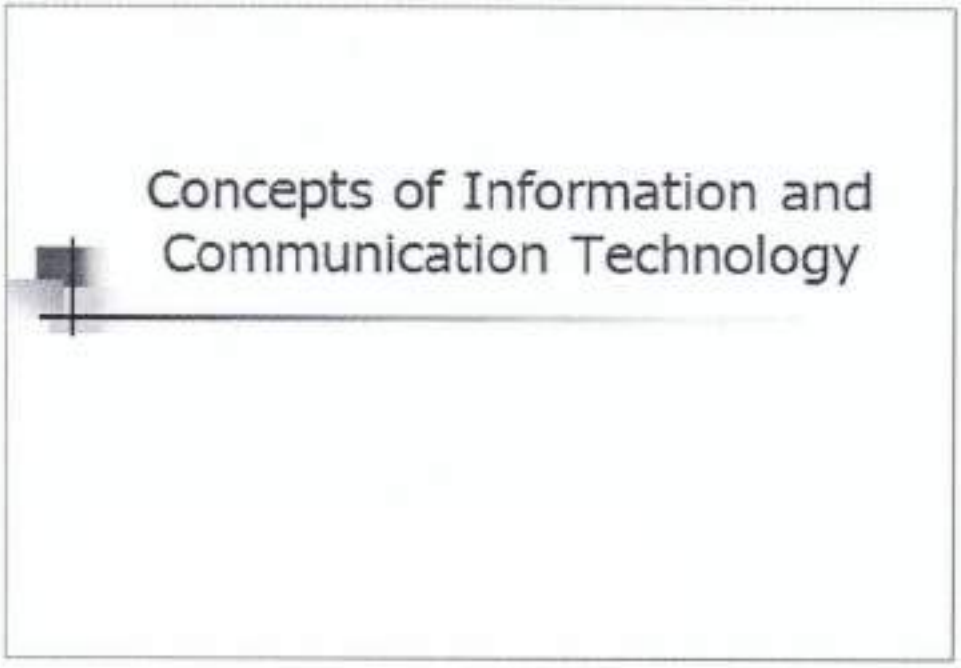
Module 1

Concepts of Information and Communication Technology (ICT)

Example 1 - Hardware

This Example will give you an understanding of what hardware is and the factors that affect the performance of computers.



There is a PowerPoint presentation in the Module 1 folder of your Exercise files, to accompany this module. If you are not familiar with using PowerPoint, the slides are reproduced in this workbook, and you may find it easier to work from this. *If you run the presentation in PowerPoint you can use the following methods to move between the slides:*

Either

- *Click once on the left mouse button*

Or

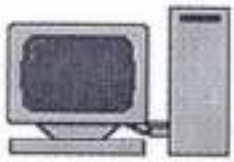
- *Press the [Enter] key on the keyboard*

Or

- *Use the [Page Down] key*
  - *To move to the next slide*
- *Use the [Page Up] key*
  - *To move back a slide.*

Hardware concepts

- What is hardware?
- What is a personal computer?
- Common handheld portable digital devices
- What are the main parts of a computer?
- Input/output ports



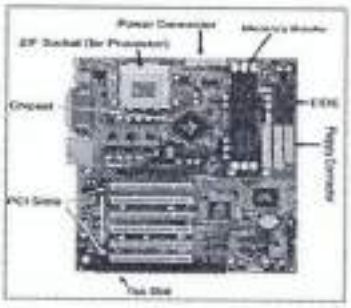
Understand the term hardware

Properly defined, "hardware" is the electronic components, boards, peripherals, and computer equipment that make up a computer system (as opposed to the "software", which tells these components what to do).

The system unit is the main box containing the essential electronic parts such as motherboard, processor, hard drive, random access memory (RAM).

Peripherals are all the devices that plug into the system unit. Peripherals can be input or output devices.

Inside a PC



Updated components for hardware, such as drivers, are produced from time to time by the manufacturers of the hardware. These enable the hardware to function with the most up-to-date operating systems and software; therefore it is important to be aware of these updates.

Understand what a personal computer is

A personal computer is also known as a "**PC**". It is an affordable, stand alone computer designed for use by one person at a time.

Personal computers come in several versions. Each version is suitable for different users. The main versions are listed below.

Desktop PC

A PC that usually sits on, or under, a user's desk and is not mobile. It usually has separate keyboard and monitor. It is larger than a laptop or tablet PC. Good for office based users.

Laptop PC

A portable (PC) that is smaller than a desktop but larger than a tablet PC. It weighs little and is easy to carry around; you can work with it on your lap. Good for users who travel frequently.

Tablet PC

A very small, mobile, notebook PC, operated with a stylus or finger rather than keyboard and mouse. Good for users who need a very lightweight, small PC.

Identify common handheld portable digital devices

With advances in technology, many handheld, portable, digital devices are becoming available – giving users the benefits and opportunities of computing on the move. Some of the most common examples are explained below.

Personal digital assistant

A personal digital assistant (PDA) is a handheld computer, with some or all of the functionality of a personal computer. A PDA is generally operated using a stylus or finger, but can also be attached to external keyboards. In education, PDAs are sometimes used to give pupils portable, individual computing capability as they move around school – and even to take home for homework purposes.

Mobile phone

A mobile phone is a portable, wireless phone which picks up its signal from a network of sites around the country. Mobile phones are usually powered by rechargeable batteries. As well as speech, mobile phones can send and receive text messages and pictures.

Smartphone

A smartphone is a mobile phone with additional features. The extra features can include such things as PC functionality, Internet access and multimedia capabilities.

Multimedia player

Multimedia players can play text, audio, photos, video and graphics in a variety of formats. In education, this can be an extremely useful way of distributing learning which can be accessed any time, anywhere. There is an enormous variety of multimedia players available, with different features and functionalities.

Know the main parts of a computer

The following are the main parts of a computer.

Central processing unit (CPU)

The powerful microprocessor chip in your computer that handles the central management functions of the computer. It is able to do millions of calculations per second, and controls the memory access, logic control and central processing of data in personal computers.

Memory

A computer has temporary memory, known as RAM, and permanent memory, known as ROM. The different types of memory are described in full in Example 2, Slide 5.

Hard disk

The hard disk is the main data storage area inside the PC. It can hold your software programs and the files you create. The hard disk is described in full in Example 2,

Common input and output devices

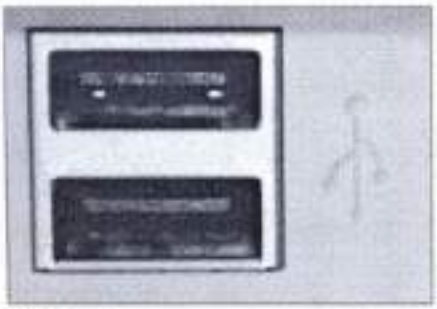
Input and output devices are described in full in Example 2,

Identify common input/output ports

Input and output devices are attached to computers via ports. Each port is a socket into which a plug can be inserted. Some of the most common are:

- USB port
- Serial port
- Parallel port
- Network port
- FireWire port

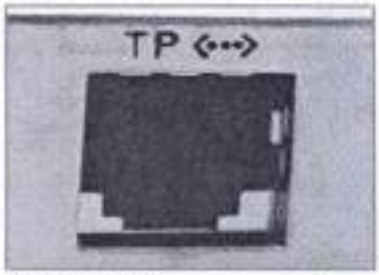
The images below identify the shape of these different ports:



USB port

Serial port

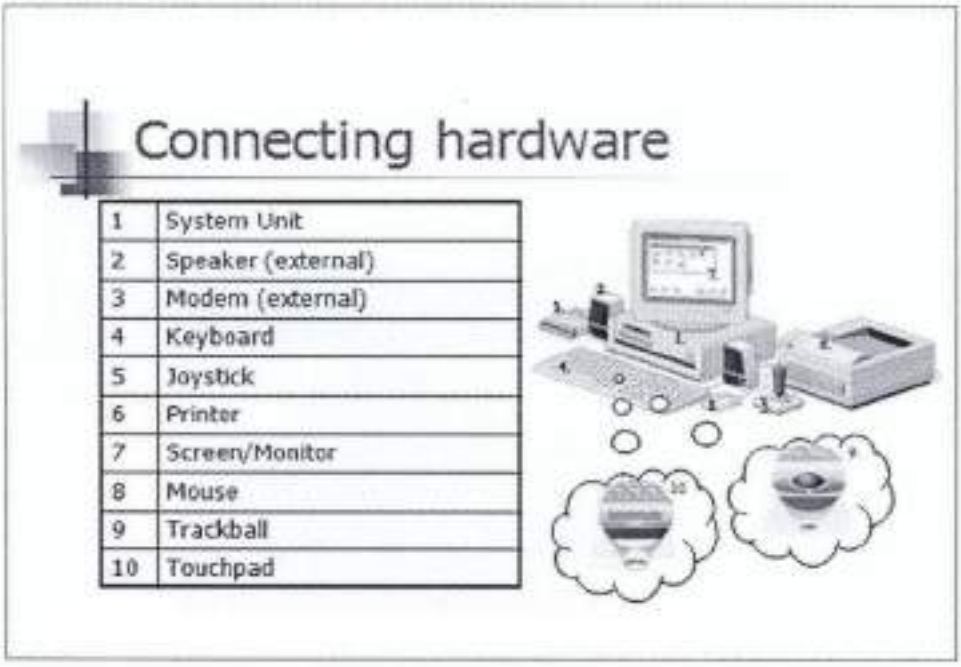
Parallel port



Network port

Firewire port

Connecting hardware



Name:	Connected to:
1. The System Unit (computer case) includes The Motherboard The Disk drives The Central Processing Unit (CPU) The Random Access Memory (RAM)	All the peripherals The screen The power supply
2. Speaker (external)	The System Unit The power supply
3. Modem (external)	The System Unit The telephone connection The power supply
4. Keyboard	The System Unit
5. Joystick	The System Unit
6. Printer	The System Unit The power supply
7. Screen/Monitor/Visual Display Unit (VDU)	The System Unit The power supply
8. Mouse	The System Unit
9. Trackball (alternative to the mouse)	Part of the keyboard or attached to the System Unit
10. Touchpad (alternative to the mouse)	

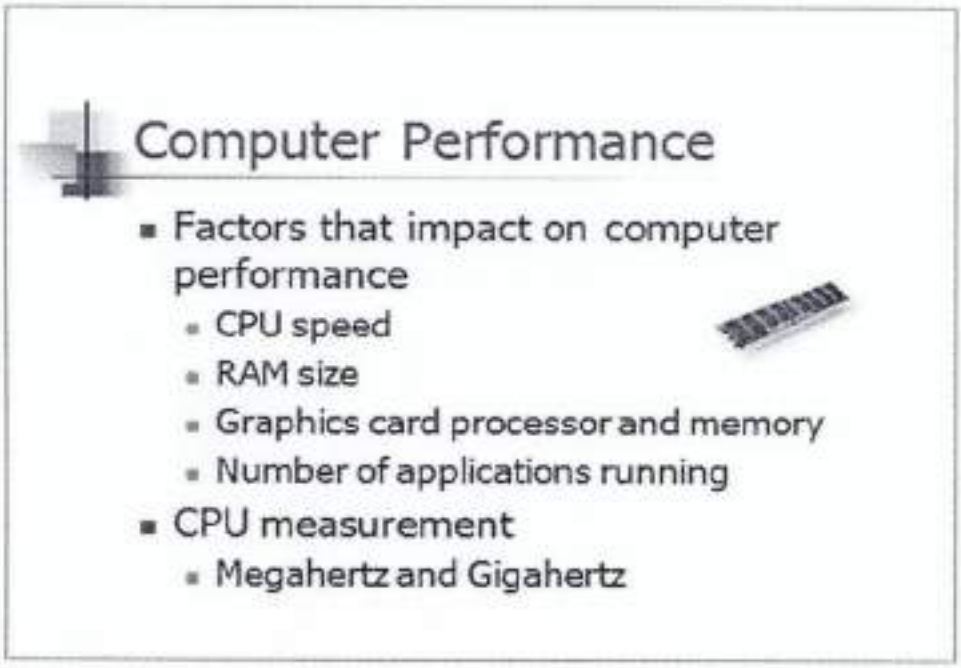
Start up checks

When your system has been set up and the relevant hardware connected, as shown on the previous page, it is important that you make certain basic checks before starting up the computer, to ensure that the system starts successfully:

- Is the power switched on?
- Are all the relevant cables connected?
- Is your monitor switched on?
- Is your printer switched on?

  Some printers will automatically switch on when a printout is sent to them. These printers do not need to be manually switched on at start up.

Computer performance



CPU speed

The faster the processor in the CPU, the faster the computer will run.

The speed (or operating frequency) of a CPU is measured in megahertz, (MHz) or gigahertz (GHz). One GHz is a thousand MHz.

RAM size

The more RAM in your computer, the more information it can handle and the faster the computer will be.

Graphics card

The graphics card contains a processor and memory to process the graphics for the computer's monitor. As with the CPU, the more powerful the graphics processor and memory are, the better the computer performance will be.

Applications

Each of the applications running on a computer use some of the computer's processing power and memory. Consequently, the performance of the computer will be affected by the number of applications running; and it is good practice to close any applications you do not need.

You may like to try this:

Comparing computers:

Collect four different adverts for a personal computer and compare the factors that will impact on your computer's performance.

Write your findings here:

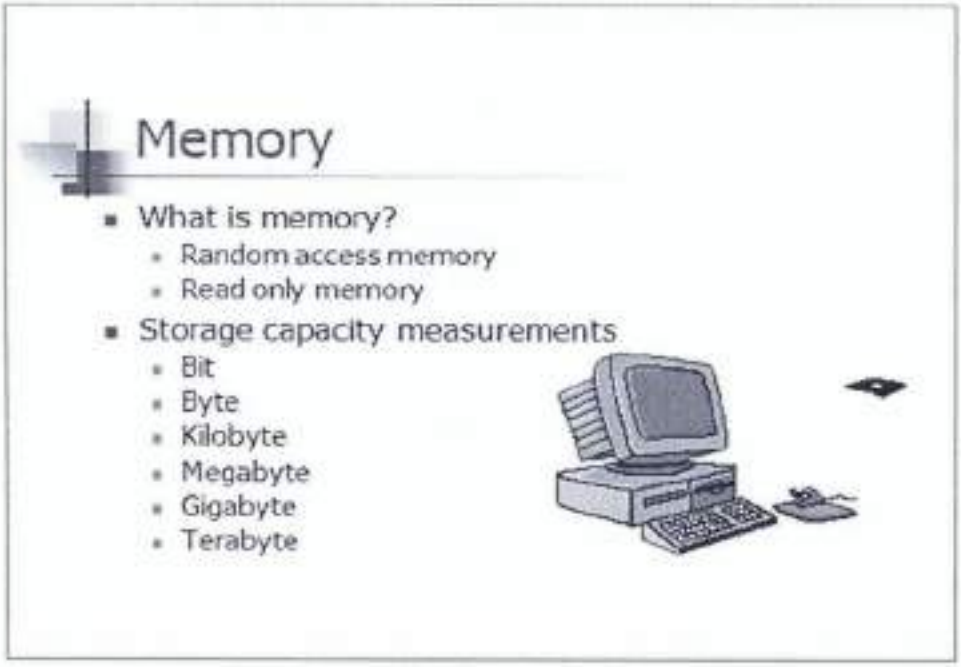
- *Advert 1:*
  -
- *Advert 2:*
  -
- *Advert 3:*
  -
- *Advert 4:*
  -
- *My choice of computer would be advert number: ___*

Example 2 - Memory, storage and input/output devices

This Example will give you an understanding of computer memory and how your programs and files are stored for use on your computer.

It will also identify the input and output devices you may need to use with your computer.

Memory



Know what computer memory is

Memory is the term commonly used to refer to a computer system's random access memory. The term 'memory' has also been used to refer to all types of electronic data storage. A computer system's memory is crucial to its operation; without memory, a computer could not read programs or retain data.

Random access memory (RAM)

This is electronic memory, which temporarily stores information inside a computer. RAM works like a blackboard that is constantly overwritten with new data. As an example, if you've typed a letter but haven't yet saved it – what you can see on the screen is held in the temporary RAM.

The amount of RAM in your computer determines the number of programs you can run at once and how fast your programs will operate. Any data stored in RAM is temporary. If you do not save the data to permanent memory, such as the hard disk, it will

disappear when you turn off the computer or lose power.

Read only memory (ROM)

This is a type of memory that permanently stores information, even when the power is turned off. Once data is programmed into ROM, its contents cannot be easily altered. For example, ROM BIOS chips, fitted to the computer's motherboard, are used to store information for starting up your computer and preparing the computer to load the operating system, such as Microsoft Windows. ROM chips are also used to store programs for hand-held computers.

Computer CDs and DVDs can also be a form of ROM.

The clipboard

The 'Windows clipboard' is another temporary holding area used by some programs. It enables text, graphics or pictures to be copied or moved either within or between documents or applications.

When a program is closed down, information held on the clipboard is usually lost. However some programs do give you the option of saving the clipboard contents.

Know storage capacity measurements

Memory is measured in **bits** and **bytes**:

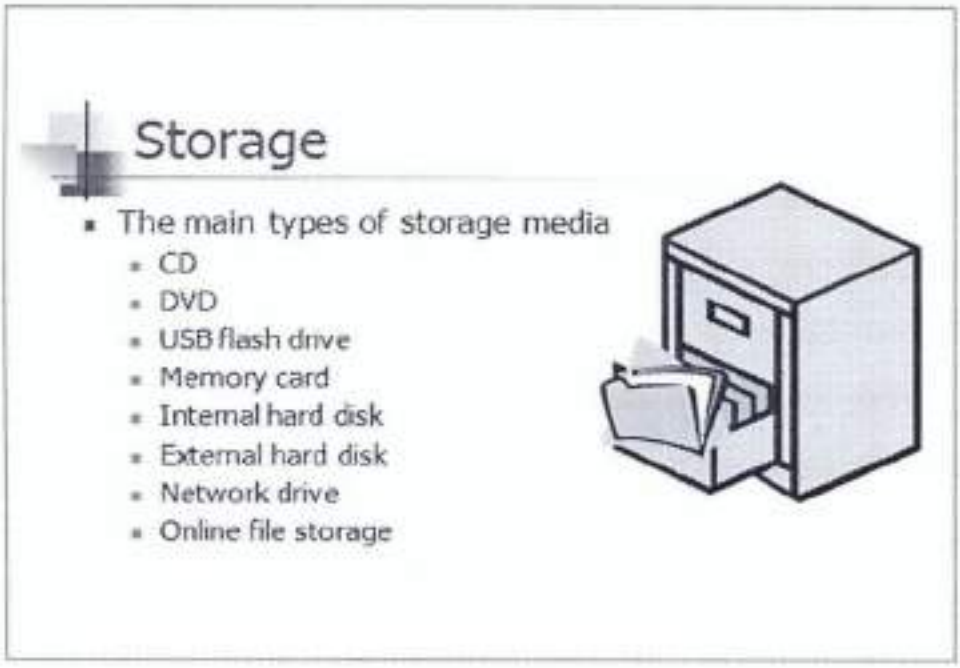
- A **bit** is the smallest measure of data
- A **byte** is 8 bits, or one character - a number, letter or symbol
- **Kilobyte** (KB) is a representative word meaning approximately one thousand bytes. (The correct amount is 1,024 bytes.) This roughly equates to one page of double spaced text (no pictures)
- **Megabyte** (MB) is approximately one million characters, or one novel.
- **Gigabyte** (GB) is approximately one billion characters, or one thousand novels

You may like to try these questions:

Comparing memory:

- *Typing your name and address might be saved in a text file measured in kilobytes or megabytes?*
  -
- *Typing a long report of over fifty pages might be saved in a text file measured in gigabytes or megabytes?*

Storage



When you save your files to permanent memory, there are many types of storage media available on which you can save them. Different types of storage are suitable for different purposes. This slide lists the main types of storage media available.

Know the main types of storage media.

CD

These are small, fast and cheap removable disks, with a memory of approximately 700 mb. These interchangeable disks are capable of storing the equivalent of 450 floppy diskettes.

CDs are often used to distribute software and multimedia.

DVD

These are removable disks, like CDs, but with a much larger capacity of approximately 4.7 gb.

USB flash drive

This is a very small, inexpensive, removable drive that plugs into a USB port on a PC. It can be purchased in many sizes from a few megabytes to many gigabytes.

Memory card

This is a very small removable card for data storage. Over time, memory cards have become smaller and smaller, with greater and greater storage capability of many gigabytes. They are used in mobile phones, digital cameras, as well as plugging into appropriate slots in PCs. Some of the common types of memory card are SD, MMC, Compact Flash, and M2.

Internal hard disk

A permanent data storage area that holds all the electronic information and software programmes on your computer. It is the primary device that a computer uses to store information. Hard disks are capable of storing vast amounts of data in multiple gigabytes. Hard disk speeds vary – the faster the speed of your hard disk, the faster it will store or retrieve data. It is wise to "defragment" your hard disk occasionally, to enable it to easily locate and unite parts of files, and therefore speed up work on your computer. Additional hard disk memory makes an affordable way of upgrading your computer.

The main hard disk is usually referred to as the "C" drive or C:\ on your computer.

External hard disk

This is a hard disk you can remove from your computer and carry about. External hard disks are useful for backups, and for transferring very large graphics and multimedia files from one location to another.

External hard disks offer the same performance as internal hard disks, however they are usually more expensive and slower than an internal hard disk.

Network drive

This is a hard disk accessible across a network, rather than being located within your own computer. Very often, network drives have many more gigabytes of storage space than the internal drive within a personal computer.

Online file storage

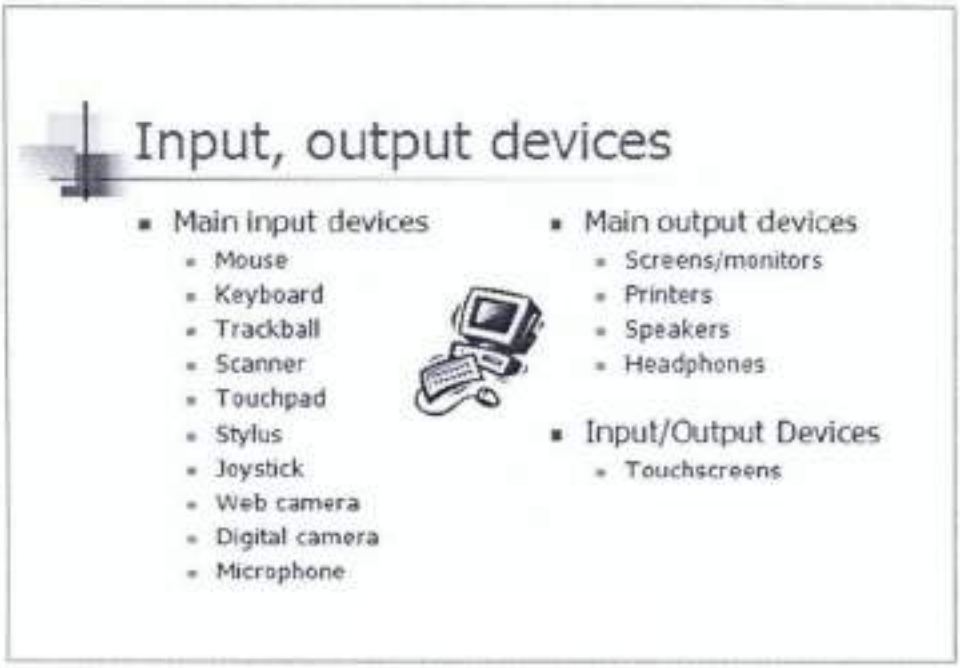
It is becoming increasingly popular to have access to storage 'online', via the Internet. Some of this storage is provided free of charge, whilst some providers charge for the amount of space you wish to use.

You may like to try this:

Comparing disks:

- *Where would you store the bulk of your everyday work?*
  -
- *When might you use a USB flash drive?*

Input, output devices



Identify some of the main input devices

Input devices are used to enter commands or information into your computer. They include a mouse, keyboard, trackball, scanner, touchpad, stylus, joystick, web camera (webcam), modem, digital camera or microphone.

Mouse

This responds to hand movement and is used to move the pointer round the screen. Its buttons are used to select and activate menus, buttons and programs. The **trackball** and **touchpad** are similar devices commonly used with laptop computers or special keyboards.


A mouse


A trackball


A touchpad

The Keyboard

Familiarise yourself with the position of the different keys. The more you use the keyboard, the quicker your typing will become! Wireless keyboards and mice are available. These have a sensor attached to a port on the computer

to pick up the actions of the keyboard and mouse; this enables the input device to be located in a convenient place without the restrictions of a wire.

Scanner

A device that optically scans pictures or text documents into your computer. It can use special software (Optical Character Recognition) to convert scanned text into a normal text file, which can be edited and saved as a regular computer document.

A **stylus**

A pen shaped instrument used with PDAs and other handheld devices, to navigate around the software and to input information into the screen.

Joystick

A handheld stick, which pivots on a base; used for playing computer games, directing video images and co-ordinating machinery.

Web camera (webcam)

These are cameras attached to PCs, enabling users to see live images of each other via the Internet. They can also be used to take digital pictures on your PC. Web cameras can be attached via a USB port; however, newer PCs and laptops often contain inbuilt web cameras,

Digital camera

These take digital pictures – images which are stored in binary form, usually on a memory card within the camera. The images can be downloaded to a PC via, for example, a USB or firewire port – or the memory card from the camera can be inserted into the card slot of a PC. These pictures can then be stored on the PC.

Microphone

These can be used to input audio to a PC.

Know some of the main output devices

Output devices are devices to which the computer sends its information in a form we can understand. Output devices include the screen, printer, speakers and headphones.

Screens

The screen (or monitor) is the computer's display. It usually has its own power on/off button and controls, similar to those of a television, to adjust the picture's brightness, contrast, colour, position and shape.

Printers

Devices that produce a paper copy of the information on your screen. Printers plug into the back of a personal computer or into the network of connected computers.

An **ink jet printer**: produces high-quality documents for a relatively low cost. Ink jet printers work by squirting tiny drops of ink onto paper. Colour ink jet printers are the least expensive type of colour printer available. They are ideal for adding touches of colour to a page, but not for reproducing colour photos.

A **laser printer** is a high-speed printer that uses a laser beam to form high quality images on a page. You can buy either a black-and-white or colour laser printer.

Speakers

Speakers give the computer an audio facility.

Headphones enable users to have personal audio – without the sound being audible to others in the vicinity.

Understand some devices are both input and output devices

Some technology works as both an input and an output device. Hardware such as a touch screen, and software such as a speech recognition program, will allow you to both enter and retrieve information from your computer.

Touch screen

A type of monitor or display with a touch-sensitive membrane over the screen. It is an input/output device that enables the user to send commands to the computer by directly touching the screen.

Speech recognition program

Computer software that understands your voice, so you don't have to type. You can use speech recognition to dictate text for a document or to give commands to your computer. Speech recognition is extremely useful for people who are unable to type.

Example 3 - Software

This Example will give you an understanding of what software is. You will learn about some of the common applications software that is available, and will also learn about operating systems software.

Software concepts

Understand the term software

Forget about computers for a moment; when you have an idea that you want to get down onto paper, if it is a rough note, you will probably choose a pencil; if it is a letter, you will probably choose a pen; if it is a painting, you will probably choose a paintbrush. You select the best tool for the task.

When using the computer, the tools that are available to you are known as "software" . Software is the generic term for all the programs which enable us to easily instruct the computer.

As technology advances, so new "versions" of software are released.
Be aware that a document created in a newer version of the software might not open in an older version - because the older version doesn't contain all of the functionality necessary to run that document.

Understand what an operating system is

An operating system (OS) is software that is the master control program that keeps everything flowing smoothly inside your computer.

The operating system starts up your computer. It controls and launches applications, schedules tasks, allocates storage, handles the interface to peripheral hardware and presents a default interface to the user when no application program is running.

Operating systems are constantly updated by manufacturers, to take advantage of improvements in technology. Support for older versions of operating systems is eventually withdrawn by manufacturers, and software programs that run with these systems eventually become obsolete.

Name some common operating systems

Some of the most popular operating systems are:

- Microsoft Windows (with versions such as 2000, NT, XP and Vista)
- Mac OS – used by Apple computers
- UNIX – an operating system that has been developed over time to a specific, single specification. This specification can be used to develop applications that run on systems that conform to the Single UNIX Specification.

As technology advances, so new "versions" of software are released. Be aware that a document created in a newer version of the software might not open in an older version - because the older version doesn't contain all of the functionality necessary to run that document.

Understand what an operating system is

An operating system (OS) is software that is the master control program that keeps everything flowing smoothly inside your computer.

The operating system starts up your computer. It controls and launches applications, schedules tasks, allocates storage, handles the interface to peripheral hardware and presents a default interface to the user when no application program is running.

Operating systems are constantly updated by manufacturers, to take advantage of improvements in technology. Support for older versions of operating systems is eventually withdrawn by manufacturers, and software programs that run with these systems eventually become obsolete.

Name some common operating systems

Some of the most popular operating systems are:

- Microsoft Windows (with versions such as 2000, NT, XP and Vista)
- Mac OS – used by Apple computers
- UNIX – an operating system that has been developed over time to a specific, single specification. This specification can be used to develop applications that run on systems that conform to the Single UNIX Specification.

- Linux – a free, Unix-type operating system
- Ubuntu – a free, community developed, Linux-based operating system, containing some application software

Identify and know the uses of some common software applications

Listed below are some software applications, and some ideas of how they can be useful in education. Can you add one more to each software category?

- Word processor
  - Letter
  - Long report
  - Lesson Plan
  -

- Spreadsheet
  - Collect data
  - Chart information
  - Compare exam results
  -

- Database
  - Records of pupils' details
  - Parent Contact list
  - Resource database
  -

- Presentation
  - Introduce an idea
  - Present results of a project
  - Give details of a forthcoming visit
  -

- E-mail
  - Correspond with classmates
  - Inter-teacher communication

- Web browsing
  - Lesson plans and resources
  - Homework

- Photo editing
  - School magazine
  - Class projects

- Computer games
  - Educational games to aid learning

- Web Site Design
  - Online school prospectus
  - Class web site
  - Special project web site

- Computer Aided Design
  - Architectural design
  - Design an object to be made in class
  - Design the packaging of an object

- E-mail
  - Correspond with classmates
  - Inter-teacher communication

- Web browsing
  - Lesson plans and resources
  - Homework

- Photo editing
  - School magazine
  - Class projects

- Computer games
  - Educational games to aid learning

- Web Site Design
  - Online school prospectus
  - Class web site
  - Special project web site

- Computer Aided Design
  - Architectural design
  - Design an object to be made in class
  - Design the packaging of an object

Distinguish between operating systems and applications software

There are two main categories of software:

Operating systems software

This provides the basic operating functions of the computer, such as Microsoft Windows, and acts as a host for the application software.

Application software

Once the computer system is up and running, application software is used to accomplish specific tasks on the computer. This software can be split into categories depending on the different tasks to be undertaken. It is important to pick the right application software for the job in hand.

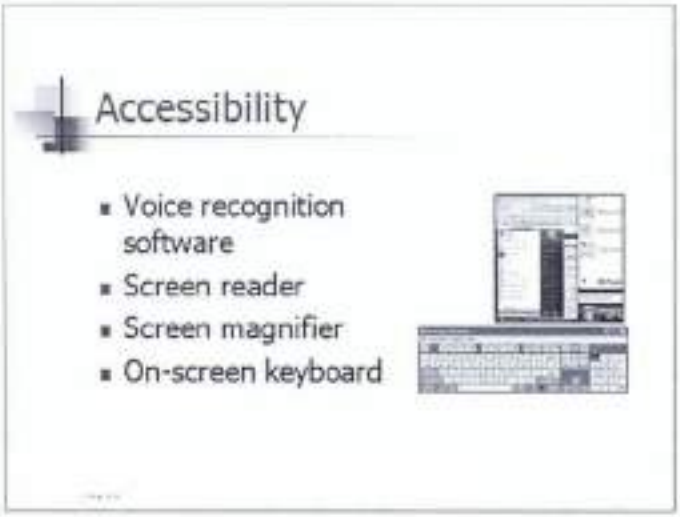
Examples of these categories are:-

- **Word processor** for letters and text documents
- **Spreadsheet** for handling figures and formulae
- **Presentation** for presenting information
- **Database** for compiling records of information.

There are many application software suites available; which include many of the application software categories within one package. Examples of these are:

- Microsoft Office
- Apple iWork – used on Apple computers
- OpenOffice – a free, community-developed, open source office suite
- StarOffice – a very reasonably priced office suite, based on OpenOffice
- Google Docs – free, web based applications for documents, spreadsheets and presentations
- Novell Open Workgroup Suite – a package including server and desktop platforms, management tools and office productivity software

Accessibility



For computer users with some form of physical impairment, there are a variety of options available to enhance the accessibility of computers.

Voice recognition software

Using voice recognition software and a microphone, a user can speak commands to a computer, rather than using a keyboard or mouse.

Screen reader

Software that 'reads' what is on-screen and either 'speaks' the content or delivers it as Braille.

Screen magnifier

Software that magnifies the relevant portion of the screen, enabling visually impaired users to see the content.

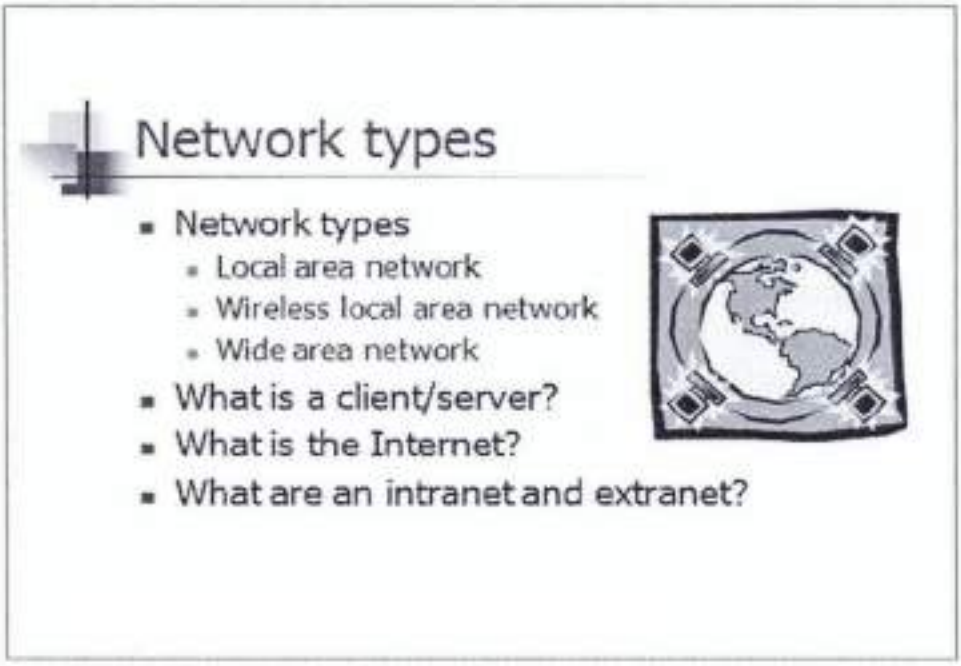
On-screen keyboard

A virtual keyboard displayed on screen, enabling users with impairments to input keyboard commands using a pointing device or joystick.

Example 4 - Networks

This Example will give you an understanding of information networks within computing. You will learn how they are used, and the different ways you can connect to the Internet.

Network types



Understand the terms LAN, WLAN and WAN

Local area network (LAN)

A LAN consists of several computers connected together, so they can share files (documents and applications) and computer equipment (for example, printers), as well as being able to exchange e-mail. *Networked computer users must always ensure that the software they are sharing has an appropriate multi-user licence, to comply with conditions of copyright.*

LANs are usually confined to a small geographic area, such as an office or building. LANs can be connected to each other over telephone lines and radio waves.

Workstations and personal computers in an office are commonly connected in a LAN. This allows individual users to send or receive files and to share access to files, peripherals and data.

Wireless local area network (WLAN)

A WLAN is a LAN where the computers and equipment are connected together wirelessly - for example, using a router to transmit data between equipment.

Wide area network (WAN)

A WAN consists of several computers connected together over high-speed, long-distance communications cables or satellites, to share files and computer equipment and exchange e-mail. A WAN connects computers across a large geographic area, such as a city or country. The Internet is an example of a WAN.

Understand the term client/server

A client/server network is the most efficient way to connect multiple computers to share information.

- The **server** is the central computer that stores everyone's files.
- A **client** is any computer that can access the information stored on the server.

Understand what the Internet is

The word Internet comes from the phrase "**Inter**connection of **net**works".
It is the biggest computer network in the world, reaching millions of people, on thousands of interconnected networks. The Internet has a staggering amount of information you can access with a modem from your home, office,

school or a public Internet point. No one person or group controls the Internet, so finding a particular piece of information can be challenging.

Businesses use the Internet to source supplies, market their products and keep track of their competitors. Lesson plans and educational research are shared over the Internet between schools and further education establishments. Individuals can communicate by e-mail and access the greatest resource in the world, all from the comfort of their own home.

Understand what an intranet, extranet is

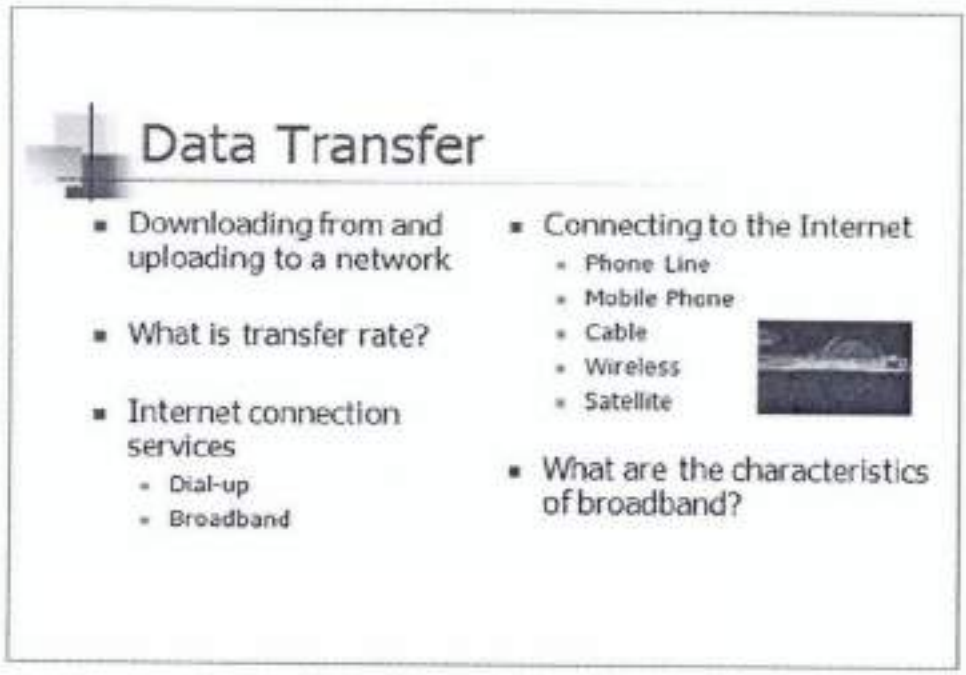
Intranet

An Intranet is a computer network used within one company or organisation. It has limited access and usually provides a similar look and feel to the **Internet** in at least some areas. It is a private network, which uses Internet-related technologies to provide services within an organisation on single or multiple sites.

Extranet

An extranet is a means of allowing external users, with appropriate security clearance, to access an organisation's Intranet.

Data Transfer



Networked computers can share information and resources. Businesses often set up a central computer, or "server", to which the other networked computers are connected.

The greatest **inter**connection of **net**works is the Internet. The "World Wide Web", or "WWW", can be used to access information that sits on the Internet. You can access the Web via a web browser, by dialling into the communication structure of cables and satellites that makes up the Internet globally: to "go online".

This is easier than it sounds, and usually involves nothing more complicated than a telephone call from your computer (via a modem) to a "service provider", who will facilitate the connection for you at a small charge.

Understand the concepts of downloading from, uploading to a network

The process of sharing information between networked computers is known as downloading (receiving information on your local computer from a networked computer) and uploading (sending data from your local computer to a networked computer).

Understand what transfer rate means

Transfer rate is the speed with which data is downloaded and uploaded by your computer.

The rate is measured in the number of units per second that are transferred. The units are counted in 'bits per second' ("bps"), 'kilobits per second' ("kbps") or 'megabits per second' ("mbps"). bps is the slowest, and mbps is the fastest. Faster modems may cost more, but they can reduce phone charges by transmitting your files more quickly.

Know about different options for connecting to the Internet

It is possible to connect to the Internet via a variety of options. The best method for any user will depend on many things, such as your location, how mobile you need to be, and how your connection can best fit with other technology you use (such as telephone and television access). Some of the most common Internet connection options are:

- Phone line
- Mobile phone
- Cable
- Wireless
- Satellite

Know about different Internet connection services

There are different services available to connect to the Internet; such as **dial-up** and **broadband**.

With **dial-up,** the number of the service provider is dialled whenever a user wishes to be connected to the Internet. Over time, as technology has advanced, there have been several types of dial-up connection, as listed below:

Public Switched Telephone Network (known as "**PSTN**") This was the standard telephone service. Used when making telephone calls and access to the Internet via a modem. Internet connection via PSTN was very slow.
Integrated Services Digital Network (known as "**ISDN**") This replaced PSTN. It is a standard for transmitting data over digital telephone lines. It is faster than PSTN to transfer or receive text, graphics, sound, and video. ISDN lines are offered by many telephone companies.
Asymetric Digital Subscriber Line (Known as "**ADSL**") This uses the existing telephone wiring found in almost every home and office to provide a faster connection to the Internet. It enables you to download (receive) information faster than you upload (send) it.

Dial-up is slow and is rapidly being replaced by broadband connections.

Understand some of the characteristics of broadband

Broadband is a type of high speed Internet connection. The benefits of a broadband connection are that it usually has a flat fee per month, it is high speed, and it is 'always on' – therefore available to access the Internet 24 hours per day.

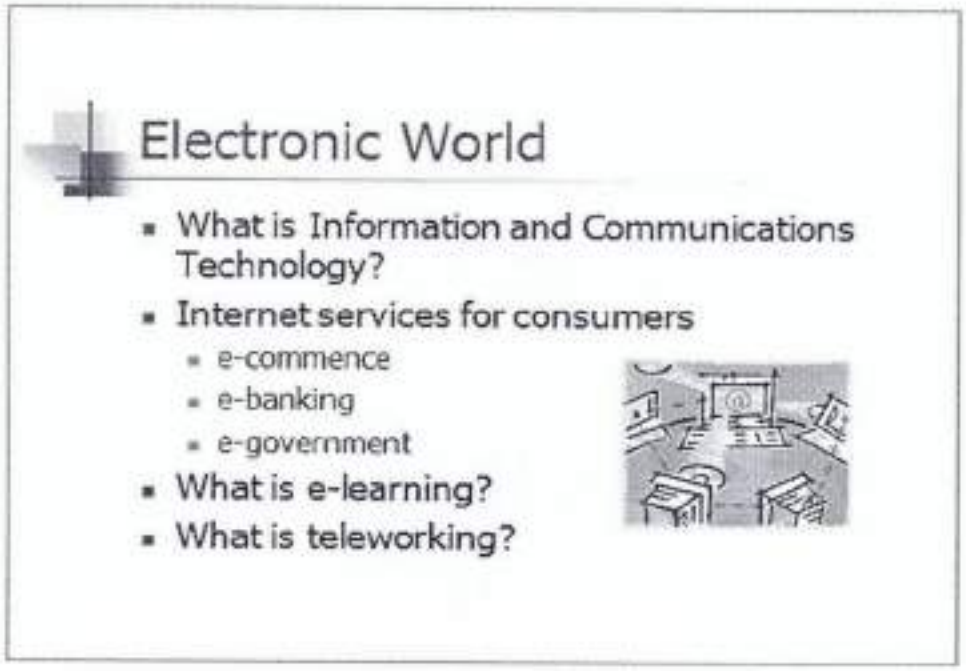
However, this unbroken access means that there is a higher risk of intruder attack; therefore up-to-date firewalls and other security measures are extremely important for users.

Example 5 - ICT in everyday life

This Example will look at the role of ICT in our everyday lives.

You will learn what Information and Communication Technology is, and how it is used in our 'electronic world'. You will also learn about communicating electronically, and about the concept of virtual online communities.

Electronic World



Understand the term Information and Communication Technology (ICT)

ICT is the technology required for information processing. In particular, it relates to the use of electronic computers to convert, store, process, transmit, and retrieve information.

It is an all-encompassing term that refers to the devices used for creating, storing, using, or exchanging information electronically.

Information Technology, "IT", also refers to the design and practical application of the devices themselves.

Know about different Internet services for consumers

With the growth of the Internet, more and more services that traditionally involved going to a shop or office in order to carry out a transaction, are becoming available online.

e-commerce

This is the ability to purchase goods and services online. Your statutory rights as a consumer (such as your right to return unsatisfactory goods) remain unchanged, however there is a certain degree of risk involved in purchasing online.

When purchasing online, you need to give three main types of information:

- The details of what you want to buy
  - Product or service identity
  - Quantity
- Your personal details
  - Who you are
  - Where you live
  - Any alternative delivery address

- Your payment details
  - Credit card number
  - Date of issue/expiry
  - Name of cardholder

Problems with fraud occur when your personal details and your payment details are stored in the same place. To reduce the risk of purchasing online, your personal details should be requested by the vendor and your payment details should be requested by a third party merchant. Look in your Browser window for the padlock symbol or the unbroken key to indicate that the transaction is safe.

Here are a few of the benefits and drawbacks of e-commerce – can you think of two more?

- Benefits
  - Services available 24 hours a day
  - Opportunity to view a wide range of products
  -

- Drawbacks
  - Choosing from a virtual store
  - No human contact
  - Risk of insecure payment methods
  -

e-banking

Online banking enables customers to access their accounts via the Internet. This is made safe with secure usernames, passwords and other security features in place. As with other e-commerce transactions, you should never divulge your personal sign-in and account details to anyone else.

Once a customer has registered to safely access their accounts online, they can carry out most transactions which would, in the past, have necessitated a visit to the bank, or written or telephone communication with the bank.

Some banks offer accounts which are held and managed completely online. Often, better rates are offered to customers for these accounts, as they are more economical for the banks to administer.

Beware of fraudulent or spam e-mails from banks asking you to confirm security details. Contact the bank by phone directly if you do believe they need to check your secure information.

e-government

This is the means by which local and national government services are being made available online. Government departments are encouraging citizens to use this option wherever possible, as it is more efficient and economical to administer than previous options.

Some examples of the services that are available online are:

- Public records systems (census, vehicle registration)
- Revenue tax collection
- Electronic registration and voting

Understand the term e-learning

The term e-learning applies to the acquisition of knowledge and skill using electronic technologies. This may involve any sort of computer based training, such as CD ROM, Internet based courseware, local and wide area networks. e-learning can be made available to students wherever they have access to a computer – allowing flexible learning times and flexible learning locations. e-learning can also provide a multi-media learning experience, which can appeal to students who are not otherwise receptive to learning.

Although thought to be a cost effective method, e-learning requires a new student to be comfortable learning on their own, or to have a coach or mentor who can help them become an efficient and successful e-learner.

Computers can be used as an administrative as well as a teaching and learning tool. Student registration and timetabling systems, computer-based training (CBT), distance learning and using the Internet for homework are just a few of the uses for computer applications in education.

Understand the term teleworking

Teleworking is the ability to work from home using telephone, fax and/or computer technology – such as the types of communication discussed on the next slide (No.13).

Here are a few of the benefits and drawbacks of teleworking – can you think of two more?

- Benefits
  - Reduced, or no commuting time
  - Greater ability to focus on one task
  - Flexible schedules
  - Reduced company space requirements
  -

- Drawbacks
  - Lack of human contact
  - Less emphasis on teamwork
  -

Communication

The Internet can be used for many types of communication. Some of the most popular are explained below.

Understand the term electronic mail

Once online, you can communicate with other users across the world by "electronic mail" or "e-mail". E-mail communication is usually instant and costs no more to send than a local telephone call only lasting a few seconds.

As well as sending and receiving text messages, you can "attach" files created in other programs, such as your presentation or spreadsheet software.

Your service provider identifies you with a unique user name that goes to make up your email address. For example: **myname@servername.com**.

Understand the term instant messaging (IM)

Instant messaging programs, such as Windows Live Messenger, allow users to send messages to their contacts that will appear on the receiving contact's desktop as soon as they are sent. They are a form of on-line textual conversation. Files can be transferred electronically to your IM contacts during the course of an IM conversation.

Some of the benefits of IM are:

- Real-time communication
- Knowing whether contacts are online
- Low cost
- The ability to transfer files

Understand the term Voice over Internet Protocol (VoIP)

VoIP enables voice messages to be sent from computer to computer over the Internet. Using a headphone or USB handset, users can talk for free to their VoIP contacts, via programs such as Skype or Windows Live Messenger. It is possible to see which of your contacts are online and available at any time.

Understand the term Really Simple Syndication (RSS) feed

Many news sites (and now schools) operate 'web feeds' (or 'syndicated' feeds) via a link on their website. Interested users subscribe to the feed, and are given access to the link on their computer. Subscribers will then be notified whenever new content is available on the site.

RSS is a form of syndicated feed which downloads new content to subscribers' computers as it becomes available. Either the full content or a summary of the content, that can be accessed on the website, will be downloaded.

Subscribing to an RSS feed enables users to keep up-to-date with content of interest to them, without having to constantly check websites themselves.

Understand the term podcast

Podcasts are another form of syndicated feed, by which digital media files are automatically downloaded to subscribers' computers.

Many podcasts are downloaded directly to the software program in which they will be played. The most popular to-date has been Apple's iTunes; however there are many alternatives available. Other podcasts can be downloaded directly as an audio file. Podcast files can be played on computers, using a media player, and on portable media players. With appropriate software, podcasts can be automatically transferred to a portable media player after they have been downloaded.

Podcasts are becoming more and more popular for recording conference speeches, performances and debates. Within schools, teachers are recording lessons and assignments and curriculum information. One of the great advantages of subscribing to a podcast is that it enables the information contained within the podcast to be available to subscribers at any time. Consequently, for example, if a student cannot attend school, they can access their lessons at home.

Understand the term web log (blog)

A blog is an online 'diary' created by a user. There are sites available that make setting up your own blog very easy. In your blog, you can type your thoughts, share information and upload images such as photos and video clips. You can make this information available to other people to read, or to interact with you.

Virtual Communities

Understand the concept of an online community

Online communities are also known as virtual communities. An online community is a group of people who communicate with each other via the Internet. Sometimes it is a way of keeping in touch with people you know or getting to know new people; at other times it is a way for people with a similar interest to share their interest and swap information and ideas about that interest. Examples of online communities are:

- Social networking websites (such as Facebook, Bebo, MySpace)
- Internet forums
- Chat rooms
- Online computer games

Know ways that users can publish and share content online

The Internet enables users to share content with other users – either freely, or via password protected sites. Photos, video and audio clips can be published either to your own web site or to sites set up by companies, such as Kodak, which enable users to upload their images and send the link to the

site to other users, in order that they can share the images. Content can also be shared via blogs and podcasts, as described above.

Know the importance of taking precautions when using online communities

Online communities and other sites, where you share information with others, can be very useful and great fun. However, it is vital to ensure that you take precautions when imparting this information. It is very easy to make public personal information that could be used fraudulently or dangerously against you. Be aware of the following:

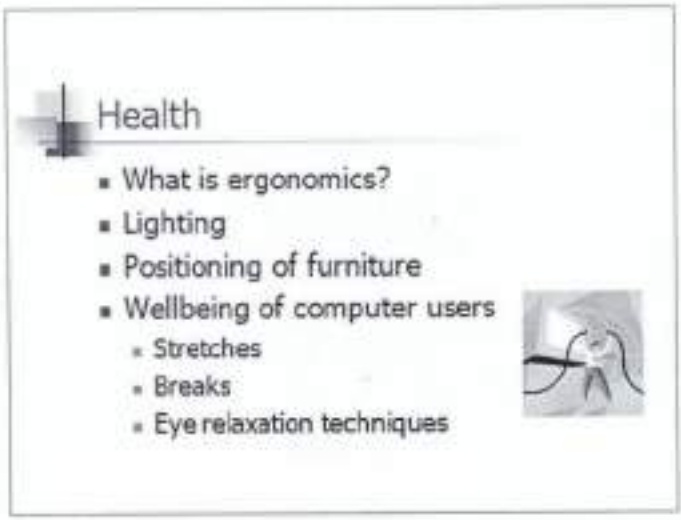
- Make your profile private (only available to users you invite to view it)
- Limit the amount of personal information you post (do not give away, for example, your date of birth, address, or other information that could be used to impersonate you)
- Be aware that posted information is publicly available
- Be wary of strangers.

Example 6 - Health and the environment

This Example will teach you about the importance of considering your health when using computers, and how to ensure that you do not endanger your wellbeing.

It will also teach you about the importance of considering the environment whilst working with computers, and ways that you can help this.

Health



Understand the term ergonomics

Ergonomics is the study of workers and their environment, in order to achieve comfort, efficiency, productivity and safety. A good ergonomic environment is necessary for safe and healthy learning when using computers. Users may be exposed to the threat of Repetitive Strain Injuries **(RSI)** caused by unsatisfactory workstations and poor conditions. Good ergonomic practice to be taken into consideration is included in the sections below.

Recognise that lighting is a health factor in computer use

- It is very important to eliminate reflections and to control glare and contrast
- Important considerations for users' health when operating a computer are:
  - Use of artificial light
  - The amount of light available
  - The direction of the light

Understand about correct positioning of furniture

The position of the computer, desk and seat must be tailored to the different tasks you perform. This can help maintain good posture.

- Monitor
  - Monitors should tilt and rotate with a screen filter available
  - Screen brightness and contrast should be adjustable
  - The display screen should have large, easy-to-read characters
  - The image should not flicker and should be in sharp focus

- Mouse
  - If you use a mouse routinely, locate it as close as possible to the keyboard and at the same height or slightly higher
  - A mouse mat should be available
  - A trackball is also available for most applications

- Desk
  - Specially designed, height adjustable workstations, desks and tables are recommended

- Chair
  - A well-designed, adjustable chair will reduce the effort required to maintain posture, circulation and the amount of strain on the spine

Recognise ways to help ensure a user's wellbeing

- Take regular stretches when using the computer
- Take regular breaks, to ensure that you don't use the computer for too long at a time
- Eye relaxation techniques help your wellbeing when using a computer
  - Consciously blink frequently – to reduce eye dryness
- Try not to face windows or bright light sources, to eliminate glare and screen reflection

Other health and safety issues to consider are:

- Cables
  - Keep all cables tucked out of the way, preferably "boxed".
- Power Supply
  - Do not overload power sockets
  - Use a device that will protect your computer from "power surges"
- Cleaning materials
  - Use specialist materials to clean your machine – never use water!
  - Only clean the computer when it is turned off!
- Pain
  - It is important that the cause of any work related pain is investigated to prevent any long term harm

Make sure you use your ergonomically designed equipment correctly! There is no point in having the most up-to-date ergonomically designed chair, if you have poor posture. Bad backs and Repetitive Strain Injuries (RSI) are often caused by a lack of common sense, as much as a bad working environment.

Within the United Kingdom, and many other countries, there are health and safety laws and guidelines relating to the use of IT. Any organisation, including a school, will keep copies of these laws and guidelines. As a user of IT, you should know where, within your organisation, details of these laws and guidelines are stored; and you should follow these in relation to yourself and other people when you are using IT.

Environment

Know about the option of recycling

In accordance with the Restriction of Hazardous Substances (**RoHS**) and Waste Electrical and Electronic Equipment (**WEEE**) directives, now in place throughout Europe, the UK has a responsibility to dispose of its IT and electrical waste in an environmentally friendly and security conscious manner. Information regarding suitable sites and their methods of recycling can be obtained through local authorities or the internet.

- Recycle computer components
- Recycle printer cartridges
  - Many charities now collect used printer cartridges. They pass these on to cartridge collectors, in return for a small donation to their cause.
- Recycle printouts
  - Print on the back
  - Use the blank side in a fax machine
  - Ultimately recycle the paper

Know about computer energy saving options

- Apply computer energy saving settings to:
  - Automatically turn off the screen/monitor when not in use
  - Automatically put the computer to sleep when not in use
  - Switch off the computer when not in use
- Use a monitor that consumes less power in "stand by" mode
- Storing information electronically will help reduce the need for printed materials.

Example 7 - Security and Law

This Example will teach you about the security issues associated with computers, and how to keep your information safe and secure.

It will also teach you about the legal issues associated with computers, in relation to copyright and data protection.

Security

Identity/Authentication

Understand the difference between Authentication, Authorization and Identification

- **Authentication** is the process of determining that a user is who he/she claims to be. Although a user name and password are the most common form of authentication used today for computer access, biometric identification can also be matched against a database of records to ensure that people are who they claim to be.

- **Authorization** – allows access to resources only to those permitted to use them. Authorization is the process of verifying that an authenticated subject has the authority to perform a specific operation. Authentication must therefore precede authorization.

Know the types of authentication and examples of them

There are three difference methods of authentication:

- What you have – in the form of keys, badges, ID, passcards, tokens
- What you are – finger and palm prints, iris pattern
- What you know – passwords, passphrases

Understand that a user name and password are needed

Windows can be set to recognise the user who is logging on and limit that user's access to certain areas – this is done using a unique user "login" (or "ID") name and "password".

Where there are many computers connected together, or "networked", such as in a school or large business, a user login can restrict or encourage sharing saved information on the network. These access rights are important. Don't let someone else log in as you – this gives them the ability to open, read, delete, change and publish documents under your identity... risky!

Know what a Smart card is and its purpose

A Smart Card is a plastic card, usually the size of a credit card, with an embedded microchip that can be loaded with data.

It can be used for telephone calls, electronic cash payments, e-mail access. Many applications can be opened with a smart card and a PIN (Personal Identification Number) or password, to ensure authentication.

Data security

Schools and other organisations benefit from having a proactive approach to business security. They should raise individuals' awareness of how to handle sensitive data and the procedures for reporting security incidents.

Here are some ideas of how you can protect your electronic information and the computerised devices that store it – can you think of two more?

- **Understand the importance of an off-site backup copy**
  - Keep a second copy of important information that is stored on a mobile telephone, laptop or PDA
  - Use magnetic tape or CDs to keep a second, separate copy of data and software that is stored on your main computer system – in the event of fire, vandalism or theft
  - Keep the backup data in a separate, secure location

    Be aware that tapes and CDs can become damaged, and the data stored on them would then be useless.

- **Understand what a firewall is**
  - A firewall is special piece of hardware or software designed to protect a private computer system from unauthorized access. Firewalls are used by schools, corporations, banks, and research facilities on the Internet to keep hackers out.

- **Know ways to prevent data theft**
  - Raise awareness of an individual's responsibility to use a user name and password and to keep these private and secure
  - Lock your computer and hardware using a security cable
  - Keep all portable devices secure from theft (laptop, PDA, mobile phone) to prevent:
    - Loss of confidential files
    - Misuse of confidential information
    - Loss of important contact details
    - Misuse of important telephone numbers

- **Know ways to work with folders**
  - When you are working with folders on a network, there are several methods you or the administrator can employ, to ensure that your data is kept secure:
    - Make personal folders private, so they cannot be accessed by any other users
    - Adjust security settings and permission levels, to restrict access by other users who need to share a folder: such as 'read only', 'contributor'
    - Hide files or folders, so they are not shown in folder lists, thus minimising the risk of altering them by mistake

- **Know that it is illegal to access another user's system without authorization**
  - Network administrators will have created policies or regulations, to control the safety of their computer systems. Individual users will be granted access to specific areas of the system through their own unique user name and password. Information stored on computers is considered confidential, unless the owner intentionally makes that information available to other groups or users. To access another user's system, resources or storage space, or to allow another user to access your resources through your password, and without authorization, could be in contravention of company policy - and be considered illegal. Disciplinary action could be taken.

- **Know about good password policies**
  - Ensure that the passwords you create are well thought out:
    - The password must be easy enough for you to remember but not obvious enough for anyone else to guess!
    - Passwords should be a minimum of eight characters
    - Randomly generated combinations of numbers and letters make the best passwords. However, you could try typing a favourite word backwards, deliberately leaving out a letter or including a number.

- Some passwords are "case sensitive" which means they recognise the difference between capitals and lower case lettering – use this to your advantage and use a combination of both.

- Do change your password regularly
  - Be aware that if you forget your password you will not be able to open your document!
  - Do not share your password with anyone else

Malware - viruses, worms and trojans

Malware (***mal***icious soft***ware***) is a term that covers malicious programs such as viruses, worms and trojan horses. All of these work in slightly different ways, but all can infect and corrupt your computer. They can be downloaded via e-mail attachments or files downloaded from the Internet, and can be spread across networks.

A virus is a man made computer program. It is called a virus because it infects your PC and is easily caught. Viruses can have many effects, some mild, some amusing and some devastating. All are unwanted. These effects can range from the appearance of annoying messages, to the destruction of information on your hard drive.

A **virus** attaches itself to another program, and is spread when this host program is copied, by users, to other computers, or when the host program is put on a network.

A **worm** copies itself over a network. It does not need to be attached to another program, and does not need user intervention to spread.

A **Trojan horse** is a program that appears to be useful, but, when the program is run, additional, malicious programs or commands are installed or run on the computer, without the user's knowledge.

Be aware how viruses can enter a computer system

Viruses can infect your computer from a diskette, a CD, a downloaded Internet file, a network connection or an e-mail attachment.

Know how to protect against viruses

In order to protect yourself against viruses:

- Install anti-virus software
  - Know how your virus checker works – does it run continuously in the background or only when you ask it to?
  - Know what to do if your virus checker detects a virus – should it "contain" or "remove" the offending file or code?
- Regularly update your anti-virus software – it is only as good as the last time you updated it!
- Ensure that your anti-virus software checks all removable disks and CDs before using them
- Ensure that your anti-virus software checks all files downloaded from the Internet

- E-mail
  - Do not open an e-mail if you don't recognise who sent it
  - ***Never*** open an attachment in an unrecognised e-mail.

Understand the term Hacking and its threats

Hacking, in computer terms, is an unauthorised attempt to bypass the security mechanisms of an information system or network. Once a hacker gains access to a computer, he can access any data that is stored on the computer, including personal information.

The best way to protect against hackers gaining access to personal or sensitive information is with a firewall. A firewall is either hardware or software which prevents unauthorised users from gaining access to a computer or private network.

Know about Password Cracker

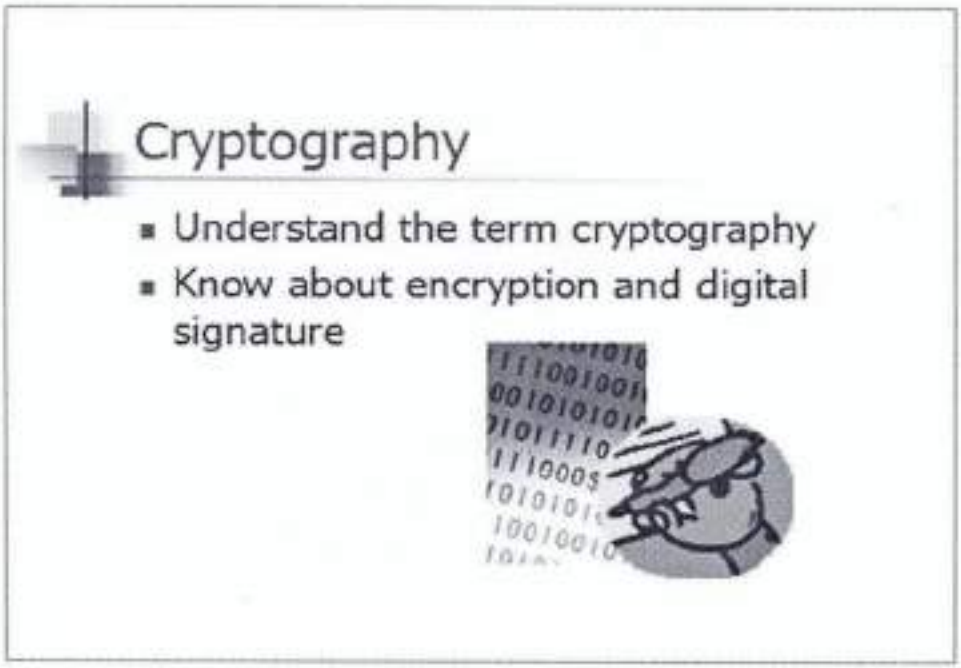
Password Cracker is a program which can decrypt passwords, or otherwise disable password protection, allowing access to private and confidential information. Password cracking may be used for several reasons:

- to help a user recover a forgotten password
- to gain unauthorised access to a system for illegal gain. In the case of sensitive company files, banks, government departments and other major institutions this can be very disruptive
- As a preventative measure by a system administrator to check for easily crackable passwords.

Passwords to access computer systems are usually stored in an encrypted format, on a database. The system performs password verification when a user attempts to log in or access a restricted area. The best way of preventing password cracking, is to ensure that attackers cannot get access even to the encrypted passwords; however, this depends on where the password files are stored and the operating system used.

One of the reasons that it can be possible to crack passwords is the type of short, easy to guess, or obvious password implemented by computer users. It is better to use passwords that are 'non words', not less than eight characters and contain both mixed-case letters and numbers. You should not use the same password in different systems or for different internet sites.

Cryptography



On this Slide you will learn about ensuring the security of data you send and receive across networks.

Understand the term cryptography

Cryptology is the conversion of data into a secret code for transmission over a public network. Cryptography plays an essential role in securing commercial and government applications; including communications, payment systems, access and identification solutions.

In cryptography, plain text is encrypted into cipher text which ensures:-

- Confidentiality: the information cannot be understood by anyone for whom it was unintended.
- Integrity: the information cannot be altered in transit or storage without detection.
- Authentication: the sender and receiver can confirm each other's identity and the origin and destination of the information.

Know about encryption and digital signature

When you send information across the Internet, it is much safer if your details are "encrypted". This means that the information is encoded before it is sent and decoded when it is received. The information is encrypted using a digital ID. Anyone can purchase a digital ID via the Internet. The digital ID will contain a private key which stays on your computer and encrypts information, and a certificate containing a public key. The certificate can be sent to anyone with whom you wish to swap encrypted information. They save the certificate on their computer – enabling them to use the public key to decrypt information received from you.

A digital signature can also be purchased via the Internet and added to all e-mails you send. The digital signature includes your certificate and public key. You then send your digital signature to your contacts, so that, when you send them e-mail messages (or other online transactions) in the future, they know the message has really come from you and they can trust its safety. A digital signature enables e-mail messages to be encrypted when they are sent.

Copyright

Understand the term copyright and copyright issues with downloading

Copyright is the legal ownership of original material and licences, and copyright registration aims to safeguard against software misuse. When software is issued under licence, the copyright remains the property of the software owner; for example, Microsoft owns the copyright for MS Office.

The Internet is the largest library of resources on earth – but when text, graphics, audio and video are published to the Internet, usually the author still holds the copyright unless they specify otherwise – known as "copyright free" or "royalty free". Therefore, if music files, images and other files are downloaded, it is important to ascertain what restrictions are put on the use of these files by the terms of the copyright. The originators of graphics available for "free download" might request that they be credited with the design, or ask that a direct reference to their source Web site be made when the graphics are used on someone else's Web site.

Know how to recognise licensed software

Copyright is the legal right to control the use of an item. The copyright remains the property of the software owner; for example, Microsoft owns the copyright for MS Office.

Your software is issued to you under licence. The licence specifies to whom the software is registered and for how many users. To exceed the number of users is illegal. To copy, share, lend or distribute software CDs or diskettes outside the licence agreement is illegal.

Software is usually issued with its own unique product identification number, affixed to the protective case or manual cover of the product. After purchasing software, it is either necessary, or advisable, to register your purchase, and its product ID, with the software owner. This can be done over the Internet, by telephone, or by returning a registration slip. As well as registering that you have the right to use this copy of the software, registration often entitles you to support and updates for the product.

Understand the term end-user license agreement

The "End User License Agreement" requires you to signify acceptance of the terms and conditions of use of the software. For the general terms of your Microsoft licence, in any application click the [File] tab, then select [Help] and click the [Additional version and copyright information] link

Understand the terms shareware, freeware, open source

Freeware

Some software is available without a licence. This software is known as "**freeware**" and may be available from an Internet source.

Shareware

If the software is available to you for free, but under certain conditions, such as a limited trial version, it is known as "**shareware**".

Open Source

"**Open source**" is a means of developing software whereby the software code is made freely available under licence for other programmers to modify or develop. The resulting software is usually free for users to download and use under licence. The idea of open source is to provide users with better quality, more reliable, more flexible programs at a much lower cost than proprietary software programs.

Data protection

Identify the main purposes of data protection legislation or conventions

Anyone processing personal data must comply with the enforceable principles of good practice of that country. All organisations dealing with 'personal data' with the GCC countries should abide by the Data Protection Law 2007 (DIFC Law No. 1 of 2007).

Data protection legislation and conventions exist for two reasons:

- To protect the rights of the data subject
- To set out the responsibilities of the data controller

Identify the main data protection rights for a data subject in your country

Personal data covers both facts and opinions about an individual. It must be:-

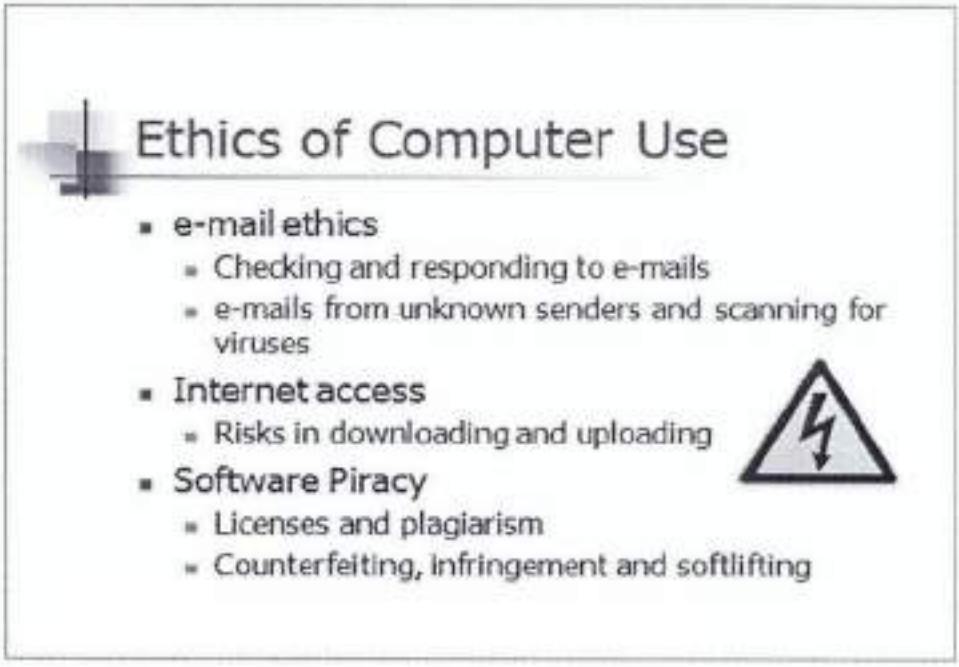
- processed fairly, lawfully and securely
- processed for specified, explicit and legitimate purposes in accordance with the data subject's rights and not further processed in a way incompatible with those purposes or rights
- adequate, relevant and not excessive in relation to the purposes for which it is collected and/or further processed
- accurate and, where necessary, kept up-to-date
- kept in a form which permits identification of data subjects for no longer than is necessary for the purposes for which the personal data was collected or for which they are further processed

Identify the main data protection responsibilities for a data controller in your country

Every reasonable step much be taken by data controllers to ensure that personal data which is inaccurate or incomplete, having regard to the purposes for which it was collected or for which it is further processed, is erased or rectified.

If a school web site collects personal data directly from individuals, via a 'guest book' or questionnaire for example, the data controller should be aware that this could constitute obtaining and holding data, and, as such, should inform the individual of the purposes for which they intend to process the personal data. If the school intends to distribute a newsletter via e-mail using such data, it should give the individual the opportunity to opt-out. Likewise if the site makes use of cookies containing personal information, this could also be deemed as a method of collecting personal data, and hence covered by the legislation.

Ethics of computer use



This Slide deals with issues concerned with the ethical use of your computer.

e-mail ethics

Know the importance of checking your e-mails and responding to the important e-mails

It is important to manage and attend to your e-mails on a regular basis. This enables you to do the following:

- Respond to important and urgent messages immediately
- Identify and mark those that can be dealt with later
- Forward others that are more suitable for a colleague to deal with
- Recognise and clear out junk mail that you don't want
- Arrange messages that deal with current or on-going topics into defined groups, such as 'conversation' or 'subject' areas; or create an e-mail folder in which you can file your incoming or outgoing messages for easy access
- Always spell-check your e-mails and give a short, subject header that reflects the content of the message

- When an e-mail is no longer required, it should be deleted, in order to keep the inbox (and other mail folders) uncluttered, manageable and up to date
- Open attachments and, if they are important, file them onto your main system. Once this is done the message and attachment can be deleted from the e-mail programme.

E-mail messages arrive much faster than ordinary mail, and sometimes it is difficult to keep up with the volume; however, with good organisation, all messages can be dealt with quickly and efficiently

Know how to handle e-mails

Unknown senders

Specialist software is used by companies and Internet Service Providers to scan and stop unwanted e-mails entering the system, however it can be difficult to stop them coming through completely. Therefore, do not open a message which is unsolicited, or if you do not recognise the sender. If you reply to, or open, these e-mails, this can lead to even more junk mail coming through and they can also bring in viruses. Confine these messages to your Junk Mail folder and permanently delete from there without opening.

Scanning incoming e-mails

Viruses can be contained within e-mail messages and attachments. These are computer programs that attack the computer in various ways – some harmless, but annoying; others with the potential to destroy files or to render the entire computer useless. Once your computer is infected with a virus, the virus is likely to send itself on to some or all of the addresses in your e-mail address list.

Anti-virus software will scan incoming e-mails, to 'trap' and remove viruses before they can do any damage.

Internet Access

Risks involved in downloading and uploading

Peer to peer downloading and uploading of media files
Peer to Peer or (P2P) technology allows users to locate, distribute and share files directly with other computer users, without connecting to a central server - with all the protection that can provide. Although P2P has legitimate and regulated uses, it has also become a popular way of sharing files via the internet, particularly involving software, music files, films and games, sometimes without copyright or a download licence. Never allow copyrighted materials to be shared. Copyright infringement through P2P file sharing, whether downloading or uploading, can put the computer owner at risk of prosecution and fines.

An additional risk associated with P2P file sharing is that downloaded files may contain viruses, spyware or malware. These can easily infect personal computers and give other users access to your system.

Media files can be purchased and downloaded safely, using the Windows Media Library.

Software Piracy

According to The Business Software Alliance (BSA), software piracy is the unauthorized copying or distribution of copyrighted software. This can be done by copying, downloading, sharing, selling, or installing multiple copies onto personal or work computers.

It is generally recognised by software vendors that, if a user somehow obtains software without agreeing to or becoming bound by the end user licence agreement (EULA,) then they do not have any licence to use the software at all.

Know about software licences, plagiarism and site licences

Software is usually issued with a **licence** and unique product identification number. The licence specifies to whom the software is registered, and for how many users. To exceed the number of users is illegal. To copy, share, lend or distribute software outside the licence agreement is illegal.

A **site licence** allows multiple copies of a piece of software to be used within an organisation. Sometimes, the licence states the number of copies that can be installed on computers; other site licences state the number of concurrent users that can access the software at any time.

Plagiarism is to represent someone else's original material as your own work. The online encyclopaedia, Wikipedia, suggests that "plagiarism is not the mere copying of text, but the presentation of another's ideas as one's own, regardless of the specific words or constructs used to express that idea". http://en.wikipedia.org/wiki/Plagiarism and http://www.plagiarism.org/ offer guidelines to teachers and students on how to deal with and avoid unintentional plagiarism.

Understand counterfeiting, CD-R & Internet infringement and softlifting.

Copyright infringement takes several forms, which include the following:

- **Counterfeiting** is the illegal duplication and sale of copyrighted material with the intent of directly imitating the copyrighted product. In computer terms, counterfeiting is associated with the illicit use of pirated software. Counterfeiting violates protections under trademark, copyright and patent laws. In most countries counterfeiting is punishable by law.
- **CD-R infringement** is the illegal copying of software using CD-R recording technology. A CD-R disk differs from a CD-ROM, in that you can write data to it. Commercial software is not distributed on CD-Rs.
- **Internet infringement** is the illegal uploading of software to the Internet for anyone to copy
- **Softlifting** occurs when a person purchases a single licensed copy of a software program and loads it on several machines, in violation of the terms of the license agreement.