



Pi Day Lab

Many students just “plug in” 3.14 and solve problems without understanding why 3.14 is used. This lab is to encourage students to explore pi in many ways in order to develop a deeper understanding of such an important number. This lab will allow students to explore Pi and hopefully develop an appreciation of such a unique number.

Lab exploration: Large Group

Materials: book, long ball of string

1. Arrange for all students to sit in a circle. It may be helpful to have a circle and circumference taped on the floor prior to students arriving.
2. Read either *Sir Cumference: And the First Round Table* or *Sir Cumference and the Dragon of Pi* to the students.
3. To demonstrate what pi is, first use the ball of string to find the diameter of the circle that the students are sitting in. (Again, having the circumference taped to the floor prior to students arriving will make this a lot easier to manage). Use the diameter-length string and measure around the outside of the circle to find out how many times that the string can go around the circle.
4. What you will find is that the string will go around 3 times, and there will be a small gap between where the string started and where it ended the third time around. **This is pi!** Pi is how many times the diameter goes around the circle: no matter the size of the circle, it will always go around 3 times with a little bit left over (.14).
5. Review the formulas on how to use pi to find the area and circumference of a circle.

Stations: Smaller Group Activity (various activities for individual participation)

- π Hand out the Pi Lab paper. Go over the directions for each of the stations. (To prevent a backup at any one station, create at least 2 of each station.)
- π Separate the students into groups of 3. Start them all at a different station and allow 14 minutes at each station (Get it, there are 3 in a group and they will work for 14 minutes?!)

Station 1: Pi Facts

Materials: Lab sheet, math text books, computer with access to internet, and Sir Cumference books that were read to the class.

- π When students arrive at this station, they are required to write 5 facts about pi.
- π They can use any information from sources provided (computer, a text book, *Sir Cumference* books...)
- π Students should write 5 facts that they know about pi. Most of what they will write will come from prior knowledge, their text book, or prior class discussions.

Station 2: Paper chain

Materials: Lab sheet, Colors for Pi Chain code sheet, colored paper strips, tape or stapler, highlighter, and a printout of pi with at least 500 digits. (See examples of these required sheets in the PowerPoint/White Board Presentation included).

- π This station is to demonstrate that pi is an irrational number. It never ends and never repeats.
- π Each group will take the next 5–10 digits of pi and use the code to create a paper chain. After each color they add, they will highlight those numbers on the pi printout. This way the next group knows what numbers to start with. On the lab sheet they will write the numbers and colors they attached to the chain.
- π Start the chain by attaching the first three digits. 3.14 would be: first ring is pink (3=pink); second ring is black (1=black); then the third ring is red (4=red).
- π This chain can be hung up in the hall to illustrate a colorful visual of this irrational number.
- π This web page may be helpful when finding a print out of the digits of pi:
<http://www.piday.org/million/>

Station 3: Large Circles

Materials: Lab sheet, string of different lengths, push pin, large poster boards of different colors or large sheets of colored paper, rulers, markers, and/or calculators.

- π At this station, students will create circles of varying sizes. For each circle, the group will calculate its area and circumference, and write it neatly and clearly on the circle. Instruct the students to round to the nearest tenth to keep the circles consistent.
- π Students will attach one end of the string to the pin and the other to the pencil.
- π Pin the string to the middle of the poster board, pull the string tight and draw a circle.
- π Then cut out the circle; students will use the ruler and calculator to figure out the area and circumference of the circle they created. They will write this information on the circle itself. They are to put their name on the back of the circle.
- π On the lab sheet they are to write the color of their circle and the area and circumference they calculated.
- π These circles can be displayed in the hallway with the paper chain. The circles create a “polka dot” look when they are different colors and sizes.

Station 4: Fun Pi

Materials: lab sheet, computers with internet, pre-approved web pages, construction paper, and art supplies.

- π There are many fun, interesting pi facts. The students can find one that they think is particularly interesting or funny and make it into a poster.
- π They will write the fact on the lab sheet, and its source or web address
- π They can either create the pi poster on the computer and print it out (if the computer is hooked up to a printer), or they can create the poster on construction paper. The posters look best when illustrated and are colorful.
- π Web pages that may be helpful are: <http://www.pleacher.com/mp/mhumor/pijokes.html> or <http://www.squidoo.com/PiDay> . A Celebrating Pi Day web page like <https://www.piday.org/2013/how-will-you-celebrate-pi-day/> may also be helpful!
- π Some suggestions about what students can create on a poster could be: “Cutie 3.14,” or “Einstein’s birthday is 3/14,” or even “What do you get when you take the sun and divide its circumference by its diameter? Pi in the sky!”
- π Along with the chain and circles, these, too, can be displayed in the hall or the classroom.



Extended activity:

- After this fun-filled day of pi exploration, you can invite students to bring in a pie to share with the class. (Please be aware that students in your class may have food allergies.)
- Students who bring in a pie to share must also be able to figure out its area and circumference!
- Another fun way to learn about pi is to listen to it. A YouTube video sings the digits of pi.

http://www.youtube.com/watch?v=27OQfd_Sg4c&feature=player_embedded