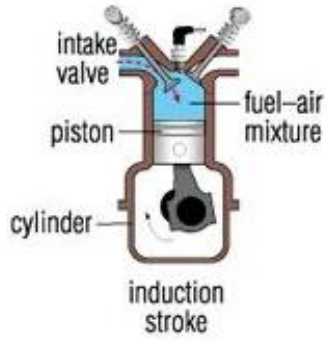
WORKSHEET 4

Task 4: Read the texts, look at the illustrations and do the activities below.

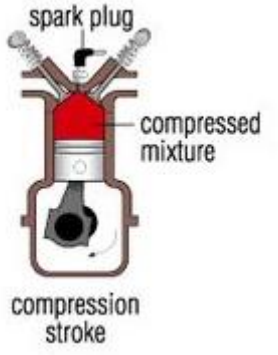
4 BASIC OPERATIONS

The Induction Stroke



On the induction stroke, the inlet valve opens and the piston, moving down, creates a depression (this is a pressure which is less than atmospheric pressure), a mixture of air/fuel which has become vaporised is pushed into the cylinder via the open inlet valve by atmospheric pressure (a high pressure always flows to a low pressure trying to make pressure equal again).

The Compression Stroke



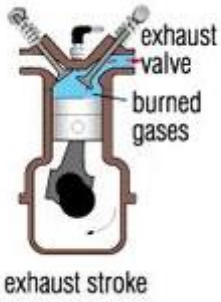
When the piston reaches its lowest limit of travel it then moves upwards, as this happens the inlet valve closes. The exhaust valve remains closed so the cylinder is sealed and nothing can get in or out. As the piston moves upwards the air/fuel mixture (a gas) is compressed to about one

tenth its original volume. Thus the compression of the mixture increases the pressure and temperature in the cylinder.

The Power (or Combustion) Stroke

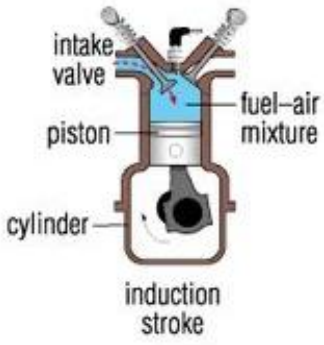
As the piston reaches the top of its travel on the compression stroke, a spark from the spark plug ignites the mixture, the mixture burns very rapidly and the cylinder pressure increases to approximately 40 times atmospheric pressure. All of this pressure against the piston forces it down the cylinder. The power is transmitted through the connecting rod to the crankshaft, which is rotated due to the force acting on it.

The Exhaust Stroke

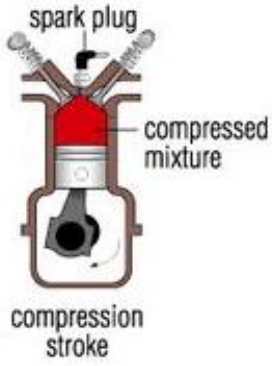


As the piston reaches the bottom of its travel (stroke) the exhaust valve opens and the expanding gas escapes to the atmosphere via the exhaust valve port. The piston then starts to move up the cylinder forcing the remaining burnt gases out through the exhaust valve port. When the piston reaches the top of its travel, the exhaust valve closes and the inlet valve opens again. The four strokes continue to repeat during engine operation.

Summary

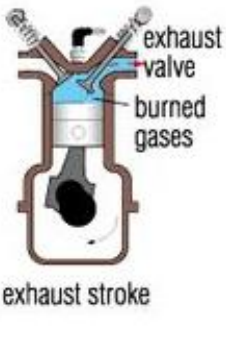


The inlet valve is open and the piston is moving down the cylinder.



Both valves are closed and the piston is moving up the cylinder compressing the fuel/air mixture.

The piston is forced down the cylinder due to the burning and expanding gas.



The exhaust valve is open and the piston is moving up the cylinder.

Task 5. Complete the table then check with the text

Stroke	**Piston travel** (Up or Down)	**Basic operations**	**Intake valve** (Open or Closed)	**Exhaust valve** (Open or Closed)
		Intake air/fuel enters the cylinder from the atmosphere.		
		The intake of air/fuel is compressed.		
		The compressed air/fuel is ignited.		
		The burnt mixture (exhaust) is discharged from the cylinder to the atmosphere.		

Task 6. Fill in the gaps from the list of missing words. The words are given in a correct form,

upwards	open	power
temperature	opens	exhaust
top	closes	four-strokes
bottom	ignites	pressure
compression	compressed	exhaust valve
up	vaporised	piston
increases	rotated	inlet valve

The induction stroke

On the induction stroke, the inlet valve _____ and the _____, moving down, creates a depression (this is a pressure which is less than atmospheric pressure), mixture of air/fuel, which has become _____, is pushed into the cylinder via the open _____ by atmospheric pressure (a high pressure always flows to a low pressure trying to make pressure equal again).

The compression stroke

When the piston reaches its lowest limit of travel it then moves _____ as this happens the inlet valve _____. The exhaust valve remains closed, so the cylinder is sealed, nothing can get out or in. As the piston moves upward the air/fuel mixture (a gas) is _____ to about one tenth its original volume. Thus the compression of the mixture increases the _____ and _____ in the cylinder.

The power stroke

As the piston reaches the _____ of its travel on the _____ stroke, a spark from the spark plug _____ the mixture, the mixture burns very rapidly and the cylinder pressure _____ to approximately 40 times atmospheric pressure. All of this pressure acting against the piston forces it down the cylinder. The _____ is transmitted through the connecting rod to the crankshaft, which is _____ due to the force acting on it.

The exhaust stroke

As the piston reaches the _____ of its travel (stroke) the _____ valve opens, the expanding gas escapes to atmosphere via the exhaust valve port, the piston then starts to move _____ the cylinder forcing the remaining burnt gases out through the exhaust valve port, when the piston reaches the top of its travel the _____ closes and the inlet valve opens again, the _____ continue to repeat during engine operation.

You did a great job. Thank you. Have a nice day!