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Lesson Begins on next page

# Understanding Circumference and Area of a Circle Lesson Plan 7th Grade

This is the third lesson in a series on circles. It follows the [Elements of a Circle Lesson Plan 7th Grade](#) and the [Understanding Pi Lesson Plan 7th Grade](#). When all three lessons are done, students should have a firm understanding of what makes a circle, what pi represents, and how to find the area and circumference of a circle. This lesson does require that students are comfortable with pi and does allow for differentiation and writing.

## Objectives/Learning Targets

- Students will understand that pi is the ratio .
- Students will be able to find the area and circumference of a circle.
- Students will understand the connection between the area of a square and the area of a circle.

## Supplies Required

- “The Ripple Effect” Worksheet
- Calculators
- Scissors (1 pair per group of 4)
- Glue stick (1 per group of 4)
- 3 different colored sheets of square paper (origami paper works well) per group of 4 students
- “Area of a Circle” Worksheet
- Student’s Circle Foldables from the last two sessions (started in [Elements of a Circle Lesson Plan 7th Grade](#))

## Methodology

### Understanding Circumference

1. At this point, students should understand the following points. If this lesson is being done on a different day, I recommend reviewing these key points before beginning the day’s lessons. All information should be found on the students’ foldables.
  1. [Circumference](#) is the distance around a circle.
  2. The [diameter](#) is the distance across the circle, passing through the center.
  3. The [radius](#) is the distance from any point on the circle to the center.
  4. Diameter is two times the radius.
  5. Pi is the ratio .
  6. Pi can be approximated to 3.14.
2. Get students into collaborative groups of 4 students and pass out “The Ripple Effect” Worksheet. Note that the first 2 pages are very guided. The numbers may require calculators

yet it is still scaffolded. The last two pages may be used as either enrichment or as a follow up homework/family involvement assignment.

3. Add the circumference information to the Circle Foldable.
4. Homework/Review for this session can be a worksheet on circumference.

### **Understanding Area of a Circle**

1. Have students stay with their foursome from the previous activity.
2. Pass out 3 congruent square sheets of paper in different colors to each group, a pair of scissors, and a glue stick.
3. Have 1 student from the group fold one sheet in half and then in half again ("snowflake fold"). From this point, have the student cut the shape of a quarter circle. Be careful that they cut off the "open flap" side. This needs to be the biggest circle possible so the arc will go to both corners. Recommend that they really cut wide or the circle will be misshaped. You will want some extra sheets on hand. Glue this circle on top of the square with the folds horizontal and vertical. (Included is a sheet with images for the Square/Circle/Diamond Cut Outs.)
4. Have another student fold the third sheet in half and then in half again ("snowflake fold"). From here have the student cut from one corner to its diagonal corner. Be careful that they cut off the "open flap" side. This should form a diamond/rhombus/square. Glue this diamond on top of the circle with the folds horizontal and vertical.
5. Lead a short class discussion on the shapes and recap their properties.
6. Have another student cut the large shape into four equal parts. Each student will get one part.
7. As a class discussion, ask the following questions:
  1. What shape do we have on the bottom?
  2. If the square represents our whole, what fraction of the whole is the triangle? How do you know?
  3. Does the quarter circle have a greater or smaller area than the triangle? How do you know?
  4. Since the quarter circle has a greater area than the triangle, is it greater than or less than  $\frac{1}{2}$  of the area of the square?
  5. Does the quarter circle have a greater or smaller area than the square? How do you know?
  6. Since the quarter circle has a smaller area than the square, is it greater than or less than 1 of the area of the square?
  7. Can we put that into the form of a compound inequality? The quarter circle is greater than \_\_\_\_\_ of the square but less than \_\_\_\_\_ of the square.
8. Pass out the "Area of a Circle" Worksheet: Have students work as a group on the first half. Lead a class discussion for the back side.
9. As a summation for the day, have students add information about the area of the circle to their Circle Foldables.
10. Homework/Review for this session can be a worksheet on the area of a circle.

### **Common Core Standard Addressed**

#### **[CCSS.MATH.CONTENT.7.G.B.4](#)**

- Know the formulas for the [area](#) and [circumference of a circle](#) and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

Addresses all 8 Standards for Mathematical Practice

#### Web Resources on Circles

- [Circumference of a circle](#)
- [Circumference Applet](#)
- [Area of a circle](#)
- [Area of Circle Applet](#)
- [diameter](#)
- [radius](#)

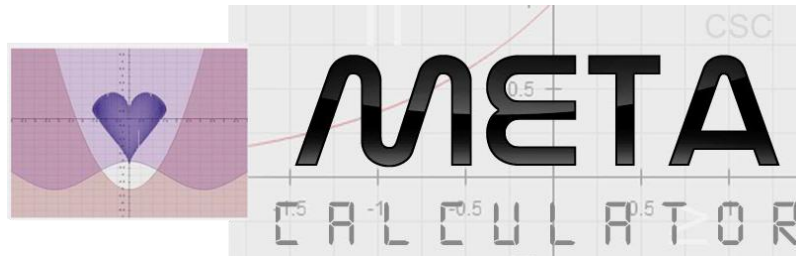
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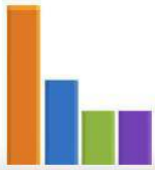
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