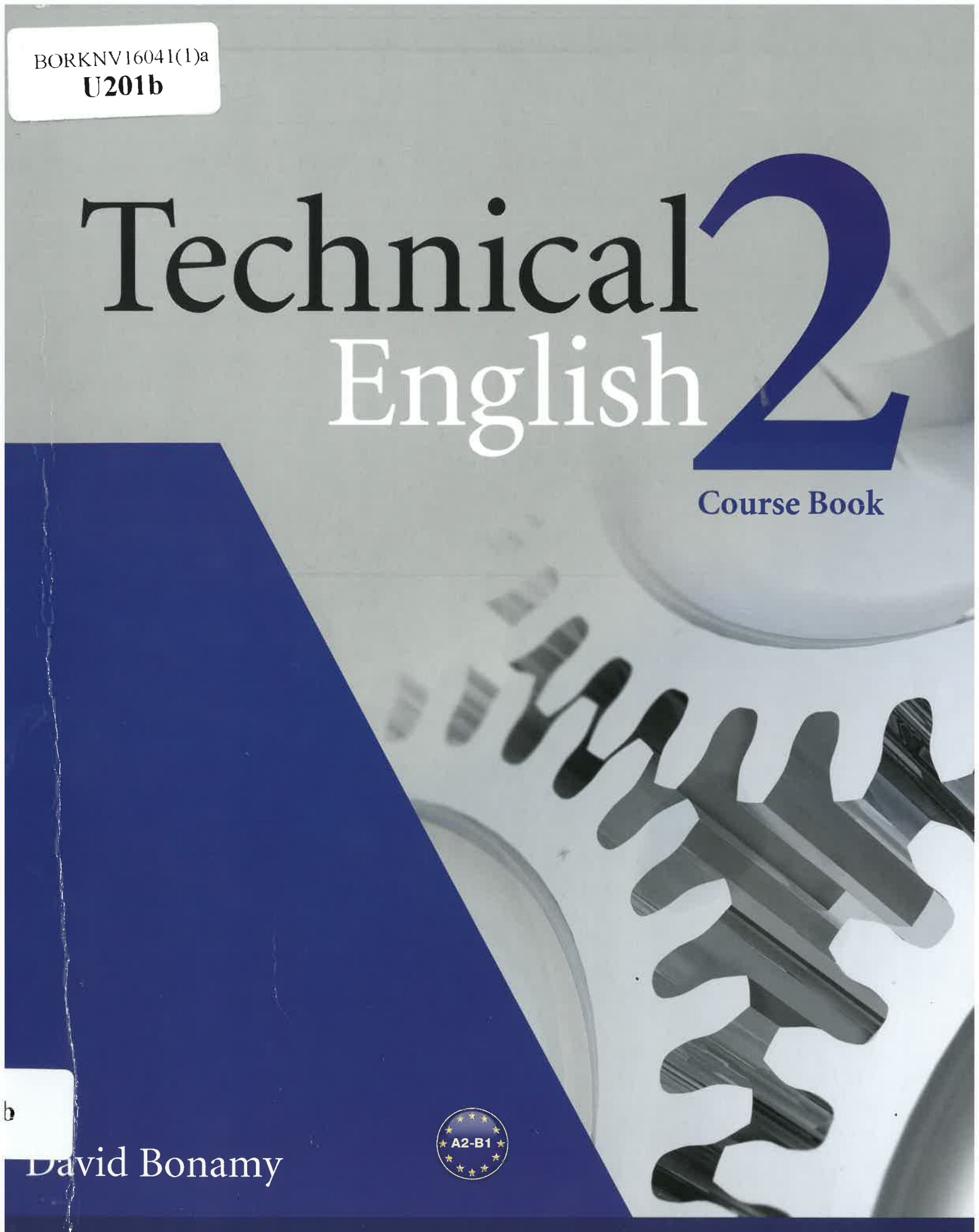
Technical English 2

Course Book



A2-B1

David Bonamy

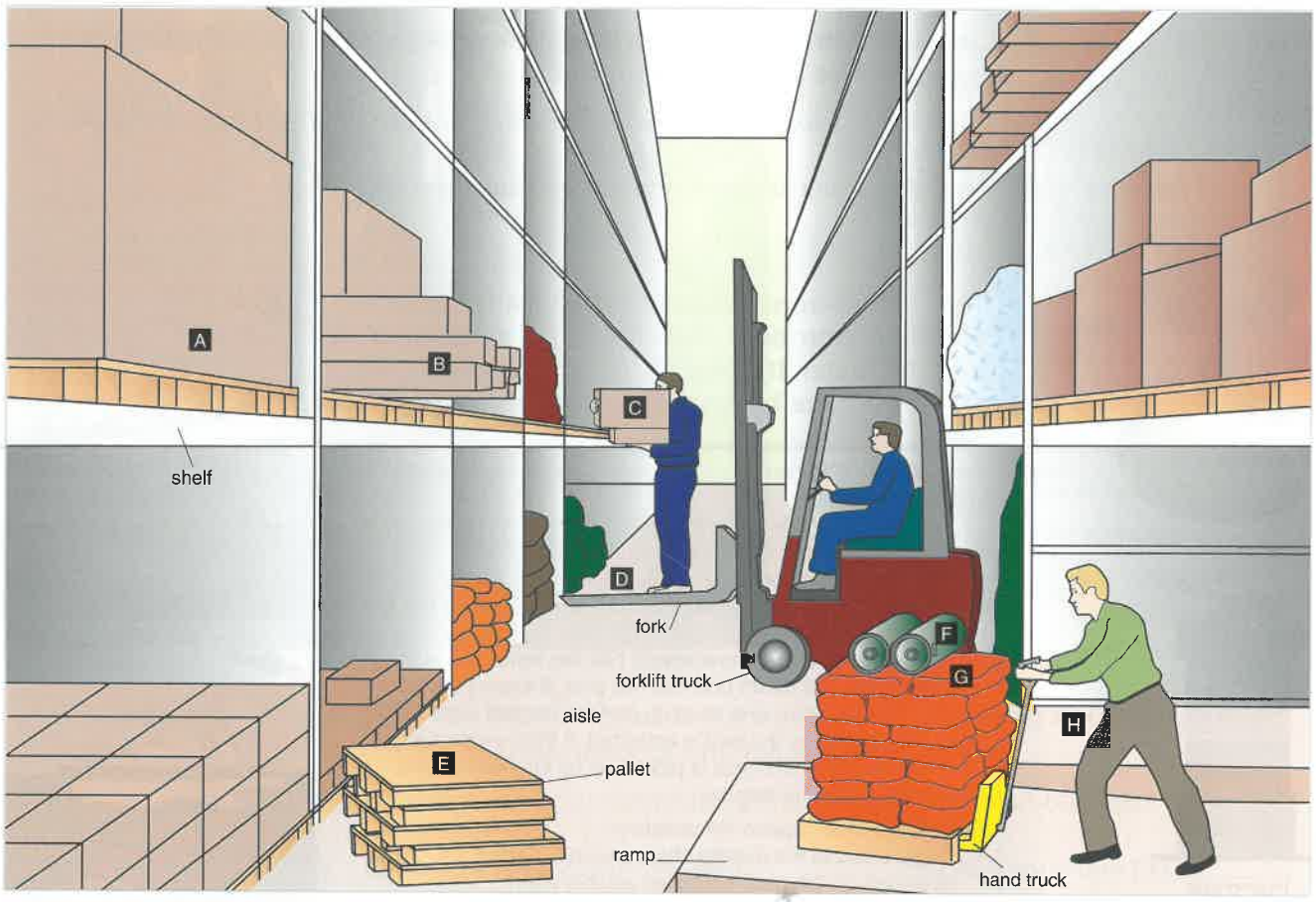
ALWAYS LEARNING

PEARSON

6 Procedures

1 Safety

Start here **1** Make a list of the hazards (A-H) in this warehouse in note form.



Reading **2** Read this warehouse safety poster. Match the rules to the hazards in 1.

Warehouse safety

1 Hand trucks must not be overloaded.
2 Aisles have to be kept free of all blockages.
3 Boxes need to be pushed in until they are level with the edge of the shelf.
4 Gas cylinders must always be strapped or chained to hand trucks.
5 The forks of a forklift truck must never be used for carrying people.
6 Larger boxes should not be stacked on higher shelves.
7 Trucks must be pulled, not pushed, up a ramp.
8 Only one item should be removed from a shelf at one time.

Language

Helmets	must/should/have to/need to		be	worn here.
	must/should	not		taken off.

3 Where can you see these labels? What do they mean?

4 What could be inside containers with the labels?

bottles of liquid fruit food glass hats electrical goods plants

5 Complete these explanations of the labels. Use the correct form of the modals and the passive form of the verbs in brackets.

1 This item _____ (need / handle) carefully.
  It _____ (must not / drop or throw).
2 This item _____ (need / carry) this way up.
  It _____ (must not / turn) upside down.
3 This item _____ (should / keep) inside the warehouse.
  It _____ (have / protect) from the rain.
4 This box _____ (should / deliver) as soon as possible.
  It _____ (must not / leave) for more than three days.
5 This box _____ (have / freeze).
  It _____ (must not / leave) outside the freezer.

Example: 1 This item needs to be handled carefully. It must not be …

6 Change the instructions in 5 into the active form.

Example: 1 You need to handle this item carefully. You mustn't …

Task **7** Three safety procedures have become mixed up. Work in pairs, A and B. Put all the notes together under the best headings in the best order. Each procedure has eight steps.

Student A: turn to page 112 to find your set of notes.
Student B: use the notes below.

FIRST AID AFTER ELECTRIC SHOCK

CHEMICAL SPILL PROCEDURE

FIRE EVACUATION PROCEDURE

If you hear an alarm, remain calm.

Do not return to the building unless you are authorised by the fire department.

Check the person's condition.

If there is no pulse, give the person CPR.

If the person is breathing, they should be placed in the recovery position.

Do not stop to collect your belongings.

Remain near workroom until Chemical Safety staff arrives.

Stop work.

The workroom must be secured to keep others out.

Move at least 30 metres from building.

Attend to any injured persons if you can do so safely.

Call 112.

7 Services

1 Technical support

Start here

1 What problems have you had with computers? What were your solutions?

2 Work with a partner. Decide on the best solutions to these computer problems.

1 You can't log into your company network from home. Your password is rejected.
2 The image on your monitor is too large, and you can't see the whole page.
3 You can open your incoming emails, but you can't open their attachments.
4 A website says CLICK HERE TO SEE PHOTO. You click, but nothing happens.
5 You can't get a wireless connection between your computer and your router.
6 Now you have the wireless connection between your computer and your router, but you can't access the Internet. A message says LIMITED OR NO CONNECTIVITY.

Listening

3 19 Lisa is an IT support technician in a large company. Her colleagues are trying to connect their home computers to the company network. They phone Lisa with their problems. Listen and complete Lisa's report.

CALL	PROBLEM	DIAGNOSIS	SOLUTION
1	Network rejects password	D3	S2
2	Can't see full page on screen; icons too large		
3	Can't open email attachments		
4	Click on link, but photo doesn't appear		
5	Can't connect computer wirelessly with router		
6	Can't access internet through wireless connection		

DIAGNOSIS CODE	
D1	computer has different IP address from router
D2	electronic devices interfere with connection
D3	network system remembers wrong password
D4	wrong screen resolution settings
D5	firewall blocks pop-ups
D6	security level in email program is too high

SOLUTION CODE	
S1	reboot the router and computer
S2	uncheck the REMEMBER PASSWORD box
S3	increase the screen resolution to correct setting
S4	switch off BLOCK POP-UP ADVERTS in firewall
S5	move the router to a different location
S6	lower the security level for attachments

4 20 Listen to how Lisa diagnoses the problem. Complete the statements with the verbs in the box.

could may might must

1 You _____ have checked the REMEMBER PASSWORD box.
2 Your computer _____ be using the wrong screen resolution settings.
3 Your email program _____ be blocking the attachments.
4 Your firewall _____ be blocking the pop-ups.
5 Another electronic device _____ be interfering with the connection.
6 You _____ have given the computer a different IP address from the router.

5 Which statements in 4 show that Lisa thinks her diagnosis is

- certainly correct? Write *C* after the statement.
- possibly correct? Write *P* after the statement.

6 21 Listen to how Lisa suggests a solution. Complete the statements. Use the correct form of the verbs in the box.

could don't lower suggest try type

1 Now try _____ in the correct password.
2 Try _____ your security level.
3 Well, you _____ move the phone away. Or why _____ you move the router around?
4 I _____ you _____ moving the router to a different location.

Language

Diagnosing a problem

- present possibility: *may/might/could* + *be*/present continuous, e.g. *The file may/might/could be too large.*
- present certainty: *must* + *be*/present continuous, e.g. *The firewall must be blocking the attachments.*
- past possibility: *must/may/might* + present perfect, e.g. *You may/might have broken it.*
- past certainty: *must* + present perfect, e.g. *You must have broken it.*

Suggesting a solution

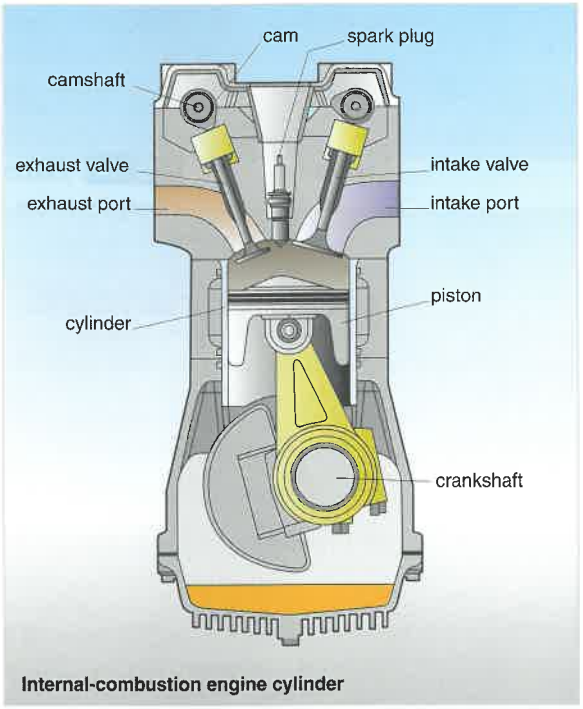
- *try* + verb + *-ing. Try clicking on the 'undo' button.*
- *Why don't you …? Why don't you click on the 'undo' button?*
- *could. You could click on the 'undo' button.*

7 Rephrase these. Use language from above.

1 *Diagnosis*: your switch is probably broken. *Suggestion*: change it
2 *D*: it's possible your cable is loose. *S*: push it firmly into the socket
3 *D*: you are definitely using the wrong IP address *S*: reboot the router
4 *D*: perhaps the program has frozen *S*: press CTRL-ALT-DEL
5 *D*: the mouse has definitely stopped working *S*: disconnect and reconnect
6 *D*: it's certain your file is too large for the disk *S*: compress it

Example: 1 Your switch might be broken. Try changing it.

2 Engines



Internal-combustion engine cylinder

Start here

1 Work with a partner or in small groups. Draw arrows to show all the movements in this diagram of an internal-combustion engine cylinder.

2 Describe the motion of all the moving parts in the diagram. Use the words in the box.

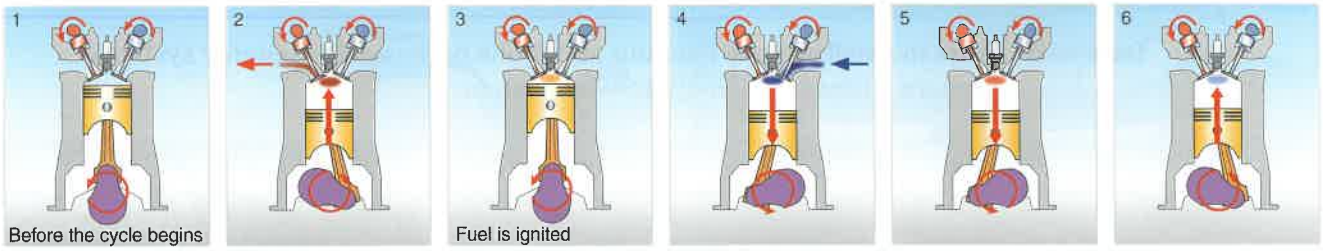
linear oscillating reciprocating rotary

3 Explain what causes the movements of

- the valves
- the piston
- the crankshaft

Task

4 With your partner or group, number these diagrams in the correct order.



Reading

5 Read this description of the four-stroke cycle. Check your answers to 4.

The four-stroke internal combustion cycle

BEFORE THE CYCLE BEGINS. The cycle begins at *top dead centre* (TDC). Here the piston is furthest away from the crankshaft. There are four *strokes* of the piston.

INTAKE STROKE. The crankshaft rotates. This makes the piston move down the cylinder, away from the valves. At the same time, the cam above the intake valve rotates. This makes the valve move downwards, which opens the intake port. As the piston moves down, fuel is sucked into the cylinder through this inlet.

COMPRESSION STROKE. As the crankshaft rotates, it makes the piston move up the chamber towards the valves. Simultaneously, the cam above the intake valve rotates and allows it to close. Both valves are now closed. As the piston moves up towards the valves, it compresses the fuel.

IGNITION. Now the piston is once again at TDC. The compressed fuel is ignited by the spark plug, and there is a small explosion at the top of the cylinder.

POWER STROKE. Immediately after this, the gases expand in the cylinder, which pushes the piston downwards. This makes the crankshaft rotate and provides torsion to drive the wheels of the vehicle.

EXHAUST STROKE. As the crankshaft rotates, it pushes the piston up the cylinder. At the same time, the cam above the exhaust valve pushes the valve downwards. This opens the exhaust port, and the burnt gases are pushed out.

The cycle is repeated thousands of times per minute.

6 What do these words refer to?

1 *which* (line 5) a) the cam b) the rotation of the cam c) the movement of the valve
2 *it* (line 7) a) the cam b) the intake valve c) the rotation of the cam
3 *this* (line 11) a) the small explosion b) the top of the cylinder
4 *which* (line 11) a) the cylinder b) the expansion of the gases
5 *This* (line 14) a) the cam b) the port c) the movement of the valve

7 Find words in the text that mean the same as these phrases.

1 at the same time (one word)
2 twisting force (one word)
3 inlet which allows fuel to enter the cylinder (two words)
4 device which moves to allow gases to escape (two words)

Language

When often indicates that two actions happen in sequence, i.e. immediately after the other, e.g. *When the spark plug ignites, the gases explode.*

As often indicates that two actions happen simultaneously, i.e. both at the same time, e.g. *As the piston moves up, it compresses the fuel.*

When or *as* can sometimes be used with the same meaning when it's difficult to decide if two actions are simultaneous or in rapid sequence, e.g. *When/As the brake pedal is pressed, the piston pushes the oil along the brake pipe.*

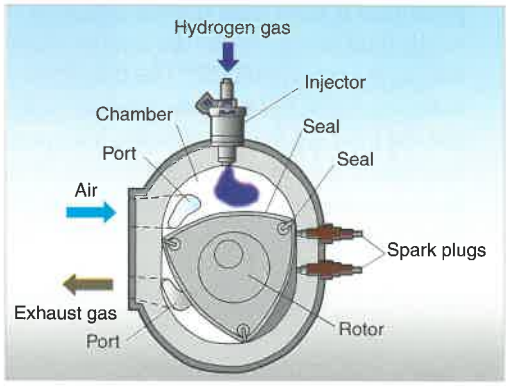
8 Join each group of sentences into a single sentence. Use ***when/as*** and ***which***. Do not use the words in italics.

1 The piston moves up. *At the same time*, the exhaust valve opens. This lets the burnt gases escape.
2 The spark plug ignites the fuel. *Immediately afterwards*, there is an explosion. This makes the piston move down with great force.
3 The camshaft rotates. *Simultaneously*, the cam pushes the intake valve downwards. This allows the fuel to enter the cylinder.
4 The piston moves away from the valves. *Immediately after this,* it creates a vacuum in the cylinder. This sucks the fuel in.
5 The piston moves up towards the valves. *Soon afterwards,* it puts the fuel under high pressure. This helps the gases to expand rapidly after ignition.
6 The cam pushes the exhaust valve down. *At the same time,* the piston moves up towards it. This forces the burnt gases out of the engine.

Example: 1 As the piston moves up, the exhaust valve opens, which lets the burnt gases escape.

Writing

9 This is a diagram of an internal combustion engine that uses hydrogen as a fuel. Describe this engine and explain how it works. Explain the benefits of this kind of engine.



9 Measurement

1 Sports data

Start here

1 What do you know about the Tour de France cycle race? Discuss in pairs.

- How long is the route (approximately)? How many days does it take?
- What do you think cyclists need to measure when they train for a race?

Reading

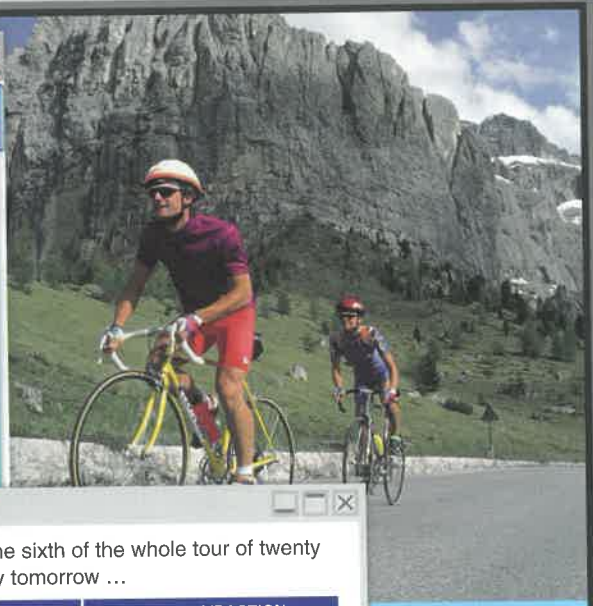
2 Read this blog and check your answers to 1.

BLOGS DIRECTORY CONTACT

Team4Tour

Posted: 27 November Comment **here**

Hello. Welcome to Team4Tour, the blog of my cycling group. We're a team of six racing cyclists, and right now we're cycling around the Tour de France route, which is 3553 km. We're not competing in the actual race this year (maybe next year ...). Right now, we're only practising the route. Click **here** to see a summary of the distances we hope to cover every day. We've brought some fantastic measurement devices with us (click **here** to see one). To see my bike maintenance schedule, click **here**.



Day 3. Now we've completed the third day, which means almost one sixth of the whole tour of twenty days! We're in Northern France, and we're going to have a rest day tomorrow ...

DAY	DISTANCE	PERCENTAGE/FRACTION	DAY	DISTANCE	PERCENTAGE/FRACTION
3	604 km	17% almost one sixth	13	2309 km	65%
5	1030 km	29%	15	2700 km	76%
7	1386 km	39%	17	3162 km	89%
10	1954 km	55%	19	3410 km	96%

My measuring device has a 5-cm display which shows many different measurements. The most useful features are the *odometer* (to measure the distance I travel), the *tachometer* (for measuring my speed), the *altimeter* (which measures my altitude) and the *barometer* (for measuring atmospheric pressure). The speed and distance data are sent wirelessly from a sensor mounted on the front of the bike.

After every ride.* * *ride = day of cycling*	Inflate tyres. Make sure that they are at the correct pressure. Examine tyres for wear.Worn tyres cause accidents. Check that the quick-release levers on the wheel are tight. I don't want wheels to fall off!
After every third ride (or every 500 km, whichever is sooner)	Test brakes and gears. Check that they are adjusted correctly. Inspect the saddle. Ensure that it is tight and at the correct height. I don't want it to slip down.
Every tenth ride (or when bike is wet)	Wash and dry bike. Apply oil carefully to chain and gears. Check that there's no lubricant on the wheel rims, to prevent brakes from slipping.

3 Answer these questions on the text.

1 What instruments provide data to measure: (1) How fast am I cycling? (2) How far have I cycled today? (3) How high am I above sea level?
2 When you inspect the (1) tyres (2) quick-release levers (3) saddle (4) wheel rims, what problems are you trying to prevent?
3 A cyclist has completed 520 km in two days of cycling. Should he/she test the gears now?

Vocabulary

4 Match the sports measuring instruments with the other items in the table.

Measuring instrument	What is measured	Unit of measurement	Abbreviation
1 barometer	distance (cycling)	metres	km/h
2 tachometer	speed	seconds	m
3 odometer	height (above sea level)	beats per second	km
4 altimeter	rate of heart beat	kilopascals	bps
5 stop watch	weight	watts	s
6 heart rate monitor	power output	kilograms	W
7 power monitor	pressure	kilometres per hour	kPa
8 scales	time	kilometres	kg

5 Ask and answer questions about the table.

What do you use for measuring your power output? What does kPa stand for? What's the abbreviation for beats per second? What's a tachometer used for? What does a barometer measure?

6 What units of measurement and measuring instruments do you use in your technical field? Make a table. Use the headings from 4. Ask and answer questions about it, as in 5.

7 Complete the distance table in the blog in 2 with the words in the box. Use approximate fractions.

almost approximately just under just over more than nearly

8 Make some statements using fractions about yourself, or about a topic which interests you.

Example: I've completed just under two thirds of my training.

Reading

9 Read the text and answer the questions below.

Notice singulars, plurals and hyphens (-)
at 3000-km intervals = at 3000-kilometre intervals
every 3000 km = every 3000 kilometres

Change the oil and filter and lubricate moving parts every six months, or at 6000-mile intervals, whichever is the sooner. Service the battery after 54 months or 54,000 miles, whichever is the sooner. The brakes should be inspected and serviced (if necessary) at three-month intervals or every 3000 miles, whichever is the sooner.

1 A car has done 54,000 miles but only 50 months. Should the battery be serviced now?
2 A car has done 30 months, and 28,256 miles. The driver has inspected the brakes nine times. The last time was three months ago. Should the brakes be inspected again now?

2 Sensors

Start here

1 Which of the following is ***not*** a sensor? Why not?




2 What other sensors can you think of?

3 With a partner, write a definition of a sensor. Use these or other words.

sensor, device, detect, change (n), environment, convert, data

Begin: A sensor is …

Reading

4 Discuss with your partner.

- What's happening here?
- What are the engineers trying to measure?
- What kind of sensors are used?

5 Read this article and complete the statements below using these words: ***acceleration***, ***load***, ***motion***.

Two different crash test dummies are used in standard European vehicle crash tests. The first dummy is used for front impact crashes, and the second one is a side impact crash dummy. The dummies, which are made of steel, aluminium and rubber, contain many sensors.

Three types of sensing equipment are used: *acceleration sensors*, *load sensors* and *motion sensors*. The dummy heads contain three accelerometers (single direction acceleration sensors) which are set at right angles (forward–backward, up–down, and left–right). The dummy necks contain load sensors to detect the bending forces, shear forces and tension forces, which put pressure on the neck in a crash. The dummy legs contain load sensors, which measure the bending, shear, compression and tension forces on the leg.

In addition, a front impact crash test dummy has steel ribs fitted with motion sensors which record front rib movement. A side impact dummy has motion sensors which record side chest deflection (or inward movement), and load sensors to measure compression forces on the chest.

Three types of sensors are used in crash test dummies:

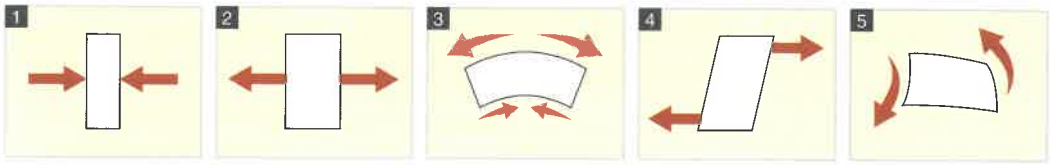
1 _____ sensors measure deflection (inward movement) of a body part during a crash.

2 _____ sensors measure how much a body part increases or decreases speed during a crash.

3 _____ sensors measure the force or pressure on different body parts during a crash.

Vocabulary

6 Match the diagrams with (a) the names of the forces and (b) their descriptions.



(a) bending, compression, shear, tension, torsion
(b) squeezing or pressing together; sliding in opposite directions; stretching or pulling apart; twisting; squeezing one side + stretching the other side

Language

Noun + noun combinations are very common in technical English.

Examples: acceleration sensors (= sensors which measure **acceleration**); *vehicle crash tests* (= tests which crash a vehicle to measure its safety); *a side impact crash dummy* (= a dummy which measures the impact from **the side in a crash**).


gas flow meter


engine speed dial


tyre pressure gauge


bass volume indicator

7 Find phrases in the article in 5 which mean the same as these. All the words in the phrases must be nouns.

1 forces which pull something apart
2 sensors which detect movement or motion
3 deflection of the side of the chest
4 crashes which are caused by an impact from the front
5 a dummy which is used for testing the impact of a crash from the front

8 Expand these phrases. You can change words and add information.

1 a gas flow meter = *a meter which measures/for measuring the flow of gas (along a pipe)*
2 an engine speed dial = _____
3 a tyre pressure gauge = _____
4 a bass volume indicator = _____
_____
5 an air pressure sensor = _____
_____
6 a fuel intake port = _____

9 Make full sentence definitions from 8.

Example: 1 A gas flow meter is a meter which measures the flow of gas along a pipe.

Task

10 List some sensors used in your industry. Complete a table like this one. If possible, work in small groups with others from the same industry.

Industry: civil engineering and construction		
Name of sensor	**Function/Use**	**Application**
strain gauge	to measure deformation of structures	high-rise buildings, bridges, roads

11 Explain to the class about the sensors you have listed in your table.

In the field of civil engineering and construction, strain gauges are used for measuring the deformation of structures. They're used in high-rise buildings, bridges and roads, for example.

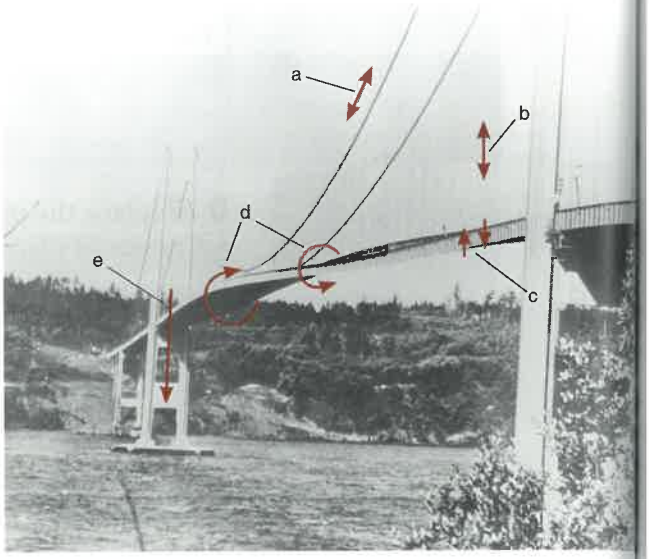
10 Forces

1 Properties

Start here

1 This is a bridge in a severe storm, minutes before it collapsed. Identify the forces acting on it. Use the words in the box.

compression shearing tension torsion



Scanning

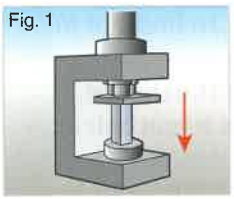
2 Practise your speed reading. Look for the information you need on the SPEED SEARCH pages (118–119). Try to be the first to complete the task.

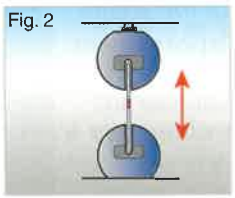
Task: Find information about the bridge in the photo in 1.

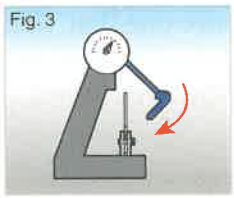
- What was the name of the bridge?
- In which year did it collapse?
- How strong was the wind?

Reading

3 Read these descriptions of tests and write the figure number in the gaps.







Materials-testing: destructive tests

The purpose of the tensile strength test (**Fig.** _____) is to discover whether a material will *deform* (change shape) or break when it is pulled apart. The material is secured with two clamps, one at each end. The clamps are pulled apart with a specified force. The *yield point* (the point where the material deforms) and/or the *breaking point* (the point where the material breaks) is measured. This measurement shows you the tensile strength of the material.

The aim of the impact-resistance test (**Fig.** _____) is to find out whether a material will bend or break when it is struck with force. The bottom of the material is placed in a clamp, so that it stands vertically. A hammer strikes the material with a specified force. The yield point and/or the breaking point is measured. This indicates the impact resistance of the material.

The objective of the compressive strength test (**Fig.** _____) is to find out if a material will deform or break when it is compressed. The material is secured in a clamp between a fixed head and a moving head. The moving head presses down on the material and the load is increased. The yield point and/or the breaking point are measured. This indicates the compressive strength of the material.

4 Divide each paragraph in 3 into three sections. Use these headings.

- Objective
- Procedure
- Result

Example. ***Objective.*** *The purpose of the tensile strength test …* ***Procedure.*** *The material is secured …* ***Result.*** *This measurement shows you …*

Language

Aim	*of*	Process	*is*	*to*	Verb	*if*	Phrase
The aim The purpose The objective	of	the test the investigation	is	to	find out discover	if whether	the metal bends. the plastic breaks.

5 Change these questions into statements about objectives. Use each word/phrase at least once.

aim discover find out investigation objective purpose test

1 Does this metal deform easily when it is hammered?
2 Is this material elastic or plastic when it is stretched?
3 Does this metal break when you strike it with a force of 10,000 newtons?
4 Will this plastic withstand deformation when it is heated to 120°C?
5 Do these three types of ceramic melt when they are heated to over 500°C?
6 Will this concrete beam crack when it is compressed under a weight of 5 tonnes?

withstand = resist

Example: 1 The purpose of the test is to discover if this metal deforms easily when it is hammered.

Vocabulary

6 Underline the stressed syllable.

1	tens ile	tens ion
2	com press ive	com press ion
3	ri gid	ri gid i ty
4	flex i bil i ty	flex i ble
5	e las ti ci ty	e las tic
6	plas tic	plas ti ci ty

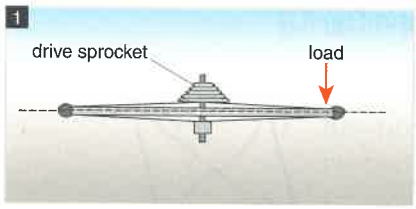
7 24 Listen and check your answers.

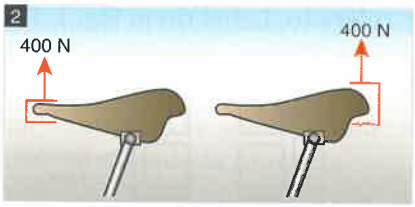
8 Make a table like this. Use all the words from 6.

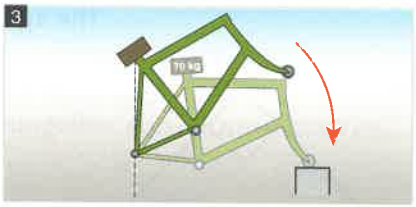
Noun	Adjective	Noun	Adjective
tension	tensile	flexibility	flexible

Task

9 Work in groups. Choose one of the following tests on parts of a bicycle: (1) the wheel, (2) the saddle, (3) the frame. Discuss how to do the test. Make notes.







10 Work individually. Use the notes from your group work. Write your description of the test under three headings.

- Objective of test
- Procedure
- Result

11 Explain your group's test to the rest of the class.

2 Technological change

Start here

1 Work in pairs. What are the 10 most important tools in the history of mankind? Make a list and put them in order of importance.

Note: the tools must be *hand-held* or *easily portable*. Do not include *simple machines* (such as levers or pulleys), *heavy machine tools* (like hydraulic jacks) or *complex, self-running machines* (such as cars, windmills or computers).

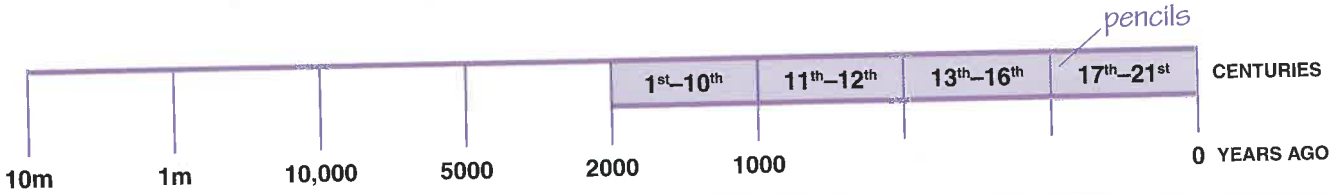
2 Explain your list to the class. Give reasons for your group's choice.

3 Compare your list with the results of a survey on page 111. Do you agree with their list? Give reasons.

Reading

4 Read this magazine article and mark the inventions on the timeline.

Note: a century ends in its own number. The 14th century is 1301–1400.



Tools through the ages

THE FIRST KNIVES were made about two and a half million years ago. They were crafted by early ancestors of modern humans. At first, sharp pieces of stone were broken off a rock, but in later times they were sharpened and straightened into blades.

The abacus is one of the first mechanical counting devices, an ancestor of today's computers. It consisted of a frame containing beads on wires. The modern abacus was designed by the Chinese around the year 1200.

The compass allowed sailors to navigate across oceans and discover new worlds. The compass was invented by the Chinese about 2200 years ago. A spoon-shaped piece of magnetic rock was balanced on a flat surface. Since it was magnetic, the handle rotated to align itself with the Earth's magnetic poles.

The first mass-produced pencils were made in Germany in 1662, which helped writing and education to develop.

The harness lets people control horses and attach them to carts. It was probably invented about 6000 years ago, when horses were first tamed and kept.

The scythe allows people to cut grass and harvest crops from the field. It consists of a long wooden shaft with handles on the end and in the middle, and a long curved blade on the other end. The blade is sharp on the inside. It was first used in Europe in the 12th century.

Glasses (or spectacles) make workers more productive and accurate, and allow people to work into old age. Mathematical calculations for a spherical lens were first made by Arab scientists in the 11th century. The first spectacles were manufactured by Italian craftsmen in the 13th century.

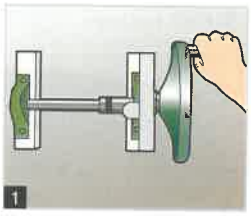
Saws were first used by the Egyptians more than 5000 years ago to cut both wood and stone. They were made of copper.

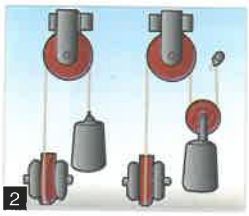
The first balance scales were seen in southern Mesopotamia about 9000 years ago. They consisted of two weighing pans attached to either end of a beam, which was balanced on a central pivot. They allowed merchants to calculate the exact weight of goods.

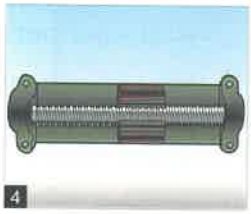
The chisel consists of a long, narrow, sharpened edge attached to a handle. It's different from a knife or axe, because it is driven by a sharp blow from a hammer or mallet. The earliest chisels were made from flint (a kind of stone) 10,000 years ago. Later, they were used by the Egyptians to carve stone for the pyramids.

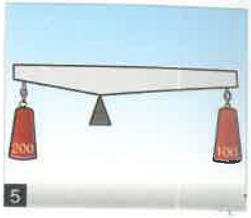
Vocabulary **5** Do you know these simple machines? Match the pictures with the words and phrases in the box.

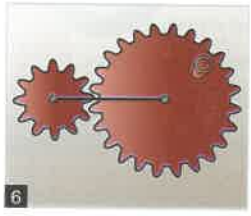
cam and follower | crank and rod | gear | lever | pulley and belt | rack and pinion
ratchet and pawl | screw | wheel and axle | wedge

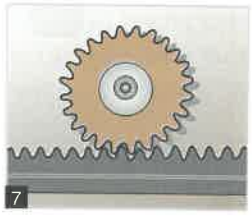


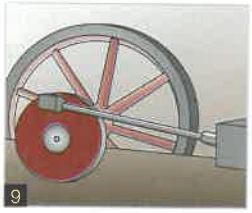


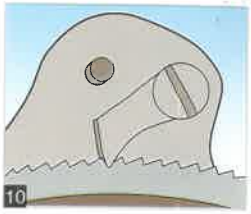












(Answers on page 114)

6 Which of these simple machines are used in your industry or technical field? How are they used? Explain to the class.

Language **7** Complete this article about the history of oil drilling. Use the correct form (present or past, active or passive) of the verbs in brackets.

Drilling for oil – past and present

Long ago, wells (1) were dug (dig) in the ground using percussion drilling. A heavy wooden cutting tool (2) _____ (suspend) by a rope from a pulley on a wooden tripod. The tool (3) _____ (pull up) by hand or steam engine, and then it (4) _____ (drop) into the hole. The rock (5) _____ (break) by the weight of the tool. The maximum depth was only about 70 metres.

Nowadays, much deeper oil wells of 700 m (6) _____ (dig) using a method called rotary drilling. A sharp drill bit (7) _____ (suspend) by a drill string from a pulley on a steel derrick. The drill bit (8) _____ (rotate) in the hole by a powerful engine. The rock (9) _____ (break) by the rotation of the drill bit.

Now there is also a new method of drilling which (10) cuts (cut) the rock using lasers. No cutting tool or drill bit (11) _____ (use). Instead, the rock (12) _____ (split) by beams of high-energy light. A fibre-optic cable (13) _____ (carry) the light from the lasers on the surface down the hole to a set of lenses. The lenses then (14) _____ (focus) the light to a sharp point on the rock face, which (15) _____ (cut) almost 100 times faster than by a drill bit. As a result, the cost of drilling (16) _____ (reduce), and drilling jobs (17) _____ (complete) much more quickly.

Task **8** Work in small groups.

- Choose an industry or work process which you know something about. *Examples: building, heavy lifting, fishing, mining, road-building, communications, sea or land travel, heating, lighting, pumping, irrigation*
- How was the work done in the past? How is it done now? Make notes showing the contrast between past and present.
- Explain your group's ideas to the class.