

# Circles, Circumference & Visual Arts

## 7th Grade Math and Visual Arts

### CORE SUBJECT AREA

Math

### ART FORM + ELEMENTS

Visual Arts

Drawing, Line, Shape, Form, Texture, Color, Balance, Emphasis, Contrast

### MSCCR STANDARDS

7.G.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 circumference and area of a circle

### MSCCR CREATIVE ARTS STANDARDS

AH-7-SA-S-VA1  
AH-7-SA-S-VA2  
AH-7-SA-S-VA3  
AH-7-SA-S-VA4  
AH-7-PA-S-VA1  
AH-7-PA-S-VA2  
AH-7-PA-S-VA3  
AH-7-PA-S-VA4  
AH-7-IAA-S-4

### DURATION

This lesson requires 1-4 full class periods, depending on TT discretion and time.

### OBJECTIVES

Math: I can identify the parts of a circle including diameter and circumference. I can identify pi. I can justify that  $\pi$  can be derived from the diameter and circumference.

Arts and Humanities: I can understand the commonalities between geometry and visual art. I can discuss works of art in terms of their color schemes and contrast. I can work with my peers to create a work of art with specific criteria. I can evaluate my own work and the work of my peers in a supportive manner.

### MATERIALS NEEDED

String (approx. 2 yards per student)  
cm rulers or tape measures,  
Cylindrical shaped objects of various sizes (>4 per group)  
Colored card stock  
Scissors  
Calculators  
Large sheets of black foam core board or cardboard for mounting  
Glue

### VOCABULARY

Circumference, radius, diameter, pi, area, texture, line shape, form, balance, contrast, emphasis, pattern

### RECOMMENDED RESOURCES

Videos on formulas and parts of a circle, as well as visual art vocabulary.

[https://www.youtube.com/watch?v=cC0fZ\\_lkFpQ](https://www.youtube.com/watch?v=cC0fZ_lkFpQ) 'What is Pi?'

<https://www.youtube.com/watch?v=O-cawByg2aA&t=70s> 'Circles, Circumference, and Area'

<https://www.youtube.com/watch?v=CIBzB-Jtf6E> 'Visual Art Vocabulary Education'

<https://www.youtube.com/watch?v=b-PqO-ILcYo&t=1s> 'How to pick colors for your design'

## LESSON SEQUENCE

Explain that you are going to do an art project related to circles. Show the video on “Visual Art Vocabulary” pausing to lead discussions about patterns with geometric shapes. Show students the ‘How to pick colors for your design’, then show the variety of colors of cardstock that you have available. Lead them in developing a rubric for assessing the project. Divide the class into groups and allow the groups to select four to six colors of cardstock. Put the sheets away for the next day.

Ask students what ideas that are important in geometry are also important in art. Allow them to brainstorm and guide them toward identifying shapes. TTW distribute a ‘Circle Data Chart’ handout to each student as well as ‘Interactive Circles’. TSW glue the Interactive Circles on the back of their Chart handout to label and record formulas and vocabulary notes from the videos. Show the ‘What is Pi?’ video, and discuss parts of a circle and the purpose of Pi.

Short Activity:

Before beginning, be sure to have a variety of cylindrical objects available—at least four per group. You want a variety of sizes, but none should be too small. Students will measure the circumferences of a variety of different size cylinders and record the results. Using string to measure the circumference of cylinders and rulers to measure the length of the string, have them record the data on the Circle Data Chart. It is much easier for students to use the base of the cylinder to measure the circumference of a circle.

Next, have students trace the circular base of each cylinder, determine the diameter, and record the results. Have students use scrap paper to trace and cut out the circular base of each cylinder. Then, fold the circular template in half to locate diameter.

Then have students measure diameter and record data on the Circle Data Chart. Demonstrate how you can trace shapes at the edge of the paper or in the corners and have a larger piece of uncut scrap left over. Tell students to cut their circles by opening their scissors wide, to get a more even cut than with the tips. By rotating the paper toward their scissor hand instead of moving their scissors hand around the circle, they will get a truer circle.

Then, have students calculate the ratio of circumference to diameter in circles and record data. Have students use their recorded data to discuss the relationships and form a generalization. TTW show the video ‘Circles, Circumference, and Area’, and finish labeling the circles on the back of their ‘Circle Data Chart’. (The generalization should be that the circumference is about 3x’s the Diameter, giving you the explanation of Pi-3.14.

When you multiply the Diameter by Pi you should arrive at the Circumference  $C=3.14 \times D$ .)

After students have completed the measuring, recording, and ratio activities, have each group store it’s circles and scrap paper for the next day to use in their project.

Project Day One: Distribute the circles and scrap paper, scissors, cylindrical objects, the black foam board or cardboard, and glue. (TT may wish to supply groups with liquid/cement glue and sticks) Review the rubric you developed as a group. If desired, make any final changes.

Allow groups to cut additional circles; cut the circles into halves, quarters, or  $\frac{3}{4}$  pieces; experiment with arrangements; and glue their compositions. Compositions should include any form of visual art using the geometric shapes that were created from the previous day/activity, and using the cardboard as their canvas.

Day Two:

Distribute the rubrics. Allow each group to self-assess and to write a rationale for the score they give themselves. Remind them to use terms like contrast, primary, secondary and tertiary, warm and cool, and shade and tint.

## EXTENDED LEARNING ACTIVITIES

Allow each group to assess another group’s project and write a rationale. Allow the groups that assessed one another’s projects time to compare and discuss their assessments before they finalize the scores. Remind students that an important aspect of discussing and evaluating art is having respect for differing opinions and being supportive of one another.

Exhibit the projects and the student charts on circumference, diameter and the relationship between the two. Invite other classes, families, school and community leaders, and the media to the exhibit. If possible, have an opening reception for the exhibit and allow your students to present and explain their work.

## SOURCES

[https://mpb.pbslearningmedia.org/resource/ket-7visual\\_arts/circle-designs/?#.Ww7Rxu4vzIU](https://mpb.pbslearningmedia.org/resource/ket-7visual_arts/circle-designs/?#.Ww7Rxu4vzIU); Edited by Jessica Jarman.

## TIPS + FREQUENTLY ASKED QUESTIONS

- Each work group should have their own set of supplies.
- TT may wish to start students with a basic rubric and guide them through the specifics.