

display screen and ergonomics

1 Your computer screen

 Discuss the following questions.

- 1 What type of display do you have?
- 2 What size is the screen?
- 3 Can you watch TV on your PC monitor?

2 How screen displays work

A Complete these definitions with words from the box.

resolution	pixel	aspect ratio	refresh rate	colour depth
video adapter		plasma screen		dot-pitch

- 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
- 7 – the distance between the pixels on the screen measured in millimetre.
- 8 – the frequency at which the monitor renews its image, measured in Hz.

B  Read the text and answer the following questions

- 1 How is the screen size measured?
- 2 What technology is used by active-matrix LCDs?
- 3 Which unit of frequency is used to measure the luminance of a display?
- 4 What substance produces light and colour when hit by electrons in a CRT monitor?
- 5 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 1024×768 .

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 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, measured in cd/m^2 (candela per square meter).

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 Diode (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 aren't being used.

C Complete the technical specifications of this monitor with words.

Quick specs

The new Paintview XT-85 combines a television and a computer
(1).....in one display.

Type of display	Flat panel LCD
(2).....	19 inches
(3)display	1,280×1,024 pixels
Dot pitch	0,294mm
(4).....	16.7million colour
Contrast ratio	1,000:1
(5).....	450 cd/m ²
Built-in TV tuner	Yes
Audio	Two 3-Watt speakers and a 5-Watt Subwoofer; headphone jack



The Picture-in-Picture function allows you to watch more than one program at the same time and lets you adjust the size of each window.

3 Big screens: plasma and projection TVs

I've got a 52-inch plasma display and really enjoy its advantages : high-contrast images and bright colours, generated by a plasma discharge which contains noble, non-harmful gases. Gas-plasma TVs allow for larger screens and wide viewing angles, perfect for movies!

I sometimes use a video projector in my Geography lessons. I prepare audiovisual presentations on my laptop and then connect it to a front-screen projector which displays the images on a distant screen or white wall

I am a home cinema enthusiast. I've set up a system with a DVD recorder, speakers for surround sound, and a rear projection TV, which has the video projector and the screen within a large TV box. It's a real cinema experience.

I use a portable DLP projector for my business presentations. This is a digital light-processing device which creates the image with millions of microscopic mirrors arranged on a silicon chip



A Complete the following sentences with the appropriate words.

- If you intend to set up a, consider getting a very big screen, a DVD recorder and a good set of speakers.
- Atakes digital images and displays them on a screen wall.
- The company announced plans to expand its (DLP) cinema technology, which has thrilled test audiences with its dazzling colours and pin-sharp images.
- The gas mixture in ais not dangerous.
- In a TV, a large box contains both the projector and the screen built in.

4 Language work: compound and complex sentences

❖ Select from the text compound and complex sentences.

1 Compound sentences

◆ A compound sentence has two or more clauses joined by coordinating conjunctions: and, but, for, so, etc.

E.g. The viewable screen size is measured diagonally, **so** a 19" screen measures...

E.g. ...an old VGA monitor with an 8-bit depth can generate 256 colours **and** a superVGA with a 24-bit...

◆ We usually leave out the same subject (1), the same subject+verb (2) or the same subject+auxiliary (3).

1 They provide ...as you work **or** play.

2 CRTs are cheap, **but** heavy.

3 LCDs offer better quality and take up less space, **so** replacing CRTs.

◆ We can emphasize the relationship between two clauses in compound sentences by using different combinations of conjunctions. They can express an addition (4), a combination (5), an alternative (6), or a combination of negatives (7).

4 LCDs **not only** require much space **but also** use less power than CRTs.

5 In a rear projection TV, a large box contains **both** the projector **and** the screen built-in.

6 The output can be displayed **either** on the screen **or** printed onto paper.

7 **Neither** a desktop PC **nor** a laptop could be as complex as a mainframe.

2 Complex sentences

◆ We create a complex sentence by joining two or more clauses with subordinating conjunctions such as because, since, after, although, or when.

E.g. The material emits light **when** it is simulated by an electrical current...

◆ Complex sentences contain relative clauses (1), noun clauses (2), and adverbial clauses (3). We can put adverbial clauses followed by a comma at the beginning of complex sentences.

1 CRT monitors use a VGA cable, which converts digital signals into analogue signals.

2 If a monitor has a refresh rate of 75Hz, it means that the screen is scanned 75 times per second.

3 When OLEDs aren't being used, they can be bent or rolled up.

3 Compound-complex sentences

◆ We form compound-complex sentences with three or more clauses joined by both coordinating and subordinating conjunctions.

E.g. Inside the computer, there is a video card **which** processes images **and** sends signals to the monitor.

A Identify the type of sentences: complex, simple or compound.

- 1 The characters and pictures that we see on the screen are made up of dots.
- 2 What we can see on the screen is created and stored in an area of RAM.
- 3 LCD uses a grid of crystals and polarizing filters to show the image.
- 4 CRT technology offers colours and high resolution pictures but the monitors are large and use a lot of energy.
- 5 Brightness and contrast buttons let you alter the image.
- 6 When choosing a monitor, you have to take into account a few basics.
- 7 The images shown on a monitor are generated by the video card.
- 8 The size of the screen is measured horizontally.
- 9 Phosphors are materials that emit light and produce colours when they are activated by an electron beam.

5 Ergonomics

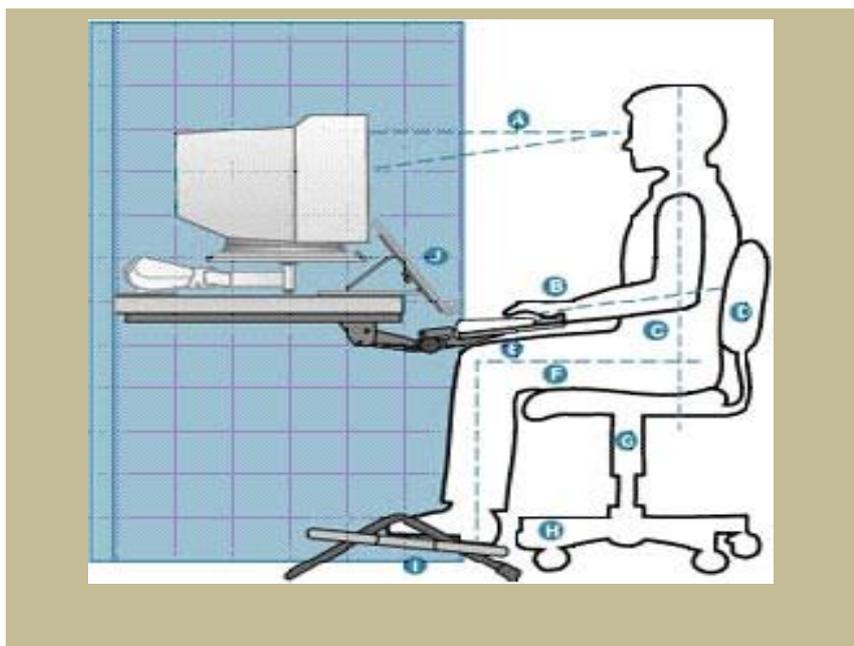
A There are a number of health and safety problems that may result from continuous use of computers.

- Typing constantly at high speed may provoke repetitive strain injury or RSI, causing pain in the neck, arms, wrists, hands and fingers. (1) & (2)
- If you work in bad postures and sit in uncomfortable chairs, backache and stress may be caused. (3)
- When looking at the screen for long periods of time, and lights reflecting off the screen, headaches and eye strain, pain and fatigue of the eyes, may occur. (4)
- Cathode Ray Tube monitors can emit electromagnetic radiation which can be dangerous to health.

The study of how people interact safely and efficiently with machines and their work conditions is called **ergonomics**. In computing, ergonomics is about designing computer facilities so they are safe and comfortable.

◆ **Find the missing words in the following tips on how to interact safely and efficiently with your computer.**

- 1 Get an so you change its height and angle.
- 2 Make sure you have enoughunder the desk, and yourrest completely on the floor or on a foot rest.
- 3 Put the monitor ator just below.
- 4 Position the keyboard at the same height as your, with yourparallel to the work surface. Try to keep your straight and flat when typing.
- 5 Use a documentin line with the screen to reduce neck and eye movements between the document and screen.
- 6 Take regularfrom the computer and look away from theat regular intervals.



7 language work: Cause and effect

Help box

In addition to the use of conjunctions covered in the previous unit, we can express the relationship between cause and effect in many different ways, before looking at some of these ways, note carefully this important distinction:

- ◆ A → B
cause effect A results in B; A causes B
E.g. Continuous use of computers **causes** a number of health and safety problems.
- ◆ B ← A
effect cause B results from A; B is caused by A
E.g. A number of health and safety problems may **result from** continuous use of computers .

1 Often the choice of verbs in a sentence will indicate a cause-effect relationship. The following verbs are used to link a cause with an effect. (1)

2 We can also use **-ing** to link a cause and effect. (2)

result	be caused by	cause	be produced by	produce
results in	allow	result from	prevent	bring about
				enable

3 Another way of showing causal relationship is by introducing the cause by **IF**, and both the cause clause and the effect clause verbs are in the present tense. (3)

4 **when clause** often indicates cause and effect. (4)

Note: Not all **when** clauses indicate a cause and effect relationship. Some are simple **time** relationship.

E.g. **when** I switch on my computer, I check for emails.

Link the following sentences showing the cause/effect relationship.

- 1 The user wants to log on.
- 2 He speaks to the computer.
- 3 It matches his voice to a database of voice patterns.
- 4 The user has a cold or sore throat.
- 5 He can use the system.
- 6 Stress and intonation patterns remain the same.

 **Start like this:**

Voice –activated computers without keyboard will become more common.....