Instruction Plan

The radius, diameter, and circumference of a circle

Standard(s): 7.G.4	**Moby Skills:**	**Domain:** Geometry	**Strand:** Circles

Vision-Setting Notes: This strand will introduce students to **measurements specific to circles** and will attempt to deepen understanding of these measurements by defining them, connecting them to measurements previously encountered, relating them to each other, and describing how they can be used.

Lesson Fit: First strand! This strand will be the first time students encounter new terms, so it will focus on broad understanding over application to come in subsequent strands.

Grade Level Fit: Students will have calculated perimeter and area of squares, rectangles, and triangles in previous grades. This instruction will set up learners to calculate circumference and areas of circles, skills associated with this grade level.

Instruction Plan Vision and Targets: This strand will be all about grounding basic vocabulary and concepts for circle-related geometry. It should focus on relating the radius and diameter, and connecting the circumference to the idea of perimeter. Pi will be introduced in the subsequent strand, so these problems will need to dance around that concept and should avoid relating radius and diameter to circumference beyond them all being length measurements.

Key Points:

- Definitions:
  - Circle is a round, flat (2D) shape with an equal distance from its center to any point on its edge.
  - Radius is the distance from the center of a circle to the circle's edge. It is half the circle's width.
  - Diameter is the distance across the longest part of the circle; the diameter will always pass through the circle's midpoint; the diameter is the circle's width.
  - Circumference is the perimeter of a circle. It is the total distance around the circle.
- Relations:
  - Radius is half the diameter.
  - Diameter is double the radius.
- Spatial understanding:
  - […redacted…]

Common Misconceptions:

- Confusing the terms verbally
- Confusing the terms conceptually (relations between terms)
  - Radius is double the length of diameter
  - Diameter is half the length of radius
- Terms are non-length measurements
  - Radius/ diameter/ circumference (r/d/c) measures area
  - R/d/c are constants
- Spatial slippages
  - Diameter does not need to pass through midpoint; any line connecting two nodes along circumference of circle is diameter

	○ Circumference cannot be measured since circles are round; no start/end of measurement

Guided Practice:

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Instructional Script:

1. Introduction with the definition of a circle
    a. "We've encountered circles before, and now we're going to dig a little bit deeper. What makes a circle a circle? How is it uniquely different from other rounded shapes? [Show a few rounded shapes.]
    b. "A circle is a shape that traces all of the points that are the exact same distance around a specific midpoint. [Highlight midpoint. Animate a radius extending to circle's edge, highlight point of intersection, rotate radius around to highlight circumference.]
    c. "To show it another way, we can draw a circle from scratch by drawing a midpoint [create a new midpoint on screen], and start marking points each the same distance from the midpoint [animate 4-12 points in this way] and start tracing the line that emerges by connecting these points [animate the connections]. As long as my traced line remains the same distance from the midpoint as the anchor points we marked initially, we will end up with a circle.
2. Define radius as the distance from midpoint to edge.
    a. […redacted…]
3. Define diameter as width of circle, twice the radius, and passing through the midpoint.
    a. […redacted…]
4. Define the circumference as distance around the circle.
    a. […redacted…]
5. Summarize vocabulary: circumference, diameter, radius, midpoint
    a. […redacted…]