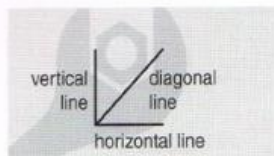


4

Movement

1 Directions

Start here



- 1 Label the jetpack man's movements with the words in the box.

backwards down forwards sideways up

- 2 Work in pairs. Which directions can planes and helicopters fly? Tick the boxes.

Direction	Plane	Helicopter
forwards		
backwards		
up and down		
sideways		



- Reading 3 Read the text. Check your answers to 2.

Passenger planes can fly forwards, and can turn to the left and to the right. But they cannot fly backwards or sideways. They can fly diagonally up and down, but they cannot fly straight up or straight down.

Helicopters can fly forwards, straight up and down, sideways and backwards.

Planes and helicopters can both rotate. Planes and helicopters can rotate on their horizontal axis. Helicopters can also rotate on their vertical axis.

Language

	It	can	fly	sideways.	
	They	can't/cannot			
Can	it		fly	sideways?	Yes, it can. / No, it can't
	they				Yes, they can. / No, they can't

- 4 Complete these sentences with *can* or *can't*.

- 1 A helicopter _____ fly sideways, but a plane _____.
- 2 A plane _____ fly sideways, but it _____ fly forwards.
- 3 A plane _____ fly straight up, but a helicopter _____.
- 4 A plane _____ fly straight up, but it _____ fly diagonally.

- Speaking 5 Work in pairs. Practise dialogues.

helicopter(s) / rocket(s) / plane(s) / fly sideways / fly straight up / fly diagonally up / rotate

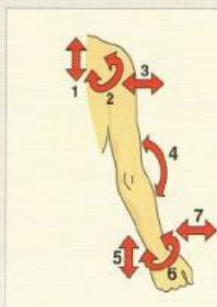
- A: Can a plane fly forwards? B: Yes, it can.
A: Can it fly backwards? B: No, it can't.

Task 6 Work in pairs. Follow the instructions and answer the questions.

Close your fist and hold your arm out straight in front of you.

- 1 Think of your wrist. (Don't move it). How many directions can it move in? One, two, three or four?
- 2 Think of your shoulder. (Don't move it). How many directions can it move in? One, two, three or four?
- 3 Think of your elbow. (Don't move it). How many directions can it move in? One, two, three or four?

Reading 7 Read the text. Check your answers to 6.



The human arm can move in seven different directions. The arm has three pivots: the wrist, the elbow and the shoulder. The wrist can move in three different directions. At the wrist, the hand can move up and down about 90° , it can move from side to side about 70° , and it

can rotate about 180° . The shoulder can move in the same three directions, but different angles. It can rotate about 20° . The elbow can only move in one direction. At the elbow, the forearm can only move up and down. It cannot move sideways or rotate.

8 Match each movement in the diagram in 7 with a word or phrase from the box.

rotate move sideways move up and down

Listening 9 26 Listen and choose the correct answers.

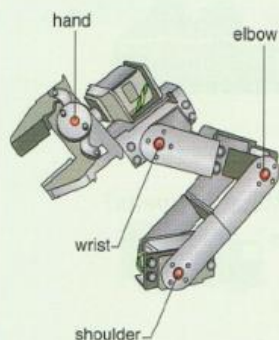
- | | | | |
|-----------------|---------------|------------------|----------------|
| 1 a) 19° | b) 90° | 3 a) 17° | b) 70° |
| 2 a) 14° | b) 40° | 4 a) 118° | b) 180° |

Task 10 Work in groups. Look at the diagram in 11 and answer these questions.

- 1 How many directions can this robot arm move?
- 2 Which part of the robot arm has different movements from the human arm. Is it: a) the shoulder? b) the wrist? c) the elbow?

Language 11 Complete the text about the robot arm with the words in the box.

can can't has is isn't



This robot arm (1) _____ like a human arm. It (2) _____ a 'wrist', an 'elbow' and a 'shoulder'.

The 'wrist' (3) _____ like the human wrist. It (4) _____ three movements. It (5) _____ rotate. It (6) _____ move from side to side. It (7) _____ move up and down.

The 'elbow' (8) _____ like the human elbow. It (9) _____ one movement. It (10) _____ move up and down.

The 'shoulder' (11) _____ like the human shoulder, because it only (12) _____ two movements. It (13) _____ rotate, and it (14) _____ move up and down. But it (15) _____ move sideways.