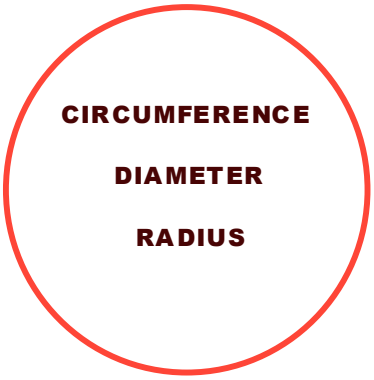

Algebra / Geometry Institute Summer 2007

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6th Grade

1. Teaching Objectives:
   - The students will determine the circumference, diameter, and radius of a circle. (Mississippi Department of Education Mathematics Framework 4c)

2. Instructional Activities:
   - Inform students that today they will be learning about measurements associated with circles.
   - Write *circumference, diameter, and radius* on the board. Ask students if they can help you define these words.
   - Write the definitions of the words on the board:
     - Circumference – the distance around a circle
     - Diameter – a line segment that passes through the center of a circle whose endpoints are on the circle
     - Radius – a line segment joining the center of a circle to any point on the circle
   - Say, "Now that we know the definitions of these words associated with circle measurements, let's look at a circle and discuss how to find them."
   - Draw a circle on the board. Ask, "What do you think we might use to find the diameter of this circle?" (Expected response: meter stick or ruler) Use a ruler or meter stick to measure the diameter of the circle. Write the measurement on the board. (Remind students that the diameter must pass through the center of the circle.)
   - Ask, "What do you think we might use to find the radius of the circle?" (Expected response: meter stick or ruler) Use a ruler or meter stick to measure the radius of the circle. Write the measurement on the board.

- Ask, “Can we use a meter stick or ruler to measure the circumference of this circle? Why?” (Expected response: No. Because the circle is round and a ruler measures straight objects.) “If we cannot use a ruler, what can we use?”
- Give the students a few moments to think of something that will measure around the circle.
- Show the students a piece of string. Ask, “What if we wrap this string around the circle, then straighten the string out and measure it with the meter stick? Do you think that will work?” (Expected response: Yes, it will work.)
- Demonstrate how the string method works with a round object found in the classroom. Measure the diameter and radius of the object also.
- Tell the students that they are going to work in groups to measure the diameter, radius, and circumference of various circular objects.

- Measurement Activity
    - Divide the class into groups of three. Each group should be given 4-5 circular objects, a piece of string, a ruler, and a Recording Sheet (Attachment 1).
    - Instruct each group to measure and record each object’s circumference, diameter, and radius.
    - Circulate around the room to make sure that all students are participating. Assist students or groups who are having trouble.
    - After the groups have finished measuring all of their objects, ask if there were any objects they had trouble with. Ask what the most difficult part of the activity was. Discuss the students’ answers with the class.
    - Display a transparency of a completed Recording Sheet (Attachment 1).
    - Ask, “Can anyone see a relationship between the diameters and radii of the circles?” (Expected Response: the radius doubled equals the diameter, or the diameter divided by 2 equals the radius)

    - Say, “That’s right. If you multiply the radius by 2 your answer is the diameter, and if you divide the diameter by 2, your answer is the radius.” Write the formulas on the board.
    - Ask, “Did anyone use these formulas to find the diameter and radius?” “Why might these formulas have been helpful to us?” (Expected response: It would have saved time by not having to make as many measurements.)
    - Draw a circle on the board and give it a radius of 2. Tell the students to use the formula to find the diameter.
    - Draw another circle on the board and give it a diameter of 10. Tell the students to use the formula to find the radius.
- Wrap-up
    - Ask if anyone can think of any reason we may need to know the circumference, diameter, and or radius of a circle. Explain that we need to know the diameter of a clock to see if it will fit in a spot on a wall. We may need to know the circumference of a candle to see if it can fit in a candleholder. We also may need to know the size of a round table to be able to find a tablecloth that will fit the table.
- Assign students to go home and look around their house to find a circular object. They should find the radius, diameter, and circumference of that object. Students can share their results during the next class.
- This lesson is designed to be extended to another lesson calculating Pi using the book Sir Cumference and the Dragon of Pi by Cindy Neuschwander. (ISBN 1570911649)

3. Materials
    - Rulers or meter sticks
    - Various circular objects (tops of jars, cd’s, plates, cups, bowls, candles, etc…)
    - String
    - Recording Sheet for Activity (Attachment 1)

- Transparency of completed recording sheet

Resources

- Lesson adapted by Carley Jefcoat from http://www.eduref.org

4. Assessment
    - The teacher will collect students' recording sheets to check for students' understanding of the difference between circumference, diameter, and radius.
    - Optional – Have students write a journal entry, sharing what they learned from the lesson.

Attachment 1

RECORDING SHEET

OBJECT	**DIAMETER**	**RADIUS**	**CIRCUMFERENCE**