2017-2018	Grade 4 Go Math! Quarter 4 Planner Chapter 12: Relative Sizes of Measurement Units	13 - 14 Days

BIG IDEA: Because some students struggle with measurement concepts, teachers should emphasize the essential concepts and meanings that underlie the procedural process of determining a measure: attributes of comparison must be clearly identified; measurement of a quantity is about comparison of that quantity with a fixed reference amount of that quantity; developing personal benchmarks for frequently used units of measure helps students develop meaning for units and make comparisons as well as recognizing the inverse relationships between the size of the unit and the numeric measure (5 in, 5 square in, 5 cubic in). Both customary units and metric units are systems of measurement with agreed upon standard units. Becoming familiar with both systems and establishing benchmarks help students judge and compare sizes.

Fourth graders will focus their learning on understanding the relationship between units within one system of measurement, with emphasis placed on solving word problems involving distances, intervals of time, liquid volumes, masses of objects, money, and area and perimeter. Students will also create line plots to display a data set of objects measured in fractional units of ½, ¼, and ⅛, solving problems using the data they collected.

Adapted from Go Math Teaching for Depth, page 469E and the Common Core Companion, page 199.

HMH Professional Development Videos: Measurement and Geometry: Grades 3 – 6
The 3-stage teaching model
Capacity with Customary Units
Capacity with Metric Units

Quarter 4 Fluency Resources:
Fluency Resources in Go Math
Building Fluency Through Word Problems
Building Fluency Through Number Talks

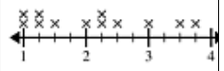
Critical Area Projects:
Landscape Architects
Creating Cars

Essential Question: How can you use relative sizes of measurements to solve problems and to generate measurement tables that show a relationship?
Standards: 4.MD.1, 4.MD.4, 4.MD.2

ELD Standards:
ELD.PI.4.1-Exchanging information/ideas via oral communication and conversations.
ELD.PI.4.3-Offering opinions and negotiating with/persuading others.
ELD.PI.4.5-Listening actively and asking/answering questions about what was heard.
ELD.PI.4.9-Expressing information and ideas in oral presentations.
ELD.PI.4.11-Supporting opinions or justifying arguments and evaluating others' opinions or arguments.
ELD.PI.4.12-Selecting and applying varied and precise vocabulary.

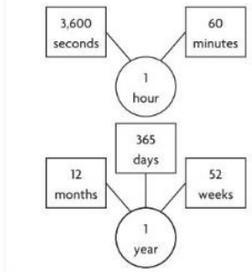
Lesson		Standards & Math Practices	Essential Question	Math Content and Strategies	Models/Tools Go Math! Teacher Resources G4	Connections (ENGAGE prior knowledge)	Vocabulary	Academic Language Support	Journal
12.1	Measurement Benchmarks Chapter 12 and 13 are sequenced before 11 to ensure sufficient coverage before SBAC.	4.MD.1 MP 1 MP 5 Companion Pg. 200	How can you use benchmarks to understand the relative sizes of measurement units?	Use benchmarks to understand the relative sizes of measurement units – units for length, liquid volume, weight, and mass. (use realia as informal benchmarks for standard measurement)	Tables	Use arms, hands, fingers to have students give you approximate measurements: how much is 1 inch, 1 foot, 1 meter? (compare responses) Have students choose a type of measurement like length, mass, weight and list 3 common units and objects for the measurement they chose.	kilometer, mile, benchmark, estimate	ELD Standards ELD Standards ELA/ELD Framework ELPD Framework Access Strategies Organizing Learning	Name the unit that would be best to use for measuring the weight of a stapler; length of a car; amount of liquid in a baby bottle.

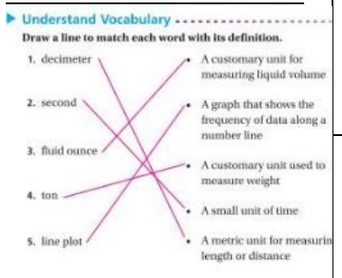
12.2	Customary Units of Length	4.MD.1 MP 1 MP 2 MP 5 Companion Pg. 200	How can you use models to compare customary units of length?	Students use models to learn the relationship between inches, feet, and yards. They use 1-inch tiles to build 1 foot and then compare 1 foot to 1 inch. Students find that 1 foot is 12 times the size of 1 inch.	I inch tiles, bar models, fraction tiles, ruler, yard stick	Have students clarify the difference between inches and feet as measurement units. Then have them estimate the answer to the following question. **How long does the measuring tape extend?** 	foot, inch, yard	for Student Access to Challenging Content Student Engagement Strategies Problem Solving Steps and Approaches **Equitable Talk** Accountable Talk Simply Stated Equitable Talk Conversation Prompts Accountable Talk Posters Five Talk Moves Bookmark Effective Math Talks **Cooperative Learning** Cooperative Learning Role Cards Collaborative Learning Table Mats Seating Chart Suggestions	A football player gained 2 yards on one play. On the next play, he gained 5 feet. Was his gain greater on the first play or the second play? Explain.
12.3	Customary Units of Weight	4.MD.1 MP 1 MP 6 MP 7 Companion Pg. 200	How can you use models to compare customary units of weight?	Use models to learn the relationship between ounces, pounds, and tons to compare customary units of weight. Using a number line and table can help students understand those relationships.	Number line, table, spring scale	Have students compare/match weights using the following: feather, paper clip, pencil, book, fork, cup. Then have them estimate the answer to the following question: **What is the net weight of the *Hershey's* chocolate bar?** 	ounce, pound, ton, weight		Juan's baby sister weighed 6 1/2 pounds at birth. How many ounces did the baby weigh?
12.4	Customary Units of Liquid Volume	4.MD.1 MP 3 MP 7 MP 8 Companion Pg. 200	How can you use models to compare customary units of liquid volume?	Use models – bars and tables - to compare customary units of liquid volume. (fluid ounces, cups, pints, quarts, half gallons, and gallons)	Bar models, tables	Have students estimate how many cups of water would fill a can of coke, a bottle of coke, a milk carton…Take highest, lowest estimates, then actually do the filling to compare their estimates. Then have them estimate the answer to the following question: **How many small vases will it take to fill the large vase?** 	cup, fluid ounce, gallon, half gallon, liquid volume, pint, quart		A chef makes 1 ½ gallons of soup in a large pot. How many 1-cup servings can the chef get from this large pot of soup?

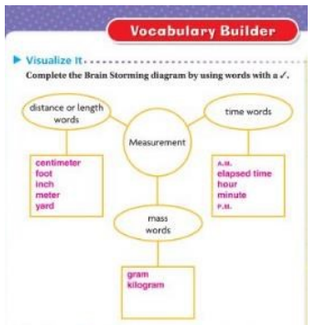
12.5	Line Plots *Important lesson, dependent on fraction concepts, not necessarily measurement units – can teach this at the beginning of the chapter OR embed with fraction lessons.	4.MD.4 MP 4 MP 5 MP 7 Companion Pg. 200	How can you make and interpret line plots with fractional data?	Proper organization of data is critical when solving problems. Based on prior work with number lines, learning to use line plots provides a logical way for students to show the number of times each number is found in the data set. Make and interpret line plots with fractional data. A line plot shows all the data that are involved, and the number of times each number is found in the data set. *SBAC questions usually include line plots embedded with your fraction operations.	Line plots, tables	Get data from your students about their birth months. Make a tally chart and/or bar graph of the data. Have students discuss what they are seeing. Review ordering fractions: write these fractions from least to greatest ½, 1/8, 2/4, ¾, ¼, 5/8, 4/4, ½, 2/2, 3/8. Make a tally chart. How could you use a "number line" to display this data? Now use what you know to create a line plot. 	line plot, tally, ordering fractions	**Vocabulary Strategies** **Vocabulary Builder** **Abbreviations** A.M. is the abbreviation for *ante meridiem,* which is Latin for *before midday.* P.M. is the abbreviation for *post meridiem,* which is Latin for *after midday.* Often instead of using A.M. or P.M., other words are given to indicate which time of day it is. Ask students to make word webs for A.M. and P.M. showing words that indicate these times of the day. Sample word webs are shown below. 	The line plot below shows the size inches) of several different frog sp  What is the difference in size betw shortest species and longest specie frog?
12.6	Investigate ● Metric units of Length	4.MD.1 MP 1 MP 7 MP 8 Companion Pg. 200	How can you use models to compare metric units of length?	Use models to compare metric units of length. Millimeter, decimeters, and meters are all based on powers of ten.	Ruler	Have students use fingers and hands to show: how much is a centimeter, meter, millimeter? Have students measure their expo marker in millimeters and repeat with centimeters, then students measure their desk with centimeters and repeat the task with meters. Help students understand that working with powers of ten make it easier to change from smaller units to larger units.	decimeter, millimeter, centimeter, kilometer, meter	**Vocabulary Builder** **Materials** large paper, color pencils **Visualizing Relationships** Have students make a poster showing the relationships among the units introduced in the lesson: fluid ounces, cups, pints, quarts, half gallons, and gallons. Have students include the abbreviation for each unit: fluid ounce (fl oz), cup (c), pint (pt), quart (qt), and gallon (gal). Remind students that the abbreviations do not include a period. Students can title their poster Units of Liquid Volume and include a brief definition for *liquid volume* below the title.	The flagpole is 4 meters tall. How many centimeters tall is the flagpole?
12.7	Metric Units of Mass and Liquid Volume	4.MD.1 MP 2 MP 7 Companion Pg. 200	How can you use models to compare metric units of mass and liquid volume?	Use models to compare metric units of mass and liquid volume, by converting a larger unit into a smaller unit by multiplying by 10, 100, or 1000.	Table	Use a water bottle (500 mL) and have students tell you how many bottles they would need to make: 2 liters, 4 liters, 6.5 liters.	milliliter, gram, kilogram, liter		Mai bought 8 kilograms of apples and 2.5 kilograms of pears. How many more grams of apples than pears did she buy?
12.8	Units of Time	4.MD.1 MP 1 MP 5 MP 7 Companion Pg. 200	How can you use models to compare units of time?	Understanding units of time and how to compare and use each unit is important as almost everything students do is based on schedules. Using multiplication to find the number of seconds in an hour or the number of days in 3 months is valuable in real-world applications. Use models to compare units of time and know how to compare and convert seconds, minutes, hours, days, weeks, and years.	Analog clocks, tables, number lines	Ask students what units of time they use every day. What units of time do the following require: Baking cookies Your age Summer vacation Running a 10-meter dash Grading period Compare cookies to running, summer vacation to your age.	second, day, hour, minute, month, week, year		Explain how you can prove that 3 weeks is less than 24 days.

<table>
<tr>
<td>12.9</td>
<td>Problem Solving ● Elapsed Time</td>
<td>4.MD.2

MP 3
MP 5
MP 8

Companion Pg. 201</td>
<td>How can you use the strategy draw a diagram to solve elapsed time problems?</td>
<td>Use the strategy draw a diagram to solve elapsed time problems. Students learn how to use a number line with a measurement scale to find either the start or end time of an event, given one of those times and the event's elapsed time. It is important to note whether the start and end times given are in A.M. or P.M.</td>
<td>Problem solving graphic organizer, number lines</td>
<td>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?)</td>
<td>A.M., elapsed time, P.M.</td>
<td rowspan="3">Vocabulary Builder
Units of Time Have students draw their own diagrams like the ones shown below to associate units of time. For example, ask students to start with a circle that reads 1 hour or 1 year. Have them write equivalent amounts of time in the other parts of the diagram.
 

 
</td>
<td>Solve the following using a diagram: If a clock tower rings at 1:00 pm daily and proceeds to ring at each half hour, how many rings will the clock have at 5:00 pm?</td>
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<tr>
<td>12.10</td>
<td>Mixed Measures

**Ac option- Lesson goes beyond expectation of 4.MD.2 using mixed measures.</td>
<td>4.MD.2

MP 1
MP 2
MP 8

Companion Pg. 201</td>
<td>How can you solve problems involving mixed measures?</td>
<td>Solve problems involving mixed measures. Students need to understand the difference between the base-ten addition/subtraction model and the addition/subtraction of mixed measures. Regrouping/renaming becomes more involved, since students must consider the units being used.</td>
<td>Conversion charts</td>
<td>15 min + 30 min = ____ min
15 min + 45 min = ____min = ____ hr
15 min + 60 min = ____min = _____hr,___m
10 in + 1 In = ____in
10 in + 2 in = ____in = ____ft
10 in + 20 in = ____in = ____ft, ____in</td>
<td>Renaming or regrouping with units

Mixed measures</td>
<td>Write a subtraction problem involving pounds and ounces. Solve the problem and show your work.</td>
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<tr>
<td>12.11</td>
<td>Algebra ● Patterns in Measurement Units</td>
<td>4.MD.1

MP 4
MP 5
MP 7

Companion Pg. 200</td>
<td>How can you use patterns to write number pairs for measurement units?</td>
<td>Students identify relationships between number pairs of measurement units, using a table to show the pattern of number pairs.
Using patterns to write number pairs for measurement units: weeks/days, gallons/quarts, days/hours, etc. helps students understand that measurement units involve a direct relationship.</td>
<td>Tables</td>
<td><table><tr><td>Number</td><td>x 3</td></tr><tr><td>1</td><td></td></tr><tr><td>3</td><td></td></tr><tr><td>5</td><td></td></tr><tr><td>10</td><td></td></tr></table>
<table><tr><td>people</td><td># eyes</td></tr><tr><td>2</td><td></td></tr><tr><td>6</td><td></td></tr><tr><td>25</td><td></td></tr><tr><td>100</td><td></td></tr></table>
Review relationships organized in a table.</td>
<td>Number pairs for measurement units</td>
<td>How can you use patterns to write number pairs for measurement units?</td>
</tr>
</table>

Literature Connections

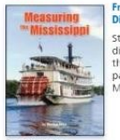
Literature

From the Grab-and-Go™ Differentiated Centers Kit

Students read about using metric units to measure and identify insects.

A Trip to the Pond

Literature



From the Grab-and-Go™ Differentiated Centers Kit

Students read about the different measurements that can be observed on a paddleboat trip down the Mississippi River.

Measuring the Mississippi

Math Talk

Since this chapter is full of vocabulary words, idioms, and/or expressions, be prepared to explain those words and expressions in the math context

								using role play, video clips, or other visual support. How do you decide which benchmark to use when measuring? How can you use benchmarks to compare and help you order units of measurement? Help students make comparison statements about two units of measurement by modeling how they are said before having students repeat after you and use them in discussion with partners. Help students recognize a pattern in the units of liquid volume: How are cups and pints related? Pints and quarts? What pattern do you see, and does this hold for other units of liquid volume? Explain. Using real-world data, have students talk about how to interpret the data in a line plot. What do all of the Xs on the line plot represent? What comparisons can you make? How can you relate centimeters and decimeters to meters? Talk about the different ways to write 8 decimeters (8/100, 0.08 of a meter). How do you change from larger units to smaller units? From smaller units to larger units? You can use models to compare metric units of mass and liquid volume by _____. Write on the board: how many minutes are in one hour? Seconds in one minute? Hours in 1 one	

								day? Have students work in groups of 3 to read, calculate, and write the answer. Have students make word webs for AM and PM activities that relate to their school day. How does base-ten addition compare to adding mixed measures. How is the regrouping the same or different? Focus on students' understanding of how to identify and label columns in a table of number pairs involving measurement units. What is the relationship between the numbers in each pair in the table? What units of time have the same relationship? There are __ in ____.	
Assessments: Go Math Chapter 12 Test HMH Performance Task Chapter 12: Store Storage									

2017-2018	Grade 4 Go Math! Quarter 4 Planner Chapter 13 Algebra: Perimeter and Area	11-12 Days

BIG IDEA: Fourth grade students have worked with area models with multiplication and division strategies. Since students often get perimeter and area confused, exploring both perimeter and area from a problem-solving perspective helps students to distinguish between the two concepts. Students need to understand that perimeter is a single-dimension linear measurement (length), while area is a two-dimensional measurement (length times width).

Students will extend their learning about perimeter and area from what was taught in third grade. Fourth graders are expected to generalize their understanding of area and perimeter by connecting the concepts to mathematical formulas to solve real world problems (i.e. Find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor).

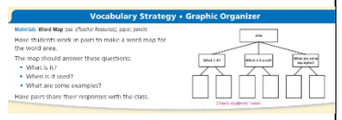
Adapted from The Common Core Companion, page 202, and Go Math Teaching for Depth, p. 523C.

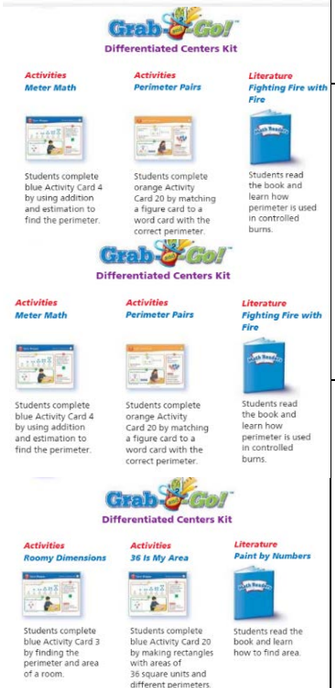
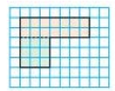
HMH Professional Development Video: Measurement and Geometry: Grades 3 – 6
Volume and Surface Area

Essential Question: How can you use formulas for perimeter and area to solve problems**?**
Standards: 4.MD.3

ELD Standards:

ELD.PI.4.1-Exchanging information/ideas via oral communication and conversations.
ELD.PI.4.3-Offering opinions and negotiating with/persuading others.
ELD.PI.4.5-Listening actively and asking/answering questions about what was heard.
ELD.PI.4.9-Expressing information and ideas in oral presentations.
ELD.PI.4.11-Supporting opinions or justifying arguments and evaluating others' opinions or arguments.
ELD.PI.4.12-Selecting and applying varied and precise vocabulary.

Lesson		Standards & Math Practices	Essential Question	Math Content/Strategies	Models/Tools Go Math! Teacher Resources G4	Connections (ENGAGE prior knowledge)	Vocabulary	Academic Language Support	Journal
13.1	Perimeter	4.MD.3 MP 1 MP 7 MP 8 Companion pg.202	How can you use a formula to find the perimeter of a rectangle?	Use a formula to find the perimeter of a rectangle. (Pe**RIM**eter = border) P = (2 x l) + (2 x W) P = 4 x S (for squares which are also rectangles) The length of a rectangle is the measure of the longer side and the width is the measure of the shorter side.	Finding perimeter and area	Use the worksheet in the hyperlinked tools (Finding perimeter and area) to find the distance around 2-3 of the squares/rectangles on the paper. Have students compare their solutions with a partner.	formula, perimeter, centimeter, foot, inch, length, meter, width, yard	**Vocabulary Strategies** **Vocabulary Builder** Materials Word Definition Map (see *eTeacher Resources*) Area Have students fill in a word definition map for **area.** Encourage students to write the definition in their own words and to illustrate some examples. They can use arrays, pictures, or the formula as they describe area under "What is it like?" What is it? What is it like? definition area examples  Vocabulary Strategy • Graphic Organizer	Tori is making a flag shaped like a square. Each side measures 12 inches. She wants to add ribbon along the edges. She has 36 inches of ribbon. Does she have enough ribbon? If not, how much more ribbon does she need?
13.2	Area	4.MD.3 MP 3 MP 6 MP 7 Companion pg.202	How can you use a formula to find the area of a rectangle?	Use a formula to find the area of a rectangle. (area = covering) A = b x h is used instead of A = l x w because A = b x h is a foundation for finding the area of other polygons in later grades.	Table Finding perimeter and area	Connect to concepts learned in chapter 10 to understand the formula: rectangles with right angles, adjacent sides that are perpendicular. Using the same hyperlinked worksheet from yesterday, have students find the area of 2-3 new rectangles/squares. Have	area, base, height, square unit		Ellie and Heather drew floor models of their living rooms. Ellie's model represented 20 feet by 15 feet. Heather's model represented 18 feet by 18 feet. Whose floor

						students talk about the difference between finding perimeter and area?		**Literature Connections** **Literature**  From the Grab-and-Go™ Differentiated Centers Kit Students read about using perimeter and area to plan and design a skate park. *Designing a Skate Park*  **Math Talk** Help students recognize the relationship between using addition and using multiplication to find the perimeter of a rectangle. How can you use a formula to find the perimeter of a rectangle?	model represents the greater area? How much greater?
13.3	Area of Combined Rectangles	4.MD.3 MP 1 MP 4 MP 5 Companion pg.202	How can you find the area of combined rectangles?	Find the area of combined rectangles-figures that can be divided into rectangles and squares. Students explore areas as additive: the area of the figure is the sum of the addends-the areas of the non-overlapping rectilinear shapes.	Grid paper	Find the perimeter and find the area of Mr. Xiong's garden.  How would you be able to find the area of this garden? 	area, base, height, square unit, non-overlapping rectilinear shapes		Solve this area problem that involves combined rectangles. Include the diagram and the solution. I am a figure that is made up of a square with an area of 16 square units and a rectangle with an an area of 16 square units.
13.4	Find Unknown Measures	4.MD.3 MP 2 MP 4 MP 7 Companion pg.202	How can you find an unknown measure of a rectangle given its area or perimeter?	Students solve problems involving unknowns by first drawing a model to represent the problem. Then they use the perimeter and area formulas to write and solve equations with unknowns. Drawing models enables students to a) use a tool to visualize the information given. b) identify what unknown measure they are asked to find. c) choose the correct perimeter or area formula.	Draw models	Jose uses 40 meters of fencing for his dog pen that is 8 meters wide. How long will the pen be? What will be the area of the pen? 	perimeter, area, unknowns		How can you find the measure of an unknown width, if the perimeter of a rectangle is 3 feet and the length is 10 inches?
13.5	Problem Solving ● Find the Area **AC option-Enrichment problems for 13.4	4.MD.3 MP 1 MP 4 MP 6 Companion pg.202	How can you use the strategy solve a simpler problem to solve area problems?	In this lesson, students are given the dimensions of a large rectangle and a small rectangle within in it. Use the strategy *solve a simpler problem* to solve area problems. Students can create a solution pathway that breaks the problem down into simpler problems: first use the area formula, A = b x H, to find the area of the two rectangles. Next, subtract the area of the small rectangle from the area of the large rectangle to find the remaining area.	Problem solving graphic organizer	Given the following diagram, how much paint will you need to paint the wall? Height of wall = 10 ft Width of wall = 14 ft Height of door = 7 ft Width of door = 4 ft 	area, unknowns		How can you use the strategy solve a simpler problem to solve the following problem: I am a rectangle with an area of 24 square feet. My side lengths have a difference of 5 feet. What are my side lengths?

								Why does it not matter which side is the base? Reinforce students' understanding that the total area of a figure is the sum of the area of all of its parts. Have students work in pairs to show how they would separate combined rectangles by redrawing them and then calculate the combined area of both rectangles. Write words that represent either area or perimeter such as fence, carpet, wallpaper, and picture frame on cards. Hold a card up and ask students to explain whether it represents area or perimeter. Give students regular opportunities to act out problems that require using perimeter and area formulas. What do you know about the sides of a square that will help you solve perimeter or area problems? How can you use division to find the length of one side of a square if you know its perimeter? If you know its area?	
Assessments: Go Math Chapter 13 Test HMH Performance Task Chapter 13: Behind the Scenes									

2017-2018	Grade 4 Go Math! Quarter 4 Planner Chapter 11: Angles	8-9 days

BIG IDEA: With this geometric measurement concept, students learn about angles and how to measure them. Activities measuring angles involve the use of a protractor, an instrument whose center point must be placed on the vertex of the angle being measured and aligned with one of the rays of the angle being measured.
Students will recognize angles as geometric shapes formed wherever two rays share a common endpoint and sketch angles of specified measure. The exploration of the circle is a natural setting for the study of angles, as well as the study of fractions. Students learn to classify angles by their measures, including acute, obtuse, right, and straight angles.

Adapted from Go Math Teaching for Depth, page 439C

Essential Question: How can you measure angles and solve problems involving angle measures?
Standards: 4.MD.5a, 4.MD.6, 4.MD.7

ELD Standards:

ELD.PI.4.1-Exchanging information/ideas via oral communication and conversations.
ELD.PI.4.3-Offering opinions and negotiating with/persuading others.
ELD.PI.4.5-Listening actively and asking/answering questions about what was heard.
ELD.PI.4.9-Expressing information and ideas in oral presentations.
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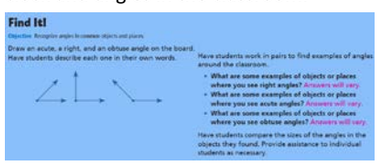
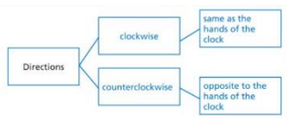
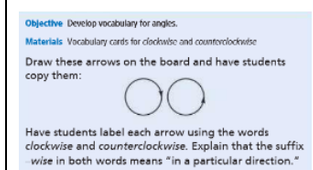
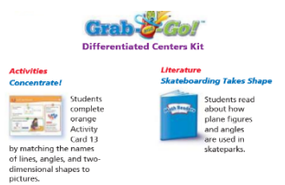
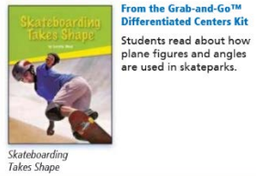
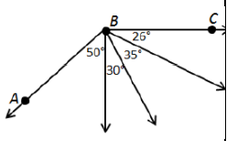
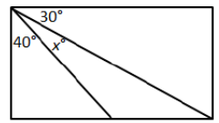
ELD.PI.4.12-Selecting and applying varied and precise vocabulary.

Lesson		Standards & Math Practices	Essential Question	Math Content and Strategies	Models/Tools Go Math! Teacher Resources G4	Connections (ENGAGE prior knowledge)	Vocabulary	Academic Language Support	Journal
11.1	Investigate ● Angles and Fractional Parts of a Circle	4.MD.5a MP 2 MP 3 MP 5 Companion pg. 206	How can you relate angles and fractional parts of a circle?	Relate angles and fractional parts of a circle. The vertex of the angle must be at the center of the circle to describe the size of the angle as a fraction of the circle. *Build a paper protractor with wedges. Have students develop the concept of degrees by first determine how many wedges. They can fold the paper revealing different counts of wedges. See "Measuring Angles with Wedges" tool.	Fraction circles Clock Measuring Angles with Wedges	Ask students what they notice about the angles formed by the hands of a clock: (i.e. 3:00, 2:05, 9:15, 6:00, 4:20, 1:50). Have students use fraction circles to investigate how angles form a circle, 2 rays from the center of a circle. Introduce acute, right, straight, and obtuse angles in connection to those angles in a clock and angles in the classroom.  Build a paper protractor using the wedges protractor tool. Have students use the tool to develop the concept of angles by folding and counting wedges. They can they use the tool to measure angles determining how many wedges an angle is equal to.	clockwise, counterclockwise, angle, circle, ray, vertex, acute angle, obtuse angle, right angle, straight angle	**Vocabulary Strategies**   **Literature Connections** 	Describe and draw the time on a clock when you make a ¾ -turn using the minute hand whose hour hand is on 6:00 pm.
11.2	Degrees	4.MD.5a MP 1 MP 2	How are degrees related to fractional parts of a circle?	Relate degrees to fractional parts of a circle by understanding that an angle that measures n◦ turns through n/360◦ of a circle. Encourage students to	Circles	Review fraction equivalence concepts. Connect those degrees with the type of angles being formed. If a circle is made up of 360 degrees, then:	degree◦, acute angle, obtuse angle, right angle, straight angle		Have students trace one of each kind of angle: 45, 90, and 180 degrees.

		MP 5 Companion pg. 206		think of a circle divided into 360 equal parts, an angle turning through 90/360 of the circle measures 90 degrees◦, 1/360 = 1◦. Using fraction equivalence, students can determine the measure of an angle that turns through 1/3 of a circle (1/3 = 120/360) as 120 degrees.	Relate Fraction circles to 360 degrees	90 degrees = ?/360 120 degrees = ?/360 180 degrees = ?/360 45 degrees = ?/360 Use the Circles to determine how many degrees each fraction is equal to if the whole circle is equal to 360 degrees. 1 circle = 360 ½ circle = 1/3 circle = ¼ circle = 1/5 circle = 1/6 circle = 1/8 circle = 1/10 circle = 1/12 circle =		Literature  **Math Talk** What part of an hour has elapsed during 15 minutes? What do an angle formed using ¼ fraction piece in a circle, a ¼ turn and ¼ hour elapsed on a clock have in common? After students draw and label angles within a circle, have them use sentence frames to describe their work. The angle I drew is a ___ angle because ___. Have students draw 3 different angle types, then trade with a partner to see if they agree on the angle types. Use Math Talk to help students recognize that a circle can be described as the whole and the angles that make up the circle, the parts.	Have them find one example of each angle measure in the classroom. Record, draw, and label.
11.3	Measure and Draw Angles	4.MD.6 MP 4 MP 5 MP 6 Companion pg. 207	How can you use a protractor to measure and draw angles?	Use a protractor to measure an angle and draw an angle with a given measure. Students use their mathematical knowledge of the classification of angles as acute, obtuse, right, or straight to decide on the reasonableness of angle measures.	Protractor Measuring Angles in Shapes with Wedges Drawing Angles with Wedges	Call out the various types of angles and have students use their arms to form the angle being called out. Call out various degrees and have students use their arms to form the approximate degree/angle being called out. Let students explore the protractor and ask them what they notice about it. Use the paper protractors to measure angles in shapes and then to draw angles. Students can then determine how many wedges and use this to make sense of the use of a protractor.	protractor		Locate an angle in the classroom. Measure the angle and record its measure. Classify the angle.
11.4	Investigate ● Unknown Angle Measures	4.MD.7 MP 2 MP 4 MP 5 Companion pg. 208	How can you determine the measure of an angle separated into parts?	Determine the measure of an angle separated into parts, by decomposing and composing angles. Students use addition and subtraction to solve problems involving finding angle measures.	Construction paper, scissors, protractor, pattern blocks Adding up Angles	Use your pattern blocks to ask students about the types of angles found in the hexagon, square, rhombus, trapezoid, parallelogram, and triangle. Put some of the shapes together and see if students can compose or decompose angles to rename the new angles as acute, obtuse, right, or straight.	protractor, decomposing, composing		 Write an equation that you can use to find the m<ABC, then solve.

11.5	Problem Solving ● Unknown Angle Measures	4.MD.7 MP 1 MP 4 Companion pg. 208	How can you use the strategy draw a diagram to solve angle measurement problems?	Use the strategy draw a diagram (bar model) to solve angle measurement problems. Students draw a bar model that shows the relationship between the whole, the given angle measure, and the unknown angle measure. Then they can use the bar model to write an equation to help find the unknown angle measure in the equation.	Bar model, problem solving graphic organizer	Review the use of bar models by having students solve the following: Juan has $45 in his bank account. If he spends $10 on a new CD, how much money does he have left? If Julie has 3 times as much money as Juan has, how much money does she have?	bar model		Use a bar model to find the measure of <x. 

Assessments:

Go Math Chapter 11 Test

Go Math Chapter 11 Performance Task: Klee Kat

****Critical Area 3:** HMH Performance Task: Community Playground

SBAC Practice Problems Hyperlink

SBAC Claim 1 Example Stems