formulas to determine circumference, perimeter, area, and volume; and the use of conversions within and between the U.S. Customary System and the metric system.</p> <p>Indicators 8-5.1 Use proportional reasoning and the properties of similar shapes to determine the length of a missing side. 8-5.6 Analyze a variety of measurement situations to determine the necessary level of accuracy and precision. 8-5.7 Use multistep unit analysis to convert between and within U.S. Customary System and the metric system.</p>	<p>Language Arts</p> <p>Standard 5-1 (Reading): The student will read and comprehend a variety of literary texts in print and nonprint formats.</p> <p>Indicators 5-1.1 Analyze literary texts to draw conclusions and make inferences.</p> <p>Standard 5-2 (Reading): The student will read and comprehend a variety of informational texts in print and nonprint formats.</p> <p>Indicators 5-2.7 Use graphic features such as illustrations, graphs, charts, maps, diagrams, and graphic organizers as sources of information.</p> <p>Standard 5-4 (Writing): The student will create written work that has a clear focus, sufficient detail, coherent organization, effective use of voice, and correct use of the conventions of written Standard American English.</p> <p>Indicators 5-4.2 Use complete sentences in a variety of types (including simple, compound, and complex sentences) in writing.</p> <p>Standard 5-6 (Researching): The student will access and use information from a variety of sources.</p> <p>Indicators 5-6.6 Use vocabulary (including Standard American English) that is appropriate for the particular audience or purpose. 5-6.7 Use appropriate organizational strategies to prepare written works and oral and visual presentations. 5-6.8 Select appropriate graphics, in print or electronic form, to support written works and oral and visual presentations.</p> <p>Science</p> <p>Standard 5-1 (Scientific Inquiry): The student will demonstrate an understanding of scientific inquiry, including the foundations of technological design and the processes, skills, and mathematical thinking necessary to conduct a controlled scientific investigation.</p> <p>Indicators 5.14 Use appropriate tools and instruments (including a timing device and a 10x magnifier) safely and accurately when conducting a controlled scientific investigation.</p>



Big Idea: Systems of measurement can be used to solve problems in the world around us.

Subconcept: Attributes of area and volume can be analyzed and described.

Lessons 5, 6, 7, 8, 9, 10

Focus Question: What strategies can be used to determine the volume of a shoebox?

Process Standards	Content Standards	Horizontal Connections
<p>Mathematics Standard 5-1 (Process): The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation.</p> <p>Indicators</p> <p>5-1.1 Analyze information to solve increasingly more sophisticated problems.</p> <p>5-1.2 Construct arguments that lead to conclusions about general mathematical properties and relationships.</p> <p>5-1.3 Explain and justify based on mathematical properties, structures, and relationships.</p> <p>5-1.4 Generate descriptions and mathematical statements about relationships between and among classes of objects.</p> <p>5-1.5 Use correct, clear, and complete, oral and written mathematical language to pose questions, communicate ideas, and extend problem situations.</p> <p>5-1.6 Generalize connections between new mathematical ideas and related concepts and subjects that have been previously considered.</p> <p>5-1.7 Use flexibility in mathematical representations.</p> <p>5-1.8 Recognize the limitations of various forms of mathematical representations.</p>	<p>Mathematics Standard 5-5 (Measurement): The student will demonstrate through the mathematical processes an understanding of the units and systems of measurement and the application of tools and formulas to determine measurement.</p> <p>Indicators</p> <p>5-5.4 Apply formulas to determine the perimeters and areas of triangles, rectangles, and parallelograms.</p> <p>5-5.5 Apply strategies and formulas to determine the volume of rectangular prisms.</p>	<p>Mathematics Standard 5-4: (Geometry) The student will demonstrate through the mathematical processes an understanding of congruency, spatial relationships, and relationships among the properties of quadrilaterals.</p> <p>Indicators</p> <p>5-4.2 Compare the angles, side lengths, and perimeters of congruent shapes.</p>

Notes:

Vertical Connections	Cross Curricular Connections
<p>Mathematics Standard 6-5 (Measurement): The student will demonstrate through the mathematical processes an understanding of surface area; the perimeter and area of irregular shapes; the relationships among the circumference, diameter, and radius of a circle; the use of proportions to determine unit rates; and the use of scale to determine distance.</p> <p>Indicators</p> <p>6-5.1 Explain the relationships among the circumference, diameter, and radius of a circle.</p> <p>6-5.2 Apply strategies and formulas with an approximation of π (3.14, or $\frac{22}{7}$) to find the circumference and area of a circle.</p> <p>6-5.3 Generate strategies to determine the surface area of a rectangular prism and a cylinder.</p> <p>6-5.4 Apply strategies and procedures to estimate the perimeters and areas of irregular shapes.</p> <p>6-5.5 Apply strategies and procedures of combining and subdividing to find the perimeters and areas of irregular shapes.</p> <p>Standard 7-5 (Measurement): The student will demonstrate through the mathematical processes an understanding of how to use ratio and proportion to solve problems involving scale factors and rates and how to use one-step unit analysis to convert between and within the U.S. Customary System and the metric system.</p> <p>Indicators</p> <p>7-5.2 Apply strategies and formulas to determine the surface area and volume of the three-dimensional shapes prism, pyramid, and cylinder.</p> <p>7-5.3 Generate strategies to determine the perimeters and areas of trapezoids.</p> <p>Standard 8-5 (Measurement): The student will demonstrate through the mathematical processes an understanding of the proportionality of similar figures; the necessary levels of accuracy and precision in measurement; the use of formulas to determine circumference, perimeter, area, and volume; and the use of conversions within and between the U.S. Customary System and the metric system.</p> <p>Indicators</p> <p>8-5.1 Use proportional reasoning and the properties of similar shapes to determine the length of a missing side.</p> <p>8-5.2 Explain the effect on the area of two-dimensional shapes and on the volume of three-dimensional shapes when one or more of the dimensions are changed.</p> <p>8-5.3 Apply strategies and formulas to determine the volume</p>	<p>Language Arts Standard 5-2 (Reading): The student will read and comprehend a variety of informational texts in print and nonprint formats.</p> <p>Indicators</p> <p>5-2.7 Use graphic features such as illustrations, graphs, charts, maps, diagrams, and graphic organizers as sources of information.</p> <p>Standard 5-4 (Writing): The student will create written work that has a clear focus, sufficient detail, coherent organization, effective use of voice, and correct use of the conventions of written Standard American English.</p> <p>Indicators</p> <p>5-4.2 Use complete sentences in a variety of types (including simple, compound, and complex sentences) in writing.</p> <p>Standard 5-6 (Researching): The student will access and use information from a variety of sources.</p> <p>Indicators</p> <p>5-6.6 Use vocabulary (including Standard American English) that is appropriate for the particular audience or purpose.</p> <p>5-6.7 Use appropriate organizational strategies to prepare written works and oral and visual presentations.</p> <p>5-6.8 Select appropriate graphics, in print or electronic form, to support written works and oral and visual presentations.</p> <p>Science Standard 5-1 (Scientific Inquiry): The student will demonstrate an understanding of scientific inquiry, including the foundations of technological design and the processes, skills, and mathematical thinking necessary to conduct a controlled scientific investigation.</p> <p>Indicators</p> <p>5.14 Use appropriate tools and instruments (including a timing device and a 10x magnifier) safely and accurately when conducting a controlled scientific investigation.</p>



of the three-dimensional shapes cone and sphere. 8-5.4 Apply formulas to determine the exact (π) circumference and area of a circle. 8-5.5 Apply formulas to determine the perimeters and areas of trapezoids.	
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Notes:



Big Idea: Systems of measurement can be used to solve problems in the world around us.

Subconcept: Attributes of time and temperature can be analyzed and described.

Lessons 11, 12, 13, 14, 15

Focus Question: What strategies can be used to determine elapsed time within a 24-hour day?

Process Standards	Content Standards	Horizontal Connections
<p>Mathematics Standard 5-1 (Process): The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation.</p> <p>Indicators</p> <p>5-1.1 Analyze information to solve increasingly more sophisticated problems.</p> <p>5-1.2 Construct arguments that lead to conclusions about general mathematical properties and relationships.</p> <p>5-1.3 Explain and justify based on mathematical properties, structures, and relationships.</p> <p>5-1.4 Generate descriptions and mathematical statements about relationships between and among classes of objects.</p> <p>5-1.5 Use correct, clear, and complete, oral and written mathematical language to pose questions, communicate ideas, and extend problem situations.</p> <p>5-1.6 Generalize connections between new mathematical ideas and related concepts and subjects that have been previously considered.</p> <p>5-1.7 Use flexibility in mathematical representations.</p> <p>5-1.8 Recognize the limitations of various forms of mathematical representations.</p>	<p>Mathematics Standard 5-5 (Measurement): The student will demonstrate through the mathematical processes an understanding of the units and systems of measurement and the application of tools and formulas to determine measurement.</p> <p>Indicators</p> <p>5-5.6 Apply procedures to determine the amount of elapsed time in hours, minutes, and seconds within a 24-hour period.</p> <p>5-5.7 Understand the relationship between the Celsius and Fahrenheit temperature scales.</p>	<p>Mathematics Standard 5-3 (Algebra): The student will demonstrate through the mathematical processes an understanding of the use of patterns, relations, functions models, structures, and algebraic symbols to represent quantitative relationships and will analyze change in various contexts.</p> <p>Indicators</p> <p>5-3.2 Analyze patterns and functions with words, tables, and graphs.</p> <p>5-3.3 Match tables, graphs, expressions, equations, and verbal descriptions of the same problem situation.</p> <p>5-3.5 Analyze situations that show change over time.</p>

Notes:

Vertical Connections	Cross Curricular Connections
<p>Grade 6 Standard 6-3 (Algebra): The student will demonstrate through the mathematical processes an understanding of writing, interpreting, and using mathematical expressions, equations, and inequalities. Indicators 6-3.1 Analyze numeric and algebraic patterns and pattern relationships. 6-3.5 Use inverse operations to solve one-step equations that have whole-number solutions and variables with whole-number coefficients.</p> <p>Grade 7 Standard 7-3 (Algebra): The student will demonstrate through the mathematical processes an understanding of proportional relationships. Indicators 7-3.2 Analyze tables and graphs to describe the rate of change between and among quantities. 7-3.3 Understand slope as a constant rate of change.</p> <p>Grade 8 Standard 8-3 (Algebra): The student will demonstrate through the mathematical processes an understanding of equations, inequalities, and linear functions. Indicators 8-3.1 Translate among verbal, graphic, tabular, and algebraic representations of linear functions. 8-3.2 Represent algebraic relationships with equations and inequalities. 8-3.6 Identify the coordinates of the x- and y-intercepts of a linear equation from a graph, equation, and/or table. 8-3.5 Classify relationships between two variables in graphs, tables, and/or equations as either linear or nonlinear.</p>	<p>Language Arts Standard 5-2 (Reading): The student will read and comprehend a variety of informational texts in print and nonprint formats. Indicators 5-2.7 Use graphic features such as illustrations, graphs, charts, maps, diagrams, and graphic organizers as sources of information.</p> <p>Standard 5-4 (Writing): The student will create written work that has a clear focus, sufficient detail, coherent organization, effective use of voice, and correct use of the conventions of written Standard American English. Indicators 5-4.2 Use complete sentences in a variety of types (including simple, compound, and complex sentences) in writing.</p> <p>Standard 5-6 (Researching): The student will access and use information from a variety of sources. Indicators 5-6.6 Use vocabulary (including Standard American English) that is appropriate for the particular audience or purpose. 5-6.7 Use appropriate organizational strategies to prepare written works and oral and visual presentations. 5-6.8 Select appropriate graphics, in print or electronic form, to support written works and oral and visual presentations.</p> <p>Science Standard 5-1 (Scientific Inquiry): The student will demonstrate an understanding of scientific inquiry, including the foundations of technological design and the processes, skills, and mathematical thinking necessary to conduct a controlled scientific investigation. Indicators 5.1.4 Use appropriate tools and instruments (including a timing device and a 10x magnifier) safely and accurately when conducting a controlled scientific investigation. 5.1.5 Construct a line graph from recorded data with correct placement of independent (manipulated) and dependent (responding) variables. 5.1.6 Evaluate results of an investigation to formulate a valid conclusion based on evidence and communicate the findings of the evaluation in oral or written form.</p>



Big Idea: Systems of measurement can be used to solve problems in the world around us.

Subconcept: Attributes of capacity and weight can be analyzed and described.

Lessons 16, 17, 18, 19, 20

Focus Question: In what ways are the units of length, capacity, and mass in the metric system similar?

Process Standards	Content Standards	Horizontal Connections
<p>Mathematics Standard 5-1 (Process): The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation.</p> <p>Indicators</p> <p>5-1.1 Analyze information to solve increasingly more sophisticated problems.</p> <p>5-1.2 Construct arguments that lead to conclusions about general mathematical properties and relationships.</p> <p>5-1.3 Explain and justify based on mathematical properties, structures, and relationships.</p> <p>5-1.4 Generate descriptions and mathematical statements about relationships between and among classes of objects.</p> <p>5-1.5 Use correct, clear, and complete, oral and written mathematical language to pose questions, communicate ideas, and extend problem situations.</p> <p>5-1.6 Generalize connections between new mathematical ideas and related concepts and subjects that have been previously considered.</p> <p>5-1.7 Use flexibility in mathematical representations.</p> <p>5-1.8 Recognize the limitations of various forms of mathematical representations.</p>	<p>Mathematics Standard 5-5 (Measurement): The student will demonstrate through the mathematical processes an understanding of the units and systems of measurement and the application of tools and formulas to determine measurement.</p> <p>Indicators</p> <p>5-5.3 Use equivalencies to convert units of measure within the metric system: converting length in millimeters, centimeters, meters, and kilometers; converting liquid volume in milliliters, centiliters, liters, and kiloliters; and converting mass in milligrams, centigrams, grams, and kilograms.</p> <p>5-5.8 Recall equivalencies associated with length, liquid volume, and mass: 10 millimeters = 1 centimeter, 100 centimeters = 1 meter, 1000 meters = 1 kilometer; 10 milliliters = 1 centiliter, 100 centiliters = 1 liter, 1000 liters = 1 kiloliter; and 10 milligrams = 1 centigram, 100 centigrams = 1 gram, 1000 grams = 1 kilogram.</p>	<p>Mathematics Standard 5-3 (Algebra): The student will demonstrate through the mathematical processes an understanding of the use of patterns, relations, functions models, structures, and algebraic symbols to represent quantitative relationships and will analyze change in various contexts.</p> <p>Indicators</p> <p>5-3.2 Analyze patterns and functions with words, tables, and graphs.</p> <p>5-3.3 Match tables, graphs, expressions, equations, and verbal descriptions of the same problem situation.</p>

Notes:

Vertical Connections	Cross Curricular Connections
<p>Mathematics Standard 6-5 (Measurement): The student will demonstrate through the mathematical processes an understanding of surface area; the perimeter and area of irregular shapes; the relationships among the circumference, diameter, and radius of a circle; the use of proportions to determine unit rates; and the use of scale to determine distance. Indicators 6-5.6 Use proportions to determine unit rates.</p> <p>Standard 7-5 (Measurement): The student will demonstrate through the mathematical processes an understanding of how to use ratio and proportion to solve problems involving scale factors and rates and how to use one-step unit analysis to convert between and within the U.S. Customary System and the metric system. Indicators 7-5.4 Recall equivalencies associated with length, mass and weight, and liquid volume: 1 square yard = 9 square feet, 1 cubic meter = 1 million cubic centimeters, 1 kilometer = $\frac{5}{8}$ mile, 1 inch = 2.54 centimeters; 2.2 kilograms = 1 pound; and 1.06 quarts = 1 liter. 7-5.5 Use one-step unit analysis to convert between and within the U.S. Customary System and the metric system.</p> <p>Standard 8-5 (Measurement): The student will demonstrate through the mathematical processes an understanding of the proportionality of similar figures; the necessary levels of accuracy and precision in measurement; the use of formulas to determine circumference, perimeter, area, and volume; and the use of conversions within and between the U.S. Customary System and the metric system. Indicators 8-5.7 Use multistep unit analysis to convert between and within U.S. Customary System and the metric system.</p>	<p>Language Arts Standard 5-2 (Reading): The student will read and comprehend a variety of informational texts in print and nonprint formats. Indicators 5-2.7 Use graphic features such as illustrations, graphs, charts, maps, diagrams, and graphic organizers as sources of information.</p> <p>Standard 5-4 (Writing): The student will create written work that has a clear focus, sufficient detail, coherent organization, effective use of voice, and correct use of the conventions of written Standard American English. Indicators 5-4.2 Use complete sentences in a variety of types (including simple, compound, and complex sentences) in writing.</p> <p>Standard 5-6 (Researching) The student will access and use information from a variety of sources. Indicators 5-6.6 Use vocabulary (including Standard American English) that is appropriate for the particular audience or purpose. 5-6.7 Use appropriate organizational strategies to prepare written works and oral and visual presentations. 5-6.8 Select appropriate graphics, in print or electronic form, to support written works and oral and visual presentations.</p>

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