

### 4.3 Communications

1  Practice your speed reading. Find the answers to the quiz about communications satellites. Try to be the first to complete this task.



Television satellites are all in orbit about 35,700 km above the Earth and travel at approximately 11,000 kph. At this speed and altitude, the satellite revolves around the planet once every 24 hours, the same period of time it takes the Earth to make one full rotation. In other words, the satellite appears to be permanently at the same location. You therefore only need to direct your dish at the satellite once, and then it picks up the signal without further adjustment. Satellites transmit signals in the frequency range of 10.7 – 12.75 GHz (in Europe). The feed horn (or LNB, low noise block) on the satellite dish on your roof converts this high-frequency signal into a lower signal in the range of 950 – 2150 MHz.

- 1 How high are communications satellites above the Earth?  
a) 15,700 km      b) 25,700 km      c) 35,700 km      d) 45,700 km
- 2 How fast do these satellites travel around the Earth?  
a) 7,000 km/h      b) 11,000 km/h      c) 15,000 km/h      d) 21,000 km/h
- 3 What frequency are signals from a communications satellite to your satellite dish?  
a) 12 GHz      b) 1 GHz      c) 500,000 MHz      d) 5000 MHz
- 4 What frequency are the signals from your satellite dish to your TV.  
a) 150 MHz      b) 1500 MHz      c) 15,000 MHz      d) 150,000 MHz

2  Read the instruction leaflet and label the diagram with the words in the box.

|          |      |          |           |           |    |            |
|----------|------|----------|-----------|-----------|----|------------|
| computer | dish | DTV card | feed horn | satellite | TV | TV station |
|----------|------|----------|-----------|-----------|----|------------|

### How to receive satellite digital video broadcasts

#### Equipment needed

You will need a computer with a DTV (digital TV) card.

5 This is connected by cable to a satellite dish, which should be between 60 cm and 1.8 m in diameter.

The dish must have a feed horn. This converts high-frequency signals to low-frequency ones.

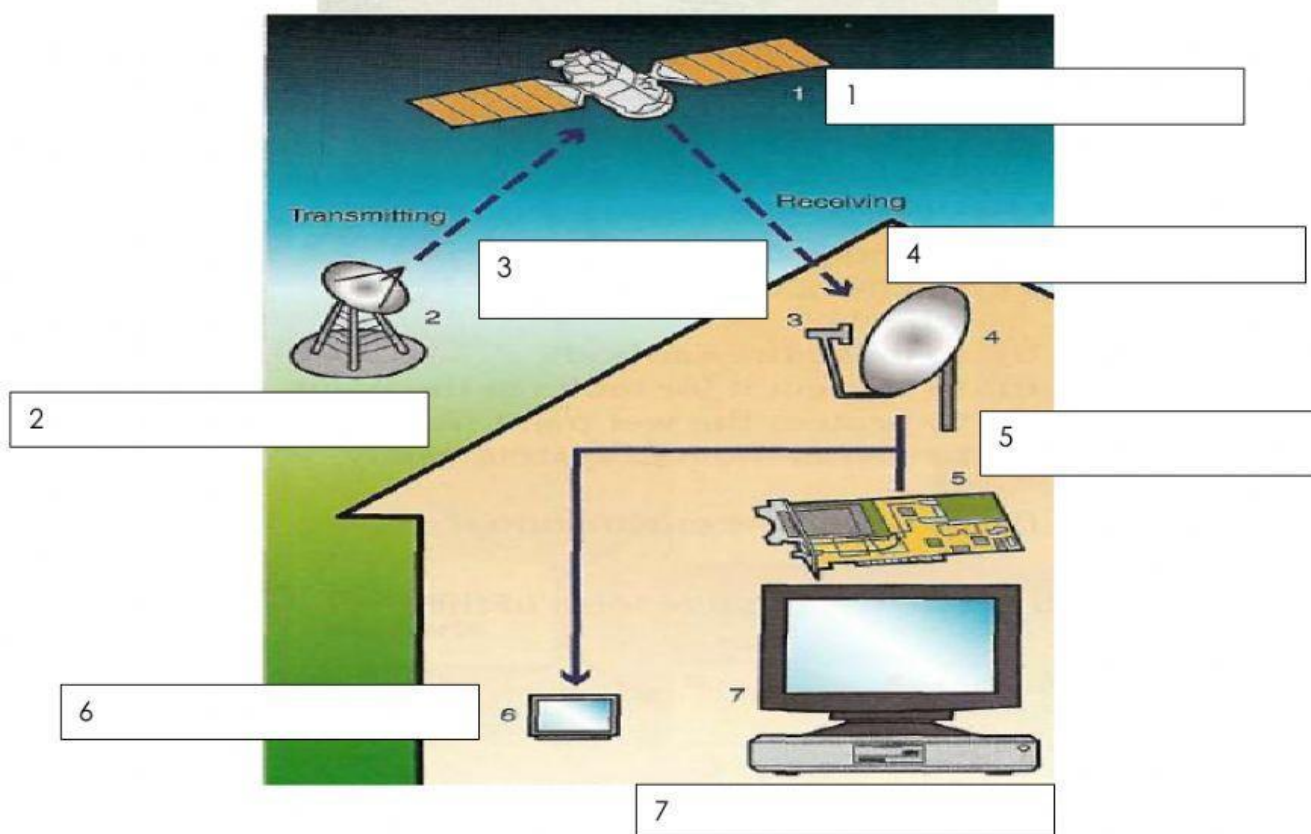
#### How it works

10 There is a communications satellite in orbit high above the Earth. TV programmes are transmitted from TV stations up to the satellite, which then sends the signals down to Earth. These signals have a high frequency of

15 several GHz.

Your dish receives the high-frequency signals and reflects them to the feed horn, which then converts the signal into a lower frequency.

20 The feed horn is connected via a cable to the DTV card, which processes the signal. It extracts the video and audio, and plays them via the PC monitor and speakers.



3/ What does 'which' refer to in the text?

- |   |         |    |               |    |                    |
|---|---------|----|---------------|----|--------------------|
| 1 | Line 5  | a) | the cable     | b) | the satellite dish |
| 2 | Line 13 | a) | the satellite | b) | the TV stations    |
| 3 | Line 17 | a) | the frequency | b) | the feed horn      |
| 4 | Line 20 | a) | the DTV card  | b) | the feed horn      |

4 Study the diagrams below. When to use **which** and when to use **who**.

|                            |                              |                                 |
|----------------------------|------------------------------|---------------------------------|
| Signals are transmitted to | the satellite. the satellite | then sends the signal to earth. |
|                            | the satellite, <b>which</b>  |                                 |
| John reports to            | Adel. Adel                   | is the training manager.        |
|                            | Adel, <b>who</b>             |                                 |

5 Join these pairs of sentences. Use **who** or **which**.

- 1 My computer has a DTV card. This is connected by cable to my satellite dish.

*My computer has a DTV card, which is connected by cable to my satellite dish.*

- 2 If your DTV card doesn't work, contact our technician. He will repair it.

\_\_\_\_\_

\_\_\_\_\_

- 3 The dish reflects the signal to the feed horn. This converts the signal to a lower frequency.

\_\_\_\_\_

\_\_\_\_\_

- 4 Please send any complaints to our customer service manager. She will then contact you.

\_\_\_\_\_

\_\_\_\_\_

- 5 The radio station sends signals to the satellite. This then transmits the signals to my dish.

\_\_\_\_\_

\_\_\_\_\_

- 6 My DTV card extracts the audio and video. These are then displayed on my PC monitor.
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6  Match the words with the same or similar meaning.

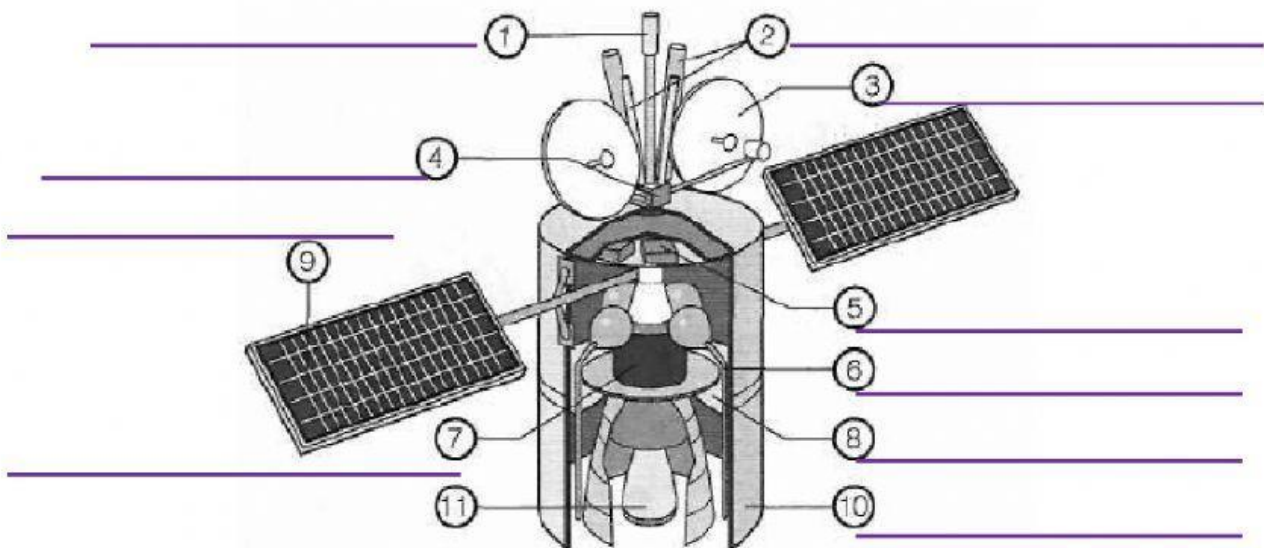
- 1 transmit
- 2 receive
- 3 convert
- 4 extract
- 5 display
- 6 operate

|  |
|--|
|  |
|  |
|  |
|  |
|  |
|  |

- A get
- B work
- C send
- D show
- E change
- F take out

7  BONUS ACTIVITY: Label the satellite parts and write the number of the parts next to the descriptions in the text on the next page.

|                  |             |          |                        |                    |
|------------------|-------------|----------|------------------------|--------------------|
| antenna          | bus         | computer | downlink               | main rocket nozzle |
| pressurised tank | puffer jets | radio    | rechargeable batteries | solar panels       |



Each satellite has a frame or **bus 10**, which is strong enough to hold everything together.

All satellites need a source of **electrical power**. This comes from solar panels \_\_\_\_\_. However, these do not work when the satellite is in shadow, on the side of the Earth away from the Sun. Therefore, a ring of rechargeable batteries \_\_\_\_\_ is installed.

All the satellite's systems are monitored and controlled by a **computer**\_\_\_\_\_.

All satellites have antennas, which receive radio wave information from the ground (**uplink**) \_\_\_\_\_ and transmit radio wave information back to Earth (**downlink**) \_\_\_\_\_. The antennas \_\_\_\_\_ are connected to the **radio** \_\_\_\_\_ on the satellite. Satellites are controlled by the ground-control crew in many ways. They can change the satellite's orbit by firing the main rocket \_\_\_\_\_ or request information.

All satellites have an **attitude control system**, which controls the positioning of the satellite. For example, the side with the solar panels may need to face the sun. Or the side with the camera or antennas may need to face the Earth. Puffer jets \_\_\_\_\_ use gas from a pressurised tank \_\_\_\_\_ to change the attitude of the satellite.

Satellites carry items of **equipment** that 'listen, speak, see and touch'. In addition to radio antennas, they may carry a telescope or camera, a thermometer or sensors.

**8/ What do these words in the text refer to?**

- |   |                 |                        |                            |
|---|-----------------|------------------------|----------------------------|
| 1 | which (line 1)  | a) satellite           | b) bus                     |
| 2 | This (line 3)   | a) electrical power    | b) frame                   |
| 3 | these (line 4)  | a) solar panels        | b) satellite               |
| 4 | which (line 7)  | a) satellites          | b) antennas                |
| 5 | They (line 10)  | a) ground-control crew | b) ways                    |
| 6 | which (line 12) | a) attitude            | b) attitude control system |
| 7 | that (line 17)  | a) items               | b) equipment               |