

**Subject:** Applied Technology

**Year/Level:** 13

<b>Strand: 5</b>	<b>AT 13.5: Machines And Engines</b>
<b>Sub Strand</b>	<b>AT 13.5.1 Motorized Machines And Engines</b>
<b>Content Learning Outcome</b>	<b>AT 13.5.1.1 Demonstrate knowledge of the use of motorized Static machines.</b>

### LESSON NOTES

#### Chapter 5: Machines and Engines

#### **STRAND OUTCOME**

After completing this strand students will be able to:

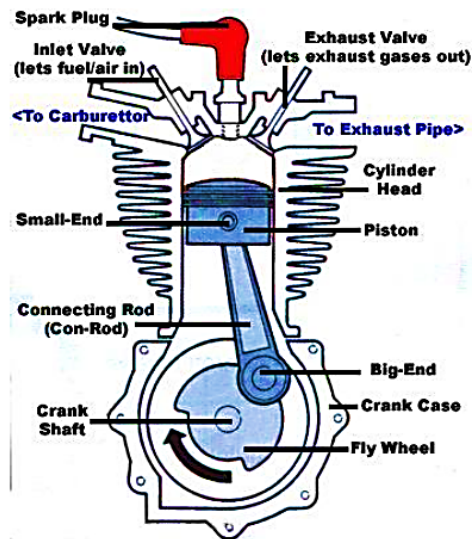
- Identify and familiarize themselves with motorized machines and four stroke engines.

#### **Four –Stroke Engines**

A **four-stroke engine** (also known as **four cycle**) is an internal combustion (IC) engine in which the piston completes four separate strokes while turning a crankshaft. A stroke refers to the full travel of the piston along the cylinder, in either direction. The four separate strokes are termed:

**Intake:** also known as induction or suction This stroke of the piston begins at top dead center (T.D.C.) and ends at bottom dead center (B.D.C.). In this stroke the intake valve must be in the open position while the piston pulls an air-fuel mixture into the cylinder by producing vacuum pressure into the cylinder through its downward motion.

**Compression:** This stroke begins at B.D.C., or just at the end of the suction stroke, and ends at T.D.C. In this stroke the piston compresses the air-fuel mixture in preparation for ignition during the power stroke (below). Both the intake and exhaust valves are closed during this stage.



**Combustion:** also known as power or ignition. This is the start of the second revolution of the four stroke cycle. At this point the crankshaft has completed a full 360 degree revolution. While the piston is at T.D.C. (the end of the compression stroke) the compressed air-fuel mixture is ignited by a spark plug (in a gasoline engine) or by heat generated by high compression (diesel engines), forcefully returning the piston to B.D.C. This stroke produces mechanical work from the engine to turn the crankshaft.

**Exhaust:** also known as outlet. During the *exhaust* stroke, the piston once again returns from B.D.C. to T.D.C. while the exhaust valve is open. This action expels the spent air-fuel mixture through the exhaust valve.

#### **Main Parts of an Internal Combustion Engine:**

1. **Cylinder block** - The main function of cylinder is to guide the piston.



2. **Cylinder head** - The top end of cylinder is closed by means of removable cylinder head. There are two holes or ports at the cylinder head, one for intake of fuel and other for exhaust.

**Piston** - A piston is fitted to each cylinder as a face to receive gas pressure and transmit the thrust to the connecting rod. It is the prime mover in the engine. The main function of piston is to give tight seal to the cylinder through bore and slide freely inside of cylinder.



**Piston rings** - A piston must be a fairly loose fit in the cylinder so it can move freely inside the cylinder. If the piston is too tight fit, it would expand as it got hot and might stick tight in the cylinder and if it is too loose it would leak the vapor pressure. To provide a good sealing fit and less friction resistance between the piston and cylinder, pistons are equipped with piston rings.



**Connecting rod** - Connecting rod connects the piston to crankshaft and transmits the motion and thrust of piston to crankshaft. It converts the reciprocating motion of the piston into rotary motion of crankshaft. There are two ends of connecting rod one is known as big end and other as small end. Big end is connected to the crankshaft and the small end is connected to the piston by use of piston pin.



**Crankshaft** - The crankshaft of an internal combustion engine receives the efforts or thrust supplied by piston to the connecting

rod and converts the reciprocating motion of piston into rotary motion of crankshaft.



### STUDENT ACTIVITY

1. Discuss the difference between a two stroke and four stroke engines.

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2. List down with their uses the main parts of internal combustion engines?

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