

Grade 4

Unit 4.3	Unit Title Understanding and Measuring Angles	Lesson 1 of 4	Day 1
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Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
<p>4.MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $\frac{1}{360}$ of a circle is called a “one-degree angle,” and can be used to measure angles.</p>	<p>Relate angles and fractional parts of a circle.</p>	<p>SMP2 Reason abstractly and quantitatively.</p>	<p>How can you relate angles and fractional parts of a circle?</p>
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
<p>Recognize an angle and identify its sides and vertex.</p> <p>Use a fraction to represent part of a whole.</p>	<p>Clockwise Counterclockwise Angle Ray</p>		<p>OnCore Lessons 93 Student pp. 185-186 Fraction circles</p>

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
<p>Teachers will guide children to relate angles and fractional parts of a circle following the lesson guidelines in OnCore lesson 93 (TM p. 97), teachers will:</p> <p>Review the meaning of <i>angle</i> and <i>ray</i>. Remind students they have used fractions to describe parts of a circle and that they will see how the size of an angle is related to a fractional part of a circle. Discuss the difference between <i>clockwise</i> and <i>counterclockwise</i>. Stress that the tip of the fraction piece must always be placed at the center of the circle and that the sides of the angles must match exactly as they move the fraction piece around the circle. Ask students to identify fraction turns and if a turn is clockwise or counterclockwise.</p>	<p>In OnCore Lesson 93 students will:</p> <ul style="list-style-type: none"> • Tell what fraction of the circle the shaded angle represents. • Tell whether the angle of the circle shows a $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ or 1 full turn clockwise or counterclockwise. • Solve problems and describe the turns. • Complete student pp.185 - 186

Grade 4

Unit 4.3	Unit Title Understanding and Measuring Angles	Lesson 2 of 4	Day 2
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Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
4.MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.	Relate degrees to fractional parts of a circle by understanding that an angle that measures 1° turn through $n/360$ of a circle.	SMP6 Attend to precision.	How are degrees related to fractional parts of a circle?
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
Classify angles and triangles by appearance as acute, obtuse, right or straight.	Degree ($^\circ$) Acute angle Obtuse angle Right angle Straight angle		OnCore Lessons 94 Student pp. 187 - 188 K-5 Math Resources —activity for 4.MD.5b Angles in Names

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
<p>Teachers will guide children to relate degrees to fractional parts of a circle by understanding that an angle that measures 1° turn through $n/360$ of a circle following the lesson guidelines in OnCore lesson 94 (TM p. 98), teachers will:</p> <p>Ask students to name some standard units that they use for measuring length, weight, and capacity. Explain that there are also standard units for measuring the size of an angle. If necessary, review how to find a fraction equivalent to a given fraction.</p> <p>Discuss the meaning of a <i>degree</i>. Guide students through the example of finding the degrees in $1/6^{\text{th}}$ of a circle and stress that to use this method of measuring of an angle, its vertex must be at the center of the circle.</p> <p>Discuss how to use the measure of an angle to classify it as <i>acute</i>, <i>right</i>, <i>obtuse</i>, or <i>straight</i>. Also explain how angle measures can be used to classify a triangle as acute, obtuse, or right.</p>	<p>In OnCore Lesson 94 students will:</p> <ul style="list-style-type: none"> • Tell the measure of an angle in degrees. • Classify angles. • Classify triangles. • Complete student pp.187-188 <p>In K-5 Math Resources students will: Write their names in capital letters and calculate the value of their name given that an acute angle is worth 7 points, a right angle is worth 8 points, and an obtuse angle is worth 10 points.</p>

Grade 4

Unit 4.3	Unit Title Understanding and Measuring Angles	Lesson 3 of 4	Day 3 - 6
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Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
4.MD.6 Measure angles in whole number degrees using a protractor. Sketch angles of specified measure.	Use a protractor to measure an angle and to draw an angle with a given measure.	SMP5 Use appropriate tools strategically.	How can you use a protractor to measure and draw angles?
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
Use the degrees as a unit for identifying the size of an angle.	Protractor	When students are using the protractor they sometimes will read the incorrect scale of numbers. i.e., when drawing a 60° angle they will draw a 120° angle. Students are to use the bottom scale of numbers when measuring angles opening to the right and the top set of numbers when opening to the left. (Student should also know and check their work. If they are drawing a 60° angle that it is an acute angle.)	OnCore Lessons 95 Student pp. 189 – 190 K-5 Math Resources —activity for 4.MD.6 Predicting and Measuring Angles Angle Barrier Game Angles in Triangles Angles in Quadrilaterals

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
<p>Teachers will guide children to use a protractor to measure an angle and draw an angle with a given measure following the lesson guidelines in OnCore lesson 95 (TM p. 99), teachers will:</p> <p>Introduce the lesson by asking students what tools they have used to measure length, weight, capacity, and temperature. Explain that they are going to use a tool to measure the size of an angle. Review the meaning of <i>degree</i> as a unit of measure for an angle. Show students how to read a <i>protractor</i> and discuss its features – the center point, the two scales, and the 0° mark on each side. Then guide them through the example on the top of p. 189. Ask students why they think the top scale, not the bottom, was used to measure the angle.</p> <p>Show students how to use a protractor to draw an angle when its measure is given. Give them one or two angle measures and have them draw the angles. Then give them an angle classification - acute, right, obtuse, or straight – and tell them to use the protractor to draw an angle of that type. Make sure students are lining up their protractors appropriately.</p>	<p>In OnCore Lesson 95 students will:</p> <ul style="list-style-type: none"> • Use a protractor to find an angle measure. • Use a protractor to draw a given angle. • Draw examples of angles and label its measure. • Complete student pp.189-190

Grade 4

Unit 4.3	Unit Title Understanding and Measuring Angles	Lesson 4 of 4	Day 7 - 10
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Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
<p>4.MD.7 Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.</p>	<p>Determine the measure of an angle separated into parts.</p> <p>Use the strategy <i>draw a diagram</i> to solve angle measurement problems.</p>	<p>SMP1 Make sense of problems and persevere in solving them.</p> <p>SMP5 Use appropriate tools strategically.</p>	<p>How can you determine the measure of an angle separated into parts?</p> <p>How can you use the strategy <i>draw a diagram</i> to solve angle measurement problems?</p>
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
<ul style="list-style-type: none"> •Use a protractor to measure angles. •Use three letters to name angles. •Find the measure of an angle given the measures of its non-overlapping parts. •Draw a bar model to represent a problem situation. 			<p>OnCore Lessons 96 - 97 Student pp. 191-194</p> <p>Protractor</p>

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
<p>Teachers will guide children to determine the measure of an angle separated into parts and use the strategy <i>draw a diagram</i> to solve angle measurement problems following the lesson guidelines in OnCore lessons 96 - 97 (TM pp. 100 - 101), teachers will:</p> <p>Introduce the lesson by reviewing how to measure an angle using a protractor. Remind students the notation $m\angle ABC$ represents “the measure of angle ABC.” Explain that sometimes they can find the measure on a large angle by finding the measures of smaller angles. Guide students through the example on p 191 and ask students to restate the conclusion in their own words. •Review how to find the measure of a large angle when the measures of its non-overlapping parts are known. Discuss how they can use this information to find the unknown measure of one of the parts. Go over the bar diagram on page 193 that shows the relationship between $x + 60^\circ = 100^\circ$ and $x = 110^\circ - 60^\circ$.</p>	<p>In OnCore Lessons 96 - 97 students will:</p> <ul style="list-style-type: none"> • Find the measure of a given angle by adding the measures of its parts. • Use a protractor to find the measure of each angle in a given problem and write the sum of the angle measures as an equation. • Use a protractor to find the measure of each angle in a circle. • Use equations to find the unknown angle measures. • Complete student pp.191-194