

## Large Outside Linear Measurement

Students of all ages enjoy going outside and doing Mathematics, and one of the activities that they enjoy the most is “Large Outside Linear Measurement”. This can be done with a simple device called a [Trundle Wheel](#), which is used by many commercial companies. Such enterprises as Yard Care Companies use it to measure yards for service, Police and State Troopers use it to measure skid marks in accidents, Building Construction Companies use it to measure outside dimensions of houses for brick, siding, spouting measurements.

It is a wheel connected to a handle and pushed by a student and the wheel revolves at the connection point. The wheel can be constructed to be a yard or meter in circumference. It is a simple device to construct and can be made of poster board or cardboard. It is best created from masonite for the wheel and simple wood slats for the handle but it takes a little collaboration between a Mathematics teacher and Wood Shop teacher to get it done.

The relationship between Linear and Circular dimensions to construct this Trundle Wheel is simple formula, which so many students have used over the years to determine circular measurement of a circle. Below are two ways to looking at this relationship or formula.

$$C = \pi D \quad \text{or} \quad C = 2 \pi R$$

$C = \text{Circumference}$        $D = \text{Diameter}$        $R = \text{Radius}$        $\pi = 3.14\dots$

To construct a wheel of one yard in circumference following the steps provided below:

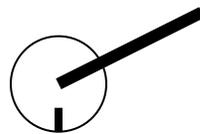
$$36'' = (3.14) D \quad 36'' / 3.14 = D \quad D = 11.47'' \quad \text{or about } 11.5''$$

Therefore       $R = 5.75''$       which is half the  $D$

Imagine using a piece of string, which is 5.75'' in length, and using it to construct a circle on a large piece of poster board or masonite board. After the circle has been created (marked) then all is left to be done is cut it out with scissors or a band saw. A hole needs to be drilled at the center so as to attach it to a handle with an identical hole attached with a nut and bolt.

### Classic Trundle Wheel

The handle is best to be around  
4 feet in length.



A mark needs to be put on  
the wheel as a start point.

As a student pushes the wheel, it is best to have another student counting how many times it goes around and repeatedly touches at the starting point. Each revolution is a Yard or Meter. The handle can be marked in inches or centimeters to act as a yardstick or a meter stick to finish the measurement if it is not an exact yard or meter which is normally the circumference.

It is almost unbelievable to see students almost argue and fight over who gets to push the Trundle Wheel and measure all sorts of lengths in a cement playground or grass playground. All sorts of geometric shapes can be measured and calculations on perimeter and area are done.

The calculations and construction for a Trundle Wheel of a **yard and meter** are very basic.