

The Isle of Immeter

Summary

This activity shows a different way to find the area of a circle using the circumference.

Materials

- *Sir Cumference and the Isle of Immeter* overhead tiles
- [Eighths](#) (pdf)
- [Sixteenths](#) (pdf)
- [Circles Overhead](#) (pdf)
- [Perimeter and Area](#) (pdf)

Additional Resources

Books

Sir Cumference and the Isle of Immeter by Cindy Neuschwander; ISBN 1-57091-681-0

Background for Teachers

This activity shows a different way to find the area of a circle, $A = \frac{1}{2} \text{ Circumference} \times \text{radius}$. Students will decompose a circle into a number of wedges and rearrange the wedges into a shape that approximates a parallelogram (or rectangle) to develop the formula for the area of a circle. Students should have an understanding of a circle's radius and circumference before starting this activity.

Instructional Procedures

Invitation to Learn

In their math journals, have students create a K-W-L chart on area and perimeter. For the "K" section, have them write down all they know about the perimeter of figures (squares, rectangles, parallelograms, triangles, circles) and what they know about the area of figures (same figures as previously mentioned). For the "W" section of their chart, have them write what they want to know about perimeter and area of figures. Have them leave the "L" section blank. After the activity they will write what they learned about perimeter and area. Have a class discussion on what they put on the "K" and "W" sections of their K-W-L charts.

Instructional Procedures

Begin reading, *Sir Cumference and the Isle of Immeter*.

After the first page, stop. On the overhead, put up tiles like the square Sir Cumference made.

Explain what the book means by inners and edges.

Read the next page, on the overhead put the shape that Lady Di made. Talk about the inners and edges.

Give a few more examples of squares and rectangles so students understand how to find inners and edges.

Read page 5, and explain what Per said about finding the inners and edges with squares and rectangles.

Read until the bottom of page 8, and then put tiles on the overhead representing the first doorway. Explain how Radius found the inners so quickly (multiplied the length by the width).

After reading page 10, ask students what they think the clue means. "Count half as many inside as out. This unlocks the towers without a doubt."

Read until the bottom of page 16.

Hand out the copies of the circles divided into eighths to groups of students. Have them cut the

wedges and form it into a rectangle. Discuss how it is a "lumpy, bumpy rectangle".

Hand out the copies of the circles divided into sixteenths. Have the groups cut the wedges apart and form it into a rectangle. Have the groups try and figure out what the long side of the rectangle represents (one half of the Circumference) and what the short side of the rectangle represents (the radius). Discuss their ideas as a class.

Read page 17 and discuss how Per multiplied $\frac{1}{2}$ the Circumference by the radius (or length x width), to figure out the area of a circle.

Read page 18 and 19, and then make sure students understand what Per is doing.

Show the *Circles Overhead* of the three circles, and have the groups figure out the area by multiplying $\frac{1}{2}$ Circumference by radius.

Read until the end of the book. Review the area and perimeter (inners and edges) of a figure and discuss any questions the students have about the book.

Explain to students that we normally don't use the formula $\frac{1}{2}$ Circumference x radius to get the area of a circle. Show them the steps of how $A = (\frac{1}{2} C) \times r$ can be changed to the standard formula of

$$A = \pi \times r^2.$$

Area of a rectangle = length x width or $\frac{1}{2} Cr$

But to find circumference, you need another formula. Circumference = $\pi \times$ diameter.

Since one diameter equals two radii ($d=2r$), $2r$ can be substituted for d , so $C = 2\pi r$.

Put all this information together to make one formula.

Area of a circle = $\frac{1}{2} \times$ circumference x radius

$$\frac{1}{2} \times 2\pi r \times r$$

$$1 \times \pi r^2 = \pi r^2$$

$$A = \pi r^2$$

In their math journals, have students write what they learned about the perimeter and area of figures in their "L" section of their K-W-L chart. Have a class discussion on what they added to their chart.

Have students complete the worksheet, *Area and Perimeter*.

Extensions

Have students create their own picture book explaining a mathematical concept.

Have students create a quiz on perimeter and area that they can trade with a classmate.

Family Connections

With your family, measure three circular objects in your home. Show your family how to find the area of the circles by multiplying $\frac{1}{2}$ the Circumference by the radius.

Read *Sir Cumference and the Isle of Immeter* with your family. Answer any questions they may have about perimeter, circumference, radius or area.

Play a game of inners and edges with your family.

Assessment Plan

Informal assessment includes class discussion, Circles Overhead, and the K-W-L chart in their math journals.

- *Area and Perimeter*

Bibliography

Von Drasek, L. (2006). Teaching with Children's Books: The "Wow" Factor. ERIC Source (ERIC # EJ729683). Retrieved March 14, 2007, from <http://www.eric.ed.gov>

Teaching math through children's books motivates children to learn math in exciting new ways; encourages students to think and reason mathematically and builds students' appreciation for math

and literature.

Ward, R. (2005). Using Children's Literature to Inspire K-8 Preservice Teachers' Future Mathematics Pedagogy. ERIC Source (ERIC # EJ738003). Retrieved March 14, 2007, from <http://www.eric.ed.gov>
A growing body of research in the fields of mathematics education and literacy supports the inclusion of children's literature with the teaching and learning of mathematics. The author presents a variety of activities and ideas that are sound strategies for effectively integrating children's literature with the teaching of mathematics.

Authors

[Utah LessonPlans](#)