

4

Under the bonnet

STARTER

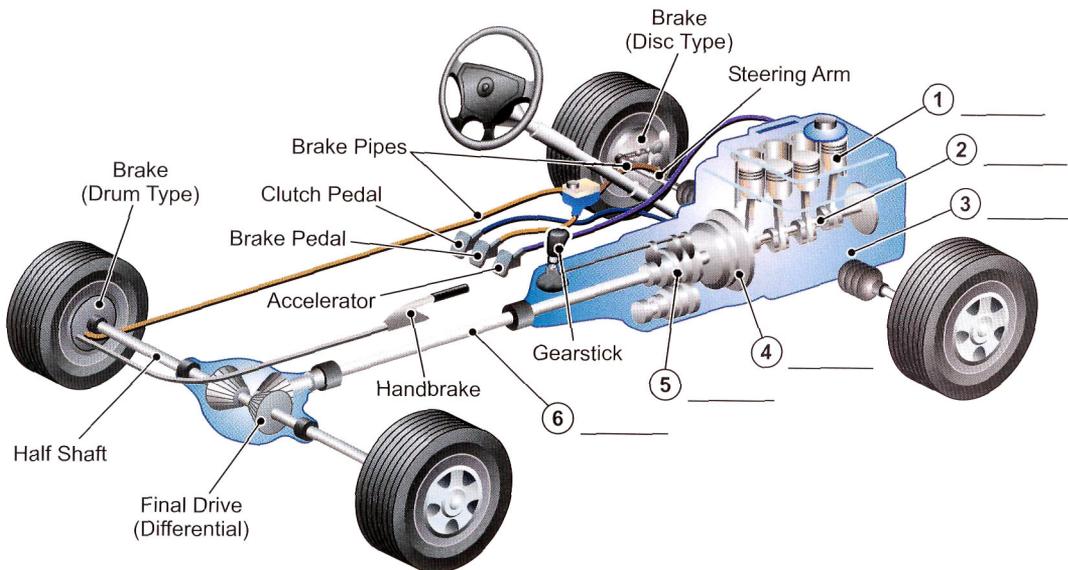
What do these abbreviations means? Work with a partner to see how many you know.

- 1 FWD front-wheel drive
- 2 bhp _____
- 3 g/km _____
- 4 GDI _____
- 5 mpg _____
- 6 mph _____
- 7 Nm _____
- 8 rpm _____
- 9 RWD _____
- 10 SI _____
- 11 TDI _____



1 Label the diagram with words from the box.

clutch • crankshaft • engine • gearbox • piston • propeller shaft



2 Look at this extract from a tour of a car factory. Complete the text with words from the box.

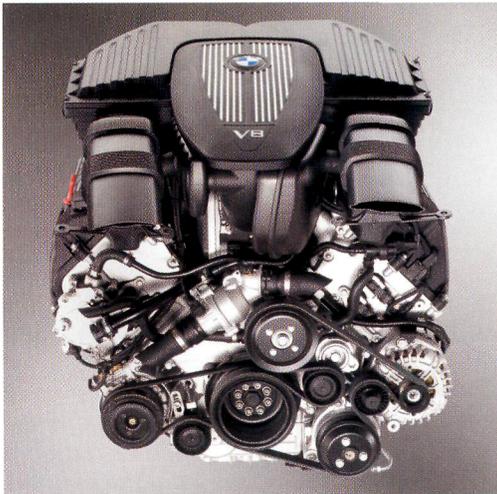
clutch • combustion •
crankshaft • cylinders •
distribution • fuel • piston •
spark plug • torque



'Now we come to the engine.

The principle of the internal
_____ ¹ engine has
not changed in the last 100 years.

The engine takes in
_____ ² and air which is compressed in a combustion chamber. Then this mixture is
ignited by a _____ ³ to produce an explosion, which moves the _____ ⁴
in the cylinder. The up and down motion of the piston in the cylinder is converted into rotational
motion by the _____ ⁵. The rotational force generated by the engine is known as



_____ ⁶.

The size of the engine determines the power.
The more _____ ⁷ there are, the
more powerful the engine. This power is
transmitted through the
_____ ⁸, the gearbox, the
propeller shaft (in rear-wheel and four-wheel
drive), and the axles to the wheels. The
position of the engine can vary, but generally
speaking it is mounted at the front. In some
sports cars, the engine is mounted at the rear
(e.g. Porsche) or in the middle (e.g. Ferrari or Lamborghini) because of weight _____ ⁹.

So, that's enough about the engine for the moment – let's move on to the next stage ...'

AUDIO



15

Now listen to the recording to check your answers.

British English
gearbox

American English
transmission

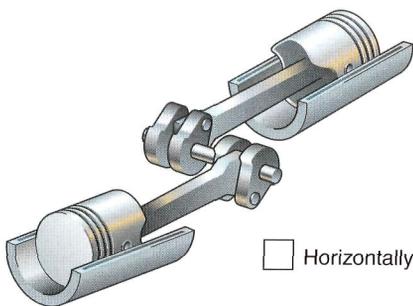
3 Find words in exercise 2 to complete the table. Use your dictionary if necessary.

Verb	Noun	Adjective
to _____ a	power	_____ b
to _____ d	_____ c	combustible
to _____ e	ignition	_____ f
to _____ g	rotation	_____ h
to _____ i	transmission	

Now complete the sentences with the correct form of words from the table.

- In an engine, linear motion is converted into _____ motion by the crankshaft.
- The power of the engine is _____ through the clutch and the gearbox.
- The spark plug _____ the air/fuel mixture and sets off an _____.
- A 6-cylinder engine is more _____ than a 4-cylinder engine.
- Fuel and air is compressed in the _____ chamber.

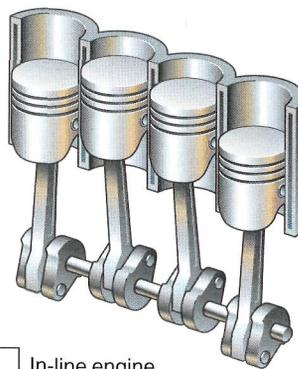
4 Match the descriptions of engine layout with the diagrams.



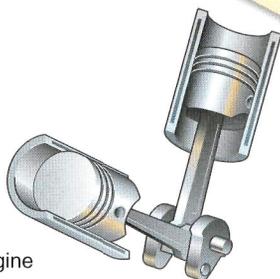
Horizontally opposed engine

1 This layout is used for high-performance engines with a compact layout such as in the BMW 7-series. The cylinders are arranged in two banks set at an angle to one another. This layout is normally more cuboid in shape than the other two.

2 This layout is wide and flat and gives the engine a low centre of gravity. The cylinders are arranged in two banks on opposite sides of the engine. It is very practical for cars with the engine located at the rear, such as the Porsche.



In-line engine



V-engine

3 This layout is long and narrow. The cylinders are all next to each other in a single bank. It is a standard, simple layout used in the Mercedes A-class, for example.

5 Work with a partner. First look at the phrases in the Language Box used to describe position and shape. Then look at the engine layouts in the Partner Files. Tell your partner where the components from the box below are.

battery • brake fluid reservoir • engine oil dipstick •
 engine oil filler cap • power steering reservoir • radiator expansion
 tank • windscreen/headlight washer container

PARTNER FILES →

Partner A File 7, p. 63
 Partner B File 14, p. 64

DESCRIBING POSITION AND SHAPE

The ... is **on the right/left-hand side** of the engine.

This part is located **at the front/rear** of the engine.

It's **on the opposite side** of the engine from the ...

It's **above/below/next to/beside** the ...

It's **between** the ... and the ...

This layout is **cuboid** in shape.

The brake fluid reservoir is the **rectangular** container on the right.



square



cuboid



rectangular



cylindrical



circular



spherical



triangular



conical



6 Listen to seven questions from customers and match them with the answers (a-g) given by a technical support hotline employee.

- a You look at the level in the reservoir.
 b The cooling system is filled once at the factory and never has to be changed.
 c Oil consumption can be up to 1.0 l/1000 km so the engine oil level must be checked at regular intervals. It is a good idea to check the oil level every time you put fuel in the car.
 d Under normal conditions you don't have to do anything with the battery except check the electrolyte level occasionally.
 e You needn't go to a service station for a brake fluid change, but make sure the person who does it is competent and has the necessary tools.
 f It's the plastic rectangular container next to the power steering reservoir.
 g Battery acid is highly corrosive so you mustn't work on the battery without wearing eye protection and gloves.

Speaker: 1 f 2 3 4 5 6 7



7 A potential customer is visiting the stand of a major car manufacturer at an international car show.

Listen to the dialogue and put these key features in the order in which they are mentioned.

- a low fuel consumption
- 1 b design
- c top speed
- d six-speed automatic gearbox as standard
- e optional extras included in the price
- f acceleration from 0–60 in 6 seconds
- g increased power of the engine



Now listen again and note down what these numbers refer to.

- 1 4.2 _____
- 2 330 _____
- 3 155 _____
- 4 W12 and V6 _____
- 5 16.1 _____
- 6 23 _____
- 7 54,000 _____
- 8 18 _____

Work with a partner. Discuss these questions.

- 1 Why does the visitor first look at the car?
- 2 Why does the car have low fuel consumption?
- 3 What two things does the rep give the visitor, and why?

8 Match the two parts to make sentences from the dialogue (listen again if necessary).

- | | |
|------------------------------------|--|
| 1 we have increased the power | a an effect on fuel consumption. |
| 2 a six-speed automatic gearbox | b with a 3.7 and a 4.2-litre petrol engine. |
| 3 We're launching the model | c is a six-disc CD unit with nine speakers ... |
| 4 That naturally has | d by 20 bhp to 330 bhp. |
| 5 Included in the price | e then just call or email me. |
| 6 If you have any other questions, | f comes as standard. |

9 Work with a partner to do a role-play. First look at the Language Box for phrases you can use. Then look at your role cards in the Partner Files.

PARTNER FILES

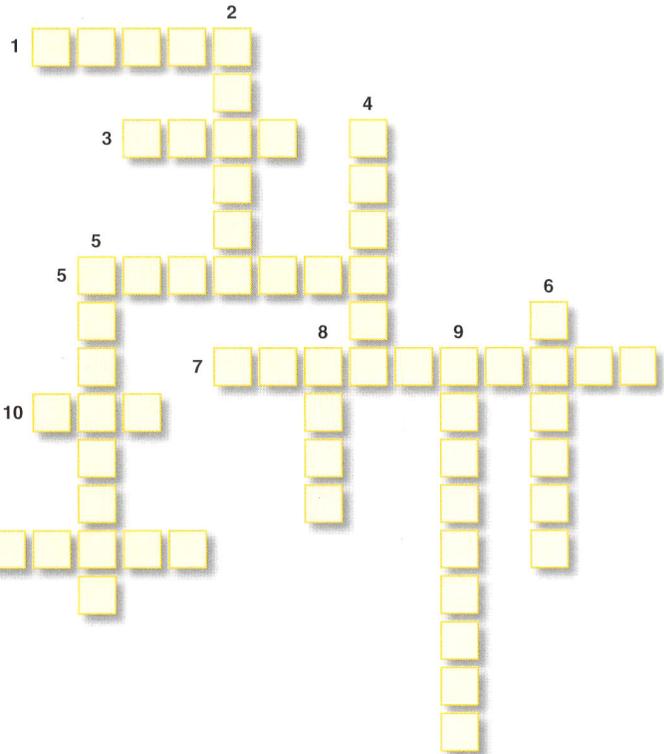
Partner A File 3, p. 62
Partner B File 15, p. 64

AT A TRADE FAIR	
Visitor	Sales rep
I'd like more information on ...	Can I help you?
I'm interested in ...	Which car are you interested in?
What about ... ?	Would you like more detailed information?
Can I take one of these brochures?	Would you like a brochure?
Could you tell me something about ... ?	Here is our price list.
	Let me give you my (business) card.

10 Complete the puzzle. The answers are all words from this unit.

Across

- 1 This keeps the brake lubricated: *brake* ...
- 3 This can be petrol or diesel.
- 5 This fluid is put in the cooling system.
- 7 The motion of the pistons rotate this.
- 10 You use a dipstick to check the ... level.
- 11 You need electricity from this to start the engine.



Down

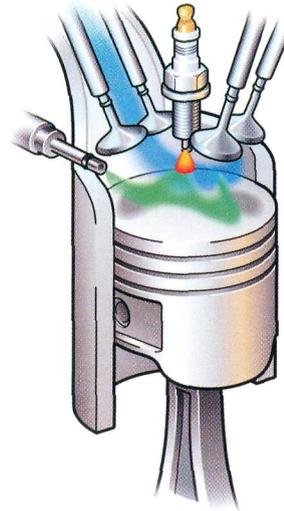
- 2 A type of fuel.
- 4 This moves up and down in the cylinder.
- 5 A six-... engine.
- 6 This fluid is used to keep the windscreen clean: *windscreen* ...
- 8 This is highly corrosive: *battery* ...
- 9 This ignites the fuel-air mixture in petrol engines. (2 words)

OUTPUT

Read the article and answer the questions which follow.

GDI Engines

When developing a new motor-vehicle engine, engineers are faced with the dilemma of more power or less fuel. The goal is to combine high power output and low fuel consumption. Increasing fuel efficiency helps motorists to save money and also reduces CO₂ emissions. Gasoline Direct Injection (GDI) engines can reduce fuel consumption by up to 20%, thereby producing 20% lower emissions.



How does it work?

GDI engines use a new combustion control method that injects gasoline directly into the cylinders, where it mixes with oxygen from air drawn in from the outside. Conventional spark-ignition engines mix air and gasoline in the intake manifold before injecting the mixture into the cylinder.

The GDI engine produces a finer mist of gasoline in the cylinder which leads to cleaner burning and more power. It also has a shaped piston crown to swirl the finely atomized gasoline into a tight cloud near the tip of the spark plug. This stratified

charge of fuel and fresh air near the source of ignition is the process behind GDI's low fuel consumption.

Some car makers have developed other key components, for example a high-pressure common-rail injection system with a single piston injection pump. This pump supplies the exact amount of fuel needed to maintain the required pressure in the system.

GDI engines will become more important in the future because of the need to reduce fuel consumption and because of growing environmental concerns.

OVER TO YOU

Can you explain in your own words how GDI engines work?
 How important do you think GDI engines will be in the future?
 Do you know of any other current engine innovations?