

Piston Displacement

Lesson 7

Remember:

Pretty **P**lease **M**y **D**ear **A**unt **S**ally

(From left to right; **P**arentheses; **P**ower; **M**ultiply; **D**ivide; **A**dd, **S**ubtract)

Today we're going to talk about how to modify an engine to make the car go faster.

What ideas do you have about how to make a car go faster?

What does "stroking" an engine mean?

What do you think the numbers on the sides of cars mean? Like 413 Hemi or 427 on a Chevy?

Why would you want to be able to figure out the cu in displacement of an engine?

So, how do you figure out the cubic inch displacement of an engine block?

What engine dimensions or specifications determine the cubic inch displacement (CID)?

What do we call the diameter of the cylinder?

What do we call the travel of the piston in the cylinder?

How do we determine piston displacement?

Define bore or diameter as the largest part across the cylinder

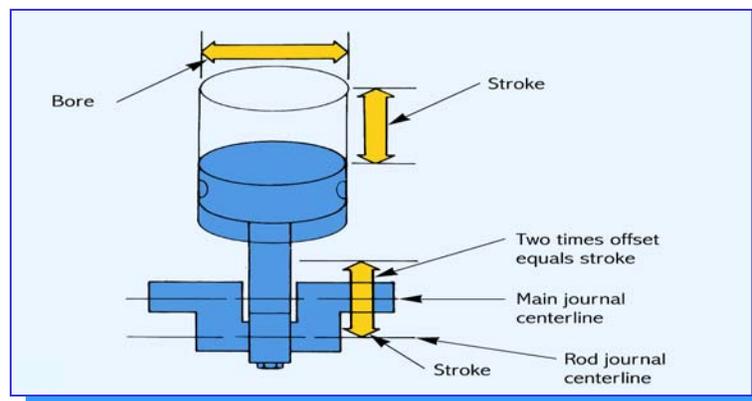
Formula for piston displacement is based on the volume of a cylinder:

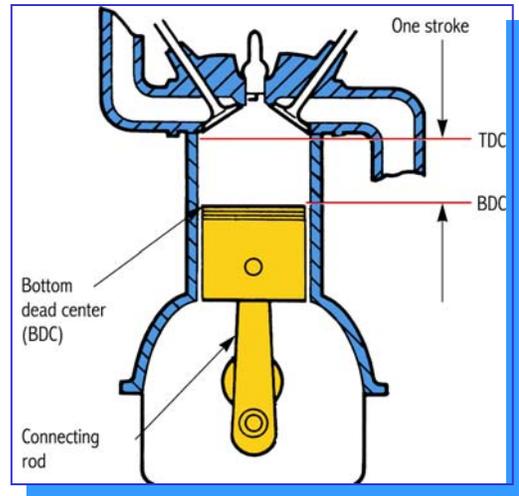
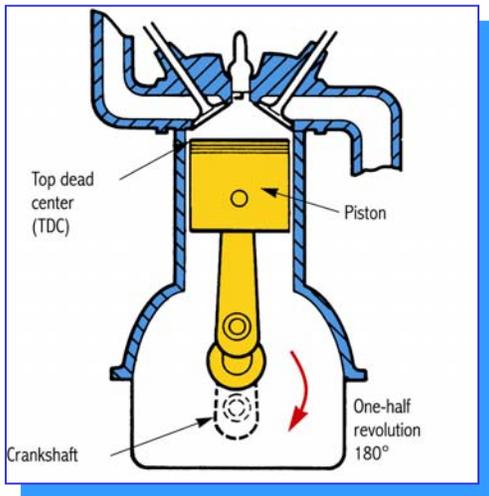
Volume the piston displaces as it travels from BDC to TDC

Found by comparing cylinder diameter and piston stroke

Piston displacement formula:

$$\text{piston displacement} = \frac{\text{bore squared} \times 3.14 \times \text{stroke}}{4}$$





1. Let's say we had a bore of 4 inches, a stroke of 3 inches...what would be the size of one cylinder? What if you had a V8 engine?

$$\text{piston displacement} = \frac{(4^2) \times 3.14 \times 3}{4} = \frac{16 \times 3.14 \times 3}{4} = \frac{150.72}{4} = 37.68 \text{ cu. in.}$$

2. What if we convert the cubic inch displacement of the previous engine to metric? We'll need out conversion charts to convert these numbers to metric.

3. The volume or cubic inch displacement of an engine with bore of 4.25 inches and a stroke of 3.76 inches in an 8-cylinder engine block should produce approximately _____ cubic inches.

4. What is the cubic inch displacement of an 8-cylinder engine having a bore of 4.094 inches and a stroke of 3.76 inches? What manufacture used this size engine back in the days of the Muscle Car?

5. Find the piston displacement for a 4-cylinder engine with a 3 3/4" bore and a 3 1/2" stroke.

6. Find the increase in PD if a 8-cylinder engine with a 3.5" bore and a 3.75" crankshaft stroke is increased to a 3.55" bore.

7. Find the volume of a soup can with the diameter of 2 7/8" and the height of 4 3/8".

8. Find the height of a cylinder with a volume of 27 cubic inches and a radius of 2 inches.

**North Montco Technical Career Center
Math-In-CTE**

Lesson 7 Worksheet – Piston Displacement

Name: _____ AM-1: _____ PM _____ Date: _____

1. Find the piston displacement for a 6-cylinder engine with a 8.56 cm bore and a 6.9 cm stroke.

2. Find the piston displacement for an 8-cylinder engine with a 4.13" bore and a 4" stroke.

3. Find the volume of water in an above ground, circular swimming pool that is 3 feet high and 15 feet across.

4. What is the radius of the pool mentioned in problem 3?

5. What is the volume of the pool if the radius is 5 feet and the height is 5 feet.

