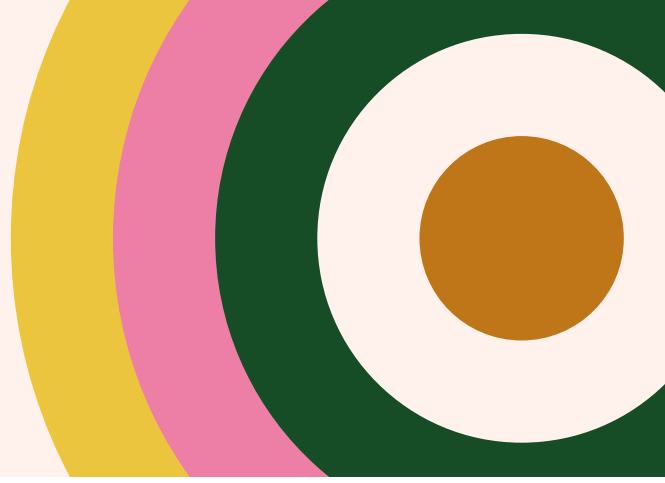


MAKING SENSE OF

π



Hands on activity

This activity involves measuring the diameter and circumference of different circular objects and helps find the relation between them.

Materials required

Circular objects like cans, coins, rounded lids, tapes etc

Ruler

String/Measuring Tape

Instructions

- Measure the circumference of the circular object by wrapping a string around its edge and calculate the length of the string using ruler
- Measure the diameter of the object
- Record your answers in the table below
- Find the ratio between the circumference and the diameter measured
- Repeat these steps for different circular objects

Object	Distance around the edge of the object (Circumference - c)	Distance across the middle of the object (Diameter - d)	Ratio of Circumference to Diameter (c/d)



All distances can be measured in any single unit and labelled appropriately

Observations

- Do you find any pattern while measuring different circular objects?
- What do you observe about the values in the last column? What does the ratio remind you of?
- The fraction **22/7** matches the true value of pi, upto two decimal places. How does this value connect to the measurement observed in the experiment ?
- With the above understanding, how can you describe the relation between the circumference and diameter. Can you write an equation for the same.

Ready to explore more?

- If circumference is plotted against the diameter, how do you think the graph would look like?
- The pi value is non-terminating decimal without a repeating pattern and cannot be expressed as a simple fraction. What are those numbers called as?

Answer Key

- Do you find any pattern while measuring different circular objects?

Yes, circumference of all circular objects will measure 3 times the length of diameter and a little more

- What do you observe about the values in the last column? What does the ratio remind you of?

This measure tells about how much of diameter length fits in the circumference. The ratio for all of these objects lie closer (when measured accurately)

The ratio will be close to 3.14 which represents the constant 'pi'

- The fraction **22/7** matches the true value of pi, upto two decimal places. How does this value connect to the measurement observed in the experiment ?

The small length of string needed to cover the length of the circumference (over 3 wholes of the diameter) accounts for $1/7^{\text{th}}$ of the diameter length. (as $1/7$ accounts to 0.14)

3 times diameter length + $1/7^{\text{th}}$ of diameter length = $22/7$ times the diameter length

- With the above understanding, how can you describe the relation between the circumference and diameter. Can you write an equation for the same.

The circumference is directly proportional to the diameter

Circumference = $\pi \times \text{diameter}$; where pi is a constant 3.14 (or) $22/7$

$$C = \pi d$$

Ready to explore more?

- If circumference is plotted against the diameter, how does the graph look like?

The graph will be a straight line (linear) taking the form of $y = kx$; where k is 'pi', the constant of proportionality and also the slope of the line.

Here is the sample graph plotted with diameter on the x-axis and circumference on the y-axis.

Note: The values might not fall on an exact straight line as measuring using thread gives us an approximate value.

