FEDS FAIRVIEW EDUCATIONAL SERVICES LTD

NZQA accredited and registered provider

2020

Unit Standard **229**

Level 2 Credit 4 v4

Identify the general locations and functions of motor vehicle systems and main components

Student Name:	**Date: / / 2020**
School:	**Mark:**

Feedback:	☐ **Excellent work**	☐ **Good work**	☐ **Attempt all questions**	☐ **Please resubmit**	**Marked by:**
Comments:					

CONTENTS

UNIT STANDARD 229

What is the objective of this unit?
To identify the general locations and functions of motor vehicle systems and main components.

What is this unit about?
It's about these outcomes:

- Identifying locations and layout of systems and main components on motor vehicles.
- Demonstrating knowledge of the functions of motor vehicle systems and their main components.

What unit standards must I have done first?
None - Entry is open.

How will I be assessed?
Assessment will be through a written theory assessment.

Where can I find the Outcome and Evidence Requirements?
Refer to the back of this workbook.

LEARNING PROGRESSIONS

The text in this workbook has been mapped against the TEC Learning Progressions for Adult Literacy and the results below show the skills needed by students to read and understand the content.

	Decoding	Vocabulary	Language and text features	Comprehension	Reading Critically
Step1					
Step 2					
Step3					
Step 4					
Step5					
Step 6					

RELEVANT VOCABULARY

It is recommended that you are familiar with the following words and their definitions to help your understanding of the material contained in this workbook.

Aerodynamics: The effect that air has on moving objects
Longitudinal: Running from front to back
Transverse: Running lengthways -sideways
Pivot: Rotate/turn
Linear: Straight line movement
Rotary: Turning movement
Momentum: Speed of movement
Intricate: Complex, having many parts
Friction: Energy created when two surfaces are rubbed against each other
Contoured: Shaped to fit the outline
Periodically: Takes place at regular intervals
Transmits: Sends
Exerted: Effort or pressure that is applied
Stationary: Not moving
Capacity: The maximum amount that can be received or given

VEHICLE DESIGN

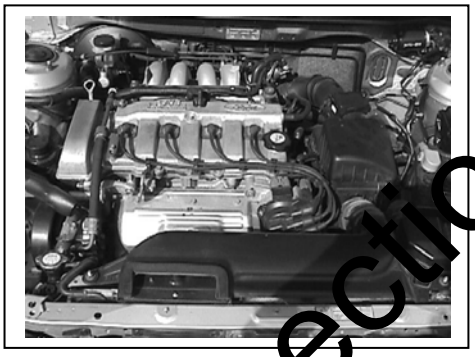
The vehicle body is the exterior shell of the vehicle that houses all of the mechanical and electrical systems required to operate the vehicle. The modern motor vehicle body is designed with passenger safety and vehicle economy in mind. The materials used in the construction of the body must be strong enough to cope with the dual demands of passenger safety and road use.

With developments in technology, vehicle manufacturers can now use materials, which are strong, and yet relatively lightweight. Vehicle manufacturers are also using the principles of aerodynamics to shape vehicle bodies so that they can limit the drag effects created when the vehicle is moving.

Body Strength

These factors have led to the unit construction design. The largest single unit is the engine; this can be positioned in several different locations and directions.

It can be mounted longitudinally or transversely, in front of or behind the front or rear wheels. It can drive the front or rear wheels, or both. The reason for varying the engine location is to gain as much space inside the vehicle as possible.



Transverse Engine

Longitudinal Engine

Vehicle specifications tell the size of a vehicle, its performance, and other important general information. They can be found in catalogues, vehicle features, and magazines.

Example

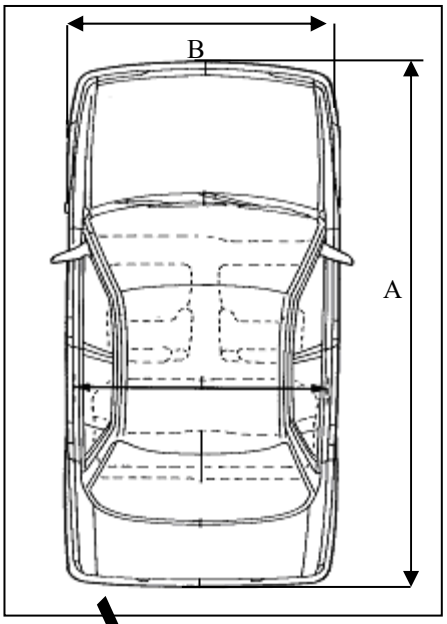
Specifications

SPECIFICATIONS (continued)

	XT EcoBoost SPECIAL ORDER ONLY	XT EcoLPi Limited stock available
Length - Overall	4,955	4,955
Overhang - Front	942	942
Overhang - Rear	1,175	1,175
Track - Front	1,583	1,583
Track - Rear	1,598	1,598
Wheelbase	2,838	2,838
Width - Overall without side mirrors	1,868	1,868
Interior dimensions (mm)		
Front - Head room	1,012	1,012
Front - Leg room	1,073	1,073
Front - Shoulder room	1,523	1,523
Rear - Head room	989	989
Rear - Leg room	989	989
Rear - Shoulder room	1,518	1,518

A **OVERALL LENGTH**

Includes bumper guards, if fitted to the vehicle.



B **OVERALL WIDTH**

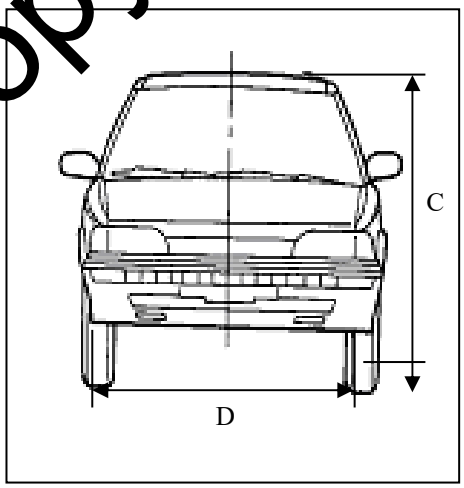
Includes bumpers, mouldings, sheet metal protrusions, etc.; measured to the outside of the metal.

C **OVERALL HEIGHT**

Measured with the vehicle in a curb weight condition.

D **TRACK**

The distance between the centrelines of the tyres.



E **WHEELBASE**

The distance between the centrelines of the front and rear axles.

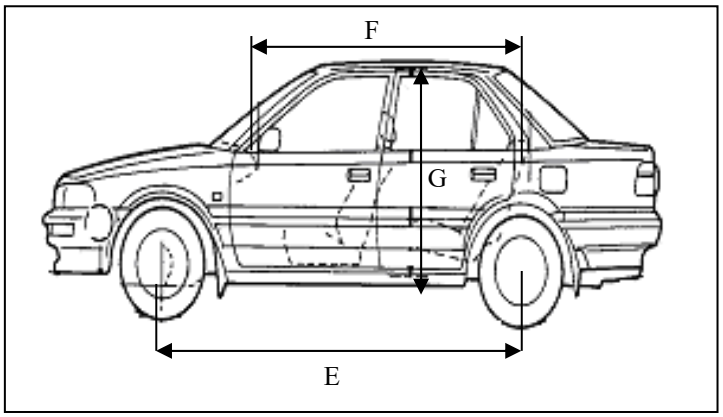
F **ROOM LENGTH**

The horizontal distance along the vehicle's longitudinal (lengthwise) centre line from the top of the instrument safety pad to the point directly above the top of the rear seatback.

Dimensions

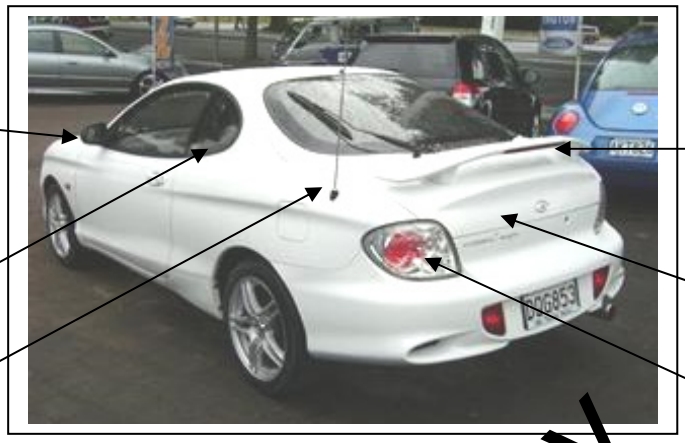
G **ROOM HEIGHT**

The maximum vertical distance from the top of the floor covering to the headlining.



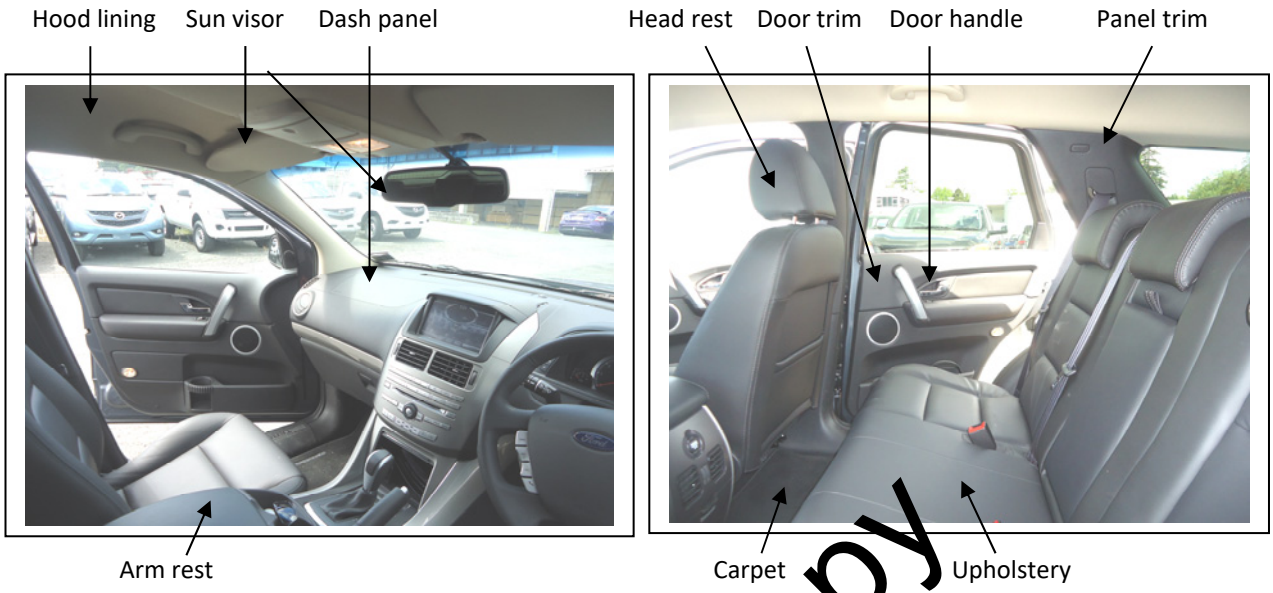
EXTERIOR VEHICLE PANELS

The photos below show the location of typical body panel, glazing and vehicle exterior trim. Body panels are usually made using high strength and mild steel.



INTERIOR VEHICLE PANELS

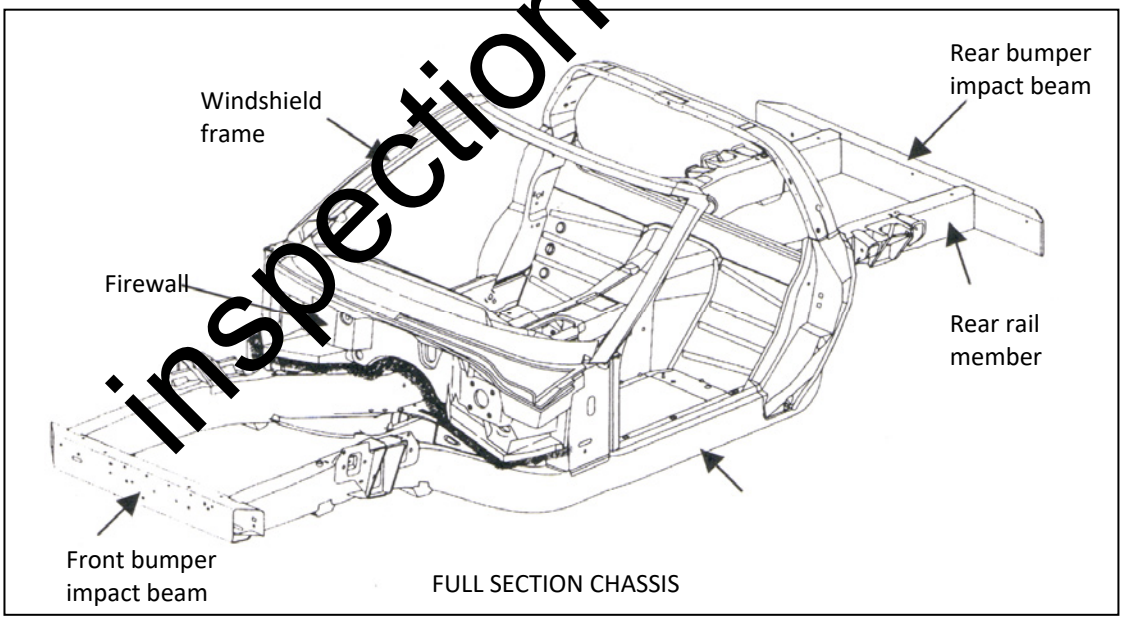
The diagram shows the location of typical interior trim.

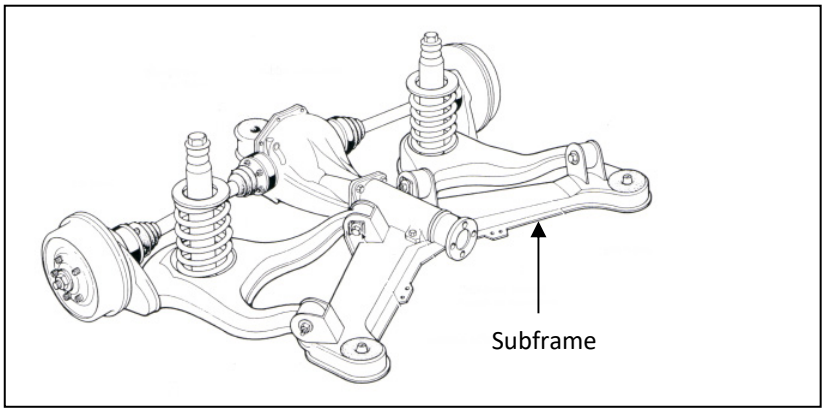


CHASSIS COMPONENTS

The picture below shows the location of typical chassis components and a subframe.

Structural Components



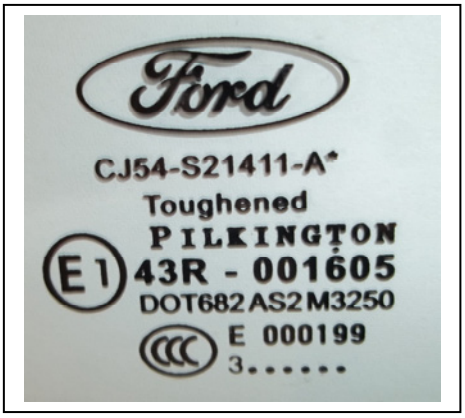


Component	Function
Aerials	Used to receive radio signals
Badges	Fitted to the exterior and details the make and model of the vehicle
Bonnet	A panel that covers the engine bay
Boot lid	A panel that covers the rear luggage compartment
Bumpers	Fitted to limit body and mechanical damage in the event of a collision.
Chassis	Makes up the vehicle body, includes sub frames, rails and impact beams
Dash panel	Plastic moulded panel that houses the glove box and instruments.
Doors	Used for entering and exiting the vehicle. Will contain a locking mechanism and controls for windows
Firewall	Separates the engine bay from the driver's compartment.
Guards	Used in each corner of the vehicle
Hatch back	A three or five door vehicle which uses a hanging rear door to access the luggage compartment
Heavy goods vehicle	Can have 2, 3 or 4 axles and used by most freight companies.
Mirrors	Allows driver to see traffic and the rear of the vehicle.
Monsoon shield	Designed to keep rain and wind out of the vehicle when the front windows are down
Mud flaps	Fitted to protect exterior panel from stone and mud damage.
Number plate	Fitted to the front and rear to display the registration number of the vehicle
Parcel shelf	Moulded panel that covers the space between the rear seats and rear windscreen.
Roof rack	Fitted to the roof to allow for larger items to be transported.
Sill covers	Protects the lower part of the vehicle from stones that are thrown up.
Spoiler	Used to assist vehicle handling at high speed and fitted to the boot lid
Station wagon	A five door vehicle which has a large rear compartment for carrying luggage
Tow bar	Attachment that allows trailers and caravans to be connected to the vehicle.
Upholstery	Materials that covers the seats and linings in the passenger compartment.
Windscreen	Can be toughened or laminated and prevents rain, wind and dust from entering the vehicle.

VEHICLE GLAZING

Safety Standard

This symbol shows a typical glazing marking that is found on all automotive glass.



Laminated windshields are made with two sheets of glass with a thin layer of Polyvinyl Butyral (PVB) in between. When an object hits the windshield, the windshield bows out without being punctured.

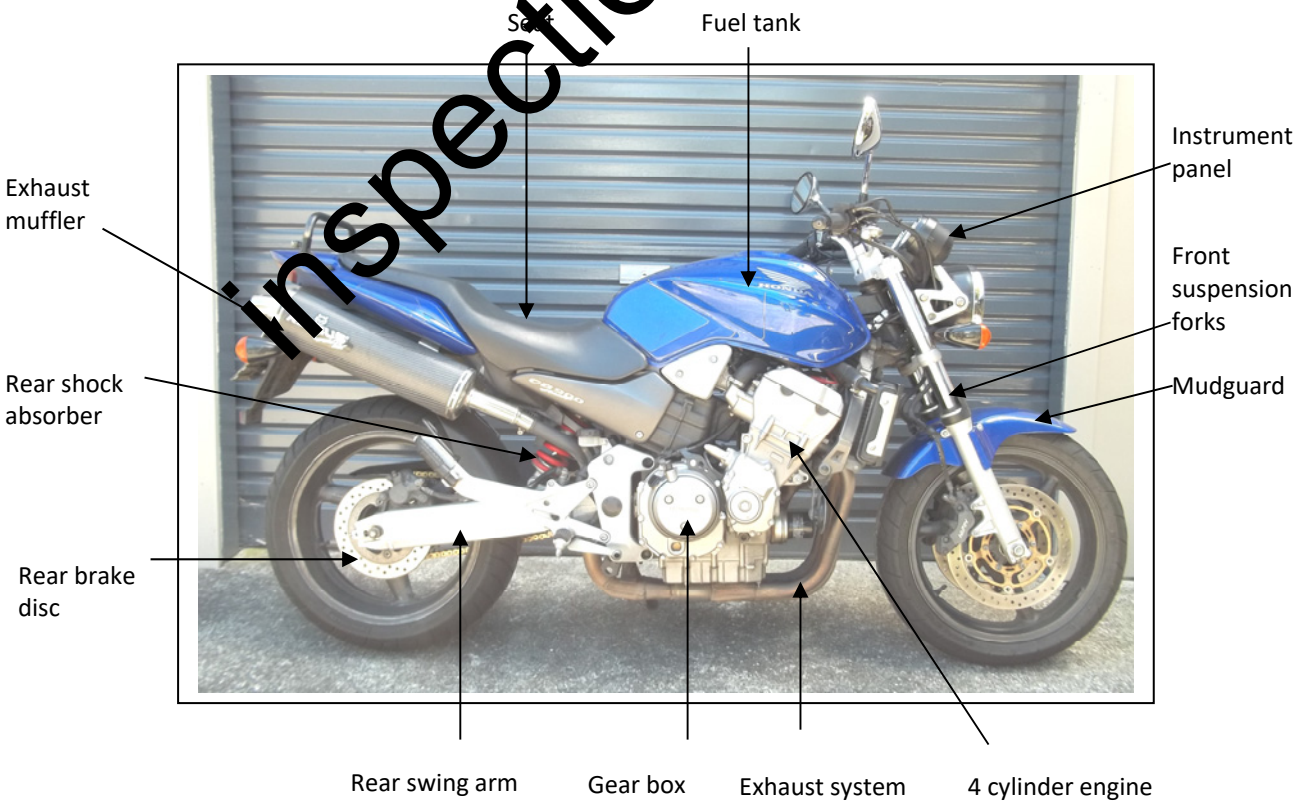
The layer prevents the glass from breaking up into large sharp pieces.

MOTORCYCLES

Motor Cycle Types

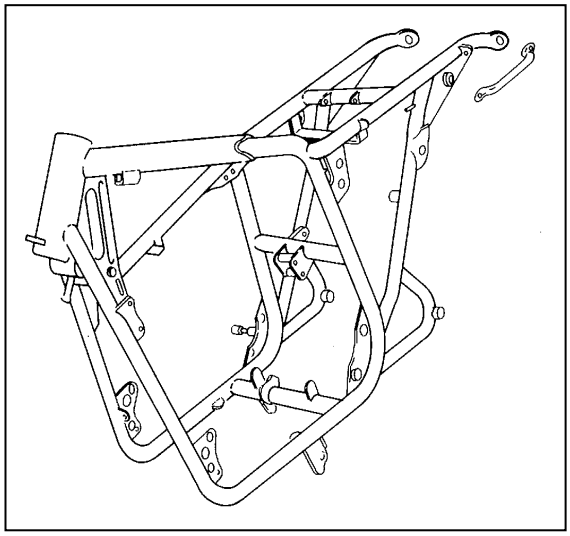
Motorcycles are two wheeled vehicles that consist of a frame, steerable front wheel, engine, transmission and a final drive gear at the rear wheel. The engines can be found in a variety of sizes and horsepower (from 50cc up to 1000cc).

There are different types of motorcycles produced which range from on road sport bikes to adventure style bikes (both on and off road).



MOTORCYCLE FRAMES

Support engine and rider



The purpose of the motorcycle frame is to support the engine and rider. At the same time, the frame provides attachment points for the wheels.

The front wheel must be mounted so that it can be pivoted from side to side for steering.

The frame must be light but strong, rigid under stress and formed so that the wheels, engine, and rider can be easily accommodated.

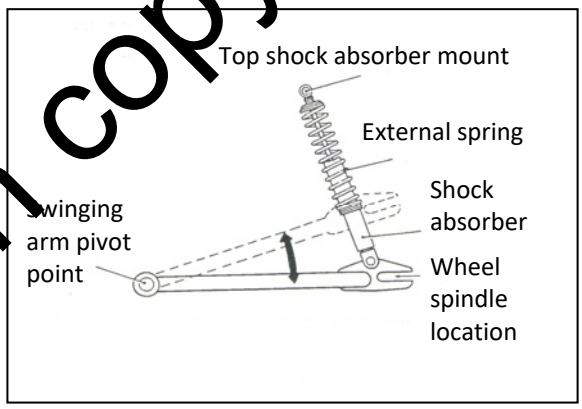
MOTORCYCLE SUSPENSION

Motor cycle suspensions

The swinging rear fork is used on most types of motorcycle rear suspension.

The swinging fork, or swing arm, has a **single pivot point behind the engine on** the frame.

This allows the rear wheel assembly to move up and down. It moves in an arc as it pivots around the attachment point on the frame. One or two springs and shock absorbers control the travel of the rear wheel.



The front steering and suspension system is one main unit known as the front forks. This allows the front wheel to move up and downward and turn at the same time.

COMMERCIAL VEHICLES

Transport goods

These vehicles are more heavily constructed than motor cars, and are specifically designed to transport goods.

The body may be in the form of a flat platform, tank, container van or be specially built to suit a particular operation. The vehicle may have two, three or four axles.

The function of major components of heavy vehicles is similar to that of light vehicles, but the components are designed to withstand much heavier loads.

The alternative to the rigid vehicle is the articulated unit, consisting of a tractor unit and trailer.

TYPES OF HEAVY VEHICLES

Articulated Semi Trailer

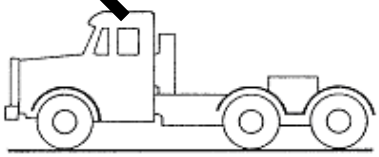
Articulated vehicle: tractive unit and semi-trailer

2 Axle Tractor and Trailer

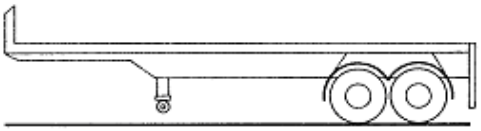
2 axle 4 wheeled tractive unit

Single axle 2 wheeled

3 Axle Tractor and Trailer

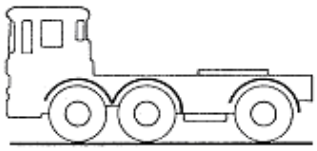


3 axle 6 wheeled tractive unit

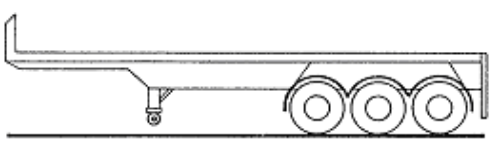


2 axle 4 wheeled

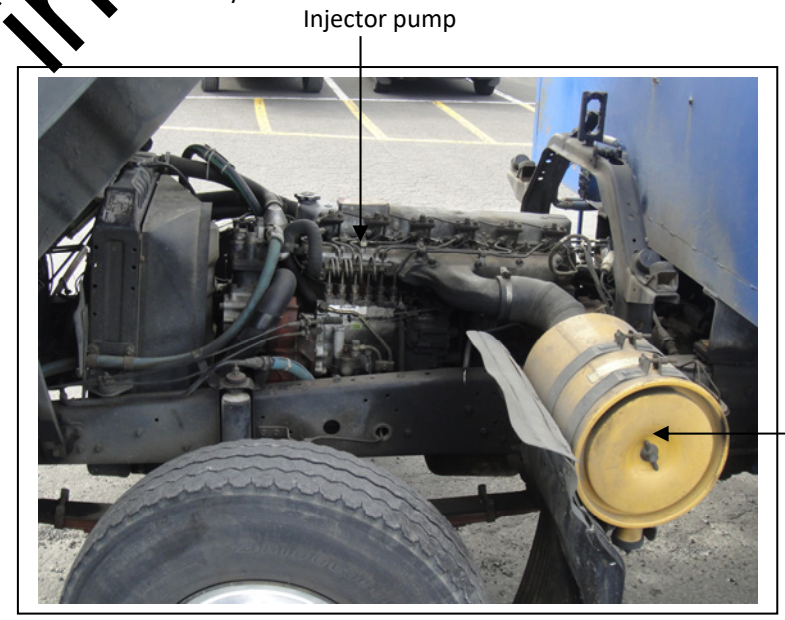
3 Axle Tractor and Trailer



3 axle 6 wheeled twin steer



3 axle 6 wheeled



Summary

SECTION OVERVIEW

Many components make up a vehicle. The body shell has to be aerodynamic, as light as possible, yet strong enough to protect the passengers. Engines are positioned in the body shell either longitudinally (north/south) or transverse (east/west).

Vehicle specifications detail the size, weight, performance, and measurements. Heavy vehicle components are similar to those on light vehicles but are more heavily constructed to withstand heavier loads. Heavy vehicles are either rigid or articulated and are often identified by their axle and wheel numbers.

Motor cycles are classified by their use. Motor cycles consist of a rigid frame, steerable front wheel, engine and transmission and a final drive at the rear wheel. Motor cycle frames are required to be light, but rigid enough so that the engine and rider can be accommodated.

REVIEW QUESTIONS ONE

Q1 Complete the following sentence.

The modern motor vehicle _____ is designed with _____ _____and vehicle _____ in mind. The materials used in the _____ of the body must be strong enough to cope with the twin _____ of passenger safety and _____.

Q2 Engines are mounted in the engine compartment in one of two configurations. These are:

_____

_____

Q3 Explain how laminated windscreens are designed not to splinter in the event of a crash.

_____

_____

_____

_____

REVIEW QUESTIONS ONE CONTINUED

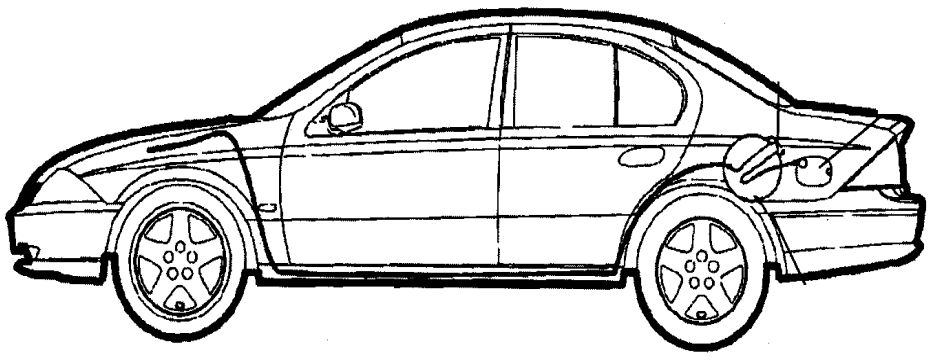
Q4 There are two types of Heavy vehicles, rigid and articulated.
Draw a sketch of:

(a) A flat top rigid vehicle

(b) An articulated vehicle consisting of a three axle tractor unit and two axle trailer.

Q5 On the vehicle indicate the measurement for:

(a) Overall length
(b) Wheel base
(c) Room length
(d) Overall height



FEDS FAIRVIEW EDUCATIONAL SERVICES LTD

NZQA accredited and registered provider

www.feds.co.nz

473 Te Rapa Road, PO Box 10-244, Hamilton 3241

phone 07 849 9828 | **gateway@fairviews.co.nz**