

LESSON 4 - Measuring Practice

Part 1 (continued): Measure diameter & circumference of wheel

MATERIALS NEEDED:

- Bike
- Allen wrenches
- Cloth tape measurer or long string
- Wooden or plastic ruler
- Tape

Problem: How far can each pedal take you?



EXAMPLE:

44 front chainring teeth
16 rear cog teeth

$$\begin{array}{r}
 16 \overline{)44} = 2.75 \\
 \underline{32} \\
 12 \\
 \underline{12} \\
 0
 \end{array}$$

of teeth in rear cog
of teeth in front chainring
gear ratio

2. Count how many “teeth” are on the front chainring and the rear cog.

3. Calculate your gear ratio: Divide the number of teeth in the front chainring by the number of teeth in the rear cog.

4. EXPLANATION: *Gear inches* is the relative difficulty it is to pedal the bike. 55 inches is the average gear inch for BMX racing and is based on the diameter of the rear wheel. *Rollout* is how many inches your bike travels with one full revolution of the pedals and is based on the circumference of the rear wheel. With different gear ratios and different sized wheels, your bike will be easier or harder to pedal and will go more or less inches per pedal.

You will now be calculating your bike’s gear inch and roll out!



5. Using the correct allen wrench size, remove the rear wheel from your bike. If it is easier, you could remove the front wheel instead IF the tires are exactly the same size on the front and the back wheels.

6. Measure the diameter of the wheel. Measurement must be very precise! You are measuring a 3-dimensional object in space, so everything must be as straight as possible or your measurement will be off.

- Take the wheel and hold it in place on the ground vertically.
- Using a wooden or plastic ruler, place the ruler as straight as you can on the highest point of the tire.
- If you have tape, tape the ruler tightly to the rim to keep in place.
- Make sure there is at least 2 inches sticking out on the side you will use to measure.
- Using your measuring tape or string, measure from the top of the ruler ledge at the top of the tire straight down to the ground.
- Have your group mates help determine if your measuring device is straight.
- Adjust the ruler or measuring device as needed to get the straightest measurement of diameter possible.
- Record your measured diameter here (in inches):

WHEEL DIAMETER: _____

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- Bike
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- Cloth tape measurer or long string
- Wooden or plastic ruler
- Tape
- #2 Pencil

Problem: How far can each pedal take you?

7. If you used a long string instead of a measuring tape, mark where the string touches the ruler at the top of the wheel and the ground at the bottom of the wheel. Then, using a ruler, measure the distance in inches between the two marks.

8. Measure the circumference of the wheel.

- Have one group member hold the wheel still while others measure.
- Take your tape measurer or long string and wrap it around the entire wheel in the middle of the tire. It is important to keep your measuring device straight.
- If you'd like, you can tape the measuring device to the tire to keep it straight in the middle of the tire as you rotate it around.

Record your circumference in inches: _____

$$\text{CIRCUMFERENCE} = \text{WHEEL DIAMETER} \times \text{PI (3.14)}$$

9. Take your measured diameter and multiply it by pi (3.14).

Is this the same as your measured circumference?

Which one do you think is more accurate?
