



Simple as a Piece of Pi

In this lesson plan, students will use data on the circumference and diameter of various objects to calculate pi. The exciting aspect of this lesson is that no matter the size or nature of the circular objects measured, the ratio of the circumference to the diameter will come out the same: pi!

Grades: 6, 7, 8
Disciplines: Math

Objective

Students will:

- Measure the circumference and diameter of variety of circular objects
- Organize the data in a table or chart
- Calculate pi - the ratio of circumference to diameter

Materials

- Measuring tape
- A variety of circular objects around the ship
- Calculators
- Worksheet

Engage

The day before this lesson remind or teach students how to measure using a measuring tape. Students can measure different objects around the room and compare their answers.

If you would like some reading in this lesson [Sir Cumference and the Isle of Immeter](#) (diameter of a circle) by Cindy Neuschwander is a great introduction.

Explore

Ask the students what circumference and diameter are. Have a class discussion and have students draw pictures or identify circumference and diameter.

Explain

Explain to students that while on the tour of the Battleship IOWA they are to find the listed 5 items and pick other circular objects and measure the circumference and their diameter and record the data in the chart. *One of the challenges is estimating the center of the circle when measuring so you might need to demonstrate this.

Object Name	Circumference	Diameter	Mystery Ratio Circumference/Diameter
Mess Hall Seat			
Mixing Bowl in Galley			
Hatch Wheel			
Ship's Wheel			
Port Hole			
Speaker in Sick Bay			

Extend

Have the students answer these in groups of four (two pairs). *The “Aha!” moment is usually more potent in the small groups because more kids can come to it at different times.

Use the data you collected and calculated to answer the following questions.

1. What do you notice about the Mystery Ratio for each object?
2. What whole number is this ratio near?
3. The mystery ratio has a special name: pi. Based on the activity you did create a mathematical definition for pi. Pi is:
4. Look at the mystery ratios on your worksheet. How close do your ratios come to 3.14?
5. Why might your ratios be a bit different?

Evaluate

Once each group is finished has a whole class discussion on the questions to clear up any misconceptions. You can have each group explain one of their examples from the ship. Then do a quick wrap-up explaining pi.

You should have noticed that the ratios for all the circles are very close. The value that you should have gotten should be very close to 3.14.

Answer sheet

Answers may vary due to measurement error.

Object Name	Circumference	Diameter	Mystery Ratio Circumference/Diameter
Mess Hall Seat	$38 \frac{1}{8} = 38.125$	$12 \frac{1}{8} = 12.128$	38.125 divided by 12.125 = 3.14432
Mixing Bowl in Galley	$105 \frac{1}{8} = 105.125$	$33 \frac{1}{2} = 33.5$	105.125 divided by 33.5 = 3.13805
Hatch Wheel	$56 \frac{1}{2} = 56.5$	18	56.5 divided by 18 = 3.13888
Ship's Wheel	76	$24 \frac{2}{8} = 24.25$	76 divided by 24.25 = 3.13402
Port Hole	$55 \frac{3}{4} = 55.75$	$17 \frac{1}{2} = 17.5$	55.75 divided by 17.5 = 3.16228
Speaker in Sick Bay	14.5	$4 \frac{5}{8} = 4.625$	14.5 divided by 4.625 = 3.13513

1. What whole number is this ratio near?
2. The mystery ratio has a special name: pi. Based on the activity you did create a mathematical definition for pi. Pi is:
3

Pi is an irrational number. That means it has a decimal component that never repeats and never ends. Think about that for a second! It goes on forever and ever with no pattern. In order to make it easier use pi, mathematicians often use the 3.141.

4. Look at the mystery ratios on your worksheet. How close do your ratios come to 3.14? How close are you from 3.1415926535897932...
5. Why might your ratios be a bit different?

Good time to talk about why some measurements might not be close to 3.14. Did you measure right?

Adapted from Battleship North Carolina Lesson Plan "Pi Tacular"