



Pi Day Celebration Challenge

Celebrate Pi Day on March 14 by completing a series of short activities all relating to the amazing number pi. The supplies needed are ones that you likely already have at home. When you complete six of the seven activities in the Pi Day Celebration Challenge, you will have earned the current Pi(e) Day patch! Visit girlscoutsw.org/piday for details.

Activities:

1. What is Pi?
2. To Infinity and Pi
3. Communicating with Symbols
4. Women Pi-oneers
5. The Sweet Sounds of Pi
6. Pi's Sister Phi
7. Pi(e) Day



girlscouts
of oregon
& sw washington

Activity 1: What is Pi?

You may be wondering: If pi isn't that warm, gooey, apple cinnamon goodness fresh from the oven, then what is it? Pi is what's known as a mathematical constant—it is the ratio of a circle's circumference (distance around) to its diameter (distance across). No matter what size circle you have, the ratio, pi, will always be the same. *Let's test it!*

For this activity, you are going to need:

- Two circular objects of different sizes
- String
- Scissors

Instructions:

1. Begin by wrapping the string once around one of your circular objects.
2. Next, cut the string to that length, this will give you the circumference.
3. Now, take your cut circumference string and stretch it across the object. Be sure to have one end of the string at the object's edge.
4. Cut off the remainder of the string. This stretched piece laying across your object will give you your diameter.
5. Using the remainder of your string, cut as many diameter lengths of string as you can.
6. Repeat this with a new string on your other circular object.

No matter what size your circle is, you should always be able to cut three full diameters from your circumference and have a little bit left over. That ratio, the number of diameters in one circumference, is pi, 3.14.



Activity 2: To Infinity and Pi

3.1415926535
8979323846
2643383279
5028841971
6939937510
5820974944
5923078164
0628620899
8628034825
3421170679
8214808651
3282306647
0938446095
5058223172
5359408128
4811174502
8410270193
8521105559
6446229489
5493038196

Guess what! We have infinite, meaning a never-ending amount, of pie! Quick! Grab a fork! Oops. We mean pi. Pi is infinite. And that means it goes on forever—so far, it's been calculated all the way out to 62.8 trillion digits!

Pi is known as an irrational number, meaning it cannot be shown as a fraction or part of a whole number. We often write pi as 3.14, but actually, it's 3.1415926535 8979323846 2643383279 5028841971 6939937510 5820974944 5923078164 0628620899 8628034825 3421170679... and on and on and on!

In celebration of Pi Day, let's see how many digits of pi you can memorize. Try listening to a pi song, or to make up your own! Try and create the next big hit camp song about pi.

Check out one of these videos to get memorizing and for some inspiration:

- [The Pi Song \(Memorize 100 Digits Of Pi\) | SCIENCE SONGS on Youtube by asapScience](#)
- [The Pi Song: Funny Song to help you memorize Pi on Youtube by Songdrops](#)
- [The Pi Song \(Easy as Pi\) | Pi to 244 Digits & a little more! on Youtube by Silly School Songs](#)

Activity 3: Communicating with Symbols

👋 ! R U 🏠 ?

🥧 👍 🍴 ?

Were you able to read what that said? If you weren't, that's okay. It reads something like, "Hi! Are you home? Is the pie ready to eat?" We use symbols daily to communicate different things; emojis are just one example.

Pi can be written as a symbol, too: it's π . Have you ever wondered why these different symbols were chosen? The symbol π is a Greek letter, and it is the first letter in the Greek word for circumference (περιφέρεια). So that's why the symbol π was selected.

Think of some of the other symbols we use every day. See if you can come up with a sentence that's written all in symbols. Now, let's think back to math. In math, many symbols represent different things, such as how "X" is often used as the missing value. What other symbols can you think of that are used in math? Try and find out why any of the symbols you thought of are used to represent what they do.



Activity 4: Women Pi-oneers



Florence Nightingale



Ada Lovelace

When talking about early accomplishments in math and science, you may have heard the names Einstein or Newton—but they weren't the only ones who seriously impacted the world as we know it today! Florence Nightingale and Ada Lovelace are just two of the women pi-oneers that have taken on the male-dominated field of math and made the world a better place because of it!

Florence Nightingale, a statistician and nurse, gathered data and made calculations that changed nursing to what we know today. During the Crimean War in 1853, Florence made data-driven decisions that reduced the hospital's death rate by two-thirds! She then translated this data into a format that anyone could understand (not just a math wiz), which inspired change and new standards in healthcare.

Ada Lovelace, known affectionately as the "Enchantress of Numbers," is considered the first computer programmer. She collaborated with Charles Babbage on the first programmable computers in the mid-19th century. Ada was thinking way ahead of her time and was able to conceptualize how a computer could turn content into digits! This laid the foundation for computers and computer programming as we know it today.

These are just two of the many women of mathematical history. Take a moment and look into another woman who has changed the world through math!

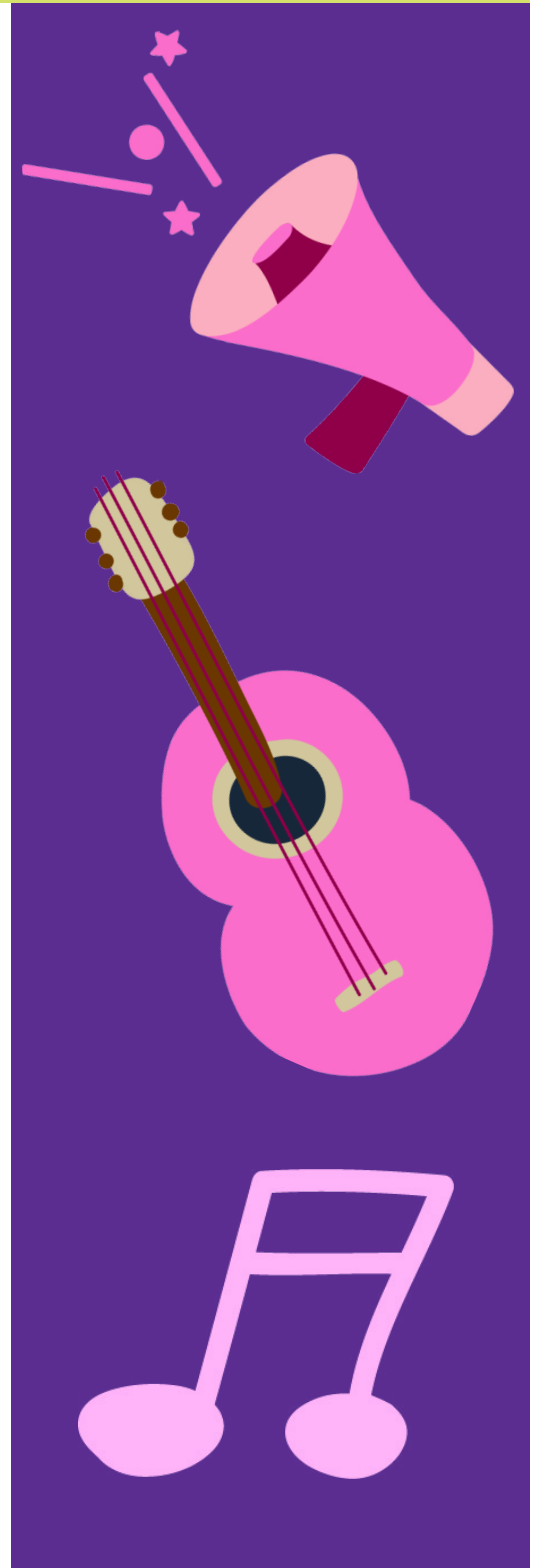
Activity 5: The Sweet Sounds of Pi

We have already explored so much about pi that we will just listen to the sweet sounds of 3.14 for this activity. Since pi is just a series of numbers, 0 through 9, we will assign each number a note or a sound and then play pi!

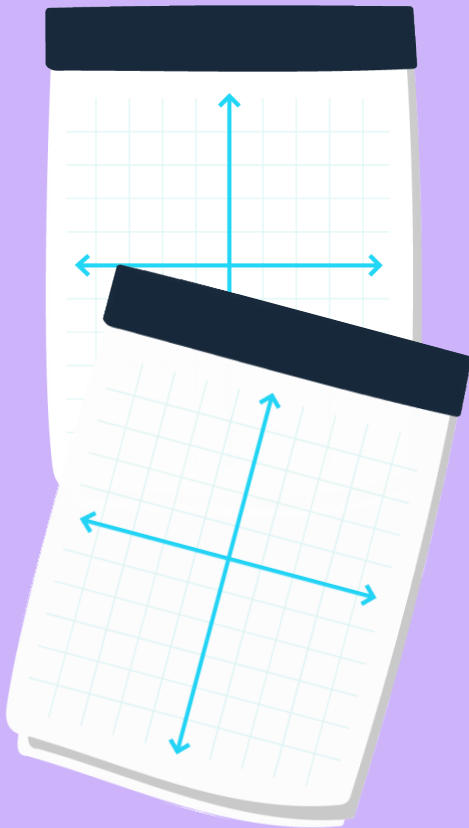
Don't worry—you don't need to know how to play an instrument or read music for this activity. If you have an instrument to use, great! If you don't have an instrument, create one with recyclables and household items, select 10 noisy things that make different sounds, or check out this [free virtual piano](#). Next, assign a note or noisy item to each number, 0–9. Now, looking at the first 30 digits of pi, begin to play! See if you can learn and then play pi for someone else.

Take a listen to some of these awesome sounds of pi on YouTube:

- [Song from \$\pi\$ by aSongScout](#)
- [What Pi sounds like by Michael Blake](#)
- [Pi as Music \(C-major pentatonic\) – \$\pi\$ to 996 decimal places by YourMJK](#)



Activity 6: Pi's Sister Phi



For this activity, we're going to branch out a bit. Instead of celebrating pi, we will celebrate phi—another super-cool number that sadly doesn't get its own day. Phi, like pi, is a mathematical constant. It can be written as the symbol ϕ and is the number 1.6180.

Phi goes by one other name: the golden ratio! The golden ratio occurs naturally all over. You can look around right now; no matter where you are, you can see it in at least one thing: yourself! Your body is proportioned based on the golden ratio, but you can also see it at work in how a snail shell spirals, how petals on flowers are arranged, and even how hurricanes form. By using the golden ratio, you can create what's called the golden rectangle.

This rectangle can be cut into a square and a rectangle. This new, smaller rectangle will have sides with the same proportions as the original. You can make this cut over and over again, with each new rectangle having sides with the same ratio as the original. This ratio is the golden ratio!

Let's make a golden rectangle on a sheet of graph paper to demonstrate the golden ratio. You will need:

- Colored Pencils
- Graph Paper

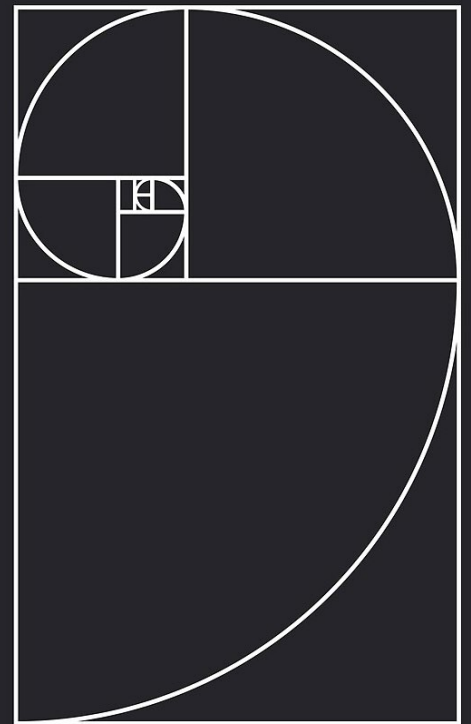


Activity 6 (continued)

Next, follow the steps below to create your golden rectangle:

1. Color in one square in the center of a sheet of graph paper.
2. Color in the square to the right with another color.
3. Color in a 2x2 block (four squares) directly above the two squares with a third color.
4. Color in a 3x3 block (nine squares) directly to the left of the 2x2 and 1x1 blocks in a different color.
5. Continue adding boxes counterclockwise, using the following amounts to form your design: 5x5, 8x8, 13x13, 21x21.
6. Now, you have your golden rectangle! Each color represents how you can divide the next smaller rectangle into a square and rectangle with the same proportions as the original.
7. Next, to make a spiral, draw a diagonal line, corner to corner, across your largest square. Your spiral will move, in order, from the largest square to the smallest square, so be sure your diagonal line touches the corner of the next largest square.
8. Repeat Step 7 to draw your diagonal line through all the squares of your golden rectangle.
9. Next, you will turn each of your lines into a curve from corner to corner to create the spiral through your golden rectangle.

You have now made the golden rectangle, which demonstrates the golden ratio! See if you can think of something else in nature that follows the golden ratio.



Activity 7: Pi(e) Day

Welcome to our seventh activity, the final activity in our Pi Day Celebration. Over the last several activities, we explored the mathematical constant pi, 3.14, discovered how it's an infinite number, and looked at the symbol π ! We then uncovered some of the amazing women in math, listened to pi, and discovered phi. So now, we have reached the PIE part of our celebration! Your final challenge is to make or enjoy a pie! The varieties are endless, from lemon meringue to pumpkin to chocolate mousse or apple! Choose any pie you like, even an outdoor mud pie, a playdough pie, a quiche (a savory egg pie), or a chicken pot pie, mix it up, and enjoy! Get creative and see if you can decorate your pie with the pi symbol, π !

Congratulations, you've earned your Pi(e) Day patch! See the image to the right to see which patch you earned this year and visit girlscoutsosw.org/piday for details.

