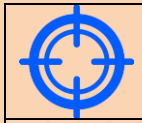
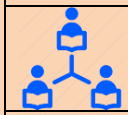
	**Module Focus/Specific Learning Outcomes:** make sure that you write the key unit objectives to be acquired at the end of the unit.
	**Learning Activity:** Complete a learning activity. This will help you to review or practise what you have learned and to prepare you for an assignment or an examination. You will not submit learning activities to your tutor/marker. Instead, you will compare your responses to those provided in the Learning Activity Answer Key found at the end of the applicable module.
	**Video/Flashcard app:** View a video.
	**Stop/Caution:** Use caution when conducting this learning activity or experiment.
	**Assignment:** Complete an assignment. You will submit your completed assignments to your tutor/marker for assessment in accordance with the chart found in the course Introduction.
	**Learning Partner:** Ask your learning partner to help you with this task.
	**Note:** Take note of and remember this important information or reminder.
	**Examination:** Write your final examination at this time.

UNIT 1	VOCABULARY	SKILLS WORK	FUNCTIONS	QUIZ
Internal Combustion Engines (ICE)	Lead-in activity Basic enginnering concepts & its measure units	Reading Internal Combustion Engine (ICE) ICE Structure (click underlined words to get more info) Video Click on the icon to watch the video	Understand basic engineering terms in English Realize the ICE basics Identify the ICE main function & parts	Match and undeline the correct words to the wright picture Try the game-based application, try to get high score Fill in the blanks with appropriate words

In this Unit, you will learn;

- The IC engine stucture
- The components of an IC engine
- The basic principal of ICE

UNIT 1

Internal Combustion Engines (ICE)

- ICE stucture & function
- The components of ICE
- The basic principal of ICE

1

Lead-in Activity: Match and underline next to the title you hear, combining the meaning word with its measure unit. Can be more than one right answers.

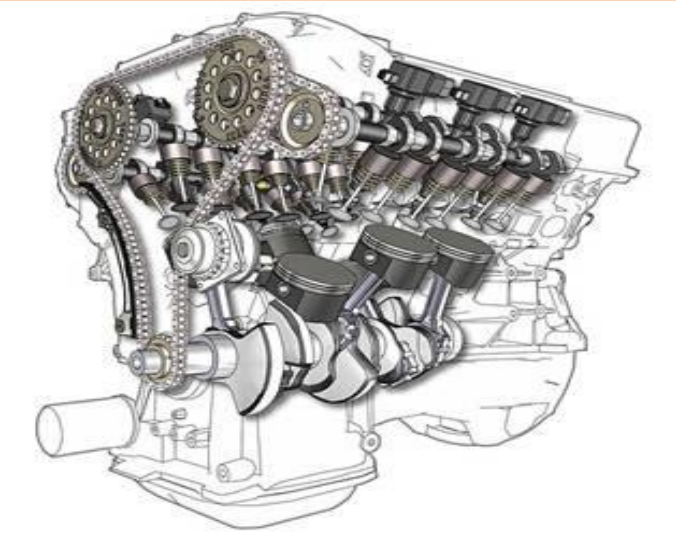
• Energy	is counted --->	Kgr*m	or	Joules	or	Watts
• Force	‘	Kp	or	Newton	or	Kgr
• Power	‘	Ps	or	Kw / HP	or	Kcal
• Torque	‘	lb*in	or	Nt*m	or	m/s^2
• Pressure	‘	Volt	or	Bar / KPa	or	Bhp
• Temperature	‘	^0F	or	^0C	or	^0K
• Linear Velocity	‘	grains	or	m/s	or	Km/h
• Rotary Velocity	‘	ft^3/min	or	rpm	or	min^{-1}

2

Reading part:

INTERNAL COMBUATION ENGINE (ICE)

An internal combustion engine (ICE) is a heat engine where the combustion of a fuel occurs with an oxidizer (usually air) in a combustion chamber that is an integral part of the working fluid flow circuit.



In an internal combustion engine the expansion of the high-temperature and high-pressure gases produced by combustion apply direct force to some component of the engine. The force is applied typically to pistons or turbine blades.

This force moves the component over a distance, transforming chemical energy into useful mechanical energy.

The first commercially successful internal combustion engine was created by Étienne Lenoir around 1859.

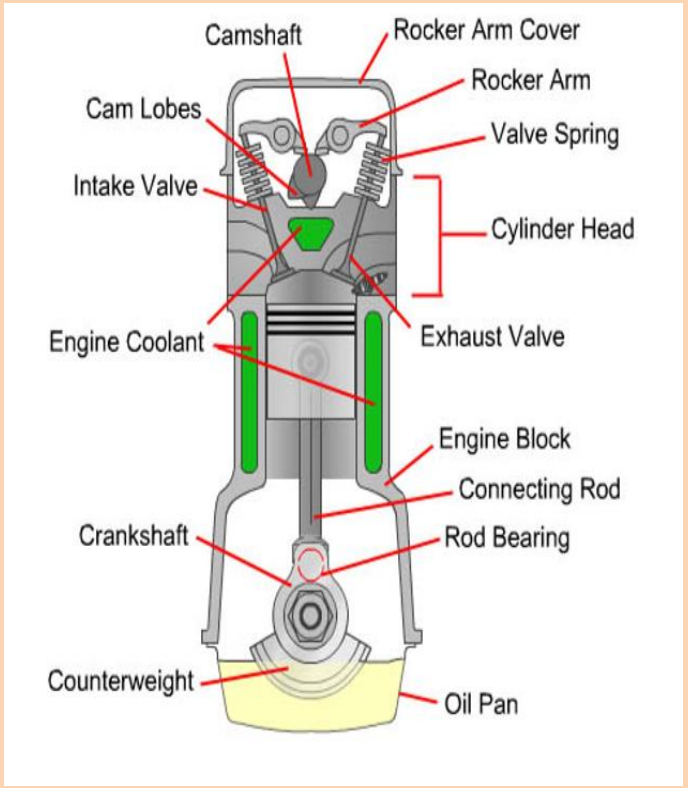
ICE Structure

The base of a reciprocating internal combustion engine is the engine block, which is typically made of cast iron or aluminum. The engine block contains the cylinders. Water-cooled engines contain passages in the engine block where cooling fluid circulate (the water jacket).

Some small engines are air-cooled and instead of having a water jacket the cylinder block has fins protruding away from it to cool by directly transferring heat to the air.

The top part of the engine is the cylinder head. It contains the **camshaft**, the **valves** and their moving mechanism.

At the bottom, the **crankshaft** rounds in the base of ICE, inside the **oil pan**, where usually the oil is saved.

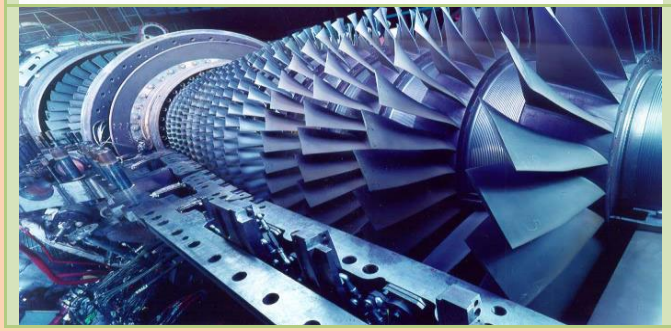


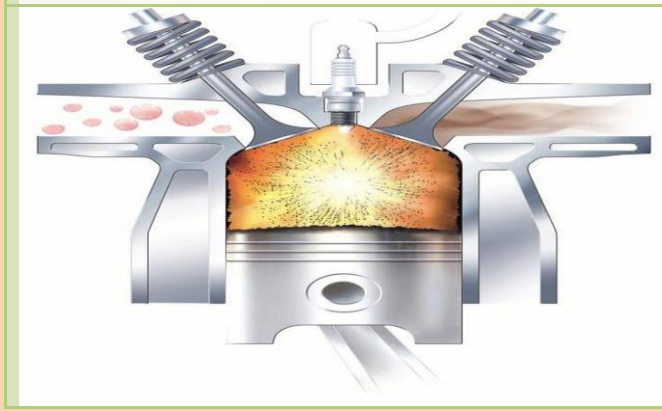
Click on the icon to watch the video. You can use the hyperlink to learn more about each term.

3

Match and undeline the correct word or words to the picture on the left column.

Work in pairs!

	Pistons, Heat engine, Fuel, Turbine blades, Combustion chamber, Nozzle, Camshaft, Cylinders, Valves, Crankshaft, Oil pan, Water jacket, Fins, Reciprocating, Air-cooled, fins, Cylinder head, Engine block.
	Pistons, Heat engine, Fuel, Turbine blades, Combustion chamber, Nozzle, Camshaft, Cylinders, Valves, Crankshaft, Oil pan, Water jacket, Fins, Reciprocating, Air-cooled, fins, Cylinder head, Engine block.

	Pistons, Heat engine, Fuel, Turbine blades, Combustion chamber, Nozzle, Camshaft, Cylinders, Valves, Crankshaft, Oil pan, Water jacket, Fins, Air-cooled, fins, Cylinder head, Engine block.
	Pistons, Heat engine, Fuel, Turbine blades, Combustion chamber, Nozzle, Camshaft, Cylinders, Valves, Crankshaft, Oil pan, Water jacket, Fins, Air-cooled, fins, Cylinder head, Engine block.
	Pistons, Heat engine, Fuel, Turbine blades, Combustion chamber, Nozzle, Camshaft, Cylinders, Valves, Crankshaft, Oil pan, Water jacket, Fins, Air-cooled, fins, Cylinder head, Engine block.

	Pistons, Heat engine, Fuel, Turbine blades, Combustion chamber, Nozzle, Camshaft, Cylinders, Valves, Crankshaft, Oil pan, Water jacket, Fins, Air-cooled, fins, Cylinder head, Engine block.

To try the game-based application, click on the icon.

You must match the appropriate image to the wright word and get the perfect score! A decent score is more than 70%, but we think that you can be perfect!

4

Test: **Fill in the blanks with appropriate (bolb) words.**

An **internal combustion engine** (**ICE**) is a _____ where the combustion of a _____ occurs with an oxidizer (usually air) in a _____ that is an integral part of the working fluid flow circuit.

In an internal combustion engine the expansion of the high-temperature and high-pressure gases produced by combustion apply direct force to some component of the engine. The force is applied typically to _____, _____, or a _____. This force moves the component over a distance, transforming _____ into useful _____.

The first commercially successful internal combustion engine was created by _____ around 1859.

Pistons, Oxidizer, Heat engine, Fuel, Chemical energy, Turbine blades, Etienne Lenoir, Combustion chamber, Mechanical energy, Nozzle

The base of a _____ internal combustion engine is the _____, which is typically made of cast iron or aluminum. The engine block contains the _____.

_____ engines contain passages in the engine block where cooling fluid circulate (the _____).

Some small engines are _____ and instead of having a water jacket the cylinder block has _____ protruding away from it to cool by directly transferring heat to the air.

The top part of the engine is the _____. Contains the _____, the _____ and their moving mechanism.

At the bottom, the _____ rounds in the base of ICE, inside the _____, where usually the oil is saved.

Camshaft, Water-cooled, Cylinders, Valves, Crankshaft, Oil pan, Water jacket, Fins, Reciprocating, Air-cooled, fins, Cylinder head, Engine block.

Can also be online where you can also check your anwsers, click here!

5

Card Game! Click the following icon to watch the video to get an idea!

At the laboratory of ICE, split in teams of two persons and each team must match the cards given over the parts on a realistic engine and spell each word correct. Winning team must have the less faults in the best time!

6

Home work!

1. Use the web services and especially search engines in order to find online technical dictionaries. Search for the words we spoke about in our last lesson. Write down the most interesting sites you have found –at least three.
2. Create a small text, speaking about the creation and history of Internal combustion Engines –ICE.

Timeline: Both projects must be delivered in two weeks.

Next lesson

In engines with more than one cylinder they are usually arranged either in 1 row (straight engine) or 2 rows (boxer engine or V engine); 3 rows are occasionally used (W engine) in contemporary engines, and other engine configurations are possible and have been used.