Calculating Distance

The distance around a circle, also known as the perimeter or the **circumference** is directly related to its diameter. This means that as the diameter of a circle increases, so does its **circumference**.

So why is this important? When we program our robot, we generally tell the wheels to turn for a given amount, either in degrees or rotations. However, this number doesn't accurately tell us the exact distance the robot has travelled in a straight line. We need to calculate the actual distance.

Wheel

Radius

Diameter

Circumference is all the way around once
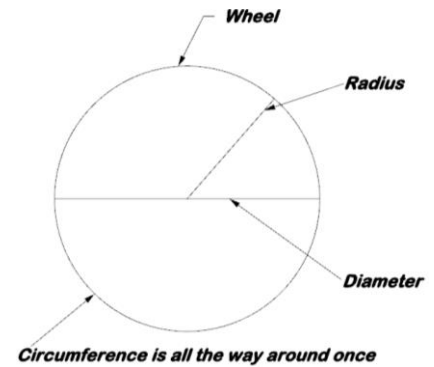
1. Program your robot to drive forward for **10** rotations. Using a ruler or measuring tape, determine how far the robot travelled.	
2. How far would it have travelled in **1** rotation? "**Hint**: This is a division problem"	

Use the following formula to help you determine how far each wheel will travel in one rotation.

Circumference:

The circumference, or distance around a circle, can be calculated using a special formula:

C = pi x d

Vocab: C= Circumference, d= diameter and pi is approximately 3.14.

3. Measure the diameter of the wheels on your robot.	
4. Calculate the circumference using C = pi x d	
5. Does the C in #4 and the Distance calculated from #2 match?	
6. So if we know how far the robot will travel in one rotation, how far will it travel in 2.5 rotations?	
7. How far will it travel when the wheels turn 720 degrees? (Hint: One rotation equals how many degrees?)	
8. We need our robot now to travel 500mm / 20". How many rotations do we need to go to achieve this? Calculate and then try it out!	

Test

9. Using a smaller or larger set of wheels, calculate how far your robot would travel in 10 rotations. Run the experiment and see if you were right. Show your math	Did this work: **Yes** or **No**