Technical English
1^B
Workbook

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PEARSON
Longman

Contents

1 Dimensions

1 Use the words in the box to label the picture.

bridge   cable   deck   pier   pylon   road   span   tunnel
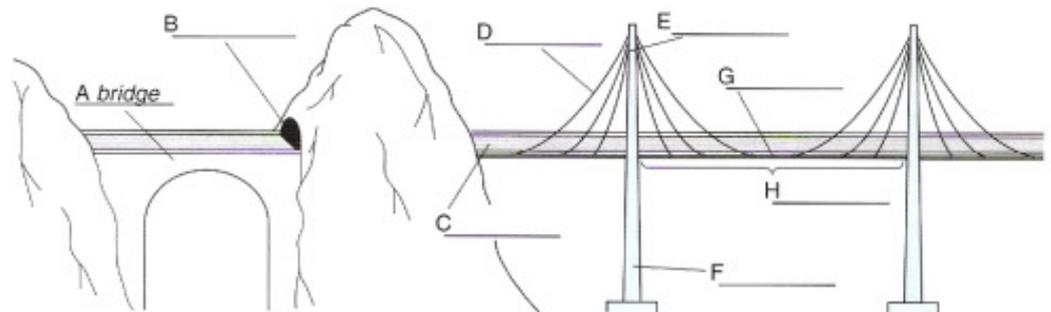
2 Make sentences. Write the words in the correct order.

1   270 has metres The sea of depth a   →   *The sea has a depth of 270 metres.*
2   deep is metres 25 river The   →   _____
3   is metres 330 span long The   →   _____
4   a 160 The height metres of have pylons   →   _____
_____
5   the 22 kilometres length The road of is   →   _____
_____
6   width has 8 deck The metres of a   →   _____

3 Write questions and answers about the bridge.
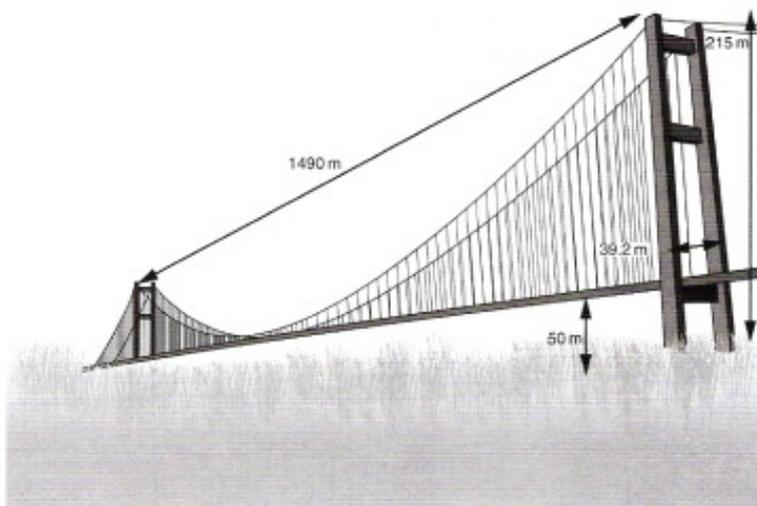
Runyang Bridge, China

1   where / this bridge ?
Q: *Where is this bridge?*
A: *It's in China.*
2   long / inner span ?
Q: _____
A: _____
3   high / pylons ?
Q: _____
A: _____
4   wide / deck ?
Q: _____
A: _____
5   high / deck / above water ?
Q: _____
A: _____

2 Quantities

1 Complete the text with facts from the specification chart.

The Gherkin

Address: 30 St Mary Axe, London
Completion date: 2003
Height: 180 m
Floors: 40
Glass area: 24 000 sq m
Floor area: circle
Footprint: small
Number of lifts: 18
Speed of lifts: 6 m/s
Materials: reinforced concrete,
 steel, aluminium, glass
Width of glass lens: 2.4 metres

This building is called 'The Gherkin'. It was completed in (1)_____. The
(2)_____-storey building is 180 (3)_____ high. The building is made of
(4)_____, (5)_____, (6)_____ and (7)_____. The glass windows
have an (8)_____ of 24 000 (9)_____. The building has (10)_____ lifts.
Each lift travels at 6 (11)_____. Each floor area of the building is a
(12)_____. The floors at the top and bottom are small. The floors in the
middle of the building are bigger. The footprint of the building is
(13)_____. All the glass on the side of the building is flat. But on the top of
the building, there is one round glass lens. It is 2.4 metres (14)_____.

2 ▶ 🔊 18 A customer is ordering some materials. Listen and complete the order form.

Item	Kind (circle)	Size (circle)	Product number (circle)	Quantity (write)
Paint	green / grey	5 / 10 litre tin	P176GR / D186G	
Cement	grey / white	10 / 20 kg bag	C0116W / S0196G	
Nails	packet of 50 / 100	24 / 30 mm	N420 / N240	
Screws	packet of 50 / 100	20 / 24 mm	S00941 / F00921	

3 ▶ 🔊 19 Listen and complete the questions from question 2.

1 How much paint do you need?

2 _____ _____ _____ do you need?

3 _____ _____ _____ do you need?

4 _____ _____ _____ do you need?

5 _____ _____ _____ do you need?

6 Do you have _____ _____?

7 _____ _____ _____ do you need?

8 Do you need _____ _____?

3 Future projects

1 Read the article about a new train tunnel. Complete the specification chart.

Zurich
SWITZERLAND
GBT
ITALY
Milan
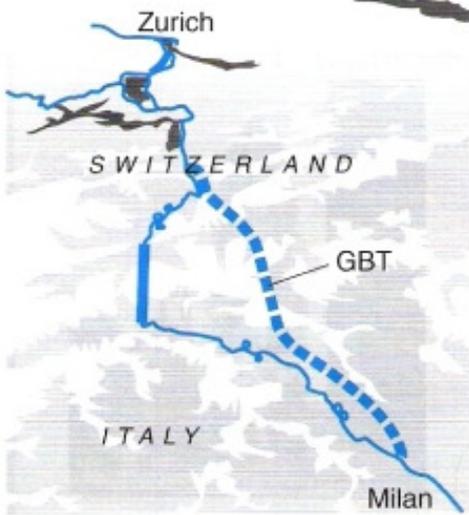
The Gotthard Base Tunnel

The Gotthard Base Tunnel (GBT) will be the longest railway tunnel in the world. Engineers are building it now, in Switzerland, under the Alps. They will finish the project in 2016–2017.

Today, many trucks use the roads over the Alps. In future, they will use the GBT. The tunnel will connect Zurich in Switzerland with Milan in Italy.

There will be two tunnels. Each tunnel will be about 57 km long. They will run about 600 metres below the old St Gotthard railway tunnel (completed in 1881).

The new trains will use electricity. Some trains will carry trucks and cars. Fast passenger trains will travel at 250 kph. About 200–250 trains per day will use the GBT.

Gotthard Base Tunnel (GBT)	
Location of tunnel	in Switzerland, under the Alps
Possible completion date	
Number of tunnels	
Length of tunnels	
Depth below old tunnel	
Maximum speed of trains	
Source of power for trains	
Number of trains per day	

2 Change the long forms to short forms.

1 They are building a new tunnel. They're building a new tunnel.
2 There will be two new tunnels. _____
3 They will finish the tunnel in 2017. _____
4 The trains will not use magnetism. _____
5 There will be more than 200 trains per day. _____

3 Underline seven mistakes in this report. Then rewrite the report.

> The GBT will be the longest road tunnel in the world. It will connect Italy and France. Engineers will finish the project in 2011. The new tunnel will be above the old railway tunnel. There will be over 300 trains per day. The new trains will use diesel. All of them will run at 250 kph.

The GBT will be the longest railway tunnel _____

_____

_____

_____

4 Word list

NOUNS (Bridge)	NOUNS (Design)	NOUNS (Materials)	VERBS
cable	completion	aluminium	attach
deck	depth	cement	build
pier	design	fibreglass	fix
pylon	elevator	glass	lay
span	footprint	glue	make
NOUNS (Tunnel)	foundation	oil	put
compressed air	height	paint	**ADJECTIVES**
diesel	length	reinforced concrete	amazing
magnetism	location	steel	approximate
vacuum	material	superglue	deep
	quantity	**UNIT NOUNS**	high
	specification	bag	inner
	storey	bottle	long
	structure	packet	outer
	width	tin	super-fast
		tube	wide

1 Find nouns for these adjectives.

long – l_____   high – h_____   wide – w_____   deep – d_____

2 Make phrases from the words in the box. Write them below.

	bottle		cement
	tube		oil
a	bag	of	paint
	packet		glue / superglue
	tin		screws

_____   _____

_____   _____

_____

3 Choose a verb from the Word list and complete these phrases.

1 lay the foundations   5 _____ the deck

2 _____ the piers   6 _____ the deck to the cables

3 _____ the pylons on the piers   7 _____ the road

4 _____ the cables to the pylons

1 Recent incidents

1 Complete the table of verb forms.

		Verb	Past simple	Past participle
Type A Regular	add -*ed*	check		
	add -*d*			changed
Type B Regular	double the final letter and add -*ed*		stopped	
		plan		
Type C Irregular	verb = past simple = past participle	cut		
			put	
Type D Irregular	past simple = past participle		bought	
				sold
			sent	
Type E Irregular	past simple ≠ past participle		fell	
		speak		
				taken
		write		

2 Complete the dialogue. A is the manager. B is the manager's assistant.

A: *Have you spoken* to Security?

B: Yes, I have.

A: Good. _____ the new customer?

B: No, I haven't. I'll do it now.

A: _____ an email to HTB?

B: Yes, _____ .

A: Good. _____ the incident report?

B: No, _____ . I'll do it now.

THINGS TO DO
speak to Security ✓
ring the new customer
send an email to HTB ✓
write incident report

3 Yesterday, the police received a lot of phone calls. Complete the sentences with verbs and nouns from the box.

have stolen	has crashed	has broken	diamonds	digger	motor boat	shop
have come	has taken	have jumped	river	town centre	shop window	
has driven	have run		sledgehammer	window		

1 Hello? Police? A thief *has taken* my *digger*.

2 Police? A man _____ a digger into the _____ here.

3 Hello? A digger _____ into a

_____ in Broad Street.

4 Help! Two men _____ into my
_____ in Broad Street.

5 One man _____ the display case with a
_____ .

6 The two thieves _____ some
_____ .

7 Two men with bags _____ down to the
_____ .

8 The two men _____ into a
_____ . They are on the river now.

2 Damage and loss

1 ▶ 🔊20 In each sentence, fill in the gap and underline the best verb. Then listen, check and repeat.

1 They *have* <u>bent</u> / burnt the router antenna.
2 The user manual *is* <u>torn</u> / burnt.
3 Someone _____ bent / broken the camera.
4 The body of the radio _____ cracked / cut.
5 The speakers _____ damaged / torn.
6 Someone _____ cut / bent the power cable.
7 The lenses of the goggles _____ cut / scratched.
8 I _____ burnt / broken my overalls.
9 They _____ dented / torn the car door.

2 ▶ 🔊21 Listen to Part 1 of the dialogue and correct the customer details. Then listen to Part 2 and complete the damage report.
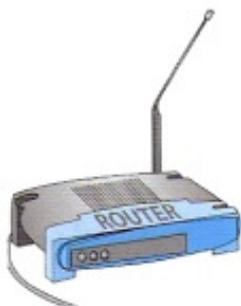
Order No:	PC08/1020/0017	Item	Damaged	Missing
Name:	Mr Bert Sandle	1 router antenna	*bent*	
Address:	14 Hayford Road	2 mouse		✓
	Catford	3 computer screen		
	London	4 keyboard		
Postcode:	SE10 4QU	5 power cable		
Tel:	0208 411 4009	6 LH speaker		
Email:	bsandell87@bdg.co.uk	7 RH speaker		
		8 user manual		

3 Complete the sentences. Some of the phrases are used more than once.

are   doesn't have   has   is   there's   there are

Reporting damage	Reporting something missing
1 The box *is* damaged.	1 The headphones _____ missing.
2 The overalls _____ torn.	2 _____ no pliers in the toolbox.
3 _____ a dent on one of the speakers.	3 The power cable _____ a plug.
4 _____ some cracks on the body of the radio.	4 _____ no batteries in the box.
	5 The radio _____ no antenna.
	6 _____ no user manual in the box.

3 Past events

1 Read the diary of a space tourist. Then complete the interview below.

1 Q: which year / travel / to / ISS?
   Which year did you travel to the ISS?
   A: In 2008.

2 Q: when / you / take off ?
   _____
   A: On April 12th.

3 Q: how / travel / into space ?
   _____
   A: On the Space Shuttle.

4 Q: what / take / with you ?
   _____
   A: Six Luka cameras and my laptop.

5 Q: what / do / on / ISS ?
   _____
   A: I tested all the Luka cameras.

6 Q: you / repair / solar panel ?
   _____
   A: No. John repaired it.

7 Q: when / you / leave / ISS ?
   _____
   A: On April 20th.

8 Q: when / you / land / in / USA ?
   _____
   A: On April 21st.

12.04.08	Took off on Space Shuttle. Took 6 Luka cameras and laptop.
13.04.08	Shuttle docked with International Space Station (ISS)
14.04.08	Tested all 6 Luka cameras. All worked OK.
15.04.08	John did spacewalk. He repaired solar panel on ISS.
20.04.08	Left ISS, after 7 days.
21.04.08	Returned to earth. Landed in USA.

2 Ben damaged his laptop a month ago. He rang the IT hotline. Write his answers to the questions. Use the past simple + *ago*.

1 When did you buy your laptop? (10 months)
   I bought it 10 months ago.

2 When did you drop it? (4 weeks)
   _____

3 When did you phone the company? (3 weeks)
   _____

4 When did you bring it into the Service Department? (10 days)
   _____

5 When did you send your email? (3 days)
   _____

6   When did you receive our bill? (2 days)

_____

7   When did you ring? (10 minutes)

_____

4 Word list

VERBS (Irregular)	VERBS (Regular)	VERBS (Damage)	NOUNS (Building)
bend / *bent*	check	bend	beam
break	climb	break	brick
burn	crack	burn	bucket
buy	crash	crack	builder
cut	dent	cut	crane
drive	happen	dent	digger
fall	land	scratch	hard hat
fly	launch	tear	scaffolding
go	lift	**NOUNS (General)**	sledgehammer
lose	move	accident	**NOUNS (Space)**
put	order	ambulance	global navigation
sell	raise	body (of radio)	moon
send	repair	damage	satellite
speak	scratch	display screen	shuttle
steal	snorkel	fuse	space station
take	**PHRASAL VERBS**	goggles (plural)	space tourist
tear	break into (irregular)	insulation	space walk
write	pick up (regular)	lens	telescope
	put on (irregular)	overalls (plural)	
	take off (irregular)	spark plug	
		surface	

1   Write the past tenses of all the irregular verbs on the Word list. (See the example at the top of column 1.)

2   Complete the sentences with nouns from the Word list.
1   They put the i_____ around the water pipe.
2   He climbed up to the top of the s_____.
3   He broke the bricks with a s_____.
4   He put a h_____ h_____ on his head and started work.
5   The c_____ lifted the metal beam onto the building.
6   One of the builders drove the d_____ into a brick wall.
7   He had an accident. He didn't put on his g_____ and damaged his eyes.
8   He stopped work, took off his dirty o_____ and went home.

Section 1

1 Use the words in the box to complete the texts. Some words are used more than once.

at   below   deep   depth   length   long   more than   through   wide   width

The Corinth Canal

The Corinth Canal is in Greece. It is 6.8 kilometres
(1)_____ and 21 metres (2)_____. The
(3)_____ of the water in the canal is 8 metres.
Large ships cannot sail (4)_____ the canal, but
small tourist ships can. (5)_____ 11 000 ships
travel through the canal every year.

The TauTona Gold Mine

The TauTona gold mine is in South Africa. It has a maximum
(6)_____ of 3.5 km. The total (7)_____ of tunnels is
(8)_____ 800 km. Mine workers get to the bottom of the
mine in super-fast lifts. These travel (9)_____ 16 m/s.
The mine opened in 1957. Soon they will open a new mine. This will be 3.9 km
(10)_____.

The Channel Tunnel

The Channel Tunnel is a railway tunnel between England
and France. It has two tunnels for trains. Each tunnel is
51.5 km (11)_____ and 7.7 metres (12)_____.
There is a small third tunnel for engineers. This has a
(13)_____ of 4.8 metres. The under-sea part of the
tunnel has a (14)_____ of 39 km. Most of the tunnel is 45 metres (15)_____
the sea floor. The travel time (16)_____ the tunnel is 20 minutes. Tunnels were
started in 1881 and in 1922. The present tunnel was completed in 1994.

2 Use the words in the box to complete the dialogues.

any   how   many   many   much   one   six   some   some

1   A: Hello. Can I help you?
    B: Yes. I'm building a wall and I
       need _____ cement.
    A: _____ much do you need?
    B: I need two bags please. And I
       also need _____ sand.
    A: How _____ bags do you
       need?
    B: I need _____ bags, please.

2   A: Hello. What can I do for you?
    B: Do you have _____ paint?
    A: Yes. How _____ do you
       need?
    B: 10 litres, please. And I need
       some nails.
    A: How _____ packets?
    B: _____ packet, please.

Section 2

1 Complete the table.

Verb	Past simple	Past participle
bend	*bent*	*bent*
build		
burn		
find		
lose		
pay		
break	*broke*	*broken*
come		
give		
go		

2 Ask questions about these recent incidents. Use the words in brackets.

1 A digger has driven into a shop window. (when / the / the)
   When did the digger drive into the shop window?

2 Some thieves have broken into the office. (when / the)

   _____

3 A mechanic has found some money. (how much / the)

   _____

4 Some builders have taken off the old roof. (when / the)

   _____

5 Some scaffolding has fallen down. (where / the)

   _____

3 Complete the dialogue. A is the supervisor. B is the builder.

A: *Have you put up the scaffolding?*
B: *Yes, I have.*
A: *Good. Have you changed the power cable?*
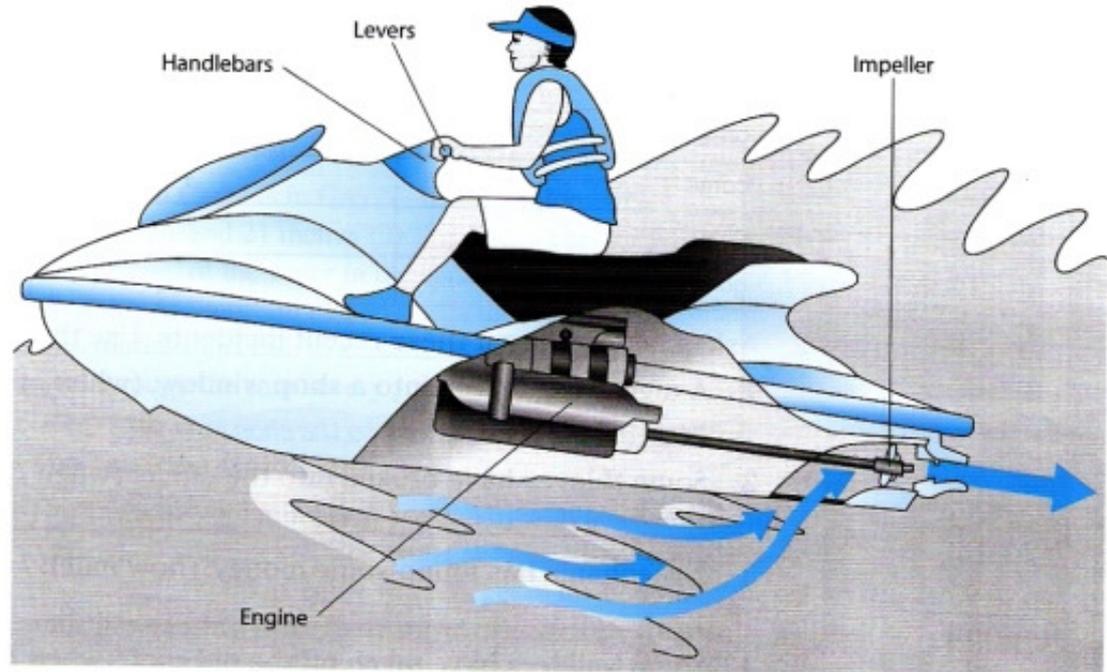B: *No, I haven't. I'll do it next week.*
A: _____
B: _____
A: _____
B: _____
A: _____

> THINGS TO DO
> put up scaffolding ✓
> change the power cable ✗
> buy the bricks ✗
> speak to the supplier ✓.
> order the water tank ✗

9 Troubleshooting

1 Operation

1 Use the words in the box to complete the text.

controls   drives   propels   pulls   pushes   release   steers   supports

Personal watercraft

A personal watercraft has a fibreglass body and an engine. A seat is mounted on the body and (1) *supports* the rider. The rider (2)_____the craft with handlebars and (3)_____ the speed with levers. The engine is mounted on the body of the craft and (4)_____ the impeller. The impeller (5)_____ water in and (6)_____ it out. This (7)_____ the craft forwards. If you want to stop the craft, you (8)_____ the lever. This stops the engine.

2 Complete the questions and answers.

1   What *does* the engine do?   It _____.
2   What _____ the impeller do?   It _____.
3   What _____ the handlebars do?   They _____.
4   What _____ the levers do?   _____
5   What _____ the seat _____?   _____

3 Make sentences with the words. Use 'mounted on' or 'attached to'.

1   seat / body   *The seat is mounted on the body.*
2   handlebars / body   _____
3   levers / handlebars _____
4   engine / body   _____

2 Hotline

1 Find these things in the picture in question 2. Write the words below.

> adapter   disk drive   display   mouse   power switch   speaker

1 *display*   3 _____   5 _____

2 _____   4 _____   6 _____

2 ▶ 🔊 **22** Listen to three short dialogues between a customer and a service technician. Parts of some of the dialogues don't match the picture. Listen and circle your answers.

Dialogue 1: no mistakes / 1 mistake / 2 mistakes

Dialogue 2: no mistakes / 1 mistake / 2 mistakes

Dialogue 3: no mistakes / 1 mistake / 2 mistakes
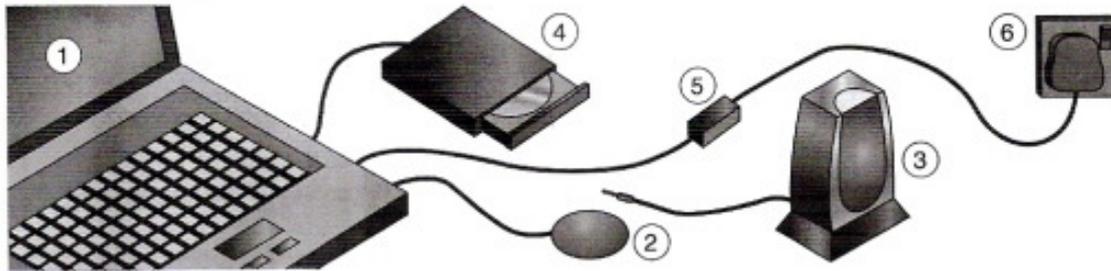
3 Look at the picture in question 2. Correct these sentences.

1   The display is closed.   →   *The display* _____.

2   The power switch is up.   →   _____

3   The mouse is disconnected.   →   _____

4   The speaker is connected.   →   _____

4 ▶ 🔊 **23** Use the words in the box to complete the dialogues. Then listen and check.

> is   isn't   are   aren't   does   doesn't   do   don't

1   *Does* the computer start?
No, it _____.
Right. Press the power button again.

2   _____ the power switch down?
No, it _____.
OK. Press it down.

3   _____ the loudspeakers connected?
No, they _____.
OK. Connect them.

4   _____ the adapter connected?
Yes, it _____.
Good.

5   _____ the loudspeakers work?
No, they _____.
OK. Connect them and try again.

6   _____ the two LED lights on?
Yes, they _____.
Good.

7   _____ the computer start?
Yes, it _____.
Good.

8   _____ the loudspeakers work now?
Yes, they _____.
Good.

3 User guide

1 Read the Troubleshooting Guide. Underline the correct words.

> **Travelling with your notebook computer**
>
> Close / <u>Open</u> the display.
> Press / Turn the power button.
> If the display light is low, check / replace the LED for the battery.
> If the battery is low, connect / recharge it.
> If the battery still doesn't work / start, replace it.
> At the end, to turn off your computer, touch / press the power button.
> Close / Open the display.

2 Make sentences with 'if' from the dialogues.

1 Are the LEDs on? No, they aren't. OK. Check the battery.	3 Is the printer light on? No, it isn't. OK. Push the 'On' button.	5 Do the speakers work? No, they don't. OK. Connect them to the computer.
2 Does the printer work? No, it doesn't. OK. Connect it to the adapter.	4 Are the batteries old? Yes, they are. OK. Replace them.	6 Does it print in black? Yes, it does. OK. Press the button for 'Start Colour'.

1   *If the LEDs aren't on, check the battery.*
2   _____
3   _____
4   _____
5   _____
6   _____

3 Use verbs from the box to complete the Troubleshooting Guide.

check   check   connected   plug   plugged   press   press   shut   shuts   turns   unplug

(1) *Check* that the power cable is (2) *plugged* into the computer and a power outlet.

(3)_____ that the mouse and the keyboard are (4)_____. Unplug the cables and then (5)_____ them in again.

(6)_____ the power button on the back of the computer for a few seconds. This (7)_____ down the computer.

If you cannot (8)_____ down the computer, (9)_____ the power cable from the computer. Wait 30 seconds. Plug it back in. (10)_____. the power button. This (11)_____ the computer on.

4 Word list

NOUNS	NOUNS	VERBS	ADJECTIVES
acceleration	hovercraft	accelerate	closed
adapter	key	check	connected
airboard	laptop	connect	disconnected
battery	LED	contain	fibreglass
body	lever	control	flat
brake	modem	drive	flexible
computer	mouse	force	open
cushion	notebook computer	hold	rubber
diagram	platform	increase	**PREPOSITIONS**
disk	power button	open	above
disk drive	power outlet	press	attached **to**
display	power source	propel	below
engine	purpose	recharge	connected **to**
fan	rider	release	mounted **on**
friction wheel	router	replace	suspended **from**
front	screen	start	**PHRASES**
function	skirt	steer	pull (air) in
handlebar	speaker	stop	push (air) out
hotline	speed	support	suck (air) in
	start button	touch	switch off
	starter motor	turn	switch on
	switch	**ADVERBS**	take out
		backwards	turn off
		downwards	turn on
		forwards	You're welcome.
		upwards	

1 Find 20 nouns that are connected to computers.

_____

_____

2 Replace the underlined words with opposites from the Word list.

1 The rider <u>presses</u> the lever. → *The rider releases the lever.*

2 The fan <u>pushes</u> air <u>out</u>. → _____
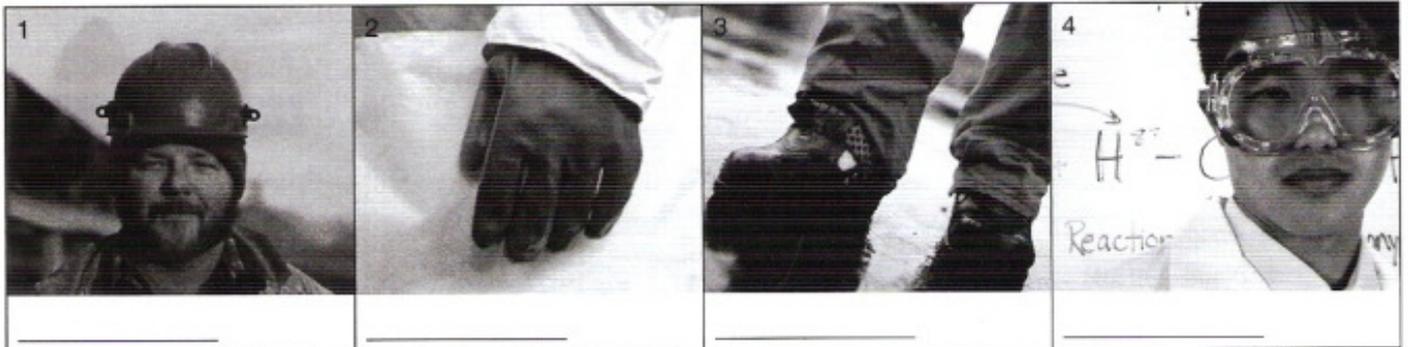
3 The rider can go <u>forwards</u>. → _____

4 The engine is <u>above</u> the platform. →

_____

5 The fan <u>starts</u> and the airboard goes <u>upwards</u>. →

_____

1 Rules and warnings

1 Label the objects with these words.

safety boots   safety goggles   safety gloves   safety helmet

2 Use the words in the box to complete the instructions.

always   do   don't   must   mustn't   never

1   *Don't* smoke in the workshop.
2   _____ use mobile phones in the workshop.
3   You _____ wear safety goggles when you use this machine.
4   You must _____ enter the cold store if you are alone in the factory.
5   _____ not lift heavy weights by hand.
6   You _____ use this machine without the guard.
7   _____ read the manual before you service the machine.
8   _____ touch packets in the cold store without gloves.

3 Complete each sentence with a pair of verbs.

drop / break   lift / hurt   pick / burn   put / melt   touch / get
use / scratch   use / trap

1   Don't *drop* that box. You might *break* the TV inside it.
2   Don't _____ the CD on that hot surface. It could _____.
3   Don't _____ that box without a forklift truck. You might _____ your back.
4   Don't _____ a hook when you lift the car. You might _____ it.
5   Don't _____ up that hot plate. You might _____ your hand.
6   Don't _____ that wire. You could _____ an electric shock.
7   Don't _____ that machine without a guard. You could _____ your hand in it.

2 Safety hazards

1 An inspector is inspecting a factory. Write sentences from his notes.

1 liquid on floor   *There is some liquid on the floor.*

2 hole in the outside door   ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾

3 no fire exit   ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾

4 broken window   ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾

5 cables on a workbench   ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾

6 no fire extinguishers in factory   ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾

7 2 machine guards missing   ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾

8 some damaged warning cones   ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾

2 Use phrases from the box with *might* or *could* to complete these warnings.

> burn your hand   fall into it   get an electric shock   injure your head
> start a fire   trap your hair in it   trip over them

1   Mind that lighted match! (could) *You could start a fire.*

2   Mind that cable! (might) ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾

3   Mind those bricks! (could) ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾

4   Mind that machine! It doesn't have a guard. (might)

‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾

5   Mind the gap! (could) ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾

6   Mind that low beam! (might) ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾

7   Mind that circular saw! It's very hot. (could)

‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾

3 Complete the inspector's report about the hazards in a factory. Use each of the words or phrases once.

> there was   there were   was   were   two   no   some   the

1   There *were* no fire extinguishers anywhere in the factory.

2   There was ‾‾‾‾‾‾‾‾ food and drink on the workbenches.

3   ‾‾‾‾‾‾‾‾ some boxes of parts on the stairs.

4   ‾‾‾‾‾‾‾‾ guard on one of the machines was broken.

5   ‾‾‾‾‾‾‾‾ some oil on the floor.

6   ‾‾‾‾‾‾‾‾ of the windows were broken.

7   The fire exit ‾‾‾‾‾‾‾‾ locked with a padlock.

8   There was ‾‾‾‾‾‾‾‾ key for the padlock.

3 Investigations

1 ▶ 🔵 **24** Listen to the dialogue. Complete the details on the accident report form.

About the accident	Type of accident (tick)	About the injured person
Date: _____ Time: _____ Location: _____	[ ] injured self [ ] injured somebody else [ ] slipped, tripped or fell [ ] lifted something [ ] dropped something	Name: _____ Job title: _____ Injury: _____ At work: Yes / No (circle)

2 ▶ 🔵 **25** Listen to the questions from question 1. Complete the questions that you hear.

1   First, *where* did the accident *happen*?
2   Was _____ hurt?
3   When did it _____ _____?
4   What's the name of the _____ person?
5   What _____ he _____?
6   What's his _____?
7   Did he injure _____ _____?
8   What _____?

3 Read the newspaper story. Complete it with the words from the box.

away	between	in	in	into	into	of	on	on	on	on	out	with

6 FISHERMEN RESCUED

(1) *On* March 19th, there was an accident (2)_____ the North Sea. A cargo ship crashed (3)_____ the fishing boat *Marianna*. The accident happened in the North Sea (4)_____ dense fog, 300 kilometres east (5)_____ Hull. The cargo ship was (6)_____ a journey from Sweden to Portugal (7)_____ a cargo of 2000 tons of wood. The *Marianna* was (8)_____ its way back to Hull, after a four-day fishing trip. There were six fishermen on it. The captain said later: 'The anti-collision system on our boat switched (9)_____ automatically. Suddenly I saw the Swedish cargo ship. The distance (10)_____ us was only 30 metres. I tried to steer our ship (11)_____ from it. But it hit us and our boat sank. We launched our life raft, got (12)_____ it and sent (13)_____ a radio signal for help. We were in our life-raft for four hours.'

4 Word list

NOUNS	NOUNS	VERBS	PHRASAL VERBS
altitude	match	coil	look out
aviation	oven	hurt	take care
chemical	padlock	injure	take place
cloud	poison	investigate	**ADJECTIVES**
cone	prohibition	light	bare
distance	safety	lock	careful
drink	shock	mind (your head)	circular
emergency	sign	prohibit	dense
factory	site	service	mandatory
flight	surface	slip	military
food	type	touch	round
gap	warning	trap	single
gear	weight	trip	triangular
glove	**COMPOUND**	warn	
guard	**NOUNS**	wash	
hazard	anti-collision system	wear	
high-voltage	fire exit		
hook	fire extinguisher		
investigation	flight path		
laser	mobile phone		
liquid	near miss		
machine	sea level		

1 Write adjectives to complete these phrases from the unit.

1 *dense* cloud
2 b_____ hand
3 l_____ match
4 n_____ miss
5 c_____ saw
6 e_____ shock
7 h_____-voltage

2 Complete these compound nouns from the unit.

1 *fire* extinguisher
2 s_____ boot
3 s_____ hazard
4 s_____ level
5 f_____ path
6 m_____ phone
7 b_____ site

3 Find ten nouns and compound nouns in the Word list that come from the story on page 78 of the Students' Book. Write them here.

altitude, _____

_____

Section 1

1 Complete the description with the nouns in the box.

> acceleration   body   cushion   engine   fans
> fibreglass   levers   platform   skirt

A hovercraft moves over land and water on a
(1)_____ of air. A powerful
(2)_____ drives four large (3)_____.
They suck the air in and push the air
downwards under the rubber (4)_____. The engine is mounted on a
strong (5)_____. The (6)_____ of the hovercraft is made of foam
covered with (7)_____. Two (8)_____ control the speed of the fans
and the (9)_____ of the hovercraft.

2 Complete the dialogue with a hotline technician. Use the words in the box, some of them more than once.

can

does

doesn't

have

haven't

is

I've

there's

Technician: Printer Hotline. How (1)_____ I help you?

Customer: I've got a problem with my printer. It
            (2)_____ work. (3)_____ switched it on. But
            (4)_____ no light on the display.

Technician: OK. First, (5)_____ the printer connected to the AC
            adapter?

Customer: Yes, it (6)_____.

Technician: Good. And (7)_____ you connected the adapter to the
            power source?

Customer: Yes, I (8)_____.

Technician: And (9)_____ you turned the switch on?

Customer: Ah, no, I (10)_____. I'll do that now.

Technician: And (11)_____ the printer work now?

Customer: Yes, it (12)_____. Thanks.

3 Look at the flow chart for a personal watercraft. Use the chart to write a Troubleshooting Guide, using sentences with 'If'.

Turn the key to the right.
Press the starter button.

Does the engine start? — No → Check the battery. → Does the battery work? — No → Recharge the battery. → Does the battery work?

Yes ↓

Move the leaver to 'D'.
Ride away.

Yes ↓

Check the starter motor.

No ↓

Replace the battery.
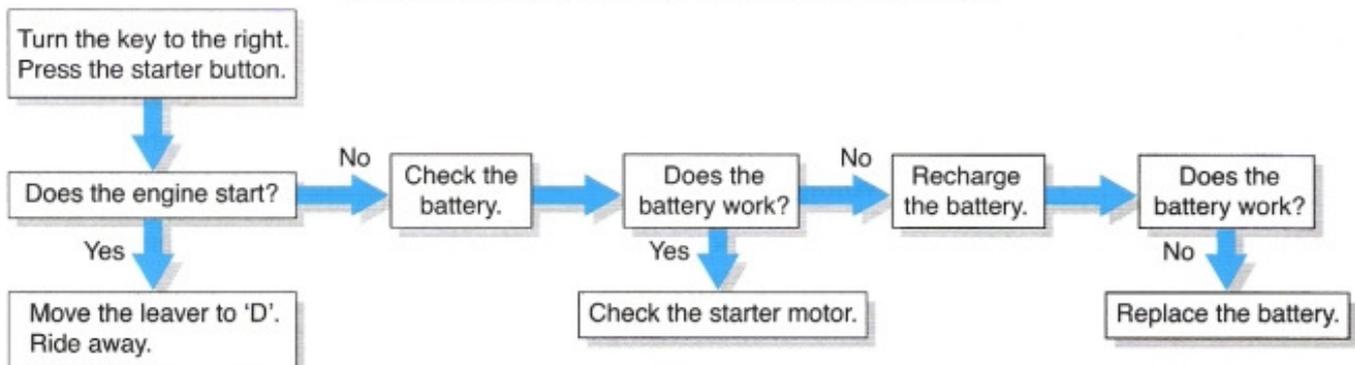
1 *Turn the key to the right. Press* _____.

2 *If the engine starts,* _____.

3 _____

4 _____

5 _____

6 _____

Section 2

1 Write these words for some safety signs in the correct order.

1 use off this after machine Turn → *Turn* _____.

2 shipyard in boots use the safety Always → _____

3 the report to Drivers must office → _____

4 the truck ride Never forklift on → _____

5 use goggles Do without machine not this safety → _____

6 supervisor reverse without You not a must → _____

2 Complete the safety report with the correct form of the verbs in brackets.

Moderna Shipyard

On 31st May, I (1)_____ (inspect) the Moderna shipyard. I (2)_____ (find) a number of safety hazards. There (3)_____ (be) some tools on the ground. There (4)_____ (be) some wire coiled outside the office. Eight of the workers (5)_____ (not have) hard hats. There (6)_____ (be) no safety signs.

In April, there (7)_____ (be) a serious incident in the shipyard. Two ships (8)_____ (be) in the shipyard. A crane (9)_____ (lift) a metal beam from one of the ships into the air. But there (10)_____ (be) no rope attached to the beam. The beam (11)_____ (come) downwards. But it (12)_____(move) in the air and (13)_____ (hit) a forklift truck. The top of the forklift truck (14)_____ (be) bent. The driver was lucky. Just before the accident, another worker (15)_____ (shout), 'Mind your head!' The driver of the forklift truck (16)_____ (see) the beam and he (17)_____ (not be) hurt.

3 Write questions for these answers about the incident in question 2.

1 Q: (Where / incident) *Where did the incident happen?*
   A: It happened in the shipyard.

2 Q: (When / take place) _____
   A: It took place in April.

3 Q: (take place / on a ship) _____
   A: No. It took place near a ship, under a crane.

4 Q: (What / crane / lift) _____
   A: It lifted a metal beam from the ship.

5 Q: (rope / attached / to the beam) _____
   A: No, there wasn't.

6 Q: (beam / hit / worker) _____
   A: No. It hit his forklift truck.

7 Q: (worker / hurt) _____
   A: No, he wasn't hurt.

11 Cause and effect

1 Pistons and valves

1 Complete the description of a flush toilet with words from the diagrams. Some words are used more than once, e.g. tank (4 times).
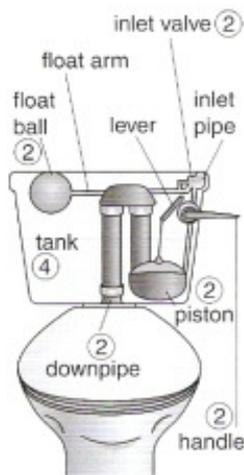
Pull the (1) *handle* down. A (2)_____ inside the tank pulls the (3)_____ up. This forces water out of the (4)_____ through the (5)_____.

When you release the (6)_____, the (7)_____ drops back into its place at the bottom of the tank. All the water flows out of the tank through the (8)_____.

There is a float ball inside the tank. It is attached to the end of the float arm. The ball makes the arm rotate vertically. The (9)_____ sinks to the bottom of the empty (10)_____. The (11)_____ rotates and opens the (12)_____. This lets water flow through the inlet pipe into the tank. The water level in the (13)_____ rises. The (14)_____ at the end of the arm rises too.

The tank fills with water. The end of the float arm now presses against the (15)_____ and closes it. This stops water from flowing into the (16)_____ through the (17)_____.

2 Tick the correct forms for the verbs.

	... it do	... it to do	... it from doing
allow		✓	
cause			
let / make			
prevent / stop			

3 Rewrite these sentences to give similar meanings. Replace the verbs in italics with the correct form of the verbs in brackets.

1   The pump *makes* the water flow along the pipes. (cause)

The pump causes _____

2   The valves *allow* air to enter the tyres. (let)

_____

3   The valves *don't let* air escape from the tyres. (prevent)

_____

4   The sun *causes* the solar panel to heat the water. (make)

_____

5   The cooling system *doesn't allow* the engine to get very hot. (stop)

_____

6   The closed inlet valve *prevents* the water from flowing out. (not allow)

_____

2 Switches and relays

1 Complete the description of a circuit breaker with words from the diagrams. Some words are used more than once, e.g. switch (3 times).

terminal

② fixed contact

③ switch

② moving contact

catch

electromagnet

terminal
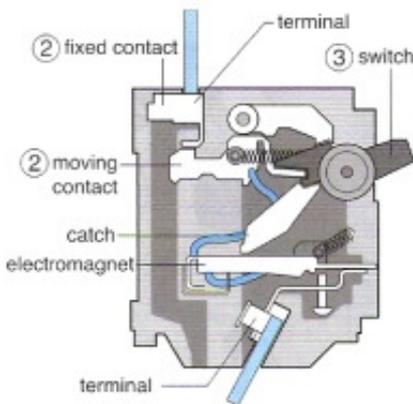
A circuit breaker has a (1) *switch* on the outside of the box. You can turn this on or off. When the (2)_____ is up (on), electricity flows into the circuit breaker through the bottom (3)_____. It flows through the (4)_____. It then flows up to the (5)_____ and across to the (6)_____. Then the electricity flows out of the circuit breaker at the top (7)_____.

If the electrical current jumps to a dangerous level, the electromagnet pulls down a (8)_____. This pulls the (9)_____ away from the (10)_____. This breaks the circuit. At the same time, the (11)_____ drops to the 'down' position. The electricity is now shut off.

2 Read the three texts in question 3. Write the titles above the texts.

a) Emergency exit   b) Home security   c) Car security

3 Read the texts and mark the sentences 'True' (T) or 'False' (F). Correct the false parts of the sentences.

1 _____

This security system uses a metal ball inside a metal pipe. When the ball remains still, it touches two of the electrical contacts. This completes the electrical circuit. If the ball moves, it breaks the circuit and opens a switch. If somebody makes the car move, the system causes the horn to sound. It makes the car lights go on too. If somebody hits the car a few times, it makes the siren sound.

2 _____

The ExitGuard is mounted over the door handle. It has a battery-operated alarm. When somebody breaks open the ExitGuard, this causes the alarm to sound. The ExitGuard allows shops to secure their emergency exits. This stops people from using the exits to enter the shop. But it lets people leave the shop in an emergency.

3 _____

If you keep expensive equipment in your workshop, fit a burglar alarm. When the doors and windows of the workshop are shut, the electrical switches are closed. This allows electricity to flow around the electrical circuit. If a burglar forces open a window, this breaks the circuit. This causes the burglar alarm to sound. If your workshop is a long distance away, install the alarm buzzer inside your house. This allows you to hear the alarm when you are inside your house.

1 <u>Two</u> of the systems cause an alarm to sound. *F Three*

2 The car security system works when somebody moves the car.

3 The ExitGuard works when somebody touches the door.

4 If there is a fire in a store, people can break open the ExitGuard.

5 The burglar alarm works only on the windows.

6 If the electrical circuit is broken, the burglar alarm will sound.

3 Rotors and turbines

1 Hidden word puzzle. Write the words for the pictures.
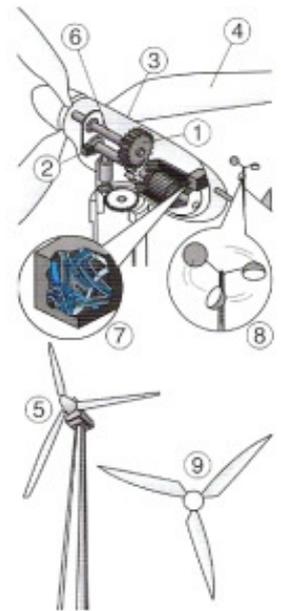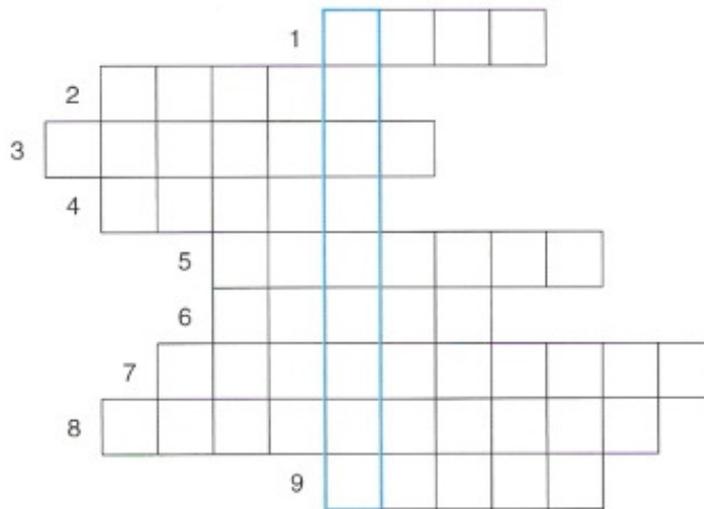
2 🔊 26 Write the ten words from question 1 next to their explanations. Then listen and repeat.

1 this produces electricity from the wind *turbine*
2 this measures the speed of the wind _____
3 this switches the wind turbine on and off _____
4 this slows down the rotating shaft _____
5 two of these make the high-speed shaft rotate at 1200 rpm

_____

6 the wind blows on three of these _____
7 this produces AC electricity _____
8 this transmits rotation to the generator _____
9 this is a strong rigid container _____
10 this consists of three blades and a hub _____

3 🔊 27 Listen to the interview with a company technician about a wind farm (a group of wind turbines). Circle the correct information.

1 In which state of the USA is the wind farm?
a) New Mexico   b) Texas   c) Nebraska
2 When did the first part of the wind farm open?
a) 2005   b) 2006   c) 2007
3 How many wind turbines are there on this wind farm?
a) 130   b) 291   c) 421
4 Is this the largest wind farm in the world today?
a) the largest   b) the second largest   c) the third largest
5 How many wind farms does the company have?
a) 38   b) 48   c) 58

4 Word list

PISTONS & VALVES	SWITCHES & RELAYS	ROTORS & TURBINES	
NOUNS	NOUNS	NOUNS	ADJECTIVES
guard	bell	anemometer	powerful
high pressure	burglar	blade	simple
low pressure	buzzer	brake	**ADVERBS**
inlet valve	circuit	controller	automatically
outlet valve	conductor	data	**VERBS**
overflow pipe	contact	gear	download
piston	earth	generator	click
piston pump	electromagnet	high-speed shaft	**PREPOSITIONS**
shaft	magnet	housing	next to
spring	relay switch	hub	**NOUNS (NOISES)**
trigger	strip	low-speed shaft	alarm bell
VERBS	switch	rotor	beep
allow	wire	tower	buzzer
cause	**VERBS**	wind turbine	click
contract	buzz	**VERBS**	dial tone
decrease	sound	blow	door bell
expand	spring	contain	horn
explode		transmit	siren
force			
increase			
let			
prevent			
pump			
spread			

1 Find opposites in the Word list for these words.

1 allow _____   5 receive _____

2 contract _____   6 inlet _____

3 increase _____   7 high pressure _____

4 suck _____   8 low-speed _____

2 Find noises for these things.

1 the *beep* of an answerphone   5 the _____ of a telephone

2 the _____ of a car   6 the _____ of a police car

3 the _____ for a fire   7 the _____ on a door

4 the _____ of a mouse   (2 choices)

12 | Checking and confirming

1 Data

1 Circle the names of 15 words from the text on Students' Book page 90. Some words are plurals. They go vertically from top to bottom, and sideways from left to right. No words go diagonally.

A	S	P	E	E	D	E	B	I	C	Q	O	B	F	D
E	U	D	J	D	L	M	O	T	O	R	S	U	H	K
H	S	F	M	K	A	Q	G	I	Z	D	L	C	E	G
A	P	W	A	I	X	A	N	T	E	N	N	A	S	M
Q	E	B	S	Z	O	F	Q	A	C	Y	F	M	W	U
I	N	S	T	R	U	M	E	N	T	S	Q	E	H	D
R	S	G	F	V	G	N	V	I	W	K	L	R	Z	A
D	I	A	M	E	T	E	R	U	D	H	V	A	R	F
X	O	Q	Z	W	K	Y	H	M	V	G	B	S	X	G
E	N	B	X	H	V	I	X	O	L	R	O	B	E	R
K	F	Y	K	E	L	R	K	Z	Q	O	D	F	W	H
G	L	A	S	E	R	G	U	N	G	B	Y	Y	U	R
B	W	Q	D	L	Y	A	Z	D	Z	O	W	I	G	Q
T	O	O	L	S	K	R	G	E	H	T	F	L	K	O

2 Read about the underwater robot *Jason*. Cross out the incorrect words.

Jason

Jason is an underwater science laboratory. It weighs, (1) *in/on* the surface, a little (2) *over/near* 3600 kg. It can operate (3) *in/at* a maximum depth of 6500 metres. There are some cameras and lights mounted (4) *on/over* its body. When it is (5) *about/near* the sea bed, the cameras look (6) *around/over*.

Jason has two robot arms attached (7) *on/to* the front of its frame. There are special tools (8) *from/at* the end of each robot arm. Some of the tools collect water samples. Others collect rocks (9) *over/from* the sea floor. A small pump sucks (10) *on/in* living things. An instrument measures the temperature of the water. Jason 1 started work in 1988 and worked (11) *up to/over* 2001. The new *Jason 2* has made 183 dives. It has spent (12) *near/at least* 3249 hours at the bottom of the sea.

3 Write questions for these answers about *Jason*. Use the information in question 2.

1　Q: What is _____?
　　A: It's called *Jason*.

2　Q: What _____?
　　A: A little over 3600 kilos.

3 Q: Where _____?
   A: They're attached to the front of the frame.
4 Q: How _____?
   A: A small pump sucks them in.
5 Q: Where _____?
   A: They're at the end of each robot arm.
6 Q: How many _____?
   A: At least 183.

2 Instructions

1 A controller is training a mobile crane driver. Match the phrases in the two boxes.

1 Press	a) the 'Start' button.
2 Press	b) forwards.
3 Release	c) to the left.
4 Push the joystick	d) the power switch. *1*
5 Turn the wheel	e) the hand-brake.
6 Move forwards	f) 45° to the left.
7 Press	g) about 50 metres.
8 Rotate the arm	h) backwards.
9 Pull the joystick	i) backwards 10 metres.
10 Reverse	j) the brake pedal.

2 Make sentences with verbs and phrases from the box.

flies   goes   up and down   forwards and backwards
into space   over rocks and holes

1   A car *goes forwards and backwards.*
2   A helicopter _____ _____.
3   A motorboat _____ _____.
4   A plane _____ _____.
5   A rover _____ _____.
6   A shuttle _____ _____.
7   A truck _____ _____.

3 Re-read paragraph 1 of the text from Section 1 Data, question 2. The ship's crane is now lifting *Jason* from the sea floor. Put the verbs in brackets into the present continuous.

A: Now, lift *Jason* up to the surface. Pull in the wire.
B: It (1 not move) *isn't moving*. *Jason* (2 not come) _____ up. I think it's stuck to some rocks.
A: Move the arm of the crane to the left. Now raise the arm of the crane.
B: I (3 bring) _____ it up.
A: What (4 happen) _____ now? (5 move) _____ the craft _____?

B: Not yet. It's stuck.

A: Move the arm to the right. Bring the arm up suddenly. Now pull in the wire.

B: I (6 pull) _____ it in now. Oh no!

A: What (7 happen) _____?

B: The wire (8 come) _____ in very fast now. I think the wire is broken. And *Jason* (9 sit) _____ on the sea floor.

3 Progress

1 ▶ 🔘 28 Change these sentences, using verbs from the box. Give sentences 1–5 the opposite meaning. Then listen, check and repeat.

assemble   attach   connect   loosen   replace   take   tighten

1 Bring the large wrench from the workshop.

  1 *Take the large wrench to the workshop.*

2 Loosen the nuts on the supply pump.

  2 _____

3 Remove the pump from the supply pipe.

  3 _____

4 Dismantle the water pump.

  4 _____

5 Disconnect the valve from the pump.

  5 _____

  6 *Replace* the valve.

2 ▶ 🔘 29 The manager of an F1 racing team is talking to the engineer. Mark the jobs on the chart with a [✗] or a [✓]. Write the days/dates for finishing the jobs.

Task	Y/N?	Date for finishing
1 Remove nose cone.	✓	May 17th
2 Take photo of nose cone.		
3 Inspect fuel tank.		
4 Replace fuel pipe.		
5 Attach cables to foot pedals.		
6 Install new valves.		
7 Lubricate the gears.		
8 Test the car.		

3 Check your answers for question 2 in the Answer key. Correct them if necessary. Write sentences about the eight jobs below.

1 (they) *They've removed the nose cone.*

2 (he) *He hasn't* _____. *He'll* _____

3 (they) _____

4 (they) _____

5 (he) _____

6   (he) _____

7   (they) _____

8   (they) _____

4 Word list

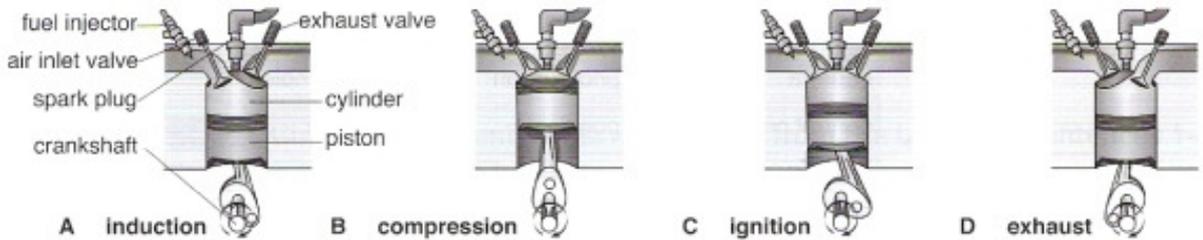| NOUNS	NOUNS	VERBS	VERBS
astronaut	oxygen	analyse	remain
camera	photograph	assemble	remove
control centre	powder	check	replace
diameter	progress	collect	respond
distance	range	confirm	roll
equipment	robot	dig	support
instrument	rover	dismantle	train
laser beam	simulation	fire	**ADJECTIVES**
laser gun	surface	include	average
mass	suspension	inspect	daily
mast	system	install	mobile
million	ventilation	lubricate	scientific
obstacle	waste	operate	**ADVERBS**
		orbit	approximately
		prepare	over
		range	less than
			more than
			under

1 Find opposites in the Word list. Write them here.

1   assemble _____

2   install _____

3   leave _____

4   exclude _____

5   more than _____

6   over _____

2 Combine two nouns, one from each box. Write them below.

laser	range
robot	system
six-wheel	tank
science	beam
suspension	arm
temperature	drive
waste	laboratory

laser beam, _____

_____

Section 1

fuel injector
air inlet valve
spark plug
crankshaft
exhaust valve
cylinder
piston

A induction   B compression   C ignition   D exhaust

1 Read about the four-stroke petrol engine. Correct the sentences, using the verbs in the box.

> allow   cause   let   make   prevent   stop

A. The inlet valve opens. The round metal piston moves downwards. It stops the pressure inside the cylinder from falling.

(1) *It makes the pressure inside the cylinder fall.*

This doesn't allow a mixture of petrol and air to enter the cylinder.

(2) _____

B.   The inlet valve closes. This lets the fuel mixture escape.

(3) _____

The piston moves upwards. This prevents the pressure in the cylinder from rising.

(4) _____

C.   The spark plug lights the fuel and doesn't cause it to explode.
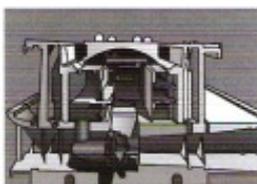
(5) _____

This forces the piston downwards on its power stroke.

D.   The outlet valve opens. The piston moves upwards. This stops the burnt fuel from escaping.

(6) _____

2 Complete the description of an electricity generating station in France. Use words from the box.

> blades   cables   dam   electricity   gates   generator   shaft   turbine

The (1) *dam* across the River Rance in France was finished in 1966. Water flows from the river into the sea through the (2)_____ in the dam. Later, it flows back into the river from the sea. The water flows past the (3)_____ of a (4)_____ and makes it rotate. A (5)_____ connects the turbine to a (6)_____. The rotation of the generator produces (7)_____. The electricity leaves the power station through high-voltage (8)_____.

Section 2

1 Write sentences about an overland rover. Use the information from the specifications chart. Change the abbreviations to words.

1 Height	202 cm	5 Wheels	steel alloy
2 Length	365 cm	6 Wheel diameter	52 cm
3 Weight	3050 kg	7 Max speed	155 kph
4 Drive	4-wheel	8 Max/Min temperature range	−40 °C min to +55 °C

1 *The rover is 202 centimetres high.*

2 *It has* _____.

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

2 Look at the progress chart for May 4th and complete the dialogue.

Task	Yes/No?	Date for finishing
1 Collect rock samples from the rover	Y	May 4
2 Repair solar panel	N	tomorrow
3 Connect cables to solar panels	N	tomorrow
4 Replace damaged mast	Y	May 2nd
5 Assemble new robot arm	Y	May 1st
6 Replace bent wheel	N	in progress
7 Service the brake system	N	May 7th

A: Now, it's May 4th today. (1) *Have you collected* the rock samples from the rover?

B: Yes. We (2) *collected* them today.

A: Right. What about the solar panel? (3) *Have you repaired it yet?*

B: No, we (4)_____. We'll (5)_____ tomorrow.

A: Have you (6)_____ the cables to the solar panels?

B: No, not yet. (7)_____ tomorrow.

A: Right. What about the damaged mast? Have (8)_____?

B: Yes, we have. We (9)_____ May 2nd.

A: Right. What about the new robot arm? (10)_____?

B: Yes, we (11)_____ May 1st.

A: Have you (12)_____ the bent wheel yet?

B: No, we're still (13)_____ that.

A: What about the brake system? (14)_____?

B: No, we haven't. We (15)_____ May 7th.