KNOW YOUR VEHICLE: HOW A CAR WORKS

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STEP 1 When you start your car – either by turning the key in the ignition or by pushing the 'Start' button – you close a circuit that allows a current to pass from the battery to the starter via the starter solenoid switch.

STEP 2 The starter makes the engine turn over.

STEP 3 The electric current stops flowing to the starter but continues to flow through the charging system (which uses an alternator to generate power and charge the battery) and to the rest of the electrical system.

STEP 4 When the engine is running, fuel flows from the fuel pump through the fuel filter to the fuel injectors, into the intake manifold, and then into the combustion chamber.

STEP 5 Fuel is mixed with air to form a mist.

STEP 6 The fuel/air mixture passes into the cylinders in the engine. Inside each cylinder is a piston, which fits snugly and moves up and down.

STEP 7 A spark from a spark plug ignites the fuel/air mixture causing it to burn and expand rapidly.

STEP 8 The expansion of gases forces the piston back down again, with more power than when it went up.

STEP 9 As the piston and the connecting rod go up and down, they cause the crankshaft to turn.

STEP 10 When you shift the gear stick into Drive in a vehicle with automatic transmission, or first gear if you have a manual transmission (using the clutch which connects or disconnects the engine from the drive train), a set of gears causes the rest of the crankshaft to turn at a particular speed.

STEP 11 The differential changes the direction of the power in a rear wheel vehicle so that the drive wheels can turn.

STEP 12 The drive wheels turn and push the vehicle forwards (or backwards) and off you go.

STEP 13 Return to Step 4 and the cycle repeats continuously until the car is stopped by applying the brakes. The ignition can then be turned off.

RETURN TO STEP 4 OR STOP

8 ESSENTIAL MOTOR VEHICLE SYSTEMS

There are many systems that work together to operate a motor vehicle. Simple operations such as moving forward, reversing, braking and cooling are all necessary functions required to operate a motor vehicle safely.

1 ENGINE SYSTEM

An internal combustion engine burns fuel in combustion chambers inside an engine.

2 DRIVE TRAIN

A drive train includes the many parts that transfer the spinning motion from an engine to the wheels. You may know a drive train by more common terms: Four Wheel Drive, Rear Wheel Drive, Front Wheel Drive or All Wheel Drive.

A drive train has three jobs:

1. Transferring spin force from an engine to the wheels.
2. Changing the rate of spin delivered to the wheels by shifting gears.
3. Connecting and disconnecting an engine from the wheels in order to start or idle.

3 FUEL SYSTEM

The fuel system has three basic jobs:

1. To supply an engine with fuel.
2. To mix this fuel continuously with air in varying combinations.
3. To discharge the burnt remains safely.

Fuel droplets form a vapourised mixture, like a mist, as they enter the engine and are mixed into an airflow. The airflow is created by the action of the pistons moving up and down.

4 COOLING SYSTEM

The cooling system uses a mixture of water and antifreeze to absorb and disperse engine heat.

The cooling system has three jobs:

1. Disperse excess engine heat.
2. Quickly heat a cold engine.
3. Maintain the correct engine running temperature.

5 RUNNING GEAR

The running gear includes the parts used to guide the vehicle through bumps, swerves and road hazards. The running gear connects the driver to the roadway and helps the vehicle to negotiate rough roads, sharp turns and fast stops; all while keeping a constant weight on four tyres. If bouncing and bumps cause one tyre to even slightly leave the roadway, this will adversely affect a vehicle's steering, cornering and braking – especially dangerous in extreme conditions when control is needed the most.

6 BRAKING SYSTEM

The braking system controls how fast, smooth and straight a car slows down. Vehicles not only have hydraulic brakes but also electronic braking systems. Most modern vehicles have anti-lock braking systems (ABS) that can prevent skids in slippery conditions.

7 ELECTRICAL SYSTEM

An automotive electrical system is a collection of circular electrical pathways. Each pathway, called a circuit, includes a wire leading from a battery to an electrical accessory and then back to the battery. The battery stores the electrical current that your vehicle uses to start and passes electricity along wires to the parts of your vehicle that need electricity to function, such as the ignition system, lights and radio.

8 SAFETY SYSTEM

Safety systems are very important in vehicles that move at high speeds. Airbags, reverse beepers, sensors, cameras and monitors are standard features in new cars. Research and testing continues to prompt the development and inclusion of mandatory safety systems.