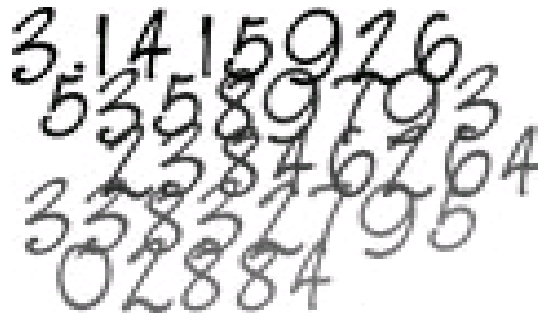


School District of Philadelphia
Office of Curriculum and Instruction
Cecilia P. Cannon, Associate Superintendent

Pi Day Activities



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Pi Day Contest Directions

Be creative in your submissions!

Pi Buttons, Pi Songs, Pi Posters, Pi Poetry, Pi Stories

(It's easier for students if you give them a theme to work around like Circles All Around Us.)

- Hold a school-wide contest first:
Choose one winner (teams ok!) for grade levels K-1, 2-3, 4-5, 6-8, 9-12.
- Submit school winners (teams ok!) to your regional office on or before **March 14**.
Choose one winner for grade levels K-1, 2-3, 4-5, 6-8, 9-12.
- Regional offices send one winner (teams ok!) for grade levels K-1, 2-3, 4-5, 6-8, 9-12 to the Office of Curriculum and Instruction, Mathematics, Cubicle 2018.04 on or before **March 31**.
- District winners to be announced on or before **April 21**.

Celebrating Pi Day

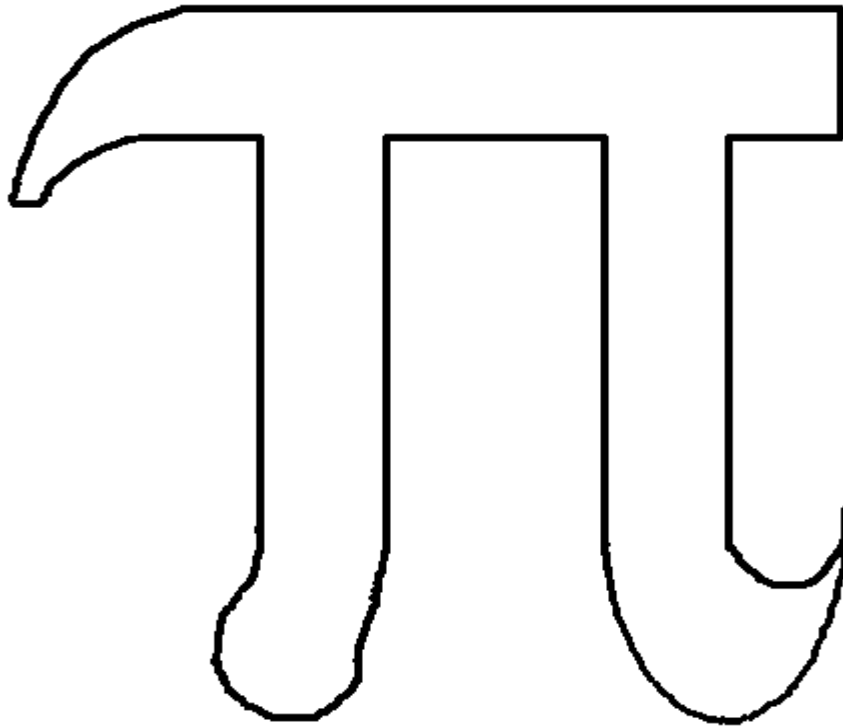
Pi Day is a day to celebrate mathematics in your school. It provides the perfect springboard to allow students to have fun while investigating mathematical concepts.

Suggested Pi Day Activities

Feel free to use any and all activities that will work with your students!

Kindergarten:

π Color the pi symbol. Explain that this is a special symbol used in mathematics.



π Sing the song “We Wish You a Happy Pi Day” by Dianna sung to the tune of We Wish You a Merry Christmas

We wish you a happy Pi Day
We wish you a happy Pi Day
We wish you a happy Pi Day
To you and to all

Pi numbers for you
For you and for all
Pi numbers in the month of March
So three point one four!

π Sing Happy Birthday to Albert Einstein.

First Grade:

π Diameter Draw: Hand out copies of circles and have students use a ruler to draw and label the diameters of the circles.

π Diameter Cheer: After teaching the meaning of diameter of a circle, have students create a cheer that describes a diameter. For example:

Circle, Circle
Draw the Line
Right through the Middle
Every time,
Diameter!

Second Grade:

π Circle Art: Have students create pictures using only colored circles. (Teacher precuts the circles in various colors) Badge-a-minute has a circle cutter for their buttons that you can buy but it's great for cutting out circles quickly without any measuring.

π Sing O Number Pi: (to the tune of "Oh Christmas Tree")

Oh Number Pi

Oh, number Pi
Oh, number Pi
Your digits are unending,
Oh, number Pi
Oh, number Pi
No pattern are you sending.
You're three point one four one five nine,
And even more if we had time,
Oh, number Pi
Oh, number Pi
For circle lengths unbending.

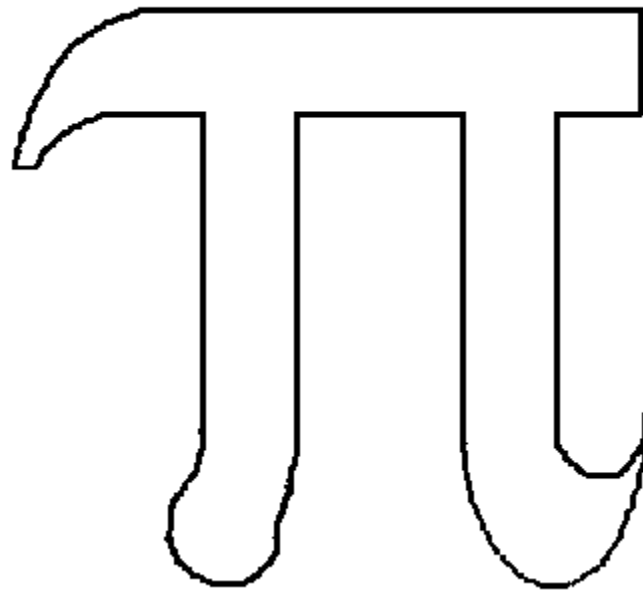
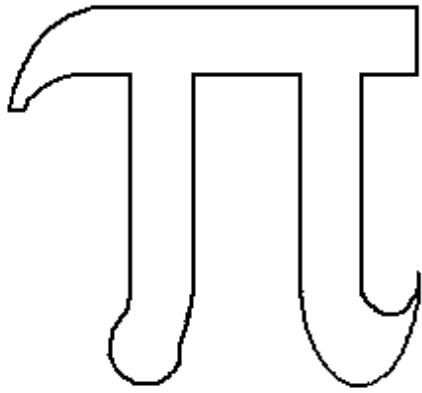
Oh, number Pi
Oh, number Pi
You are a number very sweet,
Oh, number Pi
Oh, number Pi
Your uses are so very neat.
There's 2 Pi r and Pi r squared,
A half a circle and you're there,
Oh, number Pi
Oh, number Pi
We know that Pi's a tasty treat.

Third & Fourth Grade:

π Pi Digit Distribution: Look at the first 50 or 100 digits of pi and make a bar graph that shows the frequency of each digit. How many times does zero appear?

π Infinite Diameter Draw: After reviewing the meaning of diameter of a circle, have students use a ruler to draw as many diameters into the circle that they can fit. Teach students that a circle has an infinite number of diameters.

π Create a Pi Mobile using the pi symbols below and the larger pi symbol listed under Kindergarten activities.



Fifth Grade:

- π Pi Digit Distribution: Find the mean of the first 100 digits.
- π Pi Day Necklace: Make a pi necklace to reinforce the idea that some numbers never repeat or end. Assign a color to each digit, including zero and then string the beads of those colors into a necklace using the digits of pi as a guide. The first bead, representing the first number 3, is bigger than the rest. All the other beads are the same size.
- π Read Sir Cumference and the Dragon of Pi. Write short stories about Sir Cumference and the Dragon of Pi to read aloud.

π Whole-class activity: have one student stand in the middle of the gymnasium, holding one end of a known length of string. Then walk the other end of the string around to form a circle, placing students evenly on the imaginary circumference. When finished, you should have your students representing a fairly good circle, with one in the middle. Use the tape measure to find the diameter, using the center student for accuracy in measuring through the circle's center. Then measure the circumference as well. Calculate for Pi.

π Favorite Pie Graphs: This activity takes about 60 minutes. Have students vote for their favorite type of pie. Find the percent of the class that voted for each type of pie. Calculate the percent of 360 degrees for each "slice". Have the students make a PIE GRAPH of the results. Make the graph inside of a pie tin.



Favorite Pie Data			
	Fraction	Percent	Percent of 360
Cherry			
Pumpkin			
Chocolate			
Apple			
Coconut			
Pecan			
Other			
Total			

Grades 6-8:

π Discovering Pi



Using a tape measure (centimeter side), measure the circumference and diameter of 6 different objects. Measure to the nearest _ centimeter. Record the object number, circumference, and diameter in the chart below. Then, write the ratio of the circumference to the diameter in the form of a fraction. Next, use a calculator to change the fraction into decimal form, rounding to the nearest thousandth. After doing this for all 6 objects, find the mean (average) of the 6 calculations.

Lid #	Circumference	Diameter	<u>Circumference</u> Diameter	Circumference divided by Diameter

Average _____

Explain what pattern developed when you divide the circumference by the diameter?

A commonly used approximation for pi is 3.14. How close is your average to pi? Find the difference between your average and pi.



Writing Prompts for Discovering Pi

1. In mathematics, Pi is approximately 3.14159. Explain in your own words how the value for pi is found.

2. Pi is an irrational number.
 - a) Write 2 or more sentences explaining what it means for a number to be irrational.
 - b) Give an example of a number that is rational and write a sentence explaining why it is rational.
 - 3 Which approximate is more accurate for pi: $22/7$ or 3.1? Explain why. Use complete sentences.
- π Surface Area of a Sphere: Take a sheet of paper and cut it into small right triangles. Find the area of each of the triangles. Glue the triangles onto a tennis ball and calculate the surface area!

Grades 9-12:

- π Name that Circle: Show students a graph of a circle and ask them to give the equation. Look in Planning and Scheduling Timeline in the Appendix for other activities.
- π Draw a picture of a circle with different parts labeled (diameter, radius, chord, arc, etc.) Describe each part and explain the relationships among them.
- π Internet Scavenger Hunt: Ask students to research The Story of Pi on the internet.
1. What is Pi the ratio of?
 2. Who were the first people known to find a value for pi?
 3. In the first one million digits of pi, how many threes are there?
 4. What does it mean to “square a circle”?
 5. People once thought that trying to square a circle was an illness. What was the name of the illness?
 6. What was the most inaccurate version of pi? Explain who, when and what the value was.
 7. Who memorized 42,195 digits of Pi on Feb. 18, 1995? Where was the person from?

Geometry Classes

π Six Stations: Working in groups, ask students to find solutions to the problems presented at six stations. Spend approximately ten minutes at each station over a period of two days. The stations should be positioned in the classroom so that students can move from station to station in a clockwise fashion.

Station 1 - Pool Problem

Students are given the area of a circular pool and a distance from the edge where a circular fence will be constructed. They are to find the amount of fencing needed.

Station 2 - National Park Problem

Students are given sufficient information to find the circumference of a tree. They are to find the diameter of that tree.

Station 3 - Shaded Region Problem

Students are given three sketches involving the same square with a different number of circles within the square. They must determine which sketch has more shaded area.

Station 4 - Windshield Wiper Problem

Students are given the length of a windshield wiper, the length of a rubber wiping blade and the central angle of the sector. They must determine how much area is covered by the blade.

Station 5 - Pizza Problem

Students are given the diameter and the calories, per square unit, of a pizza. They must determine the measure of the central angle of a slice, given a restriction of number of calories per slice.

Station 6 - Tennis Can Problem

Students are given a tennis ball can filled with three tennis balls. They are to determine a relationship between the circumference of one tennis ball and the height of the can.

π The Soda Can: Geometry in Industry:

1. Why is a soda can the shape or size that it is? One reason may be that the manufacturer wants to minimize the amount of aluminum used to make the can. This requirement involves finding the smallest surface area of the can whose shape is a cylinder. The volume of the soda can is fixed at 400 cubic centimeters. Use the volume with each radius to find the possible heights of different sized soda cans. Once the height column is completed calculate the surface areas. The results for $r = 1$ cm are already given. Round the height to the nearest tenth and the surface area to the nearest whole number.

radius	height	Surface Area
1 cm	127.3 cm	806 cu. cm.
2 cm		
3 cm		
4 cm		
5 cm		
6 cm		
7 cm		
8 cm		

2. Graph the radii and the surface areas on a sheet of graph paper with the radius as the independent variable and the surface area as the dependent variable.
3. Based on the results of your research, what radius and height should you choose to minimize the amount of aluminum used in a soda can? Explain your conclusion.
4. Measure an actual soda can and record its dimensions (radius and height). How do these values compare to the results of your research?

Algebra II Classes

π Functions can be fun!

Objective - Students collect data and discover the functional relationships between varying quantities.

Collecting data - Students will be working in groups. They are provided with an assortment of cans, varying in height and radius. They will measure 10 different cans, using string and rulers, then record the measurements on a worksheet.

Activity - The students input this data into their TI-83 or 84. They then create a scatter plot and find the line of best fit and answer questions relating to the graph.

Trigonometry Classes

π In celebration of Pi Day, the Trigonometry/Advanced Math students can investigate problems which involve the value of pi (approximately 3.14) in the solution. The four challenge problems include geometric, algebraic and trigonometric concepts. In small groups of three or four, the students discuss possible solutions to the problems.

Problem #1

What is the area of the union of two circles of radius 1 whose centers are 1 unit apart?

Problem #2

Find the percent increase in the area of a circular pizza if the radius is increased from nine to ten inches.

Problem #3

If Juan can consume in one sitting one medium (12 inch diameter) deep dish (1 inch thick) pizza, what is the minimum volume of his stomach?

Problem #4

If a circular track is 5 meters wide and it takes a horse, traveling its fastest, pi more seconds to travel the outer edge than the inner edge, what is the horse's speed?