Just In Time Quick Check

Standard of Learning (SOL) 6.7a

Strand: Measurement and Geometry
Standard of Learning (SOL) 6.7a ***The student will derive pi.***
Grade Level Skills: • Derive an approximation for pi (3.14 or $\frac{22}{7}$) by gathering data and comparing the circumference to the diameter of various circles, using concrete materials or computer models
Just in Time Quick Check
Just in Time Quick Check Teacher Notes

Supporting Resources:
• VDOE Mathematics Instructional Plans (MIPS)
  ○ 6.7ab - Going the Distance (Word) / PDF Version
• VDOE Algebra Readiness Remediation Plans
  ○ Discover Pi (Word) / PDF
• VDOE Word Wall Cards: Grade 6 (Word) | (PDF)
  ○ List any relevant cards
• Desmos Activity
  ○ 6.7a Measuring Circles

Supporting and Prerequisite SOL: 6.1, 6.2a, 5.2a, 5.5a, 5.10, 4.2c, 4.3d

SOL 6.7a - Just in Time Quick Check

1. The table below lists the circumference and diameter for various circles.

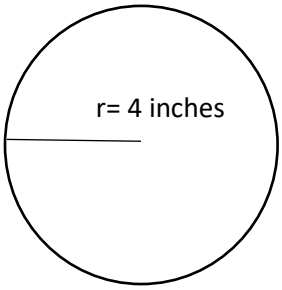
   - Find the simplified ratios of circumference to diameter to determine an approximate value for pi.
   - Express your ratios as a decimal to the nearest hundredth to determine another approximate value for pi.
   - What do you notice when you compare the ratios of circumference to diameter for all three circles?

Table

Circle Circumference	Circle Diameter	Simplified Ratio of Circumference to Diameter	Ratio Expressed as a Decimal to the nearest hundredth
44 cm	14 cm		
88 in	28 in		
110 ft.	35 ft.		

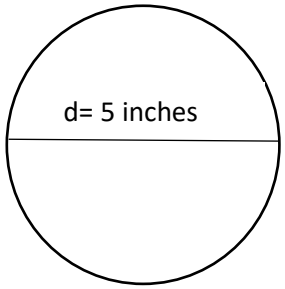
2. Examine the circles below. Each one lists the circumference and radius or diameter. How could you use this information to obtain an approximation of pi?

Circle 1



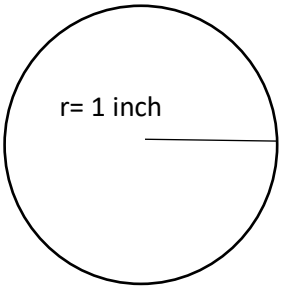
C is about 25 inches

Circle 2



C is about 16 inches

Circle 3



C is about 6.3 inches

3. Billy looked at the tires on his bike. He noticed that the radius of each tire was 6 inches and the circumference of each tire was about 38 inches. Use this information to find an approximate value for pi.

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Common Errors/Misconceptions and their Possible Indications

1. The table below lists the circumference and diameter for various circles.

   - Find the simplified ratios of circumference to diameter to determine an approximate value for pi.
   - Express your ratios as a decimal to the nearest hundredth to determine another approximate value for pi.
   - What do you notice when you compare the ratios of circumference to diameter for all three circles?

Table

Circle Circumference	Circle Diameter	Simplified Ratio of Circumference to Diameter	Ratio Expressed as a Decimal to the nearest hundredth
44 cm	14 cm		
88 in	28 in		
110 ft	35 ft		

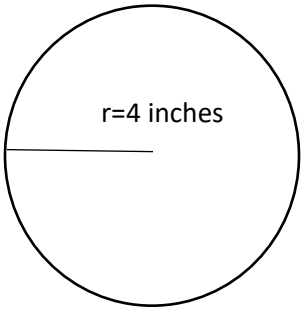
Students may make an error in creating their ratios by making the ratio diameter to circumference instead. To help students with this error, review the appropriate ways to write ratios.

Students may make errors in simplifying their ratios to $\frac{22}{7}$. To assist them, review the process for simplifying a ratio in the same manner as simplifying a fraction, dividing the numerator and denominator by the same factor to keep the proportion. For students making errors in converting the ratio to a mixed number, use concrete materials or models to model the process.

Some students may not be able to explain that for any size circle, the ratio of its circumference to its diameter is always pi, or just a little bit more than 3. Encourage them to notice patterns across all three ratios. Additionally, having them complete hands-on activities where they measure the diameter and circumference of circular objects such as lids and cans might make the abstract concept of pi more concrete.

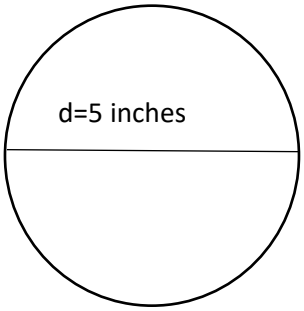
2. Examine the circles below. Each one lists the circumference and radius or diameter. How could you use this information to obtain an approximation of pi?

Circle 1



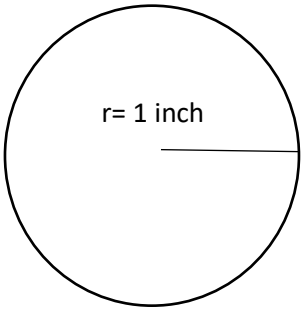
C is about 25 inches

Circle 2



C is about 16 inches

Circle 3



C is about 6.3 inches

Students may not remember to find the diameter before creating ratios to find an approximation for pi. Students also may make an error in creating their ratios by making the ratio represent diameter to circumference instead. To help students with this error, review the appropriate ways to write ratios. Additionally, students may have a difficult time grasping the concept of pi and that it can be calculated by dividing a circle's circumference by its diameter.

Hands-on activities where the students actively measure the circumference and diameter of circular objects such as lids or cans will help show them that you do not always get an exact answer, but rather an approximation. They might also be encouraged to treat their answers as decimals if they are not as comfortable with fractions. This would help them to see the connection between the fractional and decimal representations of pi. Students can use a calculator to help them see the close representations of pi and 3.14.

3. Billy looked at the tires on his bike. He noticed that the radius of each tire was 6 inches and the circumference of each tire was about 38 inches. Use this information to find an approximate value for pi.

Students may not remember to find the diameter before creating ratios to find an approximation for pi. Additionally, students may have a difficult time grasping the concept of pi and that it can be calculated by dividing a circle's circumference by its diameter.

Some students may need a visual to help understand the problem. Encourage students to draw a picture labeling the circumference and diameter. Hands-on activities where the students actively measure the circumference and diameter of circular objects such as lids or cans will help show them that you do not always get an exact answer, but rather an approximation.