

1 Your computer screen



In pairs, discuss these questions.

- 1 What type of display do you have: a cathode ray tube or an LCD flat screen?
- 2 What size is the screen?
- 3 How can you change the picture using the controls?
- 4 Can you watch TV on your PC monitor?

An Apple Mac flat screen monitor



2 How screen displays work

A Complete these definitions with words from the box. Then read the text on page 33 and check your answers.

	resolution	pixel	aspect ratio	colour depth	video adapter	plasma screen
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- 1 _____ – the smallest unit on a display screen or bitmapped image (usually a coloured dot)
- 2 _____ – an expansion card that generates the video signal sent to a computer display
- 3 _____ – the width of the screen in proportion to its height
- 4 _____ – also called *gas discharge display*
- 5 _____ – the number of pixels contained in a display, horizontally and vertically
- 6 _____ – the number of bits used to hold a colour pixel; this determines the maximum number of colours that can be displayed

B Read the text again and answer these questions.

- 1 What do CRT and LCD stand for?
- 2 How is the screen size measured?
- 3 What technology is used by active-matrix LCDs?
- 4 Which unit of frequency is used to measure the brightness of a display?
- 5 What substance produces light and colour when hit by electrons in a CRT monitor?
- 6 What are the three advantages of OLED displays?

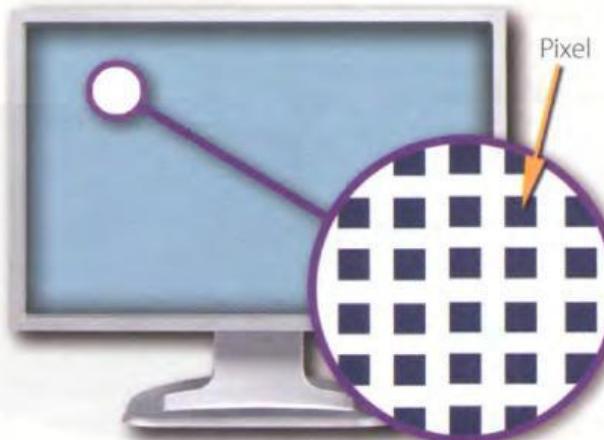
How screen displays work

Displays, often called **monitors** or **screens**, are the most-used output device on a computer. They provide instant feedback by showing you text and graphic images as you work or play.

Most desktop displays use **Liquid Crystal Display (LCD)** or **Cathode Ray Tube (CRT)** technology, while nearly all portable computing devices, such as laptops, incorporate LCDs. Because of their slimmer design and lower energy consumption, LCD monitors (also called **flat panel** or **flat screen** displays) are replacing CRTs.

Basic features

Resolution refers to the number of dots of colour, known as **pixels** (picture elements), contained in a display. It is expressed by identifying the number of pixels on the horizontal and vertical axes. A typical resolution is 1024x768.



A pixel is a combination of red, green and blue subpixels

Two measurements describe the size of your display: the **aspect ratio** and the **screen size**. Historically, computer displays, like most televisions, have had an aspect ratio of 4:3 – the width of the screen to the height is four to three. For widescreen LCD displays, the aspect ratio is 16:9, very useful for viewing DVD movies, playing games and displaying multiple windows side by side. High-definition TV also uses this format. The viewable screen size is measured diagonally, so a 19" screen measures 19" from the top left to the bottom right.

Inside the computer there is a **video adapter**, or **graphics card**, which processes images and sends signals to the monitor. CRT monitors use a **VGA (video graphics adapter)** cable, which converts digital signals into analogue signals. LCD monitors use a **DVI (digital video interface)** connection.

Colour depth refers to the number of colours a monitor can display. This depends on the number of bits used to describe the colour of a single pixel. For example, an old VGA monitor with an 8-bit depth can generate 256 colours and a SuperVGA with a 24-bit depth can generate 16.7 million colours. Monitors with a 32-bit depth are used in digital video, animation and video games to get certain effects.

Display technologies

An **LCD** is made of two glass plates with a liquid crystal material between them. The crystals block the light in different quantities to create the image. **Active-matrix LCDs** use **TFT (thin film transistor)** technology, in which each pixel has its own switch. The amount of light the LCD monitor produces is called brightness or luminance, measured in cd/m^2 (candela per square metre).

A **CRT** monitor is similar to a traditional TV set. It contains millions of tiny red, green and blue phosphor dots that glow when struck by an electron beam that travels across the screen and create a visible image.

PCs can be connected to **video projectors**, which project the image onto a large screen. They are used for presentations and home theatre applications.

In a **plasma screen**, images are created by a plasma discharge which contains noble (non-harmful) gases. Plasma TVs allow for larger screens and wide viewing angles, making them ideal for movies.

Organic Light-Emitting Diodes (OLEDs) are thin-film LED displays that don't require a backlight to function. The material emits light when stimulated by an electrical current, which is known as electroluminescence. They consume less energy, produce brighter colours and are flexible – i.e. they can be bent and rolled up when they're not being used.

3 Choosing the right display device

A  Listen to five customers in a computer shop describing their display device needs. Which device (a–e) would you recommend to each person? In pairs, discuss your choices and give reasons for them.

Speaker 1 _____

Speaker 4 _____

Speaker 2 _____

Speaker 5 _____

Speaker 3 _____

NEC MultiSyn LCD Monitor

Screen size: 17"

Resolution: 1280x1024 (SXGA)

Aspect ratio: 5:4

Brightness: 400 cd/m²



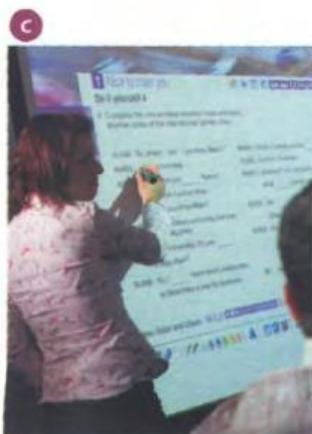
Cambridge-Hitachi interactive whiteboard

Allows interaction with a projected computer image

Board size: 78"

Connected to the PC via USB

Pointing device: cordless pen



Portable projector

DLP (Digital Light Processing) technology

Resolution: 1024x768

Projection screen



B  In pairs, discuss which of the display devices you would most like to own. Give reasons for your choice.

4 Ergonomics

A  Listen to Tony Clark, an expert in computer ergonomics, talking to some office workers about health and safety. What health problems associated with computer use do the office workers mention?

B  Listen again and complete these extracts.

- 1 Get a good chair, one that _____ your lower back and is _____
- 2 Make sure your feet rest firmly _____ or on a footrest.
- 3 Position the keyboard _____ your elbows, with your arms _____ the work surface ...
- 4 ... position the monitor at, or just below, _____
- 5 You should sit at _____ from the front of the monitor, about 50 to 70 centimetres away.
- 6 ... a kind of stand that lets you move the monitor _____, so you can use it at the correct angle and height.

C Match the extracts above (1–6) with the correct parts of the diagram (a–f).



Ergonomics – the study of how people interact safely and efficiently with machines and their work conditions

5 Language work: instructions and advice

A Look at the HELP box and then complete these health and safety guidelines with **should/shouldn't**.

- 1 If you type a lot at your computer each day, you _____ buy an ergonomic keyboard; it can help reduce the risk of repetitive strain injury.
- 2 You _____ place your mouse within easy reach and support your forearm.
- 3 If you decide to build your own PC, protect yourself from electric shocks. You _____ touch any components unnecessarily.
- 4 You _____ always use a copyholder if you are working from documents. The best position is between the screen and the keyboard, or at the same height as the screen; this can reduce neck, back and eyestrain.
- 5 Irresponsible disposal of electronic waste can cause severe environmental and health problems. You _____ just throw your old monitor or video system into the bin.

B In pairs, practise giving advice about how to use a monitor safely using **should/shouldn't** or **It's a good/bad idea to**. Look at these guidelines for help.

- 1 Don't open the monitor. It's dangerous.
- 2 Don't stare at the screen for long periods of time.
- 3 Position the monitor at eye level or just below.
- 4 Leave enough space behind the monitor for unobstructed movement.
- 5 Don't sit near the sides or back of CRT monitors. Use LCD screens instead – they're free from radiation.
- 6 Keep the screen clean to prevent distorting shadows.

HELP box

Instructions and advice

- We use the imperative to give instructions.

Get an adjustable chair.

Don't put your monitor in front of a window.

- We use **should** and **shouldn't** + infinitive to give advice or to talk about what we think is a good or bad idea.

*You **should** look down at the monitor, not up.*

*You **shouldn't** use a monitor that's fuzzy or distorts the image.*

- We can also give advice by using set phrases like **It's a good idea to** or **It's a bad idea to** + infinitive.

***It's a good idea to** have a monitor with a tilt-and-swivel stand.*

6 An ergonomic school or office

 You have been asked to write a list of guidelines for making your school or office more ergonomic. Look at the definition of ergonomics at the bottom of page 35 and then write an email to your teacher/manager explaining your guidelines. Consider 1–8 below.

- 1 Physical layout of the work site: desk areas, computer equipment, filing cabinets, etc.
- 2 Lighting (overhead lights, desk lamps), glare and ventilation
- 3 Computer and office furniture: ergonomic chairs and desks
- 4 User-friendly and ergonomic devices: keyboards, mice, monitors, wrist rests, copyholders, etc.
- 5 Location and features of telephones
- 6 Layout of cables and switches for a wired network
- 7 Wireless internet access and wireless network
- 8 Maintenance and technical repairs