Design brief submitted by Pete Sorenson (PSorenson@lwsd.org), Technology Teacher, Lake Washington High School, Kirkland, WA.

Building a Pi Tape

1) Use a template or set units to inches.
2) Construct a standard *6 inch* ruler with divisions to *1/16* inch precision.
3) Label the ruler down to the ¼ inch increments.
4) Make sure to put your full name on the ruler.
5) Total height of the ruler should be *no more* than .375 inches, *including* text
6) Copy the ruler and scale one copy by the value of **Pi**. *(If using a letter size printer you will need to split your Pi scaled ruler into several parts to fit the paper)*
7) Make sure you have an accurate "reading line" as well as a means of holding the tape when measuring.
8) Using the materials provided, test your Pi tape. Use your standard ruler to measure the diameter and the Pi tape to measure the circumference. If your work is accurate the rule and the tape will agree. Check the accuracy of your ruler with a "factory" ruler.

Estimated time: 3 class periods

Materials: Paper, Scissors, clear tape, cylindrical container.

Questions to answer:

1. Which method of measuring diameter is more accurate?
2. If your scale for the ruler was incorrect, what would the result be?
3. What scale factor would you use to build a ruler that would yield the circumference if you measured the diameter?
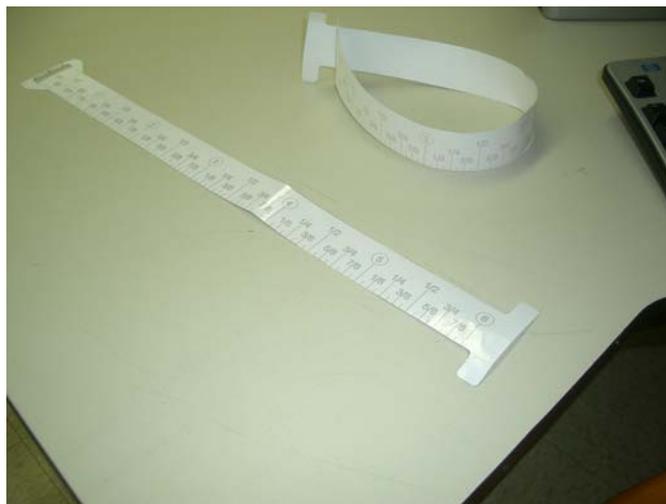
Teacher Notes for Pi Tape

Skills for CAD

Line

Trim

Copy

Array –Rectangle

Relative Position

Copy

Move

Scale

OSNAP

ORTHO

Math Issues

Use of calculator

Ratio/Scale

Percent of error

Reading a ruler

Diameter/Radius/Circumference

Answers for the questions

1. The Pi tape should be more accurate as it will measure an object that is somewhat "out of round" .While directly measuring the "diameter" could be either across the "short" or the "long" dimension of the cylinder.
2. The error would be magnified by 3.14.
3. 1 divided by 3.14

A challenge

1. Repeat the exercise with a "Decimal" tape including a Vernier scale measuring to .001 inch.
2. Repeat the exercise with a "Pipe and Tube" tape that directly reads the pipe size when wrapped around the pipe or tube.