

SUGGESTED STUDENT ACTIVITIES FOR FINDING PI

Students can work in pairs –groups of even 10 or 20 can take part in the playground activities-

Four types of measurements [mt] are suggested

A [i] mt of **circumference** [c] and radius [r]

[ii] mt of circumference [c] and diameter [d]

B [i] mt of **area** [A] and radius

[ii] mt of area [A] and diameter

C mt of **volume** [V] and the parameters needed for using appropriate formulas

D simple cut and paste method given below

A simple fun activity

Draw a fairly large circle on a cardboard of medium thickness [say 10 cm radius] –draw diameters such that the circle is divided into equal sector shapes [12 or 16 or 24 sectors ok]-

A sector looks like a piece of pizza or pie or birthday cake i.e conical shape---. cut so many pieces – arrange them in the form of a rectangle- measure the length[l] of this constructed rectangle- breadth of the rectangle is the same as the radius[r] of the starting circle – divide l by r to get $\pi = [l/r]$

Teachers may show stepwise pictures to students .[tip for the teachers : cut the last sector into 2 equal small sectors and take them to opposite ends of the rectangle to give you a decent looking rectangle]

Activities below are indicated by the types mentioned above-

* type A[i] uses the formula $\pi = c/2r$ -- type A[ii] uses the formula $\pi = c/d$

** type B[i] uses the formula $\pi = A/[r \times r]$ --- type B[ii] uses the formula $\pi = 4A/[d \times d]$

** type C formulas depend on the shape of the volume e.g cylinder, sphere

LIST OF ACTIVITIES

- 1 circles drawn on plain paper with a compass – known radius
- 2 circles drawn on graph paper with a compass – known radius
- 3 circles drawn on playground with an improvised compass – known radius
- 4 half circle drawn on a wall with an improvised compass – known radius
- 5 playground fun with human hand-held circle – both r and d using ropes
[1 to 5 belong type A[i] using the formula given above]
- 6 circles drawn on plain paper using circular objects – mt of diameter [dia]
- 7 circles drawn on graph paper using circular objects – dia mt
- 8 Circles drawn on playground using large circular objects – dia mt e.g large wheel.
Big drum standing-
- 9 roll a tin or dabba on the table and measure distance [l]- measure dia using improvised Vernier calipers –stick a thin tape or a thread on the dabba to easily count the number of rotations[n] – here $c = l/n$
- 10 Do 9 above outdoors – use a tyre or wheel or cycle etc.
- 11 Do 10 above using a drum – **have fun** kicking the drum carefully between two straight lines – don't forget to put a mark on the side of the drum
- 12 Take a solid pipe – tightly wind a wire or twine around it – compact the wire/ string leaving no space between rings- count the number of rings [n]- unwind the wire /string and measure the length [l] – find dia of the pipe using a vernier – see 9

- 13 Go to the packing department- take a roll of cello tape or any thin adhesive tape- make a mark simultaneously [meaning 'at the same time' 'at one stroke'] in many layers by pricking a pin radially (Along the radius) - unwind the tape and stick it on the side of the table
[i.e along a perfect straight line] –measure the total length [l]- number of rotations
[n = pricked points] – see 9
- 14 This is special for senior ITI students - ask your teacher if he can give you a gear which converts circular motion [=rotation, revolution] to linear motion – use the arrangement to measure c. Diameter to be separately found – method similar to 9 to 13 above
[6 to 14 belong type A[ii] using the formula given above]
- 15 Draw circles on a graph sheet , using compass – physically count the small squares , thus finding the area--- radius is known while drawing the circle – use formula [[teachers/ volunteers can help in square counting method]
16. In 15 above another person can draw concentric circles and do as before
[15 to 16 belong type B[i] using the formula given above]
17. Draw circles on a graph sheet , using available [perfectly] circular objects – physically count the small squares --- measure diameter- teachers/ volunteers can help to get the dia from the graph paper itself.
18. If there is a large room with tiled floor , 17 can be done – all square tiles is preferred--,
[17 to 18 belong type B[ii] using the formula given above]
19. Volume of a cylinder= $[\pi] \times [r \times r] \times [h]$ use this formula to calculate pi – a calculator may be needed.
20. use water and measuring jar/cylinder to find the volume --- many cylindrical objects can be found around you- Tiffin or lunch box, water bottle,
21. Volume of a sphere = $[4/3] \times [\pi] \times [r \times r \times r]$ – this formula can be used – find fairly spherical shapes which can be filled with water – e.g *binthige* (pot in Kannada) , water filled balloon. Rubber ball cut into half
22. volume of A very long cylinder- take a garden hose pipe [,the longer the better]—fill up and carefully pour water into a bucket – carefully measure the volume of this water – find the INTERNAL DIA by a suitable method- [teachers/ volunteers can help in this]- stretch and find the length of the pipe [l]- in cylinder formulas use l in place of h
23. Do 22 above – find CROSS SECTION AREA , INTERNAL, by imprint method
[or any other]
[19 to 23- belong type C- use proper formulas]

Anyone interested in the above and want help can write to engoneforall@gmail.com
Those who have tried the above or their own methods may also contact , it will boost our confidence.