US› Unit 2 3d› Unit 1
Circles

Part 1 – Radius and Diameter

(1) Radius and Diameter (US› pp. 22-25, 3d› pp. 6-9)

- Identify the center, diameter, and radius of a circle.
- Measure the radius or diameter of a circle.
- Construct circles of a given radius or diameter.
- Find the diameter given the radius.
- Find the radius, given the diameter.

In earlier levels of *Primary Mathematic*, students learned how find the perimeter of rectilinear shapes, and the area of triangles and rectangles. In this unit they will learn to find the circumference (perimeter) and area of circles, semicircles, and quarter circles, as well as the area or perimeter of composite figures which include circles, semicircles, or quarter circles.

In this part, they will learn to find the center, radius, and diameter of a circle.

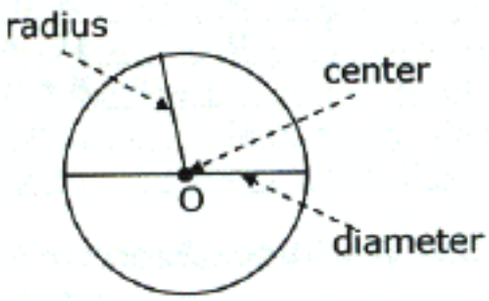
A circle is a set of points all of which are the same distance from a given point, the center. The center is usually labeled with the letter "O" here.

A radius is any line segment from the center of the circle to a point on the circle. A circle has an infinite number of radii (plural for radius), all the same length. The term *radius* is also used to mean the *length* of the radius.

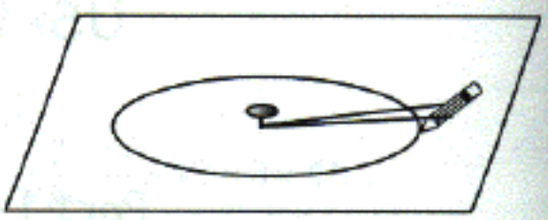
A diameter is a line segment that has its endpoints on the circle and passes through the center of the circle. The term diameter is also used to mean the length of the diameter.

Your student will not learn a formal definition for radius or diameter at this time, but will learn to recognize and measure the radius or diameter of a circle.

The diameter of a circle is twice its radius.
Diameter = Radius × 2
Radius = Diameter ÷ 2



➤ Use a cardboard, a tack or pin, and some string. Place a piece of paper on the cardboard and stick a tack through the paper into the cardboard. Tie the string in a loop so that the doubled length is less than the width of the paper. Have your student loop the string around the tack and the pencil and draw a circle, keeping the string tight. Point out that the distance from the tack to the line (circumference of the circle) is always the same.



➤ Show your student a compass and have her practice drawing circles with a compass.

US› page 22, 3d› p. 6
Have your student draw a circle, a radius, and a diameter.

➤ Draw a circle with various chords (line segments that join two points on a circle). Ask your student to identify the center, radius, and diameter.

Learning Tasks 1-7, US› pp. 23-25, 3d› pp. 7-9

1. A **3 cm** B **4 cm** C **6 cm**

2. **radius = 5 cm, diameter = 10 cm**

6. (a) **8 cm** (b) **9 cm**

7. (a) **B** (b) **D**

(c)

Circle	Radius	Diameter
A	8 m	**16 m**
B	**10 m**	20 m
C	**8 cm**	16 cm
D	7 cm	**14 cm**

US› Workbook Exercise 9 **3d› Workbook Exercise 1**

Part 2 - Circumference

(1) Circumference (US› pp. 26-29, 3d› pp. 10-13)

- Relate the circumference of a circle to its diameter.
- Find the circumference of a circle given its diameter or radius.

The ratio of the circumference of a circle to its diameter is a constant; that is, it is always the same for every circle. Mathematicians have found that it is impossible to find the exact value of the quotient $\frac{\text{circumference}}{\text{diameter}}$. They use the Greek letter π (which is sometimes written as "pi" and is pronounced like "pie") to represent this quotient. Some calculators give the approximate value of 3.141592654. In this book, 3.14, 3.142, or $\frac{22}{7}$ are used as an approximation for the value of π.

In this section, the formula for circumference is given as
Circumference $= \pi \times$ Diameter
If we use C for circumference, and d for diameter, we can write this as
$C = \pi d$
The formula for circumference is often given as
$C = 2\pi r$ where r is the radius.
Your student should know either of these.

US› page 26, 3d› page 10
Learning Task 1, US› p. 27, 3d› p. 11

If your student hasn't already learned about π, you may want to have him actually do this activity and learning task 1, using several circles, without first letting him see the text. Even if he has seen the text, he might be interested in "proving" it for himself – actually measuring the circumference and diameter of some circles and finding their ratio. His ratios may not be as close as 3.14. You can tell him that mathematicians have come up with various methods to find the ratio that depend on mathematical properties rather than just measurement, and have found that the ratio is an unending decimal, 3.14159265358979323846264... so an approximation has to be used for this ratio.

☑ 1. A: **3.14** B: **3.1428....** C: **3.14**
The quotient is always approximately the same.
