Core Content

Cluster Title: Geometric measurement: understand concepts of angle and measure angles.

<table>
<thead>
<tr>
<th>Standard 5: Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:</th>
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</thead>
<tbody>
<tr>
<td>a. An angle is measured with reference to a circle with its center at the common endpoints 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 1/360 of a circle is called a one-degree angle, and can be used to measure angles.</td>
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<td>b. An angle that turns through ( n ) one degree angles is said to have an angle measure of ( n ) degrees.</td>
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MASTERY Patterns of Reasoning:

Conceptual:
- Students will understand the definition of an angle.
- Students will understand the definition and components of a circle (i.e., point of origin, circular arc, interior, exterior).
- Students will understand the fractional relationship of angles to circles.
- Students will understand the definition of degree as pertaining to a circle.
- Students will understand that degrees are one form of angle measurement.

Procedural:
- Students can identify the three components of an angle (two rays sharing a common endpoint).
- Students can identify a circle as being comprised of 360 one-degree angles.
- Students can identify an angle measurement of \( n \) as being comprised of \( n \) one-degree angle.

Representational:
- Students can use models, manipulatives, and pictures to show various types of angles.
- Students can use models, manipulatives, and pictures to show degree as the basic unit of measurement of a circle.
- Students can use models, manipulatives, and pictures to show the relationship between an angle and a circle.
- Students can use models, manipulatives, and pictures to show how an angle is measured in \( n \) degrees.
Supports for Teachers

Critical Background Knowledge

Conceptual:
- Students will understand the definition and components of ray.
- Students will understand the basic fractional parts of a circle (e.g., \( \frac{1}{2}, \frac{1}{4}, \frac{3}{4} \)).
- Students will understand the four mathematical operations.

Procedural:
- Students can identify the construction of a ray.
- Students can identify the fractional parts of a circle.

Representational:
- Students can use models, manipulatives, and pictures to construct a ray.
- Students can use models, manipulatives, and pictures to represent fractional parts of a circle (e.g., \( \frac{1}{2}, \frac{1}{4}, \frac{3}{4} \)).

Academic Vocabulary and Notation

- intersection, circular arc, angle, vertex, point of origin, circle, ray, degree, circular interior, circular exterior, end point

Instructional Strategies Used

Students must have practice examining and labeling the components of a circle and recognizing angles formed when rays are drawn from the center of the circle.

To make an angle finder:
- Cut out two circles using a different color for one of the circles. Fit circles together using the slit. Slide the circle wheel around to form different fractions.

Resources Used

- Video showing angles growing by \( n \) degrees—good for teacher background ONLY!
  

- Math quiz using angles and degrees:
  

- Finding degrees of angles:
  

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<th>Assessment Tasks Used</th>
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<td><strong>Skill-Based Task:</strong></td>
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<td>Students use the angle finder created in class. Teacher calls out angles formed by parts of the circle—½, ¼, ¾—and students create the angles with their finders. Teacher could extend the activity by showing other angles and asking students to form a similar degree angle with the finders.</td>
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| **Problem Task:** |
| Students will use their angle finder to locate and identify angles in real-life settings (i.e., classroom, playground, home). Students will trace the measurement of the angle finder to represent the measurement of the angle. Students will label the representation with rays, vertex, and interior arc. |

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