STEM in the lab

Inspiring Idaho's future STEM workforce

Pi Day: Area and Circumference of a Circle

GRADE LEVELS
This activity is appropriate for grades 3-8.

MISSION
Use Pi (3.14) to find the area and circumference of a circle.

VOCABULARY
AREA: the size of a surface (area= length x width).

CIRCUMFERENCE: the distance around the edge of a circle.

DIAMETER: the distance from one point on a circle through the center to another point on the circle. It is also the longest distance across the circle. The diameter is twice the radius.

IRRATIONAL NUMBER: a number that has a decimal that goes on forever without repeating.

MATERIALS
» 5 round household objects (Examples: different size bowls, plates, cups, glasses, candles, cans, water bottles)
» paper
» pencil
» string
» scissors
» ruler
» calculator

ABOUT THIS ACTIVITY

March 14 is not just any regular day. March 14, or 3/14, is known to the Math and Science community as Pi day. Named after the Greek letter π, Pi is the ratio of the circumference (distance around a circle) to its diameter (width of a circle). Pi is an irrational number, or never ending number, and the first three digits of Pi are 3.14. This led to March 14, or 3/14, being called Pi day.

The importance of the measurement 3.14 goes back at least 4,000 years. The ancient Babylonians and Egyptians "recognized that every circle has the same ratio of circumference to diameter." The more you learn about Pi, the more you realize Pi day is not just for mathematicians! We all have a reason to celebrate. Every day Pi is used in calculations for building, physics, communications, medical procedures, air travel, and more.

By the start of the 20th century, about 500 digits of Pi were known. With computation advances, we now know more than 31 trillion decimal places of Pi.

INSTRUCTIONS

The number 3.14 (Pi) is used to find the area and circumference of a circle.

1 Take the first object and trace around it on a piece of paper.

2 Take a piece of string and wrap it exactly around the line you made on the piece of paper. Once the ends touch, cut the string.

3 Place the end of the string at the 0 on the ruler. Measure how long the string is. The length of the string represents the circumference of the circle.

4 With a new piece of string, measure across the center of the circle, from one side to the other. Cut the string once you have measured the diameter.

5 Place the diameter string on the ruler, starting at 0, and measure how long the string is.

6 Using a calculator, divide the number you measured in Step 4 (circumference) by the number measured in Step 5 (diameter). ***The quotient should be approximately 3.14 no matter what size circle you measured.***

EXTENSIONS

» **Create a song about Pi**: Take a well-known song and rewrite the lyrics.

» **Make a Pi necklace:** Pick a different color bead for the numbers 0-9 (red could equal 3, blue could equal 1, etc.). String the beads on a piece of yarn to represent the numbers in Pi. You can make your necklace as long as you want. Just keep adding the correct color of beads.

» **Make a Pi city:** Using graph paper, write as many digits of Pi as you can across the bottom of the page. Then go back and color the number of squares to represent the number in each digit. So starting with a 3, color 3 squares above the number. Coloring only black creates a picture of a city skyline.

RESOURCES

» https://www.piday.org/
» https://www.exploratorium.edu/pi/activities
» https://www.scientificamerican.com/article/what-is-pi-and-how-did-it-originate/
» https://science.howstuffworks.com/math-concepts/pi.htm

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