

Title: Circle Scavenger Hunt	Grade(s): 6 th grade Author(s): C.Jean Fuller	BIG Idea: $\pi = C/d$
<p>Real-World Connection: Students will complete a scavenger hunt around the school/classroom to locate circles. Then they will explore the relationship between the diameter and circumference of circles.</p> <p>How Students will Experience the Connection: highlight in yellow all that apply</p> <p> Video Clip Photo Podcast Print Media (article, ad, etc.) Vodcast Other </p>		
<p>GPS Standards</p> <p>M6D1. Students will pose questions, collect data, represent and analyze the data, and interpret results.</p> <p>M6M2. Students will use appropriate units of measure for finding length, perimeter, area and volume and will express each quantity using the appropriate unit.</p> <p>M6A1. Students will understand the concept of ratio and use it to represent quantitative relationships.</p> <p>M6A2. Students will consider relationships between varying quantities.</p> <p>M6G1. Students will further develop their understanding of plane figures.</p> <p>M6N1. Students will understand the meaning of the four arithmetic operations as related to positive rational numbers and will use these concepts to solve problems.</p> <p>M6P1. Students will solve problems (using appropriate technology).</p> <p>M6P2. Students will reason and evaluate mathematical arguments.</p> <p>M6P3. Students will communicate mathematically.</p> <p>M6P4. Students will make connections among mathematical ideas and to other disciplines.</p>	<p>Objectives:</p> <p>Students will:</p> <ol style="list-style-type: none"> 1. Measure the circumference and diameter of circular objects 2. Calculate the ratio of circumference to diameter and discover the value of pi (approx. 3.14159) 3. Discover the formulas for circumference and diameter ($C = \pi d$) and ($d = C/\pi$) 	
<p>Materials: Computer and projector to show video Video: (approx 2 min) http://www.youtube.com/watch?v=eiHWHT_8WrE</p> <p>Per group (2-3 students): Trundle wheel (if needed) Meter stick or yard stick Tape measure (20 feet or larger) Circular objects (3 different sizes)</p> <p>Per Person: Data collection sheet Calculator 1 tennis ball 1 paper measurement tape</p>		

Related Task:

Introduce the investigation as a scavenger hunt. Play the video as a review of the key vocabulary. Review the key vocabulary/concepts. Remind students they should measure carefully and use the same units to measure circumference and diameter for each object. Have students suggest ways to accurately measure these dimensions. (* Model the use of the trundle wheel as a measuring tool if used.)

Each group (2-3 students) should measure three circular objects. To follow the scavenger hunt theme choose particular objects to be measured that students will have to “find”. Preferably one quite large such as an outdoor fountain, one medium sized such as a large planter and one smaller item such as a paper plate or coffee filter. Student data will vary and groups should be asked to share their averages.

The value of $\pi \approx 3.14159$. Did anyone’s average get close to this? Can this be used to give a definition of pi? Why might your ratio vary from 3.14? Measurement differences, calculation errors, etc. Why would we expect to get this number for our ratio? Students may have trouble viewing pi as a number that is constant for all circles. This insight is part of the goal of the lesson.

If $\pi = \text{Circumference}/\text{diameter}$, can students make conjectures about a formula for circumference? ($C = \pi d$) For diameter? ($d = C/\pi$). Students this age may be unable to manipulate the C/d formula into other forms. They can be guided by giving “formulas” for C and d with a blank where pi is supposed to go. Ask: What number goes here? These relationships can be related to multiplication and division (if $3 \times 4 = 12$, then $12/4 = 3$ and $12/3 = 4$), therefore since $\pi \times \text{diameter} = \text{circumference}$, then $\text{circumference}/\pi = \text{diameter}$ and $\text{circumference}/\text{diameter} = \pi$

Learn More:

Teacher Vision: <http://www.teachervision.fen.com/math/lesson-plan/3430.html>

NCTM: <http://illuminations.nctm.org/LessonDetail.aspx?ID=L573>

International Tennis Federation: <http://www.itftennis.com/technical/research/lab/balls/size.asp>



Circle Scavenger Hunt



Directions:

1. Write at least two math facts you know about circles. Examples: what is the diameter, what is the radius, what is the circumference or some other fact you remember.

2. Measure the circumference and diameter of three circular objects.
3. Calculate the ratio of circumference to diameter for each of the three objects.
4. Find the average of the three ratios.

Name of Object	Circumference (measure to one decimal place)	Diameter (measure to one decimal place)	Ratio of Circumference to Diameter (give to 3 decimal places)

Average Ratio: _____

5. Discuss your average ratio with your partner or group. Are your findings related to the special number pi? Pi is approximately equal to 3.14159.

Can you now give a definition for pi (or π)? _____

6. Measure the circumference of the tennis ball. Using what you now know about circles, does the tennis ball meet International Tennis Federation rules that the diameter of a ball must be between 2.575 and 2.700 inches? (Yes or No). Describe how you decided this:

