

Big Idea: Classify two-dimensional figures and understand concepts of volume.

1. Students with conceptual knowledge of 2-dimensional figures understand the relationship among the shapes and that the definitions of any quadrilaterals are hierarchical in nature. As students examine defining attributes and properties of figures, they create definitions based on those properties.
2. Students will learn that a 1-unit by 1-unit by 1-unit cube is the standard unit for measuring volume. A deep understanding of volume includes recognizing volume as an attribute and understanding the multiplicative relationship between the height of an object and its cross-sectional area.
3. It is difficult for students to visualize the layer structure of 3-dimensional solids without extensive experiences with a variety of concrete representations of the solids, understanding which leads to volume as the product of area and height. Fifth graders should have experiences to describe and reason about why the formula ($V = l \times w \times h$) works before using it abstractly.
4. Students will select appropriate units, strategies, and tools for solving problems that involve estimating and measuring volume.

Adapted from the The Common Core Math Companion (Gojak & Miles, 2015, Pg.217 and Go Math Teaching for Depth, Pg. 463E

Professional Development Videos:

- [Go Math Video: Use Precision in Geometric Language](#)
- [Go Math Video: Identify Attributes](#)
- [Go Math Video: Properties of Two-Dimensional Shapes](#)
- [Go Math Video: Use Repeated Reasoning to Develop a Formula for Volume](#)
- [Go Math Video: Volume and Surface Area](#)

Quarter 4 Fluency Resources:

- [Fluency Resources in Go Math](#)
- [Building Fluency Through Word Problems](#)
- [Building Fluency Through Number Talks](#)

Critical Area Projects:

- [Space Architect](#)
- [A Space Capsule](#)

Essential Question: How do unit cubes help you build solid figures and understand the volume of a rectangular prism?

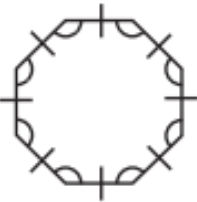









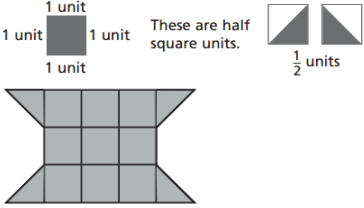
Standards: 5.G.3, 5.G.4, 5.MD.3, 5.MD.3a, 5.MD.4, 5MD.5a, 5.MD.5b, 5.MD.5c

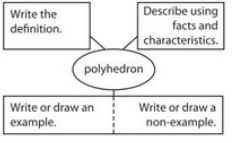
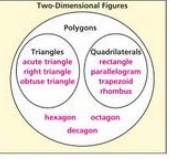
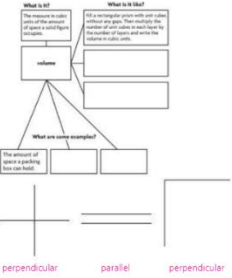
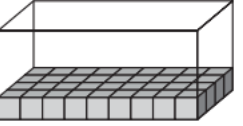
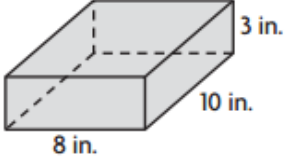
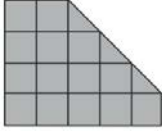
ELD Standards:


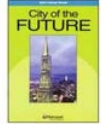

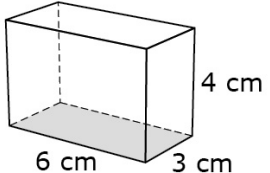

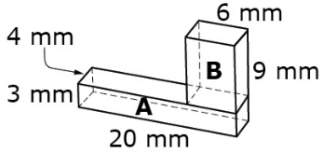
- ELD.PI.5.1-Exchanging information/ideas via oral communication and conversations.
- ELD.PI.5.3-Offering opinions and negotiating with/persuading others.
- ELD.PI.5.5-Listening actively and asking/answering questions about what was heard.

- ELD.PI.5.9- Expressing information and ideas in oral presentations.
- ELD.PI.5.11- Supporting opinions or justifying arguments and evaluating others' opinions or arguments.
- ELD.PI.5.12-Selecting and applying varied and precise vocabulary.

Lesson	Standards & Math Practices	Essential Question	Math Content/Strategies	Models/Tools Go Math! Teacher Resources G5	Connections (ENGAGE Prior Knowledge)	Vocabulary	Academic Language Support	Journal

11.1	Polygons	5.G.3 , 5.G.4 MP 5 MP 7 MP 8	How can you identify and classify polygons?	Students will use Venn diagrams to classify both two-dimensional and three dimensional shapes. The two circles overlap because some polygons have both congruent angles and congruent sides. Introduce some of the vocabulary by focusing on prefixes. Write the vocabulary words on the board. Underline each prefix. Discuss with students the relationship between the prefixes and the words.	Venn diagram Grid paper Assorted Shapes	Invite students to tell you what they know about shapes. What shapes do you know? What real-world objects have these shapes? How would you describe the shapes you know? How would you describe the sides? The angles? Have students find quadrilaterals around the classroom and sort them in as many ways as possible. Have students create a list of what they found.	Congruent, heptagon, nonagon, polygon, regular polygon, decagon, hexagon, octagon, pentagon, quadrilateral	ELD Standards <ul style="list-style-type: none"> ELD Standards ELA/ELD Framework ELPD Framework ELL Math Instruction Framework Integrating the ELD Standards into Math 	Javier drew the shape shown. Describe the shape using angles, sides. Then name the figure. 																
11.2	Triangles	5.G.3 , 5.G.4 MP 1 MP 4 MP 6 MP 7	How can you classify triangles?	Students apply their understanding of congruency to classify triangles by side lengths.	Centimeter ruler, protractor Assorted Triangles and Quadrilaterals	Review classifying angles with students, using right, scalene, and equilateral triangles. Use the hand out in link below to assist students in classification of triangles. Assorted Triangles and Quadrilaterals	Equilateral triangle, isosceles triangle, scalene triangle, acute triangle, obtuse triangle, right triangle	<ul style="list-style-type: none"> Organizing Learning for Student Access to Challenging Content Student Engagement Strategies Problem Solving Steps and Approaches 	Tamara drew a triangle with 2 congruent sides and 1 obtuse angle. Which term accurately describes the triangle? A. Isosceles C. Acute B. Scalene D. Obtuse																
11.3	Quadrilaterals	5.G.3 , 5.G.4 MP 1 MP 7 MP 8	How can you classify and compare quadrilaterals?	Precise language is needed when classifying figures using one or more names. Students classify quadrilaterals using the properties of their sides and angles. Help students understand the vocabulary by focusing on parallel and perpendicular. Have students determine whether each pair of lines below is parallel or perpendicular. Remind students that perpendicular lines do not have to intersect in the center; they simply have to be set at a right angle to each other.	Quadrilaterals Assorted Triangles and Quadrilaterals	Describe a quadrilateral with certain attributes and have students draw what you've described. (i.e. isosceles trapezoid, right triangle, rhombus, parallelogram, etc.). Use the hand out in link below to assist students in classification of triangles. Assorted Triangles and Quadrilaterals Quad Sorting Mats	Parallel lines, parallelogram, perpendicular lines, rectangle, rhombus, trapezoid	Equitable Talk <ul style="list-style-type: none"> Accountable Talk Simply Stated Equitable Talk Conversation Prompts Accountable Talk Posters Five Talk Moves Bookmark Effective Math Talks 	Determine whether each polygon is a rhombus and/or quadrilateral. Select all boxes that apply next to each polygon. Justify your selections. <table border="1" data-bbox="2271 808 2529 980"> <thead> <tr> <th></th> <th>Rhombus</th> <th>Quadrilateral</th> <th>Neither</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Rhombus	Quadrilateral	Neither												
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11.4	Three Dimensional Figures	5.MD.3 MP 6 MP 7	How can you identify, describe, and classify three-dimensional figures?	This lesson focuses on two types of polyhedrons –prisms, and pyramids. Prisms have two congruent bases with rectangular lateral faces, and they are named by the shape of their bases. Pyramids have only one base, and their lateral faces are triangles that meet at a common vertex. Real World Video Fencing a Garden: Intro to Volume (Perimeter & Area) This is a good task that will help review/apply Perimeter & Area concepts before investigating Volume.	Nets for prisms and pyramids Printable Nets	Display 2 nets and have students tell you what figure the nets will form (prism, pyramid). Then fold the nets and talk about the attributes of each figure. Printable Nets Find the area of the figure above. 	Base, decagonal prism, hexagonal prism, lateral face, octagonal prism, pentagonal prism, pentagonal pyramid, polyhedron, prism, pyramid	Cooperative Learning <ul style="list-style-type: none"> Cooperative Learning Role Cards Collaborative Learning Table Mats Seating Chart Suggestions 	Explain why a three-dimensional figure with a curved surface is not a polyhedron.																

11.5	Investigate • Unit Cubes and Solid Figures	<ul style="list-style-type: none"> 5.MD.3a MP 1 MP 5 MP 6 	What is a unit cube and how can you use it to build a solid figure?	A unit cube is a rectangular prism that is 1 unit long, 1 unit wide and 1 unit high. It has 6 square faces, and 12 edges. Students count the number of unit cubes used to build solid figures and compare the number of unit cubes used to build two different solid figures.	Centimeter cubes	Compare and contrast 2- and 3-dimensional objects in the classroom. How do we measure 2-D objects? How do we measure 3-D objects? <i>Perimeter vs Area</i> <i>Area vs Volume</i> <i>Unit Square vs Unit Cube</i> How can we measure the volume of the classroom? What is the area of the floor? Next, present the following: Give student pairs 12 cubes and have them build different prisms. List the possible dimensions of each prism.	Measurement, attribute, solid figure rectangular prism, unit, unit cube, gap, overlap, cubic cm, edge lengths, height, area of base.	<p>Math Word Wall - Grades 3-6</p> <p>Vocabulary Graphic Organizer</p>  <p>Vocabulary Builder Visualize It –</p> <p>Sort the checked words into the circle map.</p>  <p>Understand Vocabulary Understand Vocabulary</p> <p>Write the preview word that answers the riddle.</p> <ol style="list-style-type: none"> I am a solid figure with two congruent polygons that are bases, connected with lateral faces that are rectangles. prism I am a polygon in which all sides are congruent and all angles are congruent. regular polygon I am a cube that has a length, width, and height of 1 unit. unit cube I am a solid figure with faces that are polygons. polyhedron <p>Word definition mapPg487B:</p> 	Taryn will finish stacking cubes to create a solid rectangular prism. Find the volume of the completed rectangular prism.
11.6	Investigate • Understand Volume	<ul style="list-style-type: none"> 5.MD.3b 5.MD.4 MP 3 MP 5 MP 6 	How can you use unit cubes that fill a solid figure to find volume?	Students move beyond using unit cubes as building blocks to counting them to determine the volume of rectangular prisms. Students can find the number of unit cubes that it takes to fill the base of the rectangular prism without any gaps or overlaps, and then multiply that number by the number of layers that make up its height.	Centimeter cubes	Display various prisms and ask students questions: How many unit cubes are in each? How many cubes are in the base? How many layers are in this prism? How can we find the volume? Volume Exploration with Towers Volume Exploration with Towers 2	Unit cube, volume, attribute, solid figure rectangular prism, gap, overlap, cubic cm, edge lengths, height, area of base.		Mark packed 1-inch cubes into a box with a volume of 120 cubic inches. How many layers of 1-inch cubes did Mark pack?
11.7	Investigate • Estimate Volume	<ul style="list-style-type: none"> 5.MD.4 MP 1 MP 2 MP 6 	How can you use an everyday object to estimate the volume of a rectangular prism?	Students apply what they've learned about volume to estimate the volume of a rectangular prism in a real-world situation using improvised units. Students can use a small rectangular prism that they know the volume of as a tool to estimate the volume of a larger rectangular prism.	Rectangular prism net 2 boxes Crayon box	Display two different-sized boxes and ask students to determine which box is better for shipping 20 crayons. Use a crayon box as a measuring tool, to find the approximate length width, and height of each box. Then have them estimate the bases and then the volumes of both shipping boxes.	Unit cube, volume, attribute, solid figure rectangular prism, gap, overlap, cubic cm, edge lengths, height, area of base.	<p>Literature:</p> 	Explain how you can estimate the volume of a large container that holds 5 rows of 4 snack-size boxes of cereal in its bottom layer and is 3 layers high. Each cereal box has a volume of 16 cubic inches.
11.8	Volume of Rectangular Prisms	<ul style="list-style-type: none"> 5.MD.5a 5.MD.5b MP 1 MP 7 MP 8 	How can you find the volume of a rectangular prism?	Students are still not using the actual formula for volume. They are multiplying the number of cubes in the base and the number of cubes in the height to find the volume. Students should begin to connect the area of a rectangle with the volume of a rectangular prism with a height of 1 unit. Students move closer to the formula for volume by breaking the prism's base into width and height.	Rectangular prism net Centimeter cubes	Seth is planning a new deck for his backyard. What is the area of the deck?	Dimensions, measurement, attribute, solid figure rectangular prism, unit, unit cube, gap, overlap, cubic cm, edge lengths, height, area of base.		Find the volume.

11.9	Algebra • Apply Volume Formulas	5.MD.5a , 5.MD.5b MP 1 MP 6	How can you use a formula to find the volume of a rectangular prism?	Based on all the hands-on activities that have helped students develop a strong foundation for understanding volume, students will make the transition from concrete to the abstract, the formula for the volume of the rectangular prism: $V = l \times w \times h$	Various sizes of boxes to be measured	Give each table group a different-sized box to measure. How could the volume be determined? Trade boxes with another table and check the measurements and volumes. OR Find the Product: A. $(3 \times 2) \times 4$ B. $(4 \times 2) \times 5$ $3 \times (2 \times 4)$ $4 \times (2 \times 5)$	Volume, formula, Cubic units, measurement, attribute, solid figure rectangular prism, unit, gap, overlap, cubic cm, edge lengths, height, area of base.	<p>Literature <i>Beautiful Geometry</i></p>  <p>Students read about how polygons and other figures are used in famous paintings and sculptures.</p>	Megan's aquarium has a volume of 4,320 cubic inches. Which could be the dimensions of the aquarium? Mark all that apply. Ⓐ 16 in. by 16 in. by 18 in. Ⓑ 14 in. by 18 in. by 20 in. Ⓒ 12 in. by 15 in. by 24 in. Ⓓ 8 in. by 20 in. by 27 in.																																						
11.10	Problem Solving • Compare Volumes	5.MD.5b MP 1 MP 7	How can you use the strategy <i>make a table</i> to compare different rectangular prisms with the same volume?	Students organize information in a table to find the number of rectangular prisms that have a given volume. Students can make a table to find all the combinations of three factors whose product equals a given volume, and have different-sized bases.	<i>Make a table</i>	Have students find the missing value for each. <table border="1" data-bbox="1384 454 1599 609"> <tr><td>length</td><td></td></tr> <tr><td>width</td><td>4 cm</td></tr> <tr><td>height</td><td></td></tr> <tr><td>Base area</td><td>12 cm²</td></tr> <tr><td>Volume</td><td>72 cm³</td></tr> </table> <table border="1" data-bbox="1384 617 1599 771"> <tr><td>length</td><td>5 ft</td></tr> <tr><td>width</td><td></td></tr> <tr><td>height</td><td>4 ft</td></tr> <tr><td>Base area</td><td>35 ft²</td></tr> <tr><td>Volume</td><td></td></tr> </table>	length		width	4 cm	height		Base area	12 cm ²	Volume	72 cm ³	length	5 ft	width		height	4 ft	Base area	35 ft ²	Volume		Volume Formula Cubic units	<p>Literature</p>  <p>From the Grab-and-Go™ Differentiated Centers Kit Students read about the solid figures a class uses to construct a model of a city.</p> <p>Grab & Go! Differentiated Centers Kit</p> <p>Activities <i>Protractor Practice</i></p> 	Use drawings of rectangular prisms, define in your own words perimeter, area, and volume. Use colored pencils to highlight what each term refers to.  Determine whether each equation can be used to find the volume (V) of this prism. <table border="1" data-bbox="2271 812 2593 917"> <thead> <tr> <th></th> <th>Yes</th> <th>No</th> </tr> </thead> <tbody> <tr> <td>$V = 18 \times 4$</td> <td></td> <td></td> </tr> <tr> <td>$V = (6 + 3) \times 4$</td> <td></td> <td></td> </tr> <tr> <td>$V = 6 \times 3 \times 4$</td> <td></td> <td></td> </tr> <tr> <td>$V = 9 \times 4$</td> <td></td> <td></td> </tr> <tr> <td>$V = 6 \times (3 \times 4)$</td> <td></td> <td></td> </tr> </tbody> </table>		Yes	No	$V = 18 \times 4$			$V = (6 + 3) \times 4$			$V = 6 \times 3 \times 4$			$V = 9 \times 4$			$V = 6 \times (3 \times 4)$		
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11.11	Find Volume of Composed Figures	5.MD.5c MP 3 MP 5	How can you find the volume of rectangular prisms that are combined?	Students can break apart the prisms and add each of their volumes, or find the greatest possible volume and subtract the volume of the empty space.	Legos or blocks	Kaemon wants to buy the largest possible toy box for his sister. The store sells toy boxes sized 2 ft X 4 ft X 1 ft, 5 ft X 2 ft X 2 ft, and 4 ft, 3 ft X 1 ft. Which toy box should Kaemon buy?	Composite figure	<p>Games <i>Triple Play</i></p>  <p>Students practice finding the volume of rectangular prisms.</p>	Find the volume, in cubic millimeters, of Prism A and B. 																																						

Assessments:
[Go Math Chapter 11 Test](#)
[Go Math Chapter 11 Performance Task: Box Factory](#)
[SBAC Claim 1 Example Stems](#)

BIG IDEA: Patterns and Graphing

1. Students learn to graph line plots and ordered pairs in the first quadrant of the coordinate plane. A variety of opportunities should be provided for students to apply these experiences to real-world applications. (MD2)
2. Students identify, record, and graph ordered pairs in the first quadrant of the coordinate plane (positive numbers only). Students may need support in making sense of the coordinate grid. It is helpful to relate the coordinate grid to two perpendicular number lines that intersect at the zero (origin). (OA3)
3. Students often “see” data differently in graphs compared to tables. In problem solving, students begin by making lists to find a solution and then graph the ordered pairs in that list. It is appropriate to begin with graphing a single rule, then discuss and describe the graph and how it relates to the problem situation and then proceed with situations in which two rules are generated. After graphing the ordered pairs for each rule, students analyze and discuss the relationship between the two results.
4. Students analyze patterns, model, and discuss relationships between the two results. These experiences provide meaningful opportunities for students to model with mathematics.

Adapted from the The Common Core Math Companion (Gojak & Miles, 2015, Pg. 55, 215, 243) and Go Math Teaching for Depth, Pg. 463E

Professional Development Videos:

- [Go Math Video: Represent Patterns and Make Generalizations](#)
- [Go Math Video: Organize and Analyze Data](#)

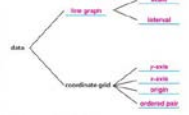
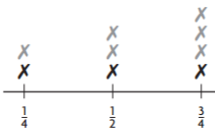
ESSENTIAL QUESTION: How can you use line plots, coordinate grids and patterns to help you graph and interpret data?

STANDARDS: 5.MD.2, 5.G.1, 5.G.2, 5.OA.3

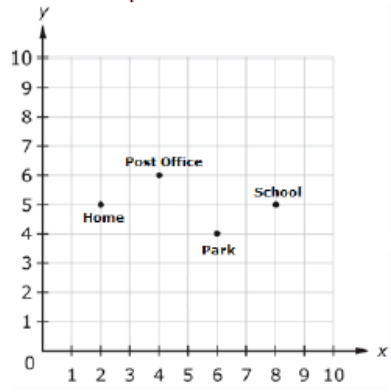
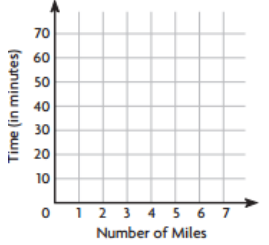
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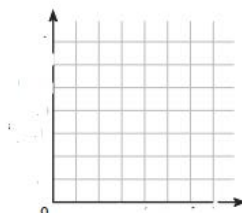
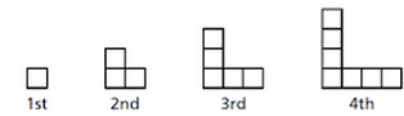
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Lesson	Standards & Math Practices	Essential Question	Math Content and Strategies	Models/Tools Go Math! Teacher Resources G5	Connections (ENGAGE Prior Knowledge)	Vocabulary	Academic Language Support	Journal
9.1	Line Plots 5.MD.2 Companion Pg. 216 MP 2 MP 4 MP 7	How can a line plot help you find an average with data in a given fraction?	Students make line plots to display a set of data that is measured in fractional amounts ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). It is not necessary to do questions on finding AVERAGE as they align to 6th grade (6.SP.B.5c). <i>Misconceptions:</i> Some students may not know what measurement to use if the object measures between $\frac{1}{8}$ and $\frac{1}{4}$ inch. Help students understand that approximations can be used to measure to the closest $\frac{1}{8}$ inch and $\frac{1}{4}$ inch.	Line plots	Get data from your students about their birth months. Make a tally chart and/or bar graph for the data. Have students discuss what they are seeing. OR Ask students to tell you everything they know about the following line plot.	Data, line plot, analyze data, interpret data,	Vocabulary Strategies Use a Graphic Organizer pg. 388  Vocabulary Builder	What is the total length of all the seeds that the students measured? 

				AC Option: Follow up lesson with Line Plot Task				<p>Pg. 393B Vocabulary Builder Semantic Feature Analysis helps students develop a link between words and numbers they see in the lesson and new vocabulary words. Y (yes), or N (no), can be used in each cell to indicate whether the description is associated with the term.</p> <table border="1"> <thead> <tr> <th></th> <th>x-axis</th> <th>y-axis</th> <th>origin</th> </tr> </thead> <tbody> <tr> <td>the ordered pair (0, 0)</td> <td>Y</td> <td>Y</td> <td>Y</td> </tr> <tr> <td>the ordered pair (0, 0)</td> <td>Y</td> <td>N</td> <td>N</td> </tr> <tr> <td>a point above the origin on an axis</td> <td>N</td> <td>Y</td> <td>N</td> </tr> </tbody> </table>		x-axis	y-axis	origin	the ordered pair (0, 0)	Y	Y	Y	the ordered pair (0, 0)	Y	N	N	a point above the origin on an axis	N	Y	N	
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the ordered pair (0, 0)	Y	N	N																						
a point above the origin on an axis	N	Y	N																						
9.2	Ordered Pairs	5.G.1 Companion Pg. 244 MP 4 MP 5	How can you identify and plot points on a coordinate grid?	<p>In this lesson, students are working in Quadrant 1 of a two-dimensional coordinate plane. The plane includes a horizontal number line, called the x-axis, and a vertical number line, called the y-axis, intersecting at a point called the origin. Students can use the x- and y-coordinates to find or describe the distance of a point from the origin.</p> <p>*Focus on vocabulary for this standard because it plays an integral role in the understanding and learning of the coordinate plane system.</p> <p><i>Misconceptions:</i> Some students may not understand the first number of the ordered pair, the (<i>x-axis</i>) indicates how far to move <i>horizontally</i> from the origin. Have students plot (4, 5) and (5, 4) and ask them to explain and discuss the importance of order used to plot the points.</p> <p>AC Option: Follow up lesson with Battle Ship Using Grid Paper</p>	Coordinate grid paper	<p>Use the following link to answer the questions below: Map of Spain</p> <p>How can you locate:</p> <ol style="list-style-type: none"> 1.Madrid 2.Barcelona 3.La Corona 4. Cadiz 	<p>Coordinate Plane, Quadrant, Horizontal number line, Vertical number line, Ordered pair, Origin, x-Coordinate, y-axis, y-Coordinate, Perpendicular, Parallel</p>	<p>How can you find the ordered pair that describes the location of the Library?</p> <p>What is a situation in which you might locate points on a coordinate grid?</p>																	
9.3	Investigate • Graph Data	5.G.2 Companion Pg. 245 MP 4 MP 5 MP 8	How can you use a coordinate grid to display data collected in an experiment?	<p>In this lesson, students see that the x-coordinate represents time, the y-coordinate represents temperature, and that both pieces of information are represented by a single point. By recording and then graphing the data points on a coordinate grid, students can better understand the relationship between the x- and y- coordinates, and how the changes in the two sets of data are related.</p> <p><i>Misconceptions:</i> Some students may not realize that a coordinate system differs from a grid system. In a coordinate system, the lines, not the area surrounding the lines, are labeled. Providing the opportunity to talk about this will help.</p>	Coordinate grid paper	<p>Are the points at (3, 8) and (8, 3) in the same location? Explain your reasoning.</p>	<p>number line, vertical number line, Ordered pair, Origin, x-axis, x-Coordinate, y-axis, y-Coordinate, Perpendicular, Parallel Degree Fahrenheit</p>	<p>Grab and Go: Differentiated Centers Kit</p>	<p>A scientist made a line graph that shows how a bear's average heart rate changes over time.</p> <p>What coordinate represents the bear's heart rate at its highest?</p>																

								What coordinate represents the bear's heart rate at its lowest?						
9.4	Line Graph (AC Option-Line Graphs are not a requirement if either 5G or 5MD).	5.G.2 Companion Pg. 245 MP 4 MP 5 MP 7	How can you use a line graph to display and analyze real-world data?	Students organize the data in related pairs. Choose a title, labels, an interval and a scale for the graph. Plot the points and draw line segments to connect the consecutive points. <i>Misconceptions:</i> Some students may not realize that a coordinate system differs from a grid system. In a coordinate system, the lines, not the area surrounding the lines, are labeled. Providing the opportunity to talk about this will help	Line graphs	Which ordered pair represents the school? Explain 2 possible paths from the school to home. 	Interval, line graph, scale	Randy is training for a race. She makes a table that shows how long it takes her to run different distances. Write the number pairs as ordered pairs, then graph the ordered pairs on the coordinate plane. 						
9.5	Numerical Patterns	5.OA.3 Companion Pg. 55 MP 7 MP 8	How can you identify a relationship between two numerical patterns?	Students generate two numerical patterns, or sequences, using two different rules. They then find a relationship between pairs of terms from the two sequences. This standard relates to previous work in Grade 4 with patterns and includes several skills beyond solving the problems and identifying a pattern. Students need experience identifying, recording, and graphing ordered pairs on a coordinate plane (positive numbers only). Proceed with situations in which TWO rules are generated.	Rules	Find the pattern and fill in the missing blanks: A.) 4,9,14, ____,24,____ B.) 100, 10, __, .01, ____ C.) 005, .05, ____, ____, 500 D.) ____, $\frac{3}{4}$, 1, $1\frac{1}{4}$, ____	Numerical Patterns, Rules, Ordered Pairs,	Patterns P & Q are generated using these rules. *Pattern P: Start with 0 and add 1. *Patter Q: Start with 0 and add $\frac{1}{4}$. Which set of ordered pairs is generated from corresponding terms of Pattern P and Pattern Q? A) (0, 0), (1, $\frac{1}{4}$), (2,1/2), (3,3/4) B) (0, 0), (1, 1/2), (2,3/4), (1,1) C) (1, $\frac{1}{4}$), (1,1/2), (1,3/4),(1,1) D) (0, 0), (1, 2), (2,3), (3,4)						
9.6	Problem Solving • Find a Rule	5.OA.3 Companion Pg. 55 MP 1 MP 4	How can you use the strategy <i>solve a simpler problem</i> to help you solve a	Students can find a pattern using simple numbers, and then use the pattern that they find to predict results with greater numbers to solve the problem.	<i>Solve a simpler problem</i>	The table shows the amount of milk in cups that Carla used in 6 days. How much milk did Carla use in 6 days? <table border="1" data-bbox="1411 1356 1814 1412"> <tr> <td>$\frac{1}{4}$</td> <td>$\frac{1}{2}$</td> <td>$\frac{3}{4}$</td> <td>$\frac{3}{4}$</td> <td>$\frac{1}{4}$</td> <td>$\frac{1}{2}$</td> </tr> </table>	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	Numerical Patterns, Rules, Ordered Pairs,	Patterns X & Y are generated using these rules. *Pattern X: Start with 5 and add 5.
$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{2}$									

		MP 7	problem with patterns?						<p>*Patter Y: Start with 1 and add 2.</p> <p>Graph three points to represent the ordered pairs formed by the first three corresponding terms in Pattern X and Pattern Y.</p> 
9.7	Graph and Analyze Relationships	5.OA.3 Companion Pg. 55 MP 2 MP 4 MP 7	How can you write and graph ordered pairs on a coordinate grid using two numerical patterns?	Use the given rules in the problem to generate the first few terms in each pattern.	Toothpick, Tables, Cubes	Using toothpicks, create a new pattern.  How many toothpicks will be used in the 7 figure?	Numerical Patterns, Rules, Ordered Pairs,	Elisa uses one cup of sugar for every three cups of water to make lemonade. Juan uses two cups of sugar for every 5 cups of water to make lemonade. Use a table and graph the ordered pairs on a coordinate grid to determine which lemonade is sweeter.	

Assessments:

[Go Math Chapter 9 Test](#)

Go Math Chapter 9 Performance Task: [Triathlon Training](#)

[SBAC Sample Questions](#)

[SBAC Sample Questions Spreadsheet](#)

Grade 5 Go Math! Quarter 4 Planner
CHAPTER 10: Convert Units of Measure

10 - 12 days

Big idea: Converting Customary & Metric Units

1. The customary measurement system requires the use of a variety of conversion ratios that are not based on the decimal system. Consequently, students frequently get confused about what operation they should use when making a conversion.
2. Converting metric units is easier than converting customary units because the metric system is related to the decimal system. Emphasizing this connection to the place value system deepens students' understanding.
3. There are two related ways to approach conversions within the metric system that make this connection. Students will convert both customary and standard measurements within the same system of measurement and solve multi-step real world problems. Fifth graders will discover base-ten conversion within the metric system, 1 kilometer = 1,000 meters. In grade 5, students extend their abilities from grade 4 to express measurements in larger or smaller units within a measurement system.

Adapted from the The Common Core Math Companion (Gojak & Miles, 2015) Pg.213 and Go Math Teaching for Depth, Pg. 387E

HMH Professional Development Videos:

[Go Math Video: 3 Stage Teaching Model](#)

[Go Math Video: Capacity with Customary Units](#)

[Go Math Video: Capacity with Metric Units](#)

Essential Question: What strategies can you use to compare and convert measurements?

Standards: 5.MD.1

ELD Standards:

ELD.PI.5.1-Exchanging information/ideas via oral communication and conversations.

ELD.PI.5.3-Offering opinions and negotiating with/persuading others.

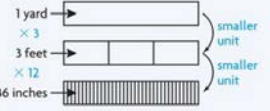
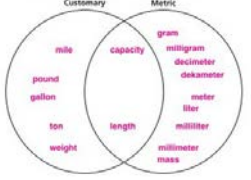
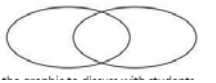


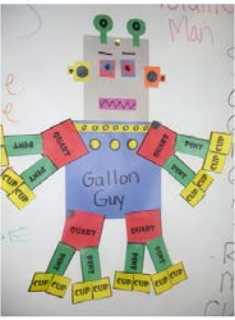

ELD.PI.5.5-Listening actively and asking/answering questions about what was heard.





ELD.PI.5.9- Expressing information and ideas in oral presentations.

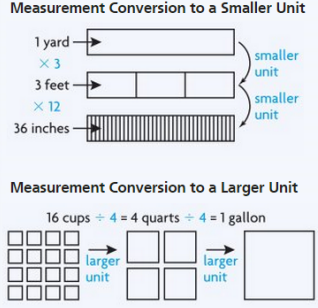
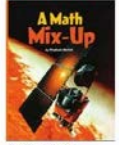
ELD.PI.5.11-Supporting opinions or justifying arguments and evaluating others' opinions or arguments.

ELD.PI.5.12-Selecting and applying varied and precise vocabulary.

Lesson	Standards & Math Practices	Essential Question	Math Content and Strategies	Models/Tools Go Math! Teacher Resources G5	Connections (ENGAGE prior knowledge)	Vocabulary	Academic Language Support	Journal
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10.1	Customary Length	5.MD.1 Companion Pg. 214 MP 5 MP 7	How can you compare and convert customary units of length?	<p>To convert units of length, we use multiplication to change a larger unit of length to a smaller unit of length and division to change a smaller unit of length to a larger unit of length.</p> <table border="1" data-bbox="747 235 997 354"> <thead> <tr> <th colspan="2">Customary Units of Length</th> </tr> </thead> <tbody> <tr> <td>1 foot (ft)</td> <td>= 12 inches (in.)</td> </tr> <tr> <td>1 yard (yd)</td> <td>= 3 feet</td> </tr> <tr> <td>1 mile (mi)</td> <td>= 5,280 feet</td> </tr> <tr> <td>1 mile</td> <td>= 1,760 yards</td> </tr> </tbody> </table> <p>Bar Model</p> <p>Measurement Conversion to a Smaller Unit</p>  <p><i>Misconceptions: Some students may not pay attention to the unit of measurement when subtracting. For example, when subtracting 5 inches from 2 feet (2ft – 5in), students may incorrectly think the answer is 1ft. and 5 inches instead of 1ft and 7 inches. To address this misconception, talk about and show the example using 2 twelve-inch rulers, then subtract.</i></p>	Customary Units of Length		1 foot (ft)	= 12 inches (in.)	1 yard (yd)	= 3 feet	1 mile (mi)	= 5,280 feet	1 mile	= 1,760 yards	Bar model, table	<p>Reinforce place value of whole numbers and decimals, and make connections between fractions and decimals.</p> <p>Fill in the missing blanks: $2\frac{1}{2} \text{ m} = 2.5 \text{ m} = 250 \text{ cm}$ $1\frac{1}{4} \text{ m} = \underline{\quad} \text{ m} = \underline{\quad} \text{ cm}$ $5\frac{3}{4} \text{ m} = \underline{\quad} \text{ m} = \underline{\quad} \text{ cm}$ $\underline{\quad} = 0.20 \text{ m} = \underline{\quad} \text{ cm}$</p>	Foot, inch, mile, yard, conversion, convert, customary units, standard units, centimeter, meter, length, metric system,	<p>Vocabulary Strategies</p> <p>Visualize it-pg. 426</p> <p>Sort the review and preview words into the Venn diagram.</p>  <p>Vocabulary Builder Pg. 439</p> <p>Vocabulary Builder</p> <p>Length and Capacity Draw and label two intersecting ovals, as shown below.</p>  <p>Fluency Builder</p> <p>Customary Conversions Have students work in pairs to practice length, capacity, and weight equivalents.</p> <p>Each pair should prepare 12 index cards labeled with the units shown below. Students shuffle the cards and place them in a pile facedown. Students take turns drawing a card and stating a fact involving the unit shown on the card. For example, if a student draws a card labeled "foot," the student might say "12 inches equal 1 foot" or "3 feet equal 1 yard." The other student checks the answer for accuracy and then draws a new card. If there is time, the cards can be reshuffled and the activity continued. You might choose to impose the rule that after reshuffling, students are required to state a different fact about each unit than was stated the first time around.</p> 	<p>Maria is knitting a scarf. On the first two days, she knitted the lengths of scarf shown in the table.</p> <table border="1" data-bbox="2306 194 2593 284"> <thead> <tr> <th>Day</th> <th>Lengths</th> </tr> </thead> <tbody> <tr> <td>One</td> <td>6 inches</td> </tr> <tr> <td>Two</td> <td>1 foot</td> </tr> </tbody> </table> <p>How many inches did Maria knit on the first two days?</p>	Day	Lengths	One	6 inches	Two	1 foot
Customary Units of Length																									
1 foot (ft)	= 12 inches (in.)																								
1 yard (yd)	= 3 feet																								
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Day	Lengths																								
One	6 inches																								
Two	1 foot																								
10.2	Customary Capacity	5.MD.1 Companion Pg. 214 MP 5 MP 6	How can you compare and convert customary units of capacity?	<p>To convert units of capacity, we use multiplication to change a larger unit of length to a smaller unit of length and division to change a smaller unit of length to a larger unit of length.</p> <table border="1" data-bbox="747 958 1008 1079"> <thead> <tr> <th colspan="2">Customary Units of Capacity</th> </tr> </thead> <tbody> <tr> <td>1 cup (c)</td> <td>= 8 fluid ounces (fl oz)</td> </tr> <tr> <td>1 pint (pt)</td> <td>= 2 cups</td> </tr> <tr> <td>1 quart (qt)</td> <td>= 2 pints</td> </tr> <tr> <td>1 gallon (gal)</td> <td>= 4 quarts</td> </tr> </tbody> </table> <p>Measurement Conversion to a Larger Unit</p> <p>$16 \text{ cups} \div 4 = 4 \text{ quarts} \div 4 = 1 \text{ gallon}$</p>  <p>Since ounces are used for both weight and capacity measure, it is important to refer to fluid ounces (fl oz) when measuring capacity.</p>	Customary Units of Capacity		1 cup (c)	= 8 fluid ounces (fl oz)	1 pint (pt)	= 2 cups	1 quart (qt)	= 2 pints	1 gallon (gal)	= 4 quarts	Bar model, table	<p>Have students create their Gallon Man Use Gallon Man Template</p>  <p>What units of capacity do you know? What items are sold in pints and quarts?</p> <p>In addition, have 5 or 6 labeled containers of different sizes and shapes and have students order them from least capacity to greatest.</p>	Capacity, cup, fluid, ounce, gallon, pint, quart, pound, ton, weight	<p>Math Talk</p> <p>Vocabulary Strategy - Graphic Organizer</p>  <p>Use math talk to focus on students' understanding of</p>	<p>Rosa made 12 gallons of lemonade to sell at a lemonade stand. How many pints of lemonade did she make?</p>						
Customary Units of Capacity																									
1 cup (c)	= 8 fluid ounces (fl oz)																								
1 pint (pt)	= 2 cups																								
1 quart (qt)	= 2 pints																								
1 gallon (gal)	= 4 quarts																								

10.3	Weight	5.MD.1 Companion Pg. 214 MP 1 MP 6	How can you compare and convert customary units of weight?	<p>Students use division to convert the smaller unit to the larger unit, or use multiplication to convert the larger unit to the smaller unit.</p> <table border="1" data-bbox="763 220 1150 334"> <tr> <th colspan="2">Customary Units of Weight</th> </tr> <tr> <td>1 pound (lb)</td> <td>= 16 ounces (oz)</td> </tr> <tr> <td>1 ton (T)</td> <td>= 2,000 pounds</td> </tr> </table>	Customary Units of Weight		1 pound (lb)	= 16 ounces (oz)	1 ton (T)	= 2,000 pounds	Bar model, tables	<p>Estimate the weight of the larger pumpkin.</p>  <p>Estimate the weight of the sled.</p> 	Capacity, cup, fluid, ounce, gallon, pint, quart pound, ton, weight	<p>how to estimate the product</p> <p>What operation would you use to convert yards to feet? Why?</p> <p>If you accidentally divided instead of multiplied to convert pounds to ounces, how might you realize that your answer is unreasonable?</p>	Cindy has a jar with 3 pounds of sand. Heather has 3 jars with 15 ounces of sand. Who has more sand and why?
Customary Units of Weight															
1 pound (lb)	= 16 ounces (oz)														
1 ton (T)	= 2,000 pounds														
10.4	Multistep Measurement Problems	5.MD.1 Companion Pg. 214 MP 1 MP 2 MP 6	How can you solve multistep problems that include measurement conversions?	Students record the information they are given and convert one of the units they are looking for. Before converting, students should think about the units to be converted and be able to explain whether the converted amount will be more or less than the original unit.	Bar model, tables	<p>Fill in the blanks:</p> <p>15 min + 30 min = ____ min</p> <p>15 min + 45 min = ____ min = ____ hr</p> <p>15 min + 60 min = ____ min = ____ hr, ____ m</p> <p>10 in + 1 in = ____ in</p> <p>10 in + 2 in = ____ in = ____ ft</p> <p>10 in + 20 in = ____ in = ____ ft, ____ in</p>	Foot, inch, mile, yard, conversion, convert, customary units, standard units, centimeter, meter, length, metric system, Capacity, cup, fluid, ounce, gallon, pint, quart pound, ton, weight	<p>How could you use mental math to check your work when you convert measurements?</p> <p>Which is greater, 1,000 milligrams or 1 gram? Explain.</p> <p>How could you use an analog clock to find the length of a movie?</p>	A bakery supplier receives an order for 2 tons of flour from a bakery chain. The flour is shipped in crates. Each crate holds eight 10-pound bags of flour. How many crates does the supplier need to ship to fulfill the orders?						
10.5	Metric Measures	5.MD.1 Companion Pg. 214 MP 1 MP 2 MP 5 MP 8	How can you compare and convert metric units?	<p>It is much simpler to convert between two customary units because metric units are related by powers of 10. To convert between two metric units, simply multiply or divide by a power of 10 such as 10, 100, or 1,000.</p> <p>**You can give students additional practice in converting metric measures by using an activity found in <i>iTools: Measurement-Equivalent Measures/Weight/Mass Capacity</i>.</p> <p>iTools Activity Length</p> <p>iTools Activity Weight/Mass</p> <p>iTools Activity Capacity</p>	Diagram	<p>Estimate the flight distance from Los Angeles, Ca to Dulles, VA.</p>  <p>How tall is the bus?</p> 	Dekameter, centimeter, decimeter, gram, kilogram, liter, mass, meter, milligram, milliliter, millimeter	<p>How many days old are you? Explain how you know.</p> <p>Grab N Go</p> <p>UNIVERSAL ACCESS INDEPENDENT ACTIVITIES</p> <p>Grab N Go!</p> <p>Differentiated Centers Kit</p> <p>Activities: Size of Up Sheet!, Literature: A March Mix-Up, Games: 2 Stage Forward, 1 Step Back</p> <p>Students investigate orange Activity Card 2 by coloring and then measuring the length in metric units.</p> <p>Students read about a message in customary and metric measurements that led to the BSA's Space Camp where crashing into Mars.</p> <p>Students convert customary and metric units to move along the game path.</p> <p>Literature</p>	Emilio bought 8.6 meters of fabric. How many centimeters of fabric did he buy?						

10.6	Problem Solving • Customary and Metric Conversions	5.MD.1 Companion Pg. 214 MP 2 MP 3 MP 4 MP 7	How can you use the strategy <i>make a table</i> to solve problems about customary and metric conversions?	<p>Multiply if you are converting to a smaller unit. Divide if you are converting to a larger unit. Use diagrams below to help organize and compare measurements.</p> 	<i>Make a table</i>	<p>Have students fill in the missing information on the table below.</p> <table border="1" data-bbox="1365 168 1752 227"> <tr> <td>Cups</td> <td>4</td> <td>8</td> <td>16</td> <td></td> </tr> <tr> <td>Quarts</td> <td></td> <td></td> <td></td> <td>5</td> </tr> </table>	Cups	4	8	16		Quarts				5	Foot, inch, mile, yard, conversion, convert, customary units, standard units, centimeter, meter, length, metric system, Capacity, cup, fluid, ounce, gallon, pint, quart pound, ton, weight	<p>Literature</p>  <p>From the Grab-and-Go™ Differentiated Centers Kit Students will read about a mix-up in customary and metric measurements that led to the NASA's Mars Climate Orbiter crashing into Mars.</p>	Lexi has a roll of shelf paper that is 800 cm long. She wants to cut the paper into 1-m strips to line the shelves in her pantry. How many 1-meter strips can she cut? Justify your answer.
Cups	4	8	16																
Quarts				5															
10.7	Elapsed Time	5.MD.1 Companion Pg. 214 MP 6 MP 7	How can you solve elapsed time problems by converting units of time?	Converting and comparing units of time is not only a math skill, but an everyday life skill. Students are likely to find countless opportunities in their lives to use skills learned in this lesson.	Conversion table	Use your daily class schedule and time frames for students to calculate elapsed time (i.e. If school starts at 8:20 AM, and we spend 25 min doing our Daily language and math, what time do we end our daily morning routine? If lunch ends at 12:30, and we have 40 minutes for lunch, what time does lunch start?)	Elapsed time, seconds, minutes, hours		The Drama Club is showing a video of their recent play. The first showing begins at 2:30 pm. The second showing is scheduled at 5:45 p.m. with a ½ hour break between the showings. How long is the video in hours and minutes?										

Assessment

Go Math Chapter 10 Test

Go Math Chapter 10 Performance Task: [Backpacking Trip](#)

**Common Assignment Critical Area 3 Performance Task: [Water Rush](#)

SBAC Sample Questions

SBAC Sample Questions Spreadsheet