

Looking for Pi (Or is that pie?)

Year 7 – Mathematics

Year 8 – Mathematics



(Mathematics; Year 7, ACMNA173)

Recognise and solve problems involving simple ratios.

(Mathematics; Year 8, ACMMG197)

Investigate the relationship between features of circles such as circumference, area, radius and diameter. Use formulas to solve problems involving circumference and area.

(Mathematics; Year 8, ACMNA186)

Investigate the concept of irrational numbers, including π .

Looking for Pi (Or is that pie?)

Maths whiz Eddie Woo shows us the patterns in circles that lead to Pi / π . But all Billy can think about is pie...

This lesson uses Episode 26 – Eddie Woo and the Fun Guys (who are actually quite serious) as a springboard for our own explorations of Pi in the natural and constructed world.

Equipment:

A variety of circular objects from small to large, such as baking pans, plates, golf balls and soccer balls, a hula hoop, etc.

Pieces of string – the longest should be long enough to go around your largest object

Rulers + calculators

A whiteboard or notebooks to record measurements and calculations

Duration:

50 minutes

Location:

The classroom

Notes:

Finding Pi

👁 Watch Eddie Woo Concentric Circles segment from **Episode 26 – Eddie Woo and the Fun Guys (who are actually quite serious)**



- ? Stop at 01:44 and ask students: What do they think will happen?
- ◇ Ask someone to do the calculations using the numbers Billy and Maddy got.
 - ◇ Do the activity yourselves in pairs using all sorts of circles: cake pans, basketballs, cookie cutters, plates, a hula hoop, even a water tank if you can!
 - ◇ Tabulate the class data as you go.
 - ◇ Ask: Do we come up with the same number – Pi?
 - ◇ If not, why might this be? (Check your measurements, discuss level of accuracy over the size – tiny or large).

Playing with Pi

- Here are some scenarios that you could use Pi to help solve.
 - ◇ You are putting in a new water tank. It's shaped like a great big cylinder. The space you have in your garden determines that the tank can't be more than 2m diameter. What is the circumference of the tank? ($\pi \times 2\text{m}$).
 - ◇ What if you want to put a fence 0.5m away from the tank all the way around? How long will the fence be? ($\pi \times 3\text{m}$).

There's a Day for Pie?

Sorry, Billy, no – it's International Pi Day.

It falls on the 14th of March, which some people write as 3.14 – the number π

Mmmm, π !

Famously irrational

- π is known as an irrational number.
- Explain what this means to the class:
 - ◇ An irrational number is any number that can't be written as a simple fraction (e.g. 1.5 can be written as $\frac{3}{2}$ – but 3.141592653 can't be expressed as a fraction – or a ratio of two integers)
 - ◇ Another way of saying this is to say that after the decimal, Pi goes on forever without repeating patterns of digits. Students could research for themselves who has most recently calculated Pi to the greatest number of decimal points.

Here's a way to remember the first few decimal places in Pi.

The number of letters in each word in this sentence equals the number in Pi to the first five decimal places: 3.141592

HOW	I	WISH	I	COULD	CALCULATE	PI
3.	1	4	1	5	9	2

Pi in the sky

- Explore the resources below including a page from NASA about how scientists use Pi in calculations involving spheres (like planets) and orbits and rotation. Even though orbits aren't perfect circles, π was an important number in the development of astronomy and the ancient idea that the universe existed in a perfect system of rotating concentric spheres. It's more complicated than that, but that idea is a beautiful place to start.
 - ◇ NASA – On Pi Day, How Scientists Use this Number: <https://www.nasa.gov/jpl/on-pi-day-how-scientists-use-this-number>
 - ◇ Astronomy Magazine – A Slice of Pi (pi jokes and puns): <http://cs.astronomy.com/asy/b/astronomy/archive/2007/03/15/332151.aspx>
 - ◇ Slate – Pi Day Facts: <https://slate.com/technology/2015/03/pi-day-facts-and-such.html>
 - ◇ Maths Careers – Calculating Pi: <http://www.mathscareers.org.uk/article/calculating-pi/>

