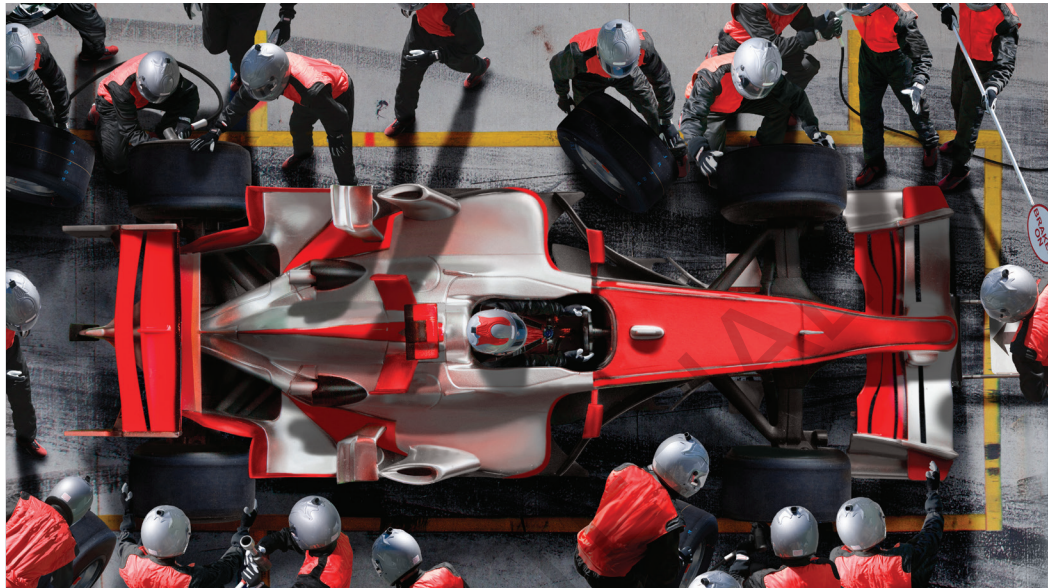




## 1 Teamwork



### START HERE » 1 Discuss these questions with a partner.

- How many mechanics work in a pit-stop crew in a big race?  
a) about 4      b) about 10      c) about 20
- What jobs do they do? List the most important jobs.

### READING » 2 Read this interview with the head of a pit-stop crew. Check your answers to 1.

## Making every millisecond count

**How do mechanics service a car so quickly in the middle of a car race? Will Peters is chief mechanic and leader of a pit-stop crew. Here he explains his work.**

I'm the crew leader, and I have about 20 mechanics in my crew. It's dangerous work, so we wear fire suits and safety helmets. I have four teams changing the wheels: *wheel-gun*, *wheel-on*, *wheel-off* and *wheel-jack*. A fifth team does all the other tasks, such as holding the car steady, cleaning the driver's visor and adjusting the wings of the car.

Every millisecond is important in the middle of a race, so everyone moves quickly and works together as a team. We can finish the job in under three seconds, but we always try to finish it in fewer than two seconds if we can!

00:30:00

About 30 seconds before we start the job, I give the order: 'Get ready!' The four *wheel-on* mechanics bring out the new wheels. The team leader adjusts the air pressure in the tyres.

00:10:00

With about ten seconds to go, the car enters the pit-stop lane and slows down.

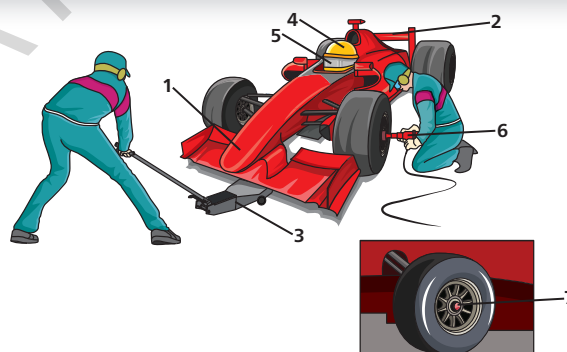
00:03:00

Three seconds to go! The car approaches the garage. The teams run into position. I signal to the driver: STOP. The driver slows down and drives towards the crew. The *wheel-gun* team leader signals where to stop and the driver stops the car with the front wheels next to the front wheel guns. A red light switches on in front of the driver. Now all the teams spring into action! GO!

00:00.00	The two wheel-jack team members move forward and place the jacks under the front and rear of the car. They raise the car off the ground and wait in position.
00:00.30	The four wheel-gun mechanics move forward. They loosen the nuts with their wheel guns. Then they move back quickly.
00:00.60	The four wheel-off mechanics move forward. They take the old wheels off and carry them away quickly. Two other mechanics stand at the side and hold the car steady while the other mechanics are changing the wheels.
00:00.90	Now the four wheel-on guys move forward. They put the new wheels on the car and move back quickly. At the side of the car, another mechanic puts his arm into the cockpit and cleans the driver's visor.
00:01.20	The wheel-gun guys move forward and tighten the wheel nuts. Then they step back and press a button on their guns to signal that everything is OK.
00:01.50	The wheel-jack people lower the car to the ground. The front guy swings the handle of the jack to the side away from the car. Then they both take the jacks away quickly and press a button on their jacks to signal that all is OK.
00:02.20	When all the wheel-gun and wheel-jack mechanics have pressed their buttons, the red light in front of the driver changes to green. This signals GO to the driver, but a safety mechanic can stop this and keep the light on red if necessary. As crew leader, I watch the whole process and I can also keep the red light on until it is safe.
00:02.30	When the light changes to green, the car speeds up and leaves the pit-stop lane. It's in the race again.

### 3 Label the parts.

visor front jack wheel nut  
rear wheel gun helmet



### 4 Complete this checklist of instructions for each team.

#### TEAM 1: WHEEL-JACK

- Place the jacks under the front and rear.
- Raise \_\_\_\_\_.
- WAIT
- \_\_\_\_\_.
- Take \_\_\_\_\_.

#### TEAM 2: WHEEL-GUN

- Loosen the wheel nuts on the old wheels.
- WAIT.
- Tighten \_\_\_\_\_.
- Press the \_\_\_\_\_.

#### TEAM 3: WHEEL-OFF

- Take the old wheels off.
- \_\_\_\_\_.

#### TEAM 4: WHEEL-ON

- Bring out the new wheels.
- Adjust \_\_\_\_\_.
- WAIT.
- Put \_\_\_\_\_.

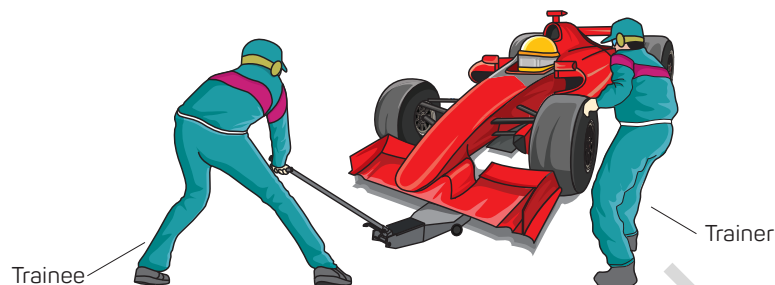
#### TEAM 5: OTHER TASKS

- Hold the car \_\_\_\_\_.
- Clean \_\_\_\_\_.
- Adjust \_\_\_\_\_.

## 2 Training



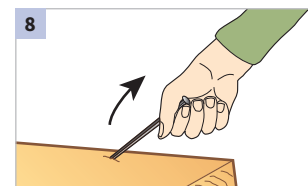
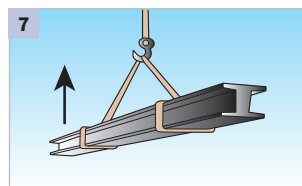
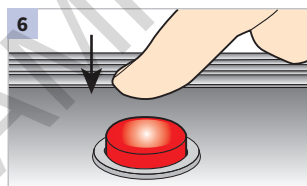
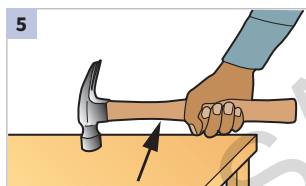
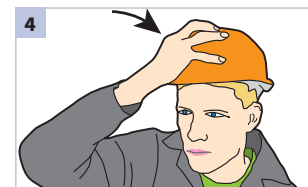
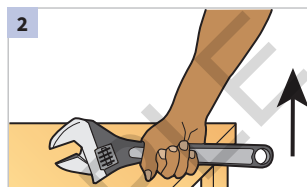
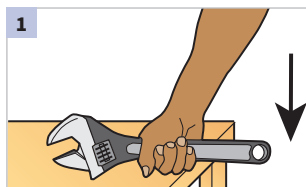
**START HERE » 1** 1.1 You are a trainee pit-stop mechanic. A trainer is giving you instructions. Listen and write numbers 1–10 to show the correct order of instructions.



Tighten the wheel nuts.	Adjust the air pressure in the tyre.	
Raise the car with the jack.	Bring the new wheel out.	
Loosen the wheel nuts.	Put the new wheel on.	
Take the old wheel off.	Put the jack under the car.	
Take the old wheel away.	Lower the car and take the jack away.	

**VOCABULARY » 2** Match the pictures with the verbs in the box.

lift up   pick up   pull out   push in   put down   put on   take away   take off



**LANGUAGE »**

Imperative	Present continuous	Present perfect
Take the tyres off.	I'm taking the tyres off now.	I've taken the tyres off.
Take off the tyres.	I'm taking off the tyres now.	I've taken off the tyres.
Take them off.	I'm taking them off.	I've taken them off.
Not: Take off them.	Not: I'm taking off them.	Not: I've taken off them.

**3** 1.2 Listen and respond to these instructions quickly. Confirm (a) what you are doing and then (b) what you have done.

Example: 1 (You hear) Bring out the new tyres. (You say) Right. I'm bringing them out now. OK, I've brought them out.

**SPEAKING » 4 Work in pairs. Make dialogues between a supervisor (S) and a trainee (T) from the checklists.**

1	• put new tyres on	done	4	• switch off electricity	done
	• tighten wheel nuts	in progress		• test all circuits	in progress
	• adjust air pressure	not yet done		• find any faults	not yet done
2	• take cover off	done	5	• strip off old paint	done
	• repair computer	in progress		• plaster holes in wall	in progress
	• take out damaged chip	not yet done		• buy new paint	not yet done
3	• replace burnt wire	done	6	• take apart telephone	done
	• switch on power	in progress		• put it together again	in progress
	• check other wires	not yet done		• test it	not yet done



Phrases to gain more time:  
Hang on. Just a minute.  
One minute. Nearly finished.  
Almost done.

**S:** How are you getting on?

**T:** I've put the new tyres on. I'm still tightening the wheel nuts. It's almost done.

**S:** OK, good. Have you adjusted the air pressure yet?

**T:** No, I haven't done that yet. I'll do it next.

**LANGUAGE » yet** is used with present perfect questions and negatives to emphasise the period of time up to now.

*Has Bill finished that job yet?* The speaker wanted or expected Bill to finish the job before now. *John hasn't cleaned the car yet.* The speaker wanted or expected John to clean the car before now.

**TASK » 5 Work in small groups. Choose one of these car jobs. With your group, make a set of instructions for doing the job.**



Changing a wheel



Cleaning a spark plug



Checking the oil level

**6 Turn to page 111. Find useful instructions from the list. Revise your own set of instructions. Rewrite them if necessary, and make them short and simple.**

**7 Roleplay this situation with someone from another group with a different job.**

**Student A:** You're the manager of a garage. You're showing a new trainee how to do the job. Tell the trainee how to do the job, but don't look at your set of instructions. Give instructions, and check how the trainee is getting on.

*First of all, loosen the wheel nuts. Have you done that yet? Good. Right. Now lift up the car with the jack. OK? Well done.*

**Student B:** You're a new trainee in the garage. Follow the manager's instructions. Mime the actions if you can. Tell the manager how you're getting on.

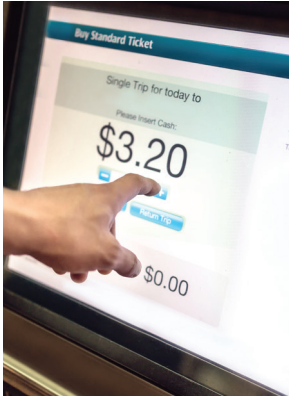
*Hang on. Just a minute. No, not yet. I'm still loosening the wheel nuts. It's almost done. OK, I've finished. I've taken it off. What do I do next?*



## 3 Method



### START HERE » 1 How do you start or activate these devices?



### READING » 2 Complete the sentences.

break kick pick up press pull switch on touch

- 1 The passenger activates the ticket machine by touching the screen.
- 2 You answer the phone by \_\_\_\_\_ the handset and \_\_\_\_\_ the green button.
- 3 The user starts the outboard motor by \_\_\_\_\_ the handle of the cord.
- 4 The rider starts the engine by \_\_\_\_\_ the battery and \_\_\_\_\_ the lever downwards.
- 5 The burglar activated the alarm by \_\_\_\_\_ the laser beam.

### SPEAKING » 3 Make questions and answers.

**A:** How does the passenger activate the ticket machine?

**B:** He activates it / He does it by touching the screen.

### LANGUAGE »

Action	Method
You start the outboard motor	by pulling the cord.
The burglar activated the alarm	by breaking the laser beam.

### 4 Work in pairs. Match the devices with the methods.

#### Device

- 1 accelerator on motorbike
- 2 voice-operated computer
- 3 solar battery
- 4 emergency stop in train
- 5 shop door alarm
- 6 car engine

#### How to start/activate it

- a) put it under an electric lamp
- b) step on a sensor in the door mat
- c) rotate the handle
- d) press and hold the remote start button
- e) pull the lever
- f) speak to it

### SPEAKING » 5 Make questions and answers.

**A:** How do you activate the accelerator on a motorbike?

**B:** By rotating the handle. (or You activate it by rotating the handle.)

## WRITING » 6 Write sentences explaining how to activate or start the devices in 4.

you the user the customer the driver the passenger

1 You activate / The user activates the accelerator on a motorbike by rotating the handle.

## READING » 7 Look at this robot. What do you think it can do? How do you think it works? Discuss with your partner.



## 8 Read this article about another robot. Make notes. List all the actions it can do.

Examples: climb stairs, walk sideways, avoid obstacles

**SPOT** is the name of this four-legged, dog-like robot created by Boston Dynamics. Spot can climb stairs, walk on rough ground, inside or outside, and crawl into narrow spaces. It can walk forwards, backwards and sideways and it can turn round. It 'sees' and avoids holes and obstacles. (It 'thinks' anything over 30 cm high is an obstacle.) If it falls down, it can roll over and get up again. You can tell Spot where to go, but Spot will 'decide' how to get there.

**How does it work?** Each shoulder has three powerful motors which control the movements of the four legs in all directions. It can 'see' its environment by means of stereo cameras located at the front, rear and sides of its body. It can 'feel' the ground by pressure sensors in its legs. An operator can steer the robot by using a controller anywhere in the world, but powerful SLAM\* software and processors *inside* the robot enable it to navigate to the location *autonomously*, that is, without input from the operator. A powerful battery located in Spot's lower body gives it a runtime of over 90 minutes.

\*SLAM: simultaneous localisation and mapping

## 9 Read the article again. Complete the chart.

Spot can ...	by means of ...	located ...
1 move its legs in all directions	12 motors	in its shoulders
2 operate for over 90 minutes	battery	
3 'see' things around it		around its body
4 'feel' the ground below it		
5 navigate to a location autonomously		inside the robot

## 10 Work in small groups. Discuss these questions.

- In the reading text, the words *see*, *feel*, *decide* and *think* are in quotation marks (eg *Spot will 'decide' ...*). Why?
- With your group, make a list of possible uses for Spot. Then put them in order from most useful to least useful. Explain why. Are there any jobs that Spot should NOT be used for? Why?

## 11 Work in pairs. Prepare a list of questions to ask about Spot. Begin your questions with *What?* *How?* and *Where?*

## 12 Take turns to ask and answer the questions.