Information and Communication Technology

Teachers' Guide
Grade 6

(Effective from 2018)

Department of Information Technology
National Institute of Education
Maharagama
Sri Lanka

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Information and Communication Technology
Grade 6–Teachers' Guide

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Message from the Director General

With the primary objective of realizing the National Educational Goals recommended by the National Education Commission, the then prevalent content based curriculum was modernized, and the first phase of the new competency based curriculum was introduced to the eight year curriculum cycle of the primary and secondary education in Sri Lanka in the year 2007

The second phase of the curriculum cycle thus initiated was introduced to the education system in the year 2015 as a result of a curriculum rationalization process based on research findings and various proposals made by stake holders.

Within this rationalization process the concepts of vertical and horizontal integration have been employed in order to build up competencies of students, from foundation level to higher levels, and to avoid repetition of subject content in various subjects respectively and furthermore, to develop a curriculum that is implementable and student friendly.

The new Teachers' Guides have been introduced with the aim of providing the teachers with the necessary guidance for planning lessons, engaging students effectively in the learning teaching process, and to make Teachers' Guides that will help teachers to be more effective within the classroom. Further, the present Teachers' Guides have given the necessary freedom for the teachers to select quality inputs and activities in order to improve student competencies. Since the Teachers' Guides do not place greater emphasis on the subject content prescribed for the relevant grades, it is very much necessary to use these guides along with the text books compiled by the Educational Publications Department if, Guides are to be made more effective.

The primary objective of this rationalized new curriculum, the new Teachers' Guides, and the new prescribed texts is to transform the student population into a human resource replete with the skills and competencies required for the world of work, through embarking upon a pattern of education which is more student centered and activity based.

I wish to make use of this opportunity to thank and express my appreciation to the members of the Council, the Academic Affairs Board of the NIE, the resource persons who contributed to the compiling of these Teachers' Guides and other parties for their dedication in this matter.

Dr. (Mrs.) Jayanthi Gunasekara

Director General

National Institute of Education

Curriculum Committee

Guidance and Approval	Academic Affairs Board National Institute of Education
Subject Coordinator	Mrs. M.N.P. Maddumage Lecturer, National Institute of Education
Resource Contributions	
Mr. D.Anura Jayalal *(M.Sc., PG in Ins Design, PGDE, B.Sc.)*	Director, Department of IT National Institute of Education
Mr. S. Shanmugalingam (*M.Sc., PGDE*)	Senior Lecturer, Department of IT National Institute of Education
Mrs. M.N.P. Maddumage (*PGDE, B.A.*)	Lecturer, Department of IT National Institute of Education
Mrs. G.D.W.M. Ariyarathna (*M.Sc., B.Sc.*)	Asst. Lecturer, Department of IT National Institute of Education
Dr.P.M.T.P.Sandirigama(*Ph.D*)	Senior Lecturer, University of Peradeniya
Dr.H.L.Premarathne (*Ph.D*)	Senior Lecturer, University of Colombo
Dr. B. Riskhan *(Ph.D, MEd, B.Sc., PGDE)*	Lecturer, Mahaweli National Collage of Education, Polgolla
P.N.W.A.L.K.Premarathne(*M.Sc., B.Sc.*)	Teacher, Girls High School, Kandy
M. Indrapalan*(M.Sc)*	Teacher, Manipay Hindu College
DinushaWijayasena*(PGDE, B.Sc.)*	Teacher, Ave Maria Convent,Negombo
A.P.N.De Silva*(PGDE, B.Sc.)*	Teacher, MR/J.R.S. De Almeda M.V, Akkuressa
P.H.Sirani*(PGDE, B.Sc.)*	Teacher,MR/Athuraliya M.V.
S.Sarveswaran *(B.IT, B.Ed.)*	Teacher,V/Saivapragasa, Ladies Collage, Vavuniya
K.B.I.Wijayaratne*(PGD (IT))*	IT Instructor, Mayurapada Central Collage
A.G.G.U. Premalal*(PGDE, B.Sc.)*	Teacher,KG/Basnagala MV, Nooriya
N.D. Samarasinghe*(PGD (IT), PGDE, B.Sc.)*	Centre manager, CRC, B/Ananda MMV, Haldummulla
Y.D.V. Pathirana	Retired Instructor
P.Premila *(M.A., PGD (Computer Science), PGDE, B.Sc.)*	Teacher, Royal Collage, Colombo 07
A.M. Vazeer*(Dip in ICT)*	Centre Manager, CRC, Kahagolla M.M.V, Diyatalawa
K. Panditharathna*(Ph.D)*	Teacher, Maliyadeva Collage, Kurunegala

Introduction

Information and Communication Technology has been identified worldwide as a tool that can be used to improve productivity, efficiency and effectiveness of organizational work and the daily activities of individuals. Therefore, providing an adequate level of ICT knowledge and skills, at different levels of education, is important for the students to progress and contribute towards national development.

The current Sri Lankan Secondary Education System has been substantially exposed to ICT through various programs including CAL, ICT for GCE (O/L), GIT for grade 12 and ICT as a component in A/L Technology stream. Consequently, to maintain the progression in competencies, the need has arisen now for implementation of learning the subject ICT from grade 6 to 9.

As grade 6 to 9 is a formative study period, it is desirable to arouse curiosity and motivation by teaching students more practical areas than the theoretical aspects of computing. Therefore, a balance between theory and practical areas is achieved. To achieve this balance, the latest technologies have been included in the content.

It has been the focus of the curriculum committee to make this balance of competencies in theory and practice in order to lay a foundation for higher studies in ICT, to apply the competencies of day to day practical situations, to improve ICT literacy and to expose them to international standards.

National Goals

1. Based on the concept of respecting human values and understanding the differences in any between the Sri Lankan multi-cultural society, building up the nation and confirming the identity of Sri Lanka by promoting national integrity, national unity, national coherence and peace

2. While responding to the challenges of the dynamic world, identifying and conserving the National heritage.

3. Creating an environment which comprises the conventions of social justice and democratic life to promote the characteristics of respecting human rights, being aware of the responsibilities, concerning each other with affectionate relationships.

4. Promoting a sustainable life style based on the people's mental and physical well-being and the concept of human values

5. Promoting the positive feelings needed for a balanced personality with the qualities of creative skills, initiative, critical thinking and responsibility.

6. Through education, developing the human resources, needed for the progress of the well-being of an individual, the nation as well as the economic growth of Sri Lanka.

7. Preparing people for the changes that occur in a rapidly changing world by adapting to it and controlling them; developing the abilities and the potentialities of people to face complex and unexpected occasions.

8. Sustaining the skills and attitudes based on justice, equality, mutual respect which is essential to achieve a respectable place in the international community.

National Education Commission Report (2003).

Basic Competencies

The competencies promoted through education mentioned below might help to achieve the above mentioned National Goals.

1. Competencies in Communication

This first set of competencies is made up of four subsets - Literacy, Numeracy, Graphics and information communication skills:

Literacy: listening carefully, speaking clearly, reading for comprehension, and writing clearly and accurately.

Numeracy: Using numbers to count, calculate, code and to measure, matter, space and time

Graphics: Making sense of line and form, expressing and recording essential data, instructions and ideas with line, form, color, two and three-dimensional configurations, graphic symbols and icons

ICT Competencies:

Knowledge on computers, and the ability to use the information communication skills learning in work as well as in private life

2. Competencies relating to Personality Development

- Generic skills such as creativity, divergent thinking, initiative, decision making, problem-solving, critical and analytical thinking, team work, inter-personal relationships, discovering and exploring
- Values such as integrity, tolerance and respect for human dignity
- Cognition

3. Competencies relating to the Environment

This is the second set of competencies related to the Social, Biological and Physical Environments.

Social Environment: Awareness, sensitivity and skills linked to being a member of society, social relationships, personal conduct, general and legal conventions, rights, responsibilities, duties and obligations.

Biological Environment: Awareness, sensitivity and skills linked to the living world, man and the ecosystem, trees, forests, seas, water, air and plant -life, animal and human life.

Physical Environment: Awareness, sensitivity and skills relating to space, energy, fuels, matter, materials and their links with human living, food, clothing, shelter, health, comfort, respiration, sleep, relaxation, rest, waste and excretion, media of communication and transport. Included here are the skills in using tools to shape and materials for living and learning

4. Competencies relating to preparation for the world of work

Employment related skills to maximize their potential and to enhance their capacity to contribute to economic development; to discover their vocational interests and aptitudes; to choose a job that suits their abilities and to engage in a rewarding and sustainable livelihood.

5. Competencies relating to religion and ethics

This fourth set of competencies is laden with values and attitudes. It is essential for individuals to assimilate values, so that they may function in a manner consistent with the ethical, moral and religious modes of conduct, rituals, practices in everyday living, selecting the most appropriate.

6. Competencies in play and use of leisure

Competencies that link up with pleasure, joy, emotions and such human motivations. These find expression in play, sports, athletics and leisure pursuit of many types. These also link up with such values as cooperation, team work, healthy competition in life and work. Here are included such activities as are involved in aesthetics, arts, drama, literature, exploratory research and other creative modes in human living.

7. Competencies relating to 'Learning to learn'

These competencies flow directly from the nature of a rapidly changing, complex, interdependent and crowded world whatever one learns, that learning will need updating and review. This requires that one should be aware, sensitive and skillful in sustained attention, and be willing to persevere and attend to details that matter in a given situation.

Objectives of the Subject

This syllabus enables students to:

- Develop basic skills useful to access ICT resources.
- Inculcate basic good practices in the use of ICT resources
- Inculcate basic computer literacy and develop a base for further pursuit of Information Technology and Communication Technology studies.

Proposed number of periods for each unit

Term	Competency Level	Number of periods
1st Term	1.1, 1.2, 1.3, 1.4	05
	2.1, 2.2,	02
	3.1	02
	4.1	01
2nd Term	4.1, 4.2,	06
	5.1, 5.2	04
3rd Term	5.2	01
	6.1, 6.2, 6.3	09
Total		30

Grade 6 Syllabus **Information and Communication Technology**				
Competency	Competency Level	Content	Learning Outcomes	Duration/ Periods

1. Appreciates the importance of computers	1.1 Explains the functions of the computer and its characteristics	• Basic components of computer- Input, Processing, Output, Storage
		• Computer vs. Human
		  o Speed and Efficiency
		  o Accuracy
		  o Reliability
		  o Consistency
		  o Capacity of storage
		  o Cost
		  o Intelligence
		• Devices with embedded computers
		  o Mobile Phones
		  o Modern Televisions
		  o Washing Machines
		  o Automobiles
			i. Identifies the components of a computer
			ii. Elaborates its role in different environments
			iii. Lists the functions and characteristics of a computer
			iv. Identifies the devices with embedded computers
				1

	1.2 Identifies computer components	• CPU • Memory • Input/ Output devices • Storage devices • Communication devices	i. Identifies the CPU in a computer ii. Lists various input devices iii. Lists various output devices iv. Lists various storage devices v. Lists various communication devices	2

	1.3 Describes the need for software	• Need for software
		• Examples of software
		  o Games
		  o Media player
		  o Drawing software
			i. Explains the need of software
			ii. Lists various software
				1

	1.4 Appreciates the use of a computer to carry out routine work	• Identification of areas of application (educational software, library management system etc.) in the school and other fields • The Role of the computer in o schools o banks o hospitals o factories o farms	i. Describes potential application areas in education and other fields	1
2. Appreciates the need for using computers safely	2.1 Uses the computer laboratory properly	• Good practices to follow o Keeping the lab dust free o Avoiding food and drinks in the lab o Leaving the items used in the lab in the proper order	i. Comprehends the good practices in the lab ii. Follows the good practices in the lab	1
	2.2 Uses computers and peripherals safely	• Correct steps to Start/Shutdown the computer • Ethics of using the computer • Correct posture to minimize health issues • Management of e-waste (Safe disposal of computer hardware) • Use of passwords to avoid unauthorized access	i. Follows the correct steps to Start/ Shutdown the computer ii. Uses the computer ethically iii. Safely disposes the obsolete computers/peripherals iv. Understands and practices the safe use of computers	1
3. Uses of operating systems	3.1 Handles files	• File handling using a simple drawing software o Create o Save o Open o Edit o Close	Creates and saves a file Opens and edits a file Practices to maximize/ minimize/ resize a window	2

		• Minimizing / Maximizing / Resizing of a window		
4. Uses application software appropriately	4.1 Uses text editing and drawing software effectively	• Use of drawing software to use the mouse properly • Use of typing software to develop keyboard skills	i. Uses mouse and keyboard effectively ii. Types using correct finger movements iii. Draws pictures with mouse	5
	4.2 Uses audio software and video software effectively	• Use of audio software to create an audio clip • Use of video software to create a video clip	i. Creates an audio file ii. Creates a video file	2
5. Appreciates the concept of algorithms and develops simple programs	5.1 Relates practical problem solving process to an algorithm	• Making of a composition according to a recipe (Ex. Making a cake)	i. Identifies the process of problem solving as a series of steps	2
	5.2 Draws flowcharts to explain a process	• Introduction to flowchart symbols o Start/Stop o Input/ Output o Process • Flowcharts to explain the simple sequential processes of day to day tasks	i. Identifies flowchart symbols ii. Represents a process with a flowchart.	3
6. Appreciates the Internet for information gathering and communication	6.1 Identifies the Internet as a collection of information resources in a shareable pool	• Introduction to the Internet • Accessing educational websites to practice browsing	i. Defines the Internet ii. Accesses the Internet iii. Obtains information through educational web sites	3

	6.2 Uses search engines to obtain information	• Introduction to search engines • Information searching on a specific topic using Search Engines	i. Lists different Search Engines ii. Obtains information using Search Engines	5
	6.3 Uses computers and data safely and securely	• Application of access control mechanisms (Username, Passwords, etc.)	i. Follows safety and security procedures ii. Realizes the importance of guidance of trusted mentors	1
Total				30

The Learning Teaching process

Information and Communication Technology is a rapidly changing subject and students are eager to use the latest technology. The curriculum provides actual hands on experience every for every student using practical exercises. It also provides them with a convinning theoretical basis through practical exercises.

It is essential that the proposed method of teaching should be student-centered as this subject is essentially practice-oriented. There is a need to pay special attention to encourage the students for self-studies. Further, it is necessary to guide the students to apply the achieved ICT competencies to improve the learning process of other subjects.

Primitive social values and legal constraints related to the subject carry with them the imperatives of a sense and spirit of self-discipline. It is important that the learning-teaching evaluation process is so organized as to highlight the importance of the use of computer.

Students should be motivated and inspired to attend group activities to learn new things and collaborative activities to share and verify their findings with others through ICT based and manual mediums.

Competency 1 : Appreciates the importance of computers

Competency Level 1.1: Explains the functions of the computer and its characteristics

Time : 01 period

Learning Outcome:

- Identifies the components of a computer
- Elaborates its role in different environments
- Lists the functions and characteristics of a computer
- Identifies the devices with embedded computers

Contents:

- Basic components of a computer- Input, Processing, Output, Storage
- Computer vs. Human
    - Speed and Efficiency
    - Accuracy
    - Reliability
    - Consistency
    - Capacity of storage
    - Cost
    - Intelligence
- Devices with embedded computers
    - Mobile Phones
    - Modern Televisions
    - Washing Machines
    - Automobiles

Concepts and terms to be highlighted:

- Components of a computer
- Characteristics of a computer
- Devices with embedded computers

Guidance for lesson Plan:

- Search for components of computers through a web browser and discuss them with students
- Identify the searched components in the computers and other devices in the laboratory
- Discuss with students the characteristics - Speed and Efficiency, Accuracy, Reliability etc. - of a computer
- Discuss the operation of a fully automatic washing matching as a computerized system (embedded system) where the steps of washing to spinning occur according to the user-selected set of instructions (user selected protocol).

Guidance for assessments and evaluations:

- Identify a device as input or output.
- Compare the performance of a computer against a human (manual) by using a suitable example such as adding a series of numbers
- Find out other embedded systems available at home and the students' environment

Quality inputs:

- Internet facility, Computer

Reading Material

- **Basic components of the computer**
  - **Input Devices –** used to supply/provide data to a computer
  - **Processing Devices –** The Central Processing Unit (CPU) performs all types of data processing operations and controls other devices
  - **Output Devices –** used to receive the processed information and signals from the computer.
  - **Storage Devices -** used for storing data/information permanently
- **Computer vs. Human**
  - High Speed and Efficiency
    - A computer functions at a very high speed. Therefore, it is capable of performing a large number of operations/calculations within a short period
    - It can perform millions of calculations in a few seconds as compared to man who will spend many months to perform the same task.
  - Accuracy
    - In addition to being very fast, computers are very accurate.
    - The calculations are 100% error free.
    - Computers perform all jobs with 100% accuracy provided that the input is correct
  - Reliability
    - A computer is a reliable machine. Breakdowns are very rare so that the user can depend on it.
    - Modern electronic components have long lives.
    - Computers are designed to make maintenance easy.
  - Consistency
    - It is certain that a computer produces the same result at two or more instances for the same operation.
    - However, humans may produce different results for the same operation at different instances.
  - Cost
    - Although the initial cost to purchase a computer is relatively high, the long term operational cost is low compared to the cost for the same activity done manually by humans
  - Intelligence
    - Computers are not intelligent because they perform/function according to the instructions given to it by humans.
    - Although some computers show intelligent behavior it is only limited to the given instructions which is called Artificial Intelligence (AI).
    - The human brain is a self-organizing system which can display intelligence.

- Capacity of Storage
  - A computer has much more storage capacity than the capacity of human beings to memorize.
  - It can store a large amount of data.
  - It can store different types of data such as images, videos, text, audio etc.
  - A computer is used to store large amount of data and information in a relatively small unit and we can retrieve them easily and quickly when needed.
  - A large physical area is needed to store the same data and information manually.

- **Devices with embedded computers**
  - Devices with computers to perform s specific task are called embedded devices. Some of them are:
    - Mobile Phones
    - Modern Televisions
    - Washing Machines
    - Automobiles

Washing Machines

achine

Modern fully automatic washing machines wash the clothes in the same way humans do manually.

These washing machines are equipped with a processor which carries out all the operations step by step. Following are the steps to be followed in using a washing machine.

1. Add the clothes to be washed and washing powder/detergent to the drum or to the special drawer of the machine.
2. Then, select the right amount or weight of clothes, e.g. Very Large/Large/Medium/ Small.
3. Select other option as given in the instructions

Once the machine is started, the following operations will take place automatically.

i. Filling water to the drum to the exactly required level
ii. Rotating the drum side to side to clean the clothes for a predetermined time period. In this step, the drum will be shaken unevenly from time to time in order to balance the clothes in the drum
iii. Releasing the dirty water from the drum
iv. Re-filling the drum with water to rinse the clothes
v. Releasing the water from the drum
vi. Spinning the drum (at a very high speed) to remove water from the clothes as much as possible
vii. Stop

Some washing machines even save the current status if there is a power break down. When the power is back, the machine will continue the process starting from the state where it was at the time of power failure.

Competency 1 **:** Appreciates the importance of computers

Competency Level 1.2: Identifies computer components

Time **:** 02 periods

Learning Outcome:

- Identifies the CPU in a computer
- Lists various input devices
- Lists various output devices
- Lists various storage devices
- Lists various communication devices

Contents:

- CPU
- Memory
- Input/ Output devices
- Storage devices
- Communication devices

Concepts and terms to be highlighted:

- Basic Components of a computer
- Various input devices
- Various output devices
- Various storage devices
- Various communication devices

Guidance for lesson Plan:

- Search components of computers through the web browser and discuss with students
- Identify the searched components in the computers and other devices in the laboratory

Guidance for assessment and evaluation:

- Provide MCQ, Structured paper related to this topic.
- Ask students to search and make an article about the Internet, the World Wide Web and Cloud Computing in order to display on the ICT notice board.

Quality inputs:

- Computer with Internet Accessibility

Reading Material

CPU (Central Processing Unit)

CPU is considered as the brain of the computer. CPU performs all types of data processing operations. It stores data, intermediate results, and instructions (program) in relevant storage elements. It controls the operation of all parts of the computer.

CPU itself has the following three components:

- ALU (Arithmetic and Logical Unit)
- Memory Registers
- Control Unit

Memory

A memory in a computer is similar to the memory the human brain. It is used to store data and instructions. Computer memory is the storage space in the computer, where data to be processed and instructions required for processing are stored.

Memory is primarily of two types.

- Primary Memory/Main Memory
- Secondary Memory

Primary Memory (Main Memory)

Primary memory holds only those data and instructions on which the computer is currently working. It has a limited capacity, and data in the memory is lost when power is switched off.

Secondary Memory

This type of memory is also known as external memory or non-volatile memory. Data and information in secondary memory are stored permanently. It is slower than the main memory. The contents of secondary memories are first transferred to the main memory, and then the CPU can access it. Some examples for secondary memory are hard disk, CD-ROM, DVD and flash memory.

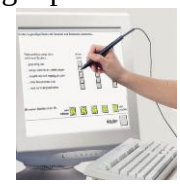
Input Devices

Devices used to send data to a computer system are input devices.

Eg. Keyboards

Keyboard

Pointing Devices (Mouse, Touch screen, Joysticks, Light pen, … etc)

Mouse	Touch screen	Remote control	Light pen
			

Direct Entry input devices (Magnetic Stripe Reader, Bar Code Reader, Smart Card Reader, …etc)

Magnetic Stripe Reader	Bar Code Reader	Smart Card Reader
		

Image and Video input devices (Video Cameras, Digital Cameras, Web Cameras, CCTV Cameras, …etc)

Video Camera	Digital Camera	Webcam	CCTV
			

Scanning Devices (Flatbed Scanners, Magnetic Ink Character Reader- MICR, Optical Mark Reader- OMR, Optical Character Reader- OCR, … etc)

Flatbed Scanner	MICR	OMR	OCR
			

Graphic tablet (Digitizer)


Sound Input Devices

Microphone

Microphone


<u>Output Devices</u>

These devices are used to provide the processed information and signals from the computer to the user.

Eg.

- Monitor

CRT Monitor	LCD Monitor	LED Monitor
		

- Printer

Dot matrix Printer	Laser Printer	Inkjet Printer
		

Graphic Plotter	Multi-function printer (photocopier)
	

- Audio video output devices

Multimedia Projector	Headphone	Speaker
		

Storage Devices

These are used for storing data/information permanently.

e.g.

- Fixed internal magnetic hard disk


- External hard disk

- Magnetic tape

- Optical discs

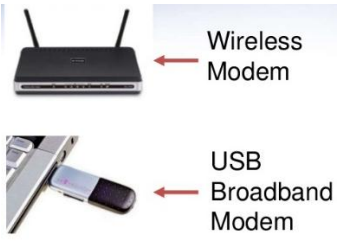
Type	Capacity
CD-ROM	650-900 MB
CD-R	
CD-RW	
DVD-ROM	4.7-9.4 GB
DVD-R	
DVD-RW	
DVD-RAM	
Blu-Ray	25-128 GB

CD DVD Blue Ray

- Flash drive

- Memory card (SD card)

Communication Devices

Switch	Hub	Modem	Router
			

Competency 1 **:** Appreciates the importance of computers

Competency Level 1.3: Describes the need for software

Time **:** 01 period

Learning Outcome:

- Explains the need for software
- Lists various software

Contents:

- Need for software
- Examples of software
    - Games
    - Media player
    - Drawing software

Concepts and terms to be highlighted:

- Need for software
- various software

Guidance for lesson Plan:

- Search the software for media player, games, drawings,…etc through web browser and discuss with students
- Play a song or video using above searched software

Guidance for assessment and evaluation:

- Provide a simple picture for students to draw, using searched drawing software.
  .

Quality inputs:

- Computer with Internet Accessibility

Reading Material

Need for software

Software is generally a program or collection of programs used by end users. It can be called an application or simply an app. There are software which are developed to help the user to perform specific tasks such as:

- to draw an image
- to play a song or video
- to play a game

Various kinds of software

- Educational software
- Word processing software
- Business software
- Decision-making software
- Image editing software
- Mathematical software
- Medical software
- Video editing software
- Video games
- etc

Competency 1 **:** Appreciates the importance of computers

Competency Level 1.4: Appreciates the use of the computer to carry out routine work

Time **:** 01 period

Learning Outcome:

- Describes potential application areas in education and other fields

Contents:

- Identification of areas of applications (educational software, library management system etc.) in the school and other fields
- Role of the computer in
    - schools
    - banks
    - hospitals
    - factories
    - farms

Concepts and terms to be highlighted:

- Areas of applications
- Role of the computer in education and other fields

Guidance for lesson Plan:

- Discuss with students the various areas of applications
- Discuss with students the applications in educational areas (library management system etc.)
- Search the role of the computer in schools, banks, hospitals etc. using the Internet and discuss with students

Guidance for assessment and evaluation:

- Identify the applications in the educational (school) fields and other fields.

Quality inputs:

- Computer with the Internet facility

Reading Material

The Application of Computers in the Education Sector

There are many ways the computer and the Internet are used for education:

- Presentations
- Videos for education from www.youtube.com and from other sites
- Creation of images and video
- Desktop publishing of magazines, reports and brochures
- Educational games
- Learning using the CD-ROM media
- Gathering educational information from the Internet
- Learning Management System

Educational software for schools

Eg. Timetable preparing software
School belling system software
Educational Software
Interactive Models/Simulations
Educational Games
… etc

* Educational software incorporates multimedia content and gives users a high level of interactivity. These two features differentiate them from traditional teaching practices. Multimedia content like pictures, graphics, and sound help engage the students in their lessons.

The Application of Computers in the Banking Sector

- **Account Management**

In banking, activities start with automating customer accounts, which allow personnel to create, update and maintain customer records.

Banking software performs customer transactions through a centralized data record system. Account management is the genesis and backbone of all banking information systems.

Fig 1.4.1 - Auto Teller Machine (ATM) to withdraw, transfer money

The Application of Computers in the Hospital Sector

Automated hospital information systems can help improve the quality of care because of their far-reaching capabilities. An example is the HELP system, which is a complete knowledge based hospital information system. It supports the following activities.

Ex.

- Easy access to a patient's full medical history
- Increased capacity for record keeping
- Reduced paper usage and financial costs
- Facilitating immediate treatment (e.g. Surgery)
- To monitor and function many medical machines using a computer

The Application of Computers in the Factory Sector

Computer can be used in industry in the following ways:

1. **Automated production systems**

Many vehicle manufacturing factories are fully computerized. Vehicles are assembled by computer-controlled robots. These systems work quicker with high quality and accuracy better than human beings are becoming popular.

Fig 1.4.2 - Assembling car using computer-controlled robots

2. **Design systems**

In modern Lathe Machines, computer programs are used to design the required item to be produced by the machine. The user designs the item on the computer screen using the computer program and sends the command to the machine. The machine then produces the item exactly as designed.

Fig 1.4.3 - An automated Lathe Machine

(Source: http://mechanical-machines.blogspot.com/2008/09/cnc-latheintroduction-and-modern-design.html)

The Application of Computers in the Farm Sector

A range of automatic machines are available today to ease the work of the farmer who works hard in the field. These machines not only reduce the work of a farmer but also enable him to produce high quality yields.

Below are some of the machines used in developed as well as developing countries.

Eg.

Field conditions measuring devices

These devices help in measuring various parameters such as fertility and humidity levels of soil which aid in the determination of cultivation activities.

Fig 1.4.4 -A Field conditions measuring device

Drip irrigation

These devices control the supply of water as per the data fed. Wastage of water and destruction of crops due to lack of water supply are minimized by the use of these devices.

Fig 1.4.5 - Automated water supply system

Automatic Weed remover

This machine runs through the field and removes the weeds as per instructions provided by identifying crops and weeds separately.

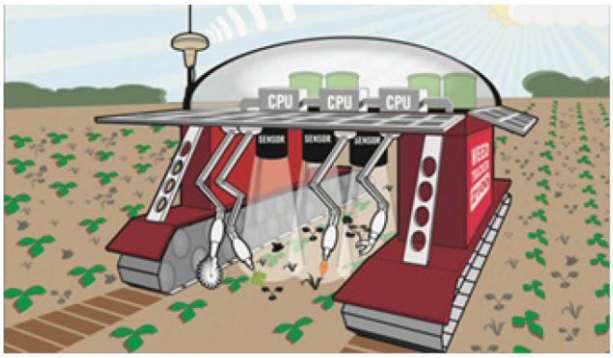


Fig 1.4.6 – Automatic Weed remover

Crop harvesting using Robots

Robotic machines are used to monitor plant growth levels, record them and harvesting in large scale farm lands. These machines help us overcome difficulties in managing large farm lands.

Fig 1.4.7 – Crop harvesting using Robots

RFID – Radio Frequency Identification Device

The RFID help in identifying and counting the number of animals and also in locating the animals in a large area.

Fig 1.4.8 - Radio Frequency Identification Device

Automated milking and examination of cows

This machine which is programmed to function automatically is helpful in monitoring the health status of the cows and the quality of milk. This also helps in milking cows.

Fig 1.4.9 - Automated milking and examination of cows

Farm Management

Today's farmer uses various computer applications in portable computers such as laptops, tabs, smart phones to keep track of information on his farm; to calculate profits and losses, to save employees salary details etc. Using this portable device which has the Internet connectivity, he is capable of monitoring the market rates, get updated on latest business information and exchange information.

Competency 2 **:** Appreciates the need for using computers safely

Competency Level 2.1: Uses the computer laboratory properly

Time **:** 01 period

Learning Outcome:

- Comprehends the good practices in the laboratory
- Follows the good practices in the laboratory

Contents:

- Good practices to follow
    - Keeping the laboratory dust free
    - Avoiding food and drinks in the laboratory
    - Leaving the items used in the laboratory in proper order

Concepts and terms to be highlighted:

- Good practices to follow in the computer laboratory
- Benefits of good practices in the laboratory
- Reasons for following good practices

Guidance for lesson Plan:

- Discuss with students ‘what to do’ and ‘what not do’ in the computer laboratory
- Discuss with students the Benefits of good practices in the computer laboratory

Guidance for assessment and evaluation:

- List the good practices to follow in a computer laboratory

Quality inputs:

- Internet facility, Computer , Software

Reading Material

- **Why must there be good practices in the computer laboratory?**
  - To avoid accidental injuries to the users.
  - To avoid damage to computers
  - To provide a conducive and safe environment for computer use.
- **Good practices to follow**
  - Always remove shoes outside the computer room.
  - Avoid carrying food and beverages to the computer laboratory since these may fall into moving parts causing rusting or electrical faults (Do not eat or drink inside the laboratory).
  - Avoid unnecessary movements because you may accidentally knock down peripheral devices (Behave properly).
  - At all times follow the right procedures while starting and shutting down the computer therefore abrupt switching on and the off the computer should be avoided since this can lead to damaging the computer.
  - Leaving the items used in the laboratory in the proper order
  - Clean the computer with a soft, dry cloth (Keeping the laboratory dust free).
  - Do not open the system unit casing or monitor casing particularly when the power is turned on.
  - Do not touch, connect or disconnect any plug or cable without permission.
  - Do not open an external device without scanning them for computer viruses.
  - Do not unplug anything unless the computer has properly shut down.
  - Avoid stepping on electrical wires or any other computer cables
  - Report any broken plugs or exposed electrical wires to the teacher immediately.
  - Do not insert metal objects such as clips, pins and needles into the computer casings. They may cause fire.
  - Organize before leaving your area.

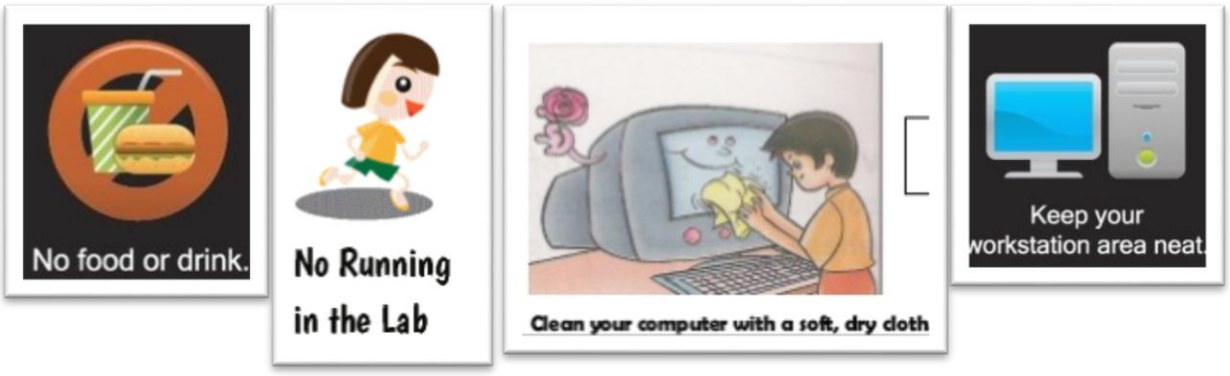


Fig 2.1.1 – Image of Good practices to follow

Competency 2 **:** Appreciates the need for using computers safely

Competency Level 2.2: Uses computers and peripherals safely

Time **:** 01 period

Learning Outcome:

- Follows the correct steps to Start/ Shutdown the computer
- Uses the computer ethically
- Safely disposes the obsolete computers/peripherals
- Understands and practices the safe use of computers

Contents:

- Correct steps to Start/Shutdown the computer
- Ethics of using the computer
- Correct posture to minimize health issues
- Management of e-waste or electronic waste (Safe disposal of computer hardware)
- Use of passwords to avoid unauthorized access

Concepts and terms to be highlighted:

- Steps to Start/Shutdown the computer
- Ethics of using the computer
- Sit correctly in front of the computer
- Safe disposal of computer hardware
- e-waste
- Use of password

Guidance for lesson plan:

- Discuss with students the steps in Start and Shutdown the computer
- Discuss the ethics of using the computer
- Show a picture of the proper sitting posture at the computer
- Discuss with the students the management of e-waste
- Discuss the use of passwords to avoid unauthorized access

Guidance for assessment and evaluation:

- Give an opportunity for the students to Start and Shutdown the computer
- Draw a picture of the proper sitting posture at computer
- Find out e-waste management methods
- Write down why we need to practice ethics in using the computer
- Find out importance of the password

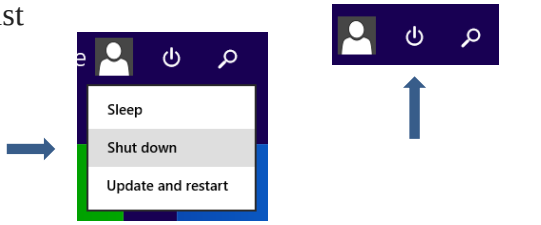
Quality inputs:

- Internet facility, Computer , Software

Reading Material

- **Correct steps to Start the computer**
  - **1)** First, plugging power cable of the UPS to the wall power plug base
  - **2)** Turn on wall power switch
  - **3)** Press your UPS's power button
  - **4)** Press your PC's power button

- **Correct steps to Shutdown the computer**
  1) Close all software programs in preparation to turn off a computer
  2) Click the 'Windows' button at the bottom left-hand corner of your screen.
  3) Click on the power option icon at the top of the right-hand corner of your screen.
  4) Select Shut Down from the dropdown list



- **Ethics of using the computer**
  - **What are ethics of using the computer?**

    Ethics are a set of moral principles that govern the behavior of a group or individual. Therefore, computer ethics is a set of moral principles that regulates the use of computers.

  - **Ethical rules for computer users**
    1. Do not use computers to harm other users.
    2. Do not use computers to steal other's information.
    3. Do not access files without the permission of the owner.
    4. Do not copy copyrighted software without the author's permission.
    5. Always respect copyright laws and policies.
    6. Respect the privacy of others, just as you expect the same from others.
    7. Do not use other user's computer resources without their permission.
    8. Use the Internet ethically.
    9. Complain about illegal communication and activities
    10. Users are responsible for safeguarding their User Id and Passwords. They should not write them on paper or anywhere else for remembrance.
    11. Users should not intentionally use the computers to retrieve or modify the information of others, which may include password information, files, etc.

- **Correct posture to minimize health issues (Recommended for regular use)**

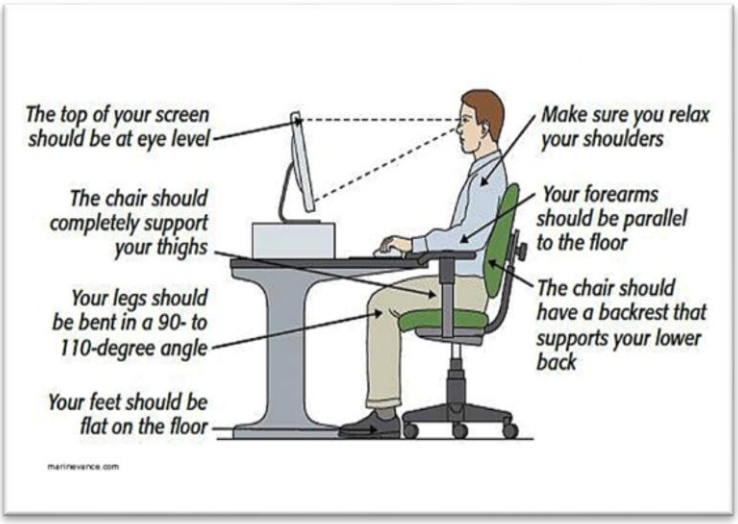


Fig 2.2.1 – Correct posture in Recommended for regular use

  - Top of the monitor at eye level or slightly below.
  - The distance between the computer screen and the eyes is about 18-28 inches
  - Upper back straight with shoulders relaxed at sides and backrest of the chair supports curve in the lower back.
  - Feet flat on the ground or resting on a footrest.
  - Keeping the mouse and keyboard close. Arms relaxed at sides with upper arm and lower arm forming a 90^0 angle. Wrists straight with fingers relaxed.

- **Management of e-waste**

  The three R's in ICT – reduce, reuse and recycle – all help to cut down on the amount of e- waste we throw away.

  - Reduce – Repair broken items rather than buy new ones.
  - Reuse – Donate or sell unwanted electronic devices.
  - Recycle –Equipment that cannot be repaired are referred to an institution recyclable.

- **Use of passwords to avoid unauthorized access**
  - Passwords are used to secure data stored in a computer.
  - Passwords protect unauthorized entry or use of a computer.
  - Never keep a default password. Passwords such as "password," "root," "admin," or no password at all allow easy access to your computer
  - In using a password, it is advisable to mix letters, symbols and numbers to make the password stronger.
  - Change passwords often (regularly).
  - Do not use sticky notes around your computer to write down passwords.

Competency 3 **:** Uses operating systems

Competency Level 3.1: Handles files

Time **:** 02 periods

Learning Outcome:

- Creates and saves a file
- Opens and edits a file
- Practices to maximize/minimize/resize a window

Contents:

- File handling using a simple drawing software
    - Create
    - Save
    - Open
    - Edit
    - Close
- Minimizing / Maximizing / Resizing of a window

Concepts and terms to be highlighted:

- Create and save a file using a simple drawing software
- Open, edit and close a file using a simple drawing software
- Maximize/ minimize/ resize a window

Guidance for lesson Plan:

- Discuss and Demonstrate the Interactive Development Environment (IDE) through a simple drawing software (Example: Paint, … etc.)
- Discuss how a file can be opened, viewed and closed with a simple drawing of the software
- Create a new file and edit a created picture using above the simple drawing software
- Demonstrate the File handling function, using a simple of the drawing software (open, create, edit, save and close)
- Divide the students into groups
- Provide a picture to the groups and give an opportunity to the students to create it

Guidance for assessments and evaluations:

- Ask the groups to create a sample picture file using a simple drawing software (Example: Paint)
- Ask students to open/ edit/ save and close an image file using a drawing software
- Ask students to create an image file and perform file handling operations by using drawing software

Quality inputs:

- Computers with drawing software
- Sample image/picture

Reading Material

The Operating System is a software which manages the hardware and other software in a computer system. It provides services to other software. There are two main services performed by an operating system. They are:

1. Managing the hardware of a computer
2. Providing user interface

File Management is one of the processes of managing the hardware of a computer.

File Management

We can save data in files and we keep the files within the folders in order to manage them methodically. The Operating System manages the files and folders.

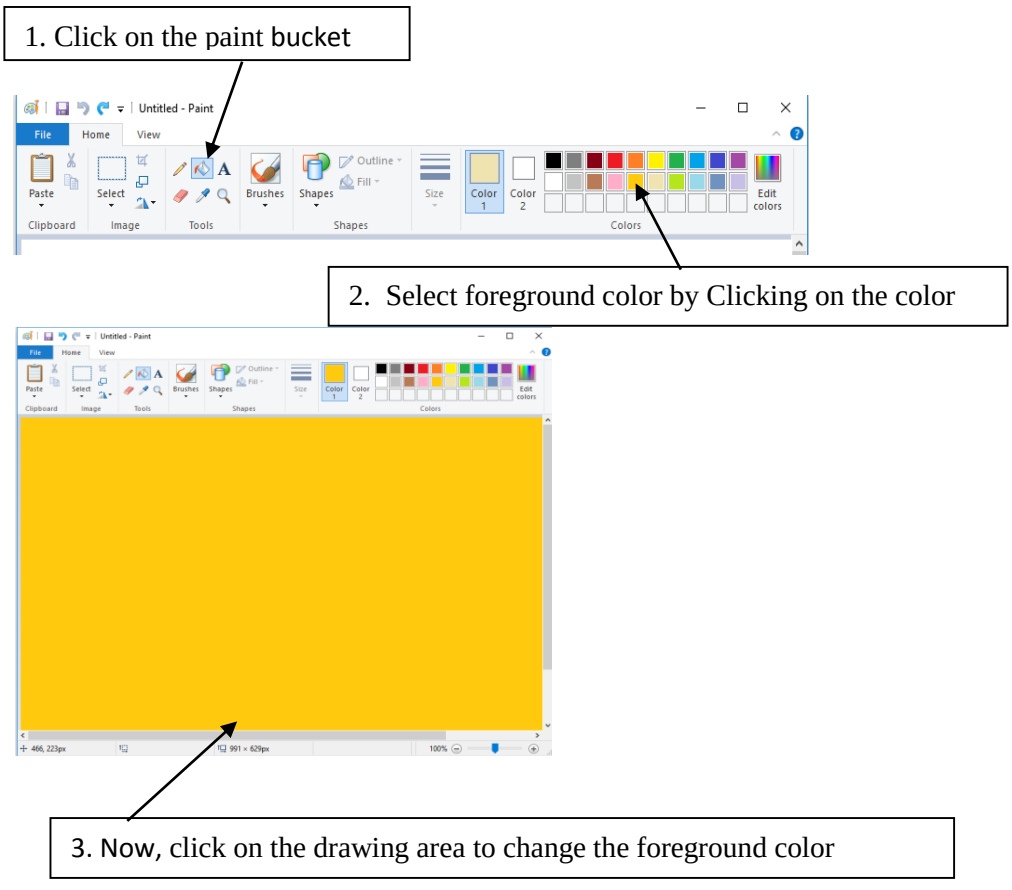
Some of the services performed by the Operating System in file management are listed below:

- Making new files and saving them at suitable places
- Deleting the unnecessary files
- Arranging the folders in order and deleting the unnecessary folders
- Renaming the files and folders
- Changing the storage location of files and folders
- Creating backups of the files and folders as needed

File and folder management includes handling file properties, file operations, file access and file systems. The data we save must be given a file name for the purpose of identification. File names consist of two components, namely file name and file extension.

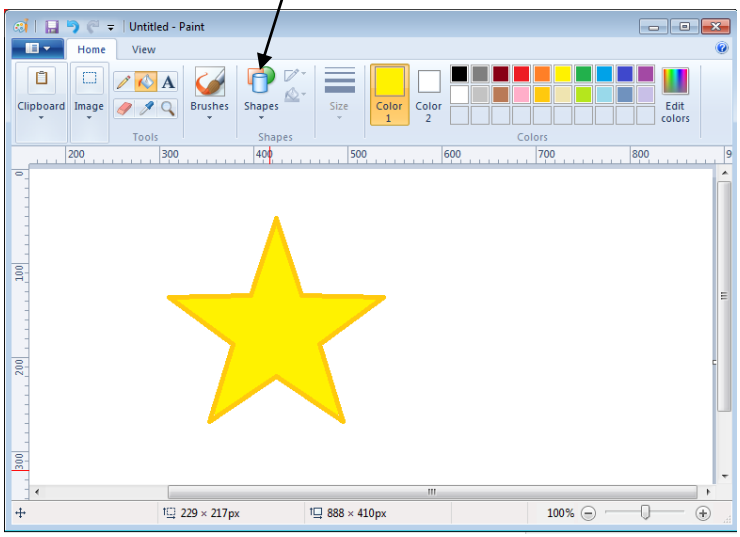
File handling using a simple drawing software

- Open MS Paint tool and create new file(File→New)



- Perform Drag and Drop

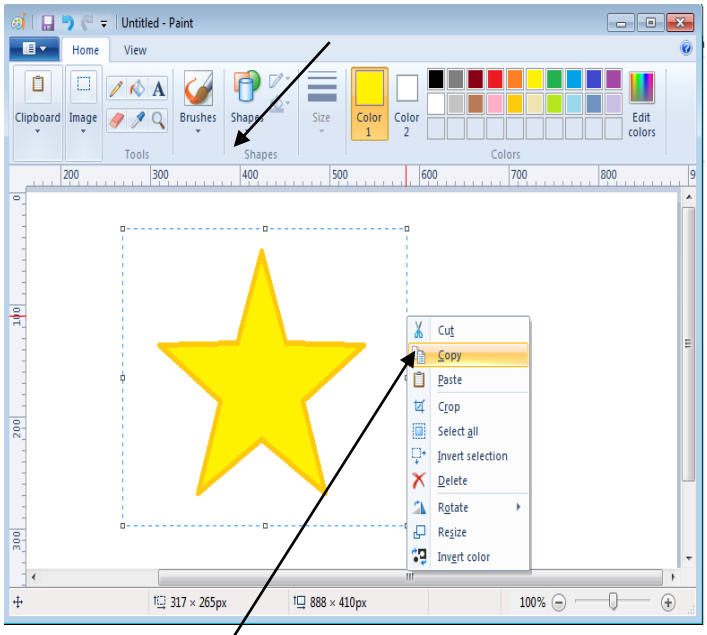
1. Click on the Shape Icon and select any shape by clicking on the shape



2. Draw the shape using drag and drop

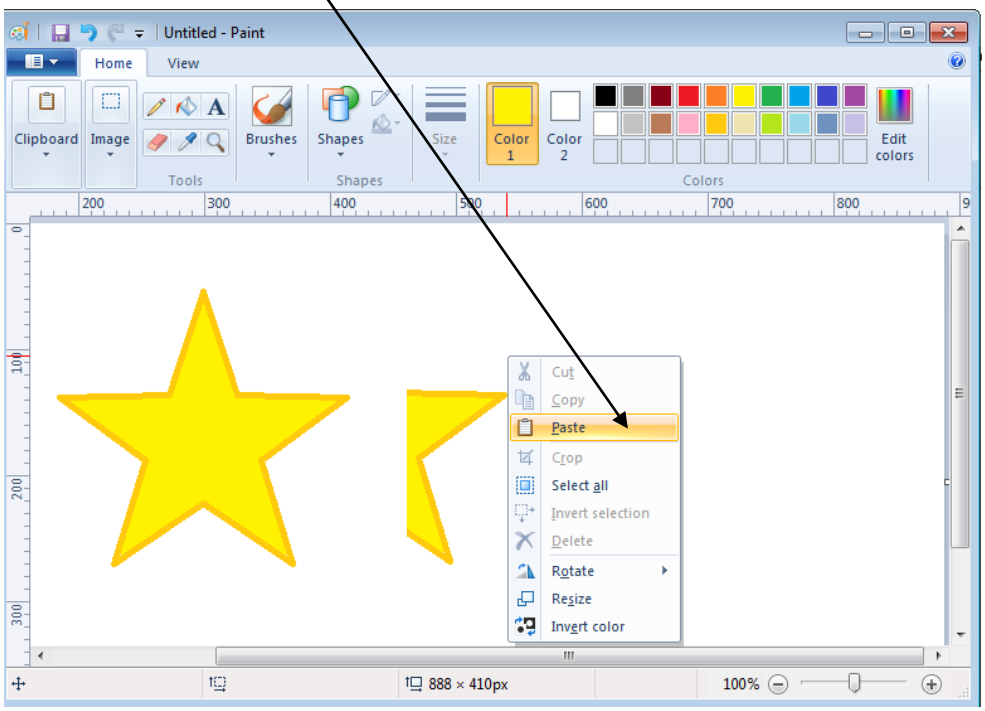
- Perform right click

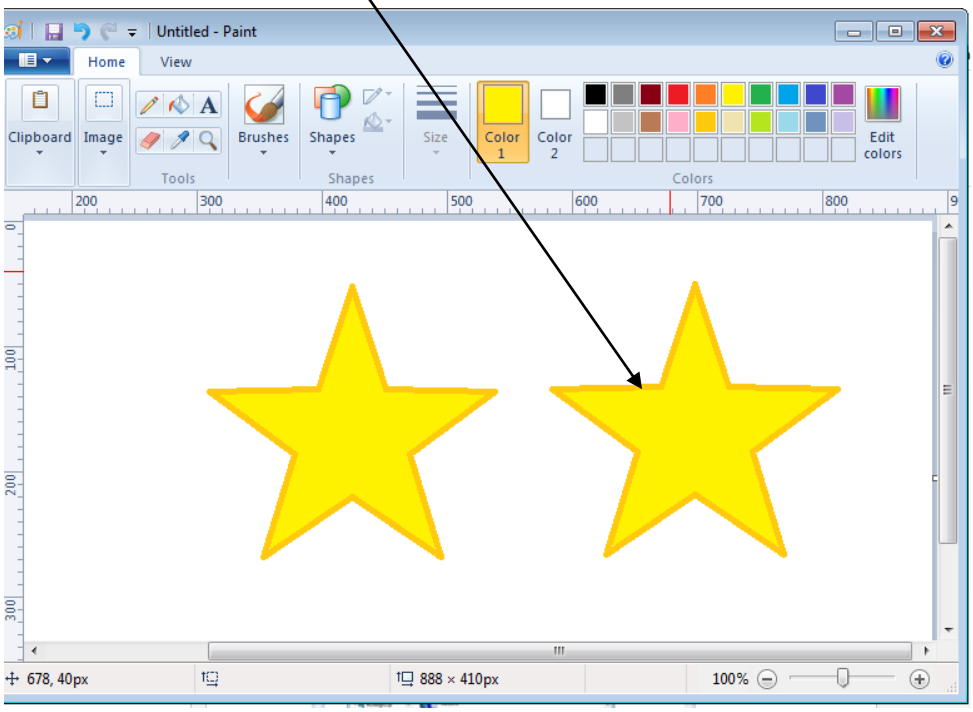
1. Select shape by using any select icon



2. Right click on the shape and select copy command

3. Then, right click on the drawing area and select paste command

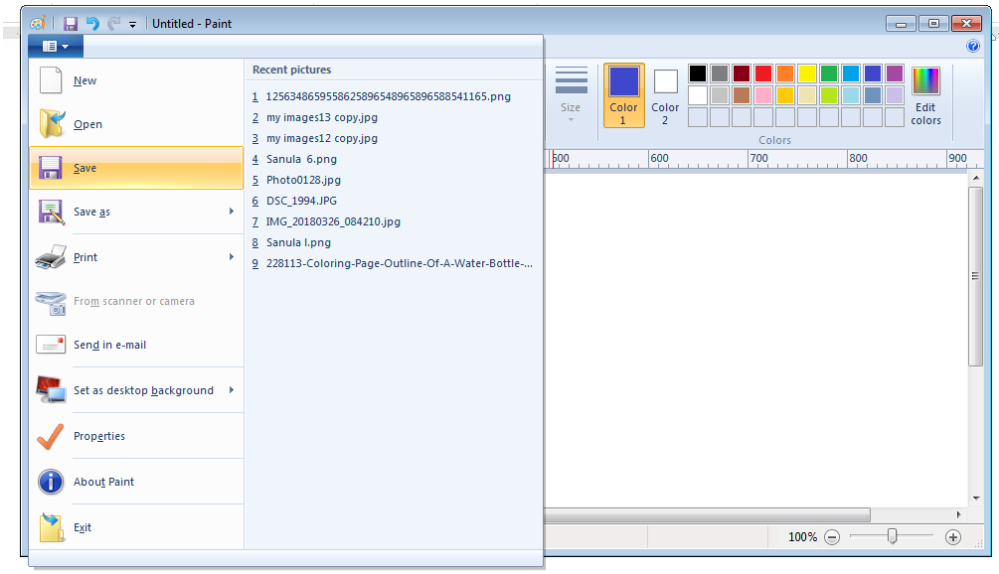


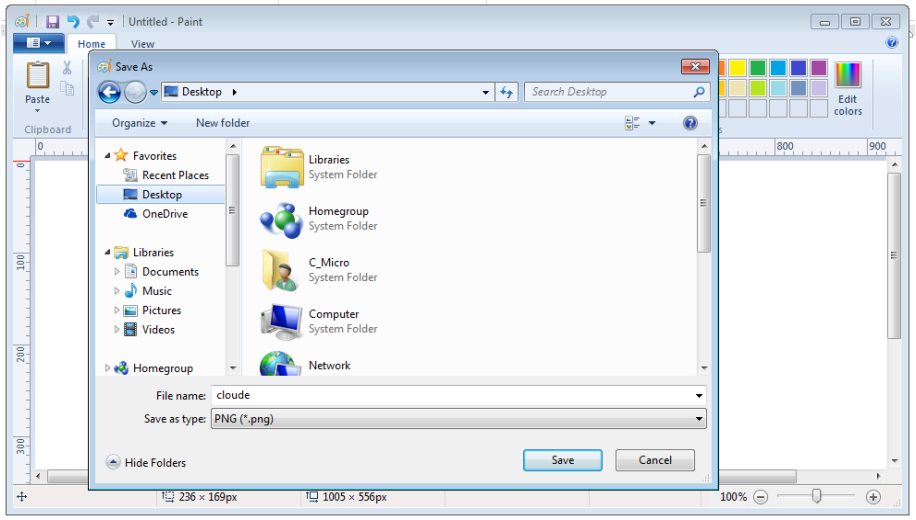


Draw sample pictures like the ones shown below

Fig 3.1.1

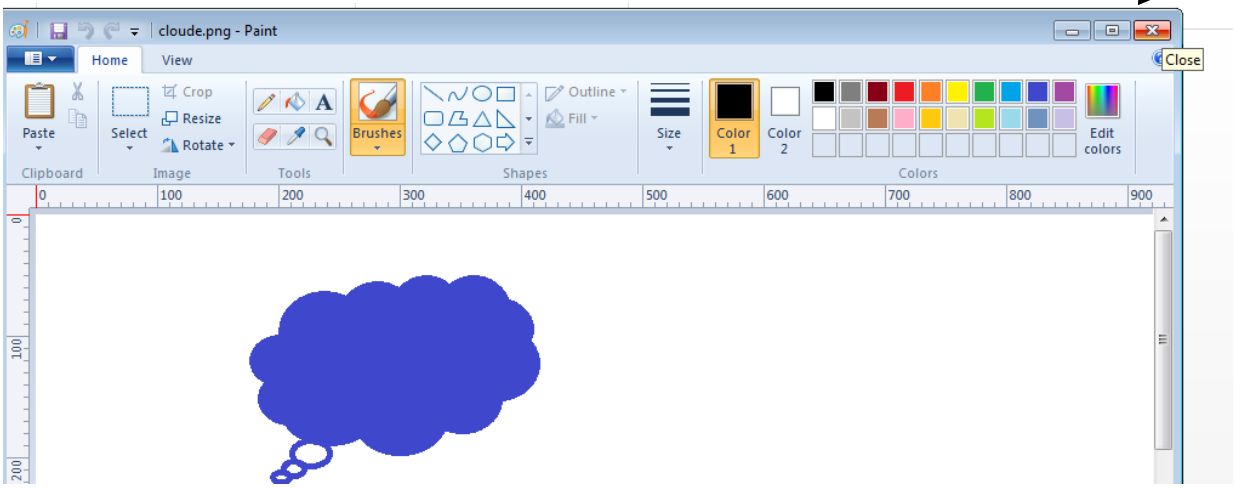
- Save a new file
  (File→save→choose the area to save→ give the file name→click save button)



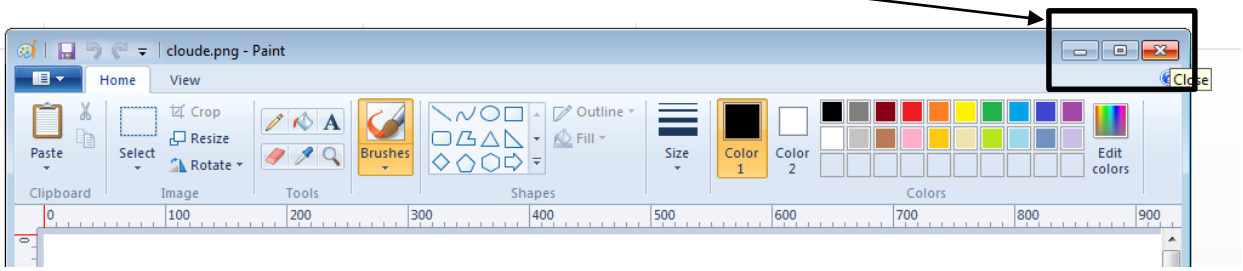


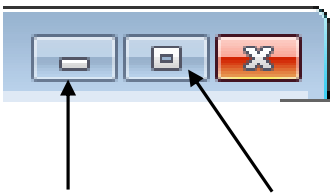
- Open a file
  (File→open→choose the saved area→ choose the saved file name→click open button)

Close a file



- Minimizing / Maximizing / Resizing of a window





Minimize Maximize

Competency 4 : Uses application software appropriately

Competency Level 4.1: Uses text editing and drawing software effectively

Time : 05 periods

Learning Outcome:

- Uses mouse and keyboard effectively
- Types using correct finger movements
- Draws pictures with mouse

Contents:

- Use of drawing software to use the mouse
- Use of typing software to develop keyboard skills

Concepts and terms to be highlighted:

- Basic functions of the mouse
- Features of the keyboard and functions performed by the keyboard
- Correct way of holding the mouse and keyboard

Guidance for lesson Plan:

- Discuss with students the functions of the mouse –Move the mouse pointer, left click, right click, double click, middle click, scrolling , drag and drop
- Identify the keys of the keyboard and functions performed by the keyboard – keys for individual letters, numbers and special characters, as well as keys for specific functions

Guidance for assessment and evaluation:

- Identify the parts of the mouse and functions performed by the mouse
- Draw a given picture using MS Paint software
- Identify the keys of the keyboard as letters, numbers and special characters
- Typing exercise using Rapid Typing software or any other typing software

Quality inputs:

- Internet facility, Computer , software
- https://merabheja.com/top-free-typing-softwares/

Reading Material

- **Mouse**

The Mouse is a device that controls the movement of the cursor or pointer on a display screen and it is an input device. A mouse is a small object and can roll along a hard, flat surface. As you move the mouse, the pointer on the display screen moves in the same direction. The standard mouse has two buttons, plus a scroll wheel in the middle which sometimes is a button.

Fig 4.1.1 – A Mouse

- **Functions of the mouse**

A Mouse does just two things: right- and left-click.

- Left-click is often referred to as "normal-click" or "regular-click". By default, the left button is the main mouse button, and is used for common tasks such as selecting objects and double-clicking.
- When you press the one on the right, it is called a right click. The right mouse button is often used to open context menus, which are pop-up menus that change depending where you click.
- Scroll wheel is used to scroll through the document.
- Action of selecting an object or section of text, moving it (dragging), and then placing it (dropping) into an alternate area.

  Ex: - to drag-and-drop an object such as an icon, you would first move your mouse cursor over it. Then, you would press and hold down the left mouse button, move it to the object to the location you desire, and release the button to set it down.

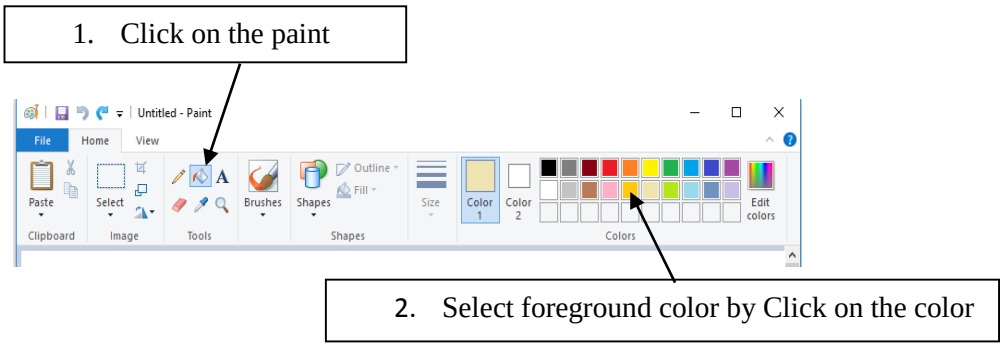
Hold a mouse correctly

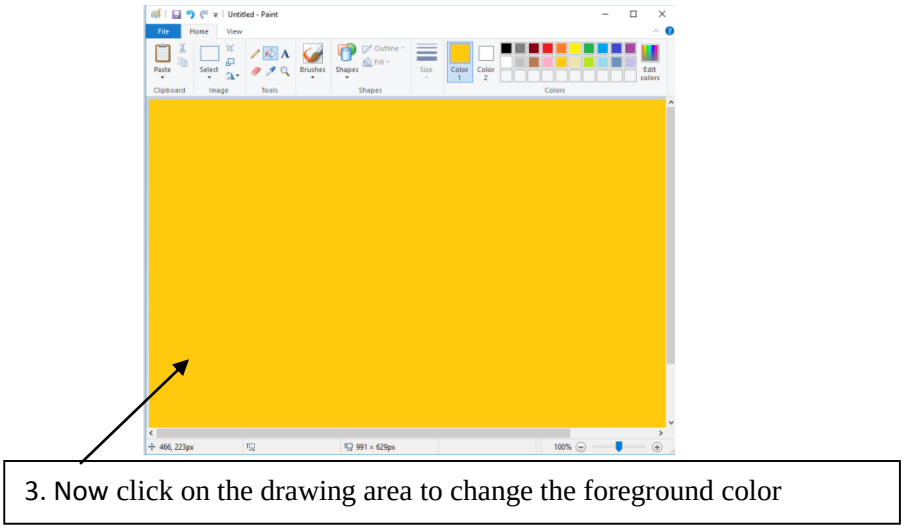
Fig 4.1.2 – Use of Mouse correctly

- **Use drawing software to use the mouse**
    - Mouse is also useful for graphics programs that allow you to draw pictures by using the mouse like a pen, pencil, or paintbrush. Use MS Paint to draw a picture.
    - Introduce tools of the MS Paint and allow students to draw a picture according to their desire.
    - Introduce the basic functions of the mouse by using MS Paint.

    - Open MS Paint and perform left click

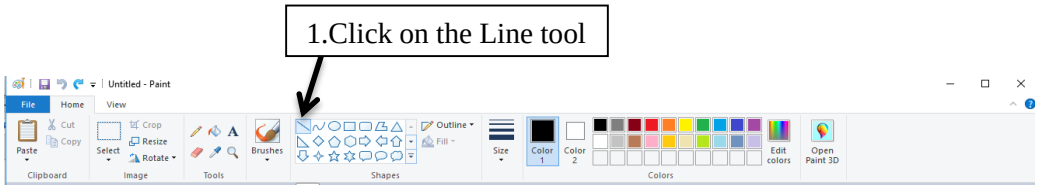
      Ex:- 01



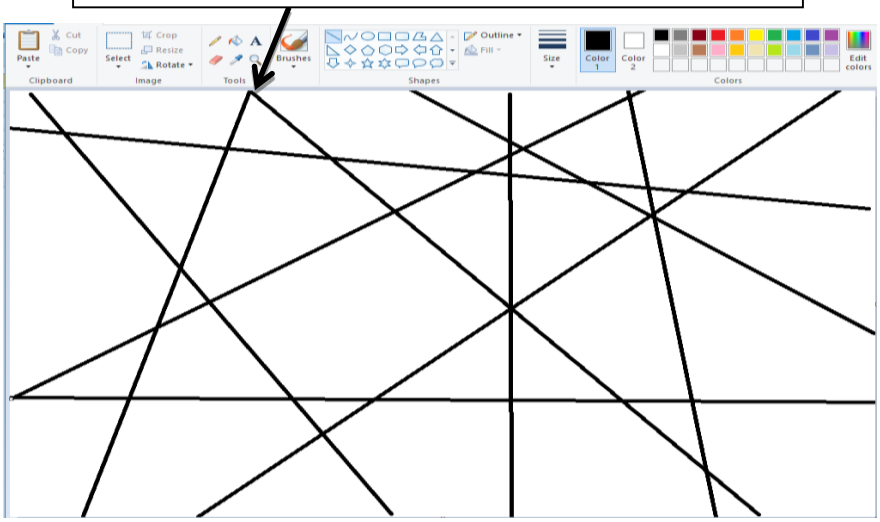


    - Perform Drag and Drop

      <u>Ex:- 01</u>

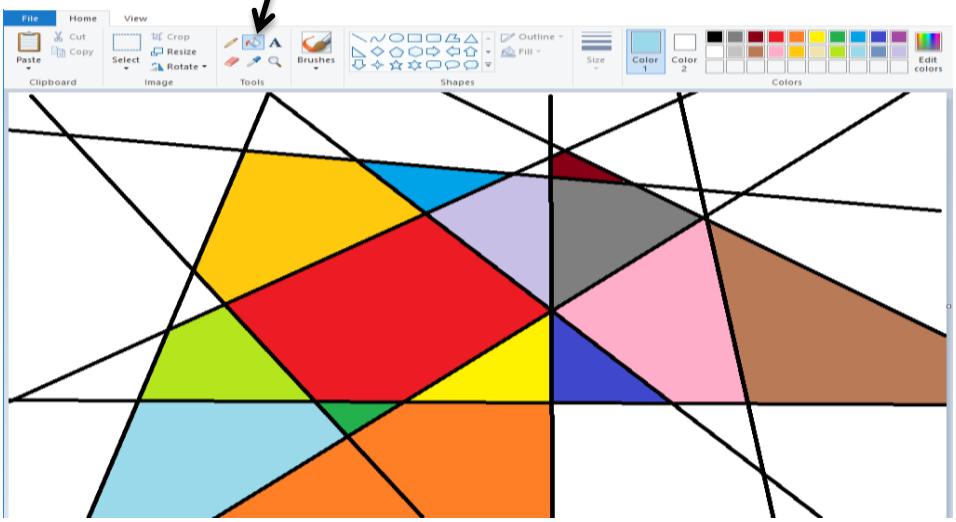


2. Draw so many lines using drag and drop function



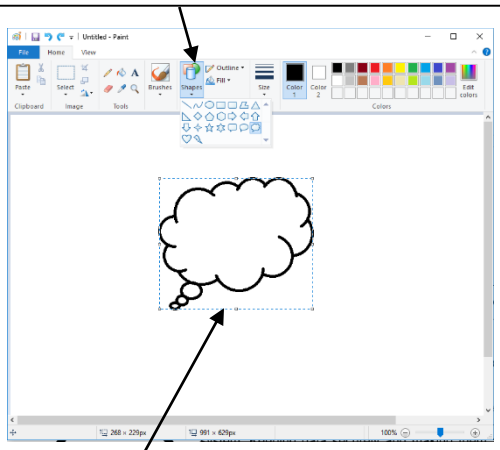
-

3. Apply various colors using paint bucket



Ex:- 02

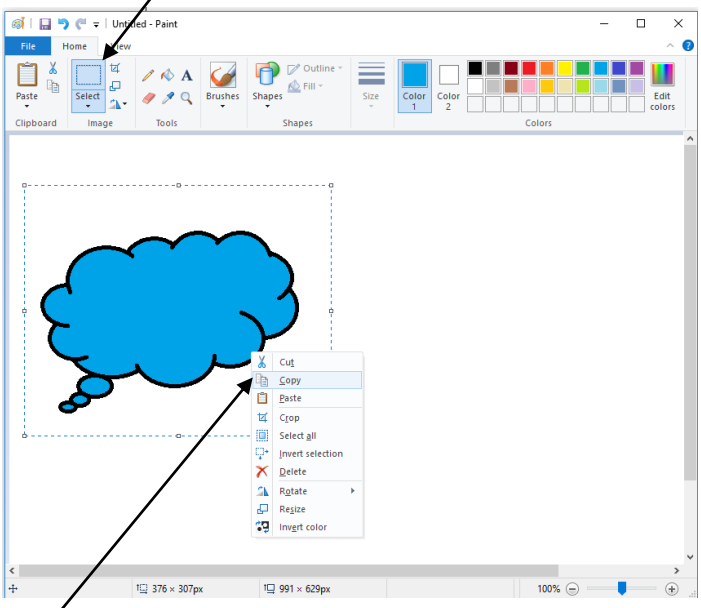
1. Click on the Shape Icon and select any shape by clicking on the shape



2. Draw the shape using drag and drop function

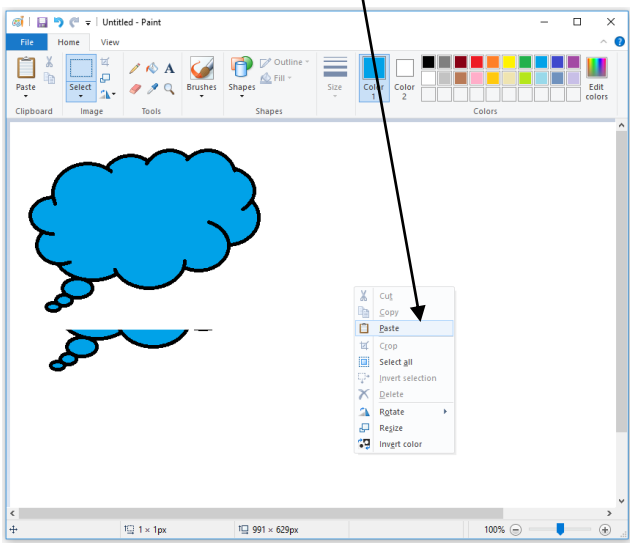
- Perform right click

1. Select shape by using select

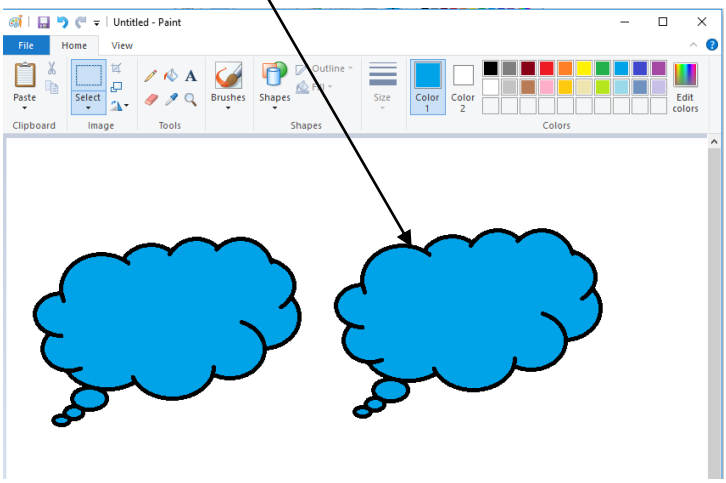


2. Right click on the shape and select copy

3. Now, right click on the drawing area and select paste command



Use drag and drop function to locate the pasted item



Draw sample pictures like shown below

Fig 4.1.3

- **Keyboard**

A computer keyboard is an input device used to enter characters and perform functions into the computer system by pressing buttons, or keys. It is the primary device used to enter text. A keyboard typically contains keys for individual letters, numbers and special characters, as well as keys for specific functions.

- **Parts of the Keyboard**

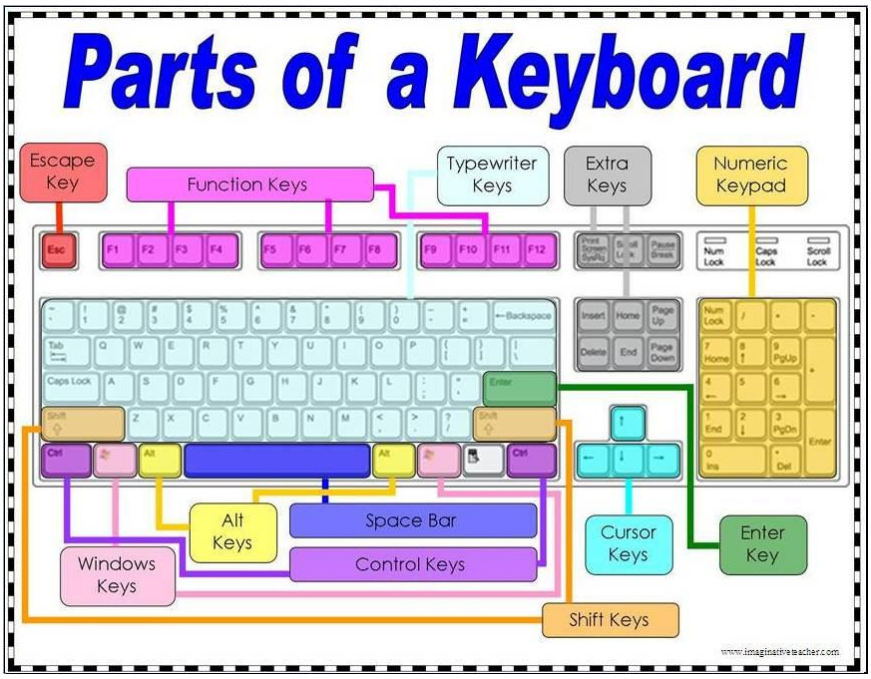


Fig 4.1.4 - Parts of the Keyboard

1. **Character Keys/ Typewriter Keys**
   A lowercase letter is typed when one of the letter keys is pressed

2. **Space Bar**
   The Space Bar inserts a space. It is used to separate words.

3. **Shift Key**
   A capital letter is typed when you hold down the Shift key and press a letter key. The top symbol displayed on a key is typed when you hold down the Shift key and press a number or symbol key.

4. **Caps Lock Key**
   The Caps Lock key is used to type in ALL CAPITALS. Notice the Caps Lock light on the keyboard. It indicates that Caps Lock mode is on or off.

5. **Backspace Key**
   The Backspace key is an editing key. It erases the character to the LEFT of the cursor, one at a time. Note the arrow on the key.

6. **Enter Key**
   The Enter key enters information or moves the cursor to the next line. Notice that there are two Enter keys on a standard keyboard.

7. **Delete Key**
   The Delete key is an editing key. It erases the character to the RIGHT of the cursor, one at a time.

8. **Numeric Keys**
   The numeric keypad makes it easy to type numbers quickly and with only one hand. The Num Lock key activates the numbers.

Hold a Keyboard correctly

Fig 4.1.5 - Use of Keyboard correctly

- **Type using correct finger movements**
  - Use Rapid Typing software or other typing software to improve typing skill. (refer this link to download typing software:- https://merabheja.com/top-free-typing-softwares/)

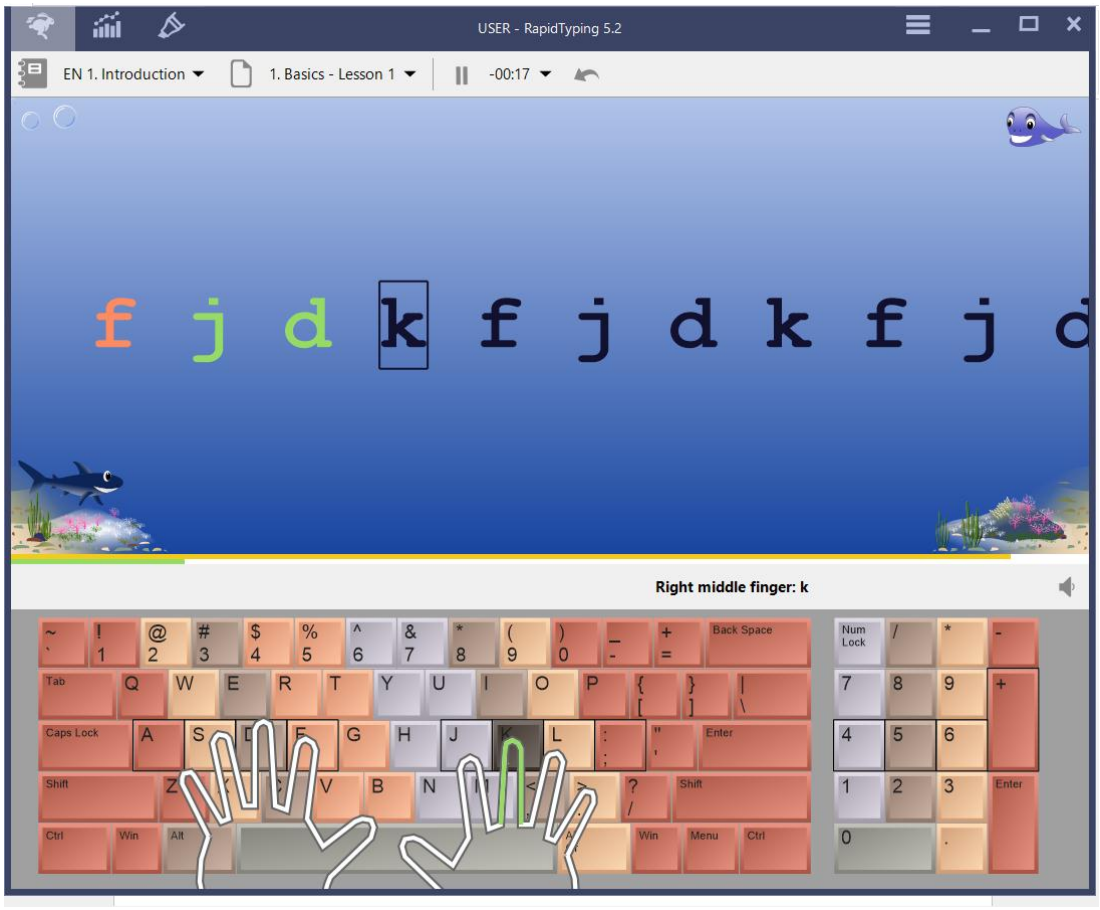


Fig 4.1.6

- Change lesson according to the improvement of students

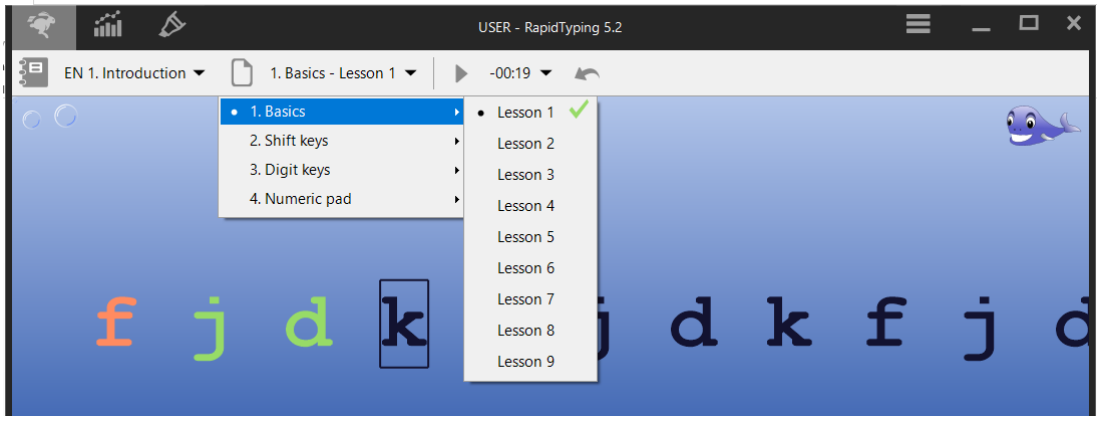


Fig 4.1.7

- Do the exercise mentioned below.

PLANNING A HOLIDAY?

LOOKING FOR LATE AVAILABILITY?

BROAD STREET TRAVEL

THE FAMILY SPECIALISTS

SKI, SUN, SAFARI ETC

REDUCED PRICES FOR EARY BOOKERS

ACCOMMODATION

***HOTEL**

***PENSION B&B**

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Competency 4 **:** Uses application software appropriately

Competency Level 4.2: Uses audio software and video software effectively

Time **:** 02 periods

Learning Outcome:

- Creates an audio file
- Creates a video file

Contents:

- Use of audio software to create an audio clip
- Use of video software to create a video clip

Concepts and terms to be highlighted:

- audio file
- video file

Guidance for lesson Plan:

- Discuss with students the audio files and video files
- Demonstrate the IDE in a sample audio software
- Create a new audio file using the above mentioned audio software
- Demonstrate the IDE in a sample video software
- Create a new video file using the above mentioned video software
- Divide the students into groups
- Give time to the student to create a suitable audio clip to use own video file

Guidance for assessment and evaluation:

- Ask the groups to create a suitable audio file to use in own video file

Quality inputs:

- Computers with audio and video editing software
- Sample audio and video
- Computer with Internet facility
- http://audacity.sourceforge.net/
- http://www.windows-movie-maker.org/

Reading Material

Create an audio file

Audacity

Audacity is a free software that can be installed in Windows, Mac and Linux operating systems. Audacity can be used for both editing and recording purposes. It consists of multi layers. In installing the software, the user can select the language in the interface to suit the user's choice.

Audacity has functions for;

- Recording live audio proceedings
- Recording music being played in the computer
- Inserting sound effects on recorded digital graphics write on CDs/DVDs content.
- Copying sound, trimming, mixing, or joining together for editing purposes
- Editing file formats such as WAV,AIFF,FLAC,MP2,MP3
- Changing speed and pitch in recordings

Audacity can be downloaded from the following URL;
http://audacity.sourceforge.net/

Audacity Graphical User Interface

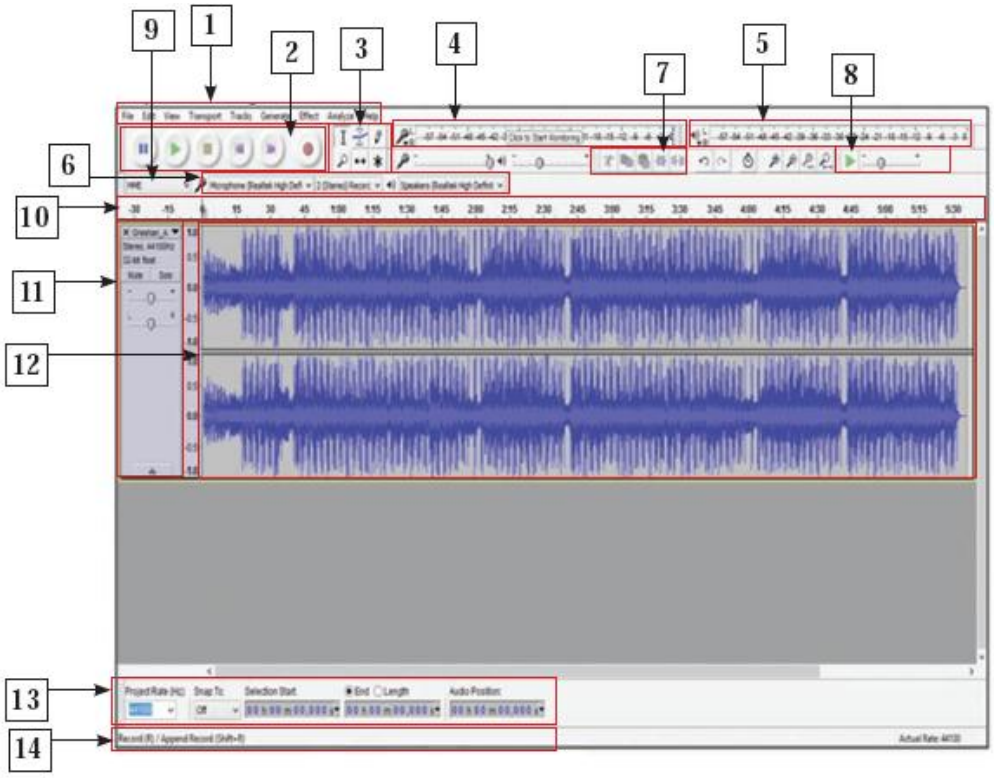


Fig 4.2.1 - Audacity Graphical User Interface

1. Menu Bar
2. Transport Toolbar
3. Tools Toolbar
4. Recording Meter Toolbar
5. Playback Meter Toolbar
6. Mixer Toolbar
7. Edit Toolbar
8. Transcription Toolbar
9. Device Toolbar
10. Timeline
11. Track Control Panel
12. Audio Track
13. Selection Toolbar
14. Status Bar

Steps in creating an audio clip using Audacity software

1. Click File-→New
2. Click Record Button on Transport Toolbar

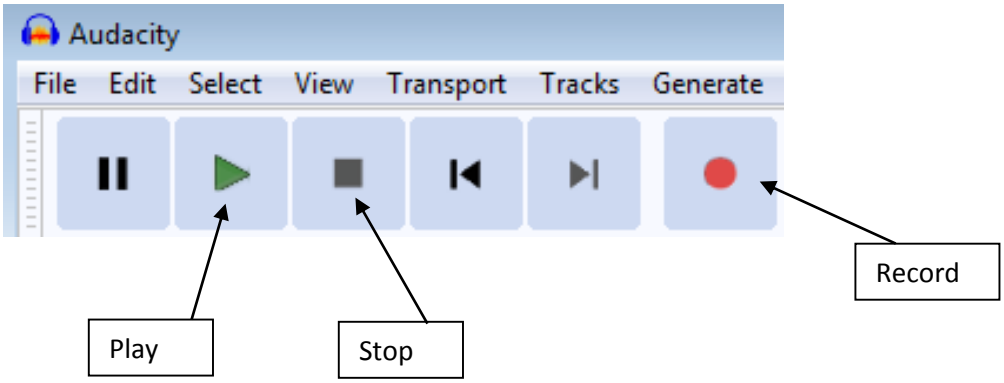


Fig 4.2.2

Using the microphone built into the computer, record the required audio content

3. Click Stop button(Fig 4.2.2) on Transport Toolbar to end recording
4. Click Play button (Fig 4.2.2) and listen to the recording done
5. To save an audio file
6. File→Save Project→choose the location to save audio file →give a name to save an audio file→Save

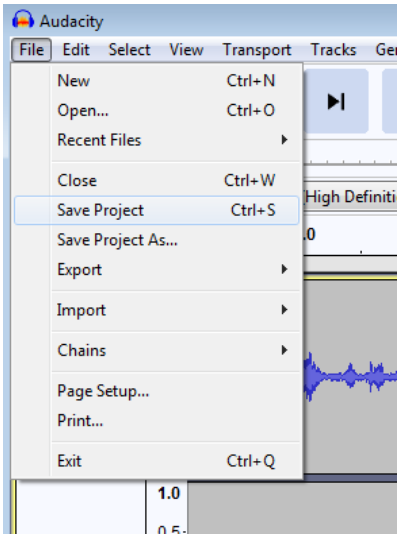


Fig 4.2.3

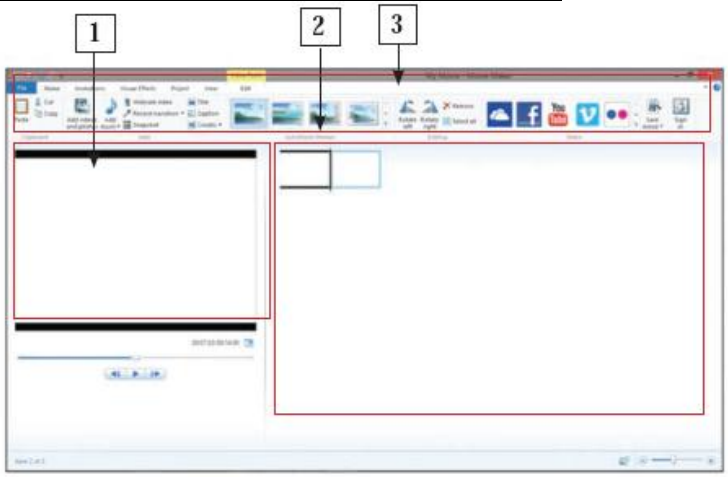
Creates a Video file

Windows Movie Maker

Windows Movie Maker is free software provided by the Microsoft co-operation. This software can be used to create and edit a video clip.

Download and install Windows Movie Maker software from the URL given below.
http://www.windows-movie-maker.org/

Windows Movie Maker Graphical User Interface



1. Preview/ Player pane
2. Timeline stage
3. Editing function panel

Fig 4.2.4 - Windows Movie Maker Graphical User Interface

Steps of creating a video clip using Windows Movie Maker software

1. Open the Windows Movie Maker software
2. Using Home→Add Videos and Photos →choose the images location and select images →open button

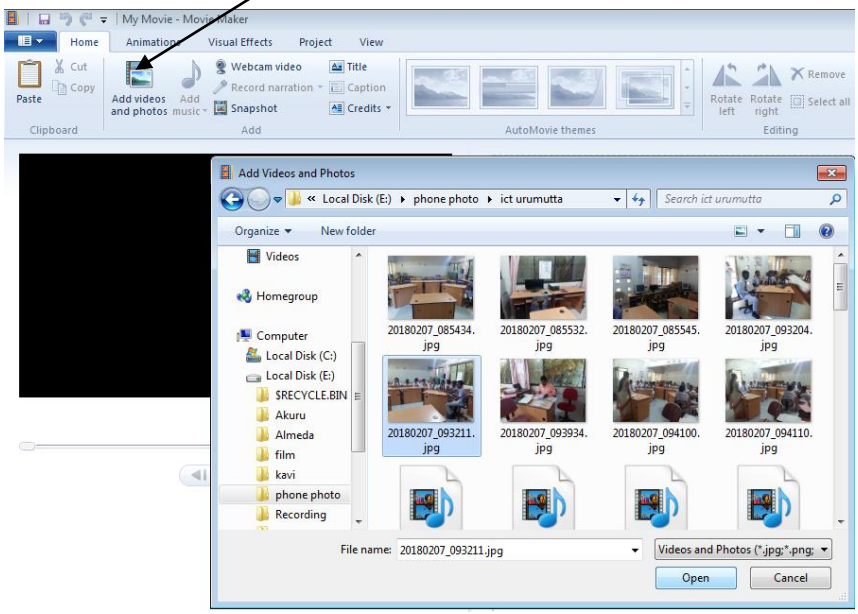


Fig 4.2.5

3. Then display below

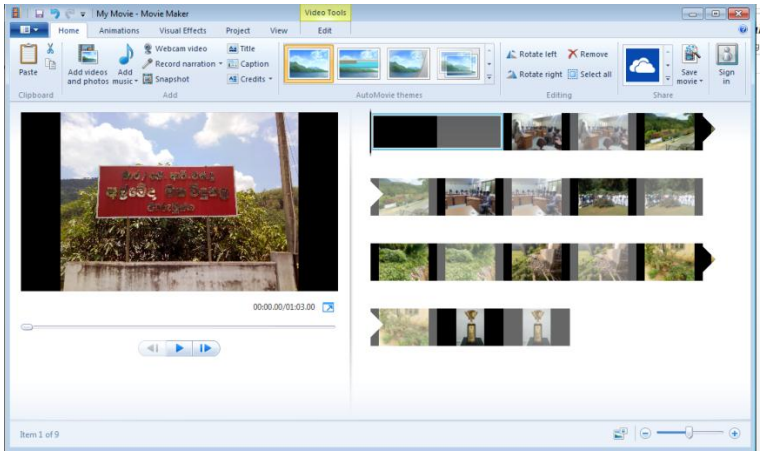


Fig 4.2.6

4. To use transitions,
   Animation→click first image frame→select suitable transitions
5. Apply the suitable transitions to other images on the timeline stage. After applying transitions, timeline stage is shown as follows.

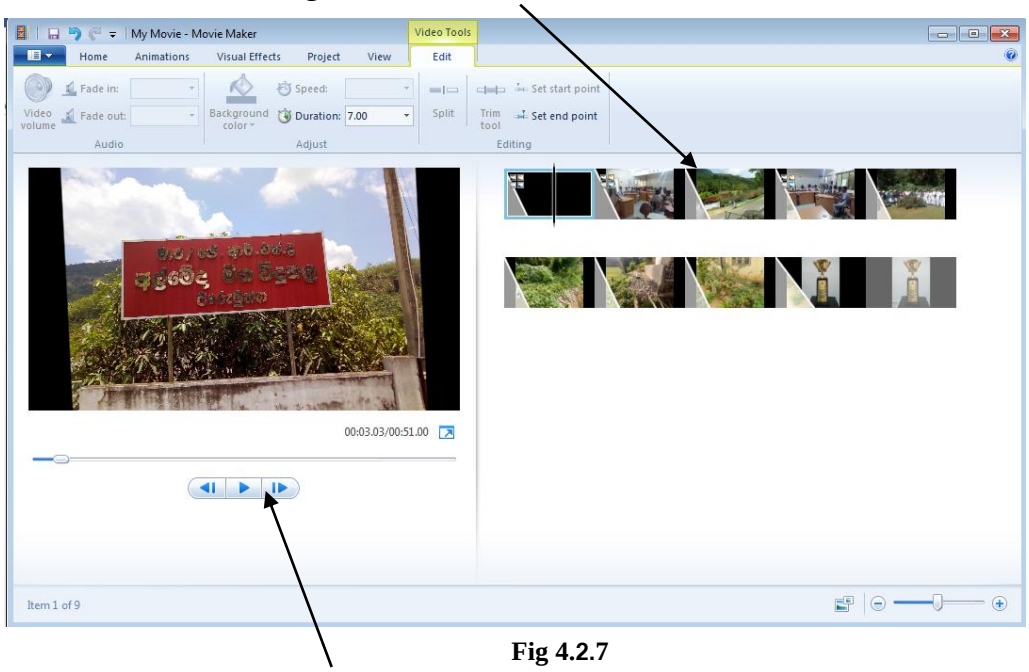


Fig 4.2.7

6. Using preview/player pane, play the creation. Edit as necessary.

7. To arrange the time period to display an image frame. use
   Animation→change time duration you want

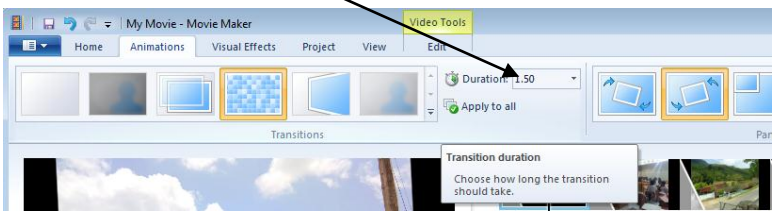


Fig 4.2.8

8. To add a topic to the creation:
   Select first frame,
   Home →Title→types a suitable topic and Open format menu. Add effect to topic

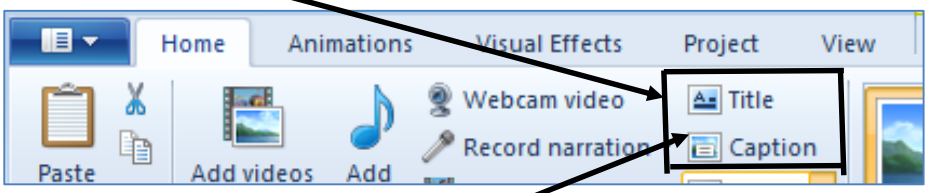


Fig 4.2.9

9. Caption can be added to each image frame. For this purpose;
   Select image frame,
   Select Home →Caption and type suitable caption

10. At the beginning or at the end of the video content, the direction, artists, music, Venue, … etc. can be introduced. Separate frames can be added for this.
    - Select the necessary introduction from Home → Credits
    - Type in necessary information.

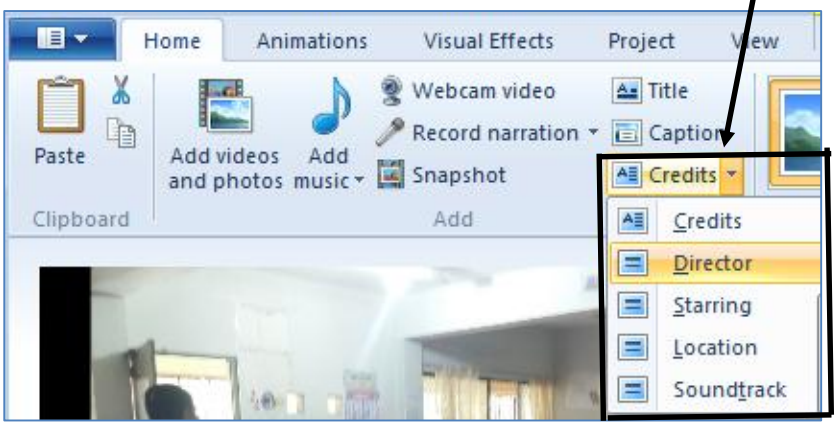


Fig 4.2.10

11. Follow the steps below to add audio file around created video
    - Select first frame
    - Select Home→add music→select the music you want

12. Play the video file. Edit as necessary.

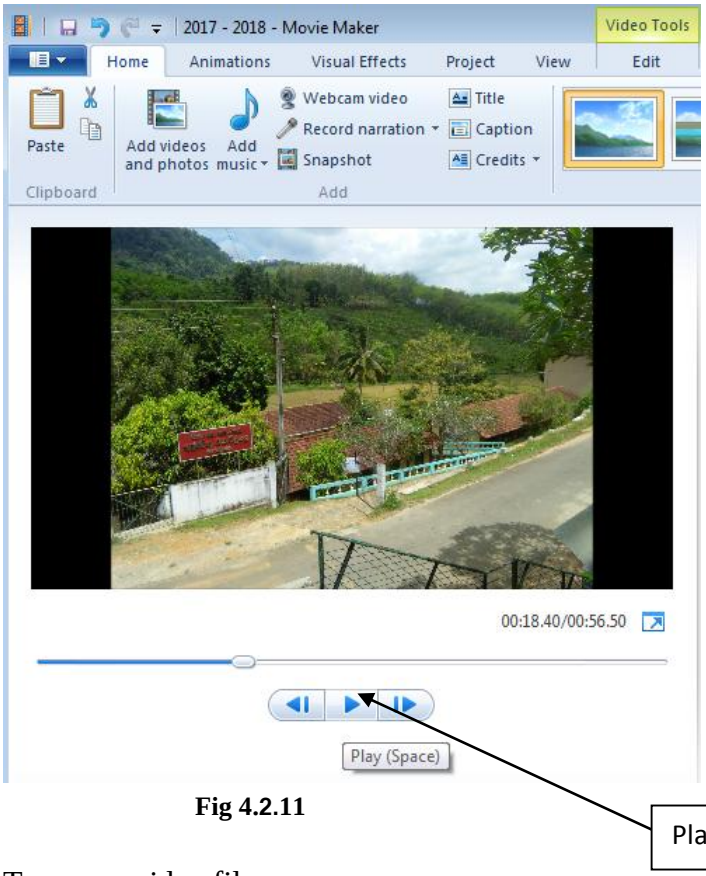


Fig 4.2.11

13. To save a video file
    File→Save Movie →For Computer →choose saved location and give name to video →Save

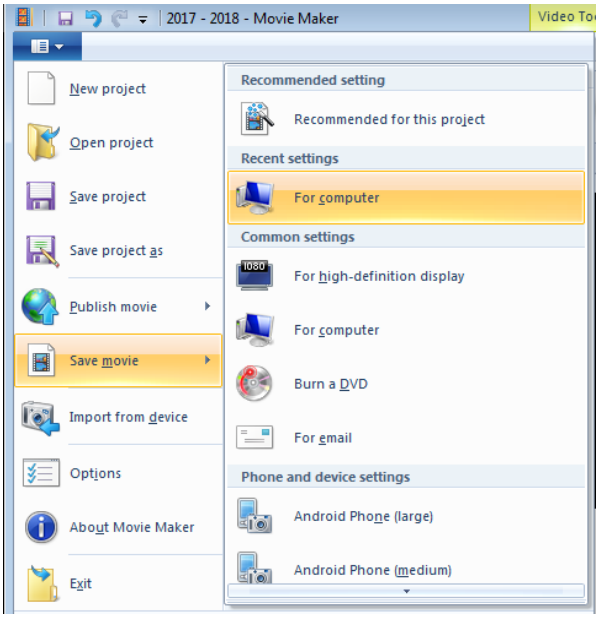


Fig 4.2.12

Competency 5 **:** Appreciates the concept of algorithms and develops simple programs

Competency Level 5.1: Relates practical problem solving process to an algorithm

Time **:** 02 periods

Learning Outcome:

- Identifies process of problem solving as a series of steps

Contents:

- Making of a composition according to a recipe

Concepts and terms to be highlighted:

- Steps of analyzing a problem (input, output, process)
- process of problem solving as a series of steps

Guidance for lesson plan:

- Introduce some problems in the real world(Ex :- posting a letter, Making a cake, calculating the perimeter of a rectangle)
- Analyze those problems (Identify input, output and process)
- Identify the series of steps for solving those problems

Guidance for assessment and evaluation:

- Give a simple problem to analyze
- Write down the series of steps to solve a problem

Quality inputs:

- Internet facility, Computer

Reading Material

- **Analyzing a problem**

When analyzing a problem, Input, process and Output should be identified separately. The raw materials that are used to solve a problem are known as the input. The result obtained after solving a problem is known as the 'Output'. Converting input to Output is known as the 'Process'. A process takes place step by step.

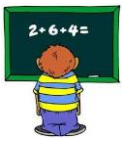
Ex 01 :- Problem – Making a cup of milk tea

Input – boiled water, sugar, milk, tea leaves, teapot, cup, spoon, strainer

Process –

1. Putting the tea leaves in the filter
2. Pouring boiled water to the teapot through the filter
3. Adding some sugar and milk to the tea pot
4. Stirring it well with a spoon
5. Pouring milk tea into the cup

Output – cup of milk tea



Ex 02 :- Problem –Adding two numbers

Input – Two numbers

Process – Total= 1st number + 2nd number

Output – Total

Ex 03 :- Problem – Calculate the Perimeter of the rectangle

Input – Length and Width of the rectangle

Process – Calculating the Perimeter

Perimeter = Length + Length + Width+ Width

Output – Perimeter

Competency 5 **:** Appreciates the concept of algorithms and develops simple programs

Competency Level 5.2: Draws flowcharts to explain a process

Time **:** 03 periods

Learning Outcome:

- Identifies flowchart symbols
- Represents a process with a flowchart.

Contents:

- Introduction to flowchart symbols
    - Start/Stop
    - Input/ Output
    - Process
    - Direction of flow
- Flowcharts to explain simple sequential processes of day to day tasks

Concepts and terms to be highlighted:

- Symbols on flowchart
- Way that symbols are used

Guidance for lesson Plan:

- Introduce symbols on flowchart
- Present algorithm using flowchart

Guidance for assessment and evaluation:

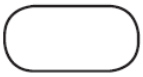
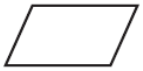
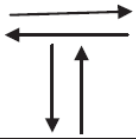
- Identify flowchart symbols
- Draw flowchart to represent a process

Quality inputs:

- Internet facility, Computer, Software

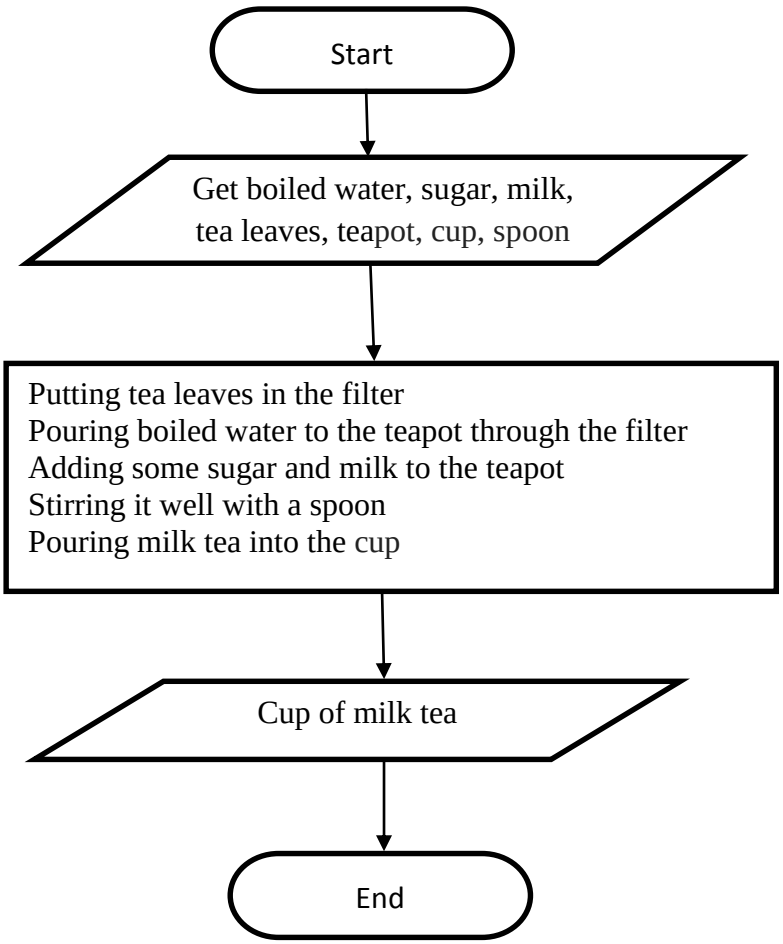
Reading Material

- **Symbols on Flow charts**

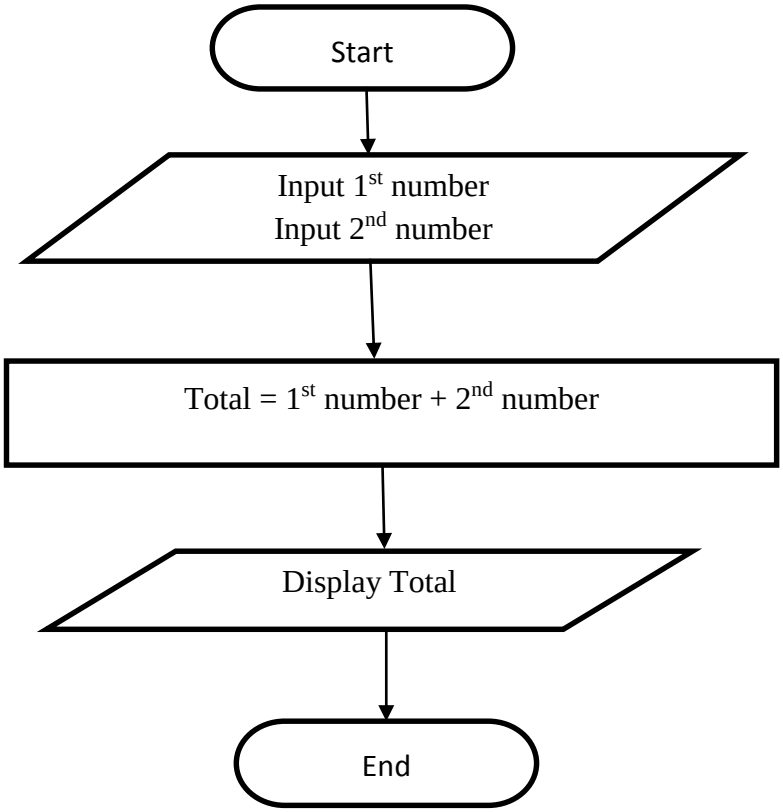
Symbol	Function
	Start or end
	Input or output
	Process
	Flow direction

- **Draw a Flow chart to explain a simple sequential processes**

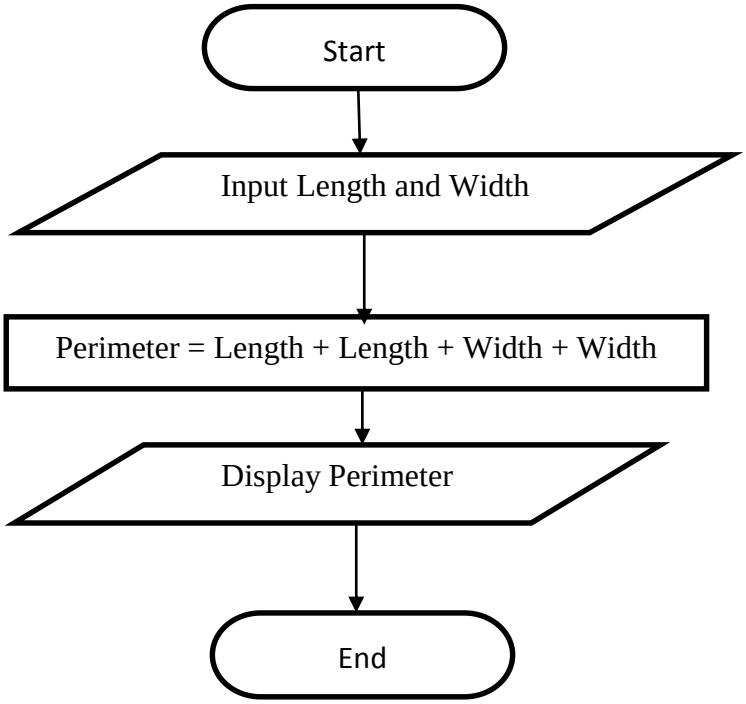
Ex.1 :- Making a cup of milk tea



Ex.2 :-Adding two numbers



Ex.3 :-Calculate the Perimeter of the rectangle



Competency 6 **:** Appreciates the Internet for information gathering and communication

Competency Level 6.1: Identifies the Internet as a pool of collection of shareable information resources

Time **:** 03 periods

Learning Outcome:

- Defines the Internet
- Accesses the Internet
- Obtains information through educational web sites

Contents:

- Introduction to the Internet
- Accessing educational websites to practice browsing

Concepts and terms to be highlighted:

- Definition of the Internet
- Components that are used to access the Internet
- Usage of the Internet
- Educational web sites

Guidance for lesson Plan:

- Define the Internet
- Discuss with the students the Components and software that are used to access the Internet
- Discuss the Usage of the Internet
- Discuss the available educational websites in Sri Lanka

Guidance for assessment and evaluation:

- Identify the components and software that are used to access the Internet
- Identify the usage of the Internet
- Access the Internet
- Find out information by using educational web sites

Quality inputs:

- Internet facility, Computer , Software

Reading Material

- **Introduction to the Internet**

  The Internet is a collection of computer networks around the world. It connects university, government, commercial, and other computers in over 150 countries. It allows almost all computers worldwide to connect and exchange information. With the use of the Internet today, the whole world has become a global village. There is no owner for the Internet. When you access the Internet from your computer, it also becomes a computer which belongs to the Internet**.**

- **Internet Connection Components and software**
  - A Computer
  - Modem/Telephone Connection, dongle, Wi-Fi Router
  - Internet Service Provider (ISP- e.g. :- Dialog, Mobitel, Telecom)
  - Web browser (e.g. :-Google Chrome, Internet Explorer, Firefox, Safari, Opera)


Google Chrome


Internet Explorer


Firefox

Or

  - Smart Phone with Internet connection

- **Educational web sites**

Educational websites were designed to facilitate both students and teachers. Students can learn by themselves using educational websites. These websites have games, videos or topic related resources that act as tools to enhance learning and supplement classroom teaching. These websites help make the process of learning entertaining and be attractive to the student, especially in today's age.

Students can use the following websites in the educational sector to do self-studies in order to improve their knowledge or to obtain information or services.

1) www.nie.lk
2) www.doenets.lk
3) www.edupub.gov.lk
4) www.moe.gov.lk
5) www.e-thaksalawa.moe.gov.lk
6) www.nenasala.lk
7) www.vidumanpetha.com

Open the web browser and type one of the above mentioned educational URL in the address bar and access these websites to get educational information.

- **www.nie.lk (Download Syllabus, Teacher Guide)**

Fig 6.1.1 - www.nie.lk – a web site of National Institute of Education

- Download Syllabus

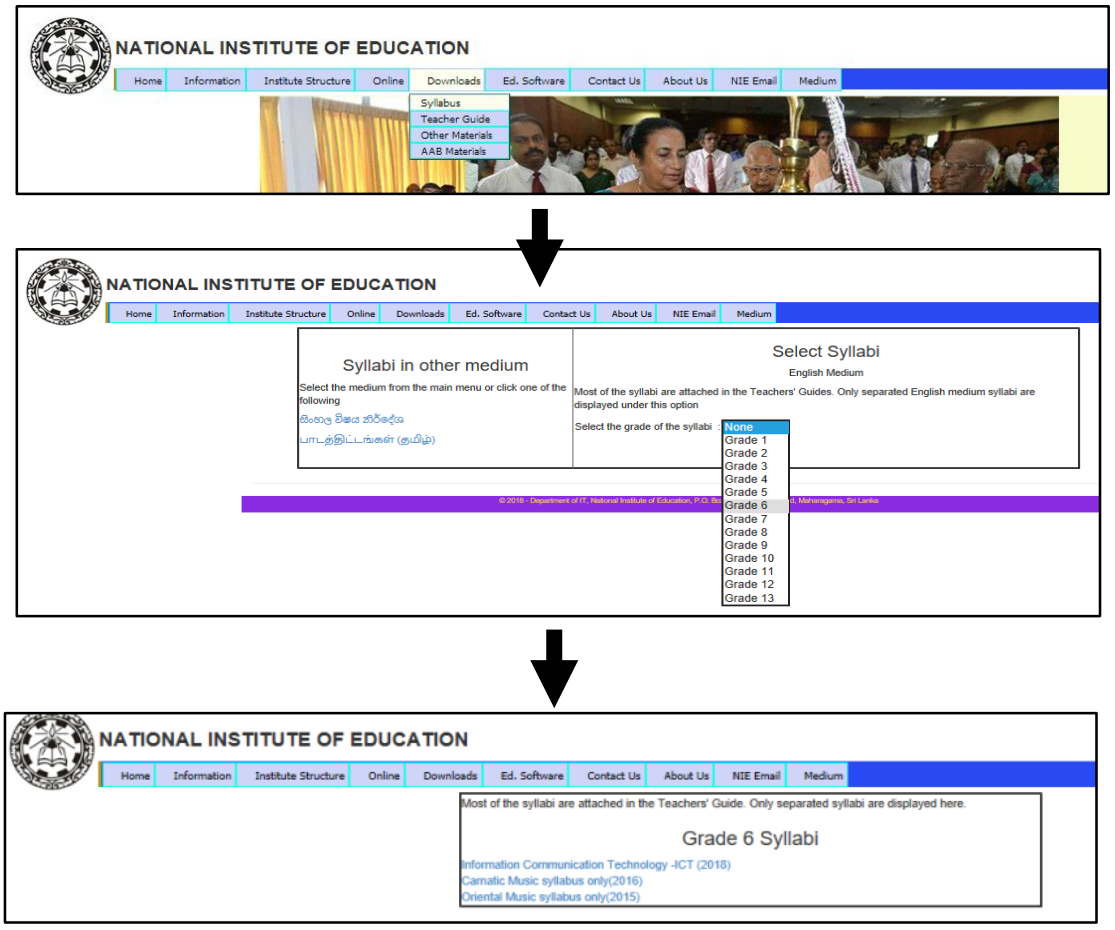


Fig 6.1.2 – Download Syllabus from National Institute of Education web site

- **www.doenets.lk (Exam Results)**

Fig 6.1.3 – www.doenets.lk - a web site of Department of Examinations

- **www.edupub.gov.lk (download Textbooks)**

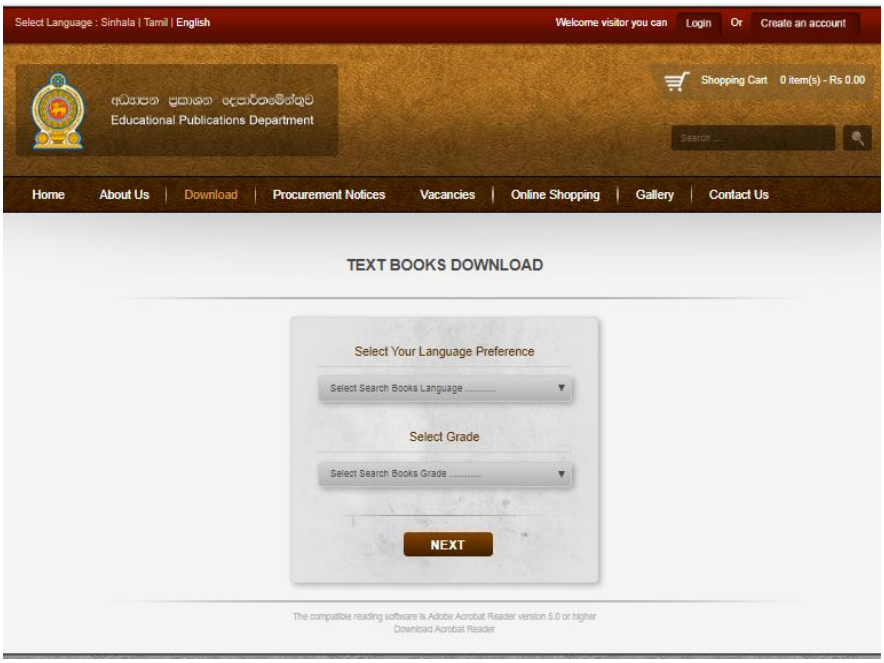
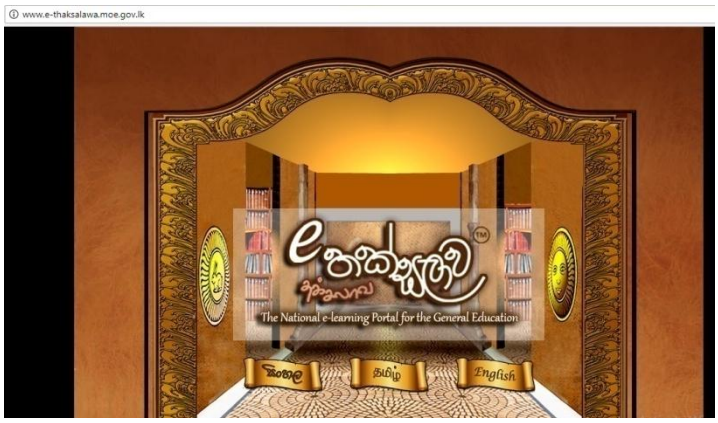


Fig 6.1.4 - www. edupub.gov.lk - a web site of Educational Publications Department

- **www.moe.gov.lk**
  (Circulars, Subject Related, Suraksha, Nenasa, Telecasting Timetable, … etc.)

Fig 6.1.5 - www.moe.gov.lk - a web site of Ministry of education

- **www.e-thaksalawa.moe.gov.lk (educational information)**



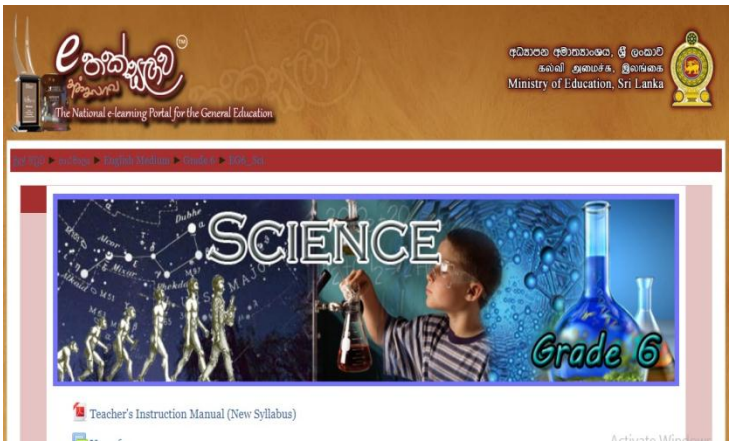


Fig 6.1.6 - e-thaksalawa

- **www.nenasala.lk**

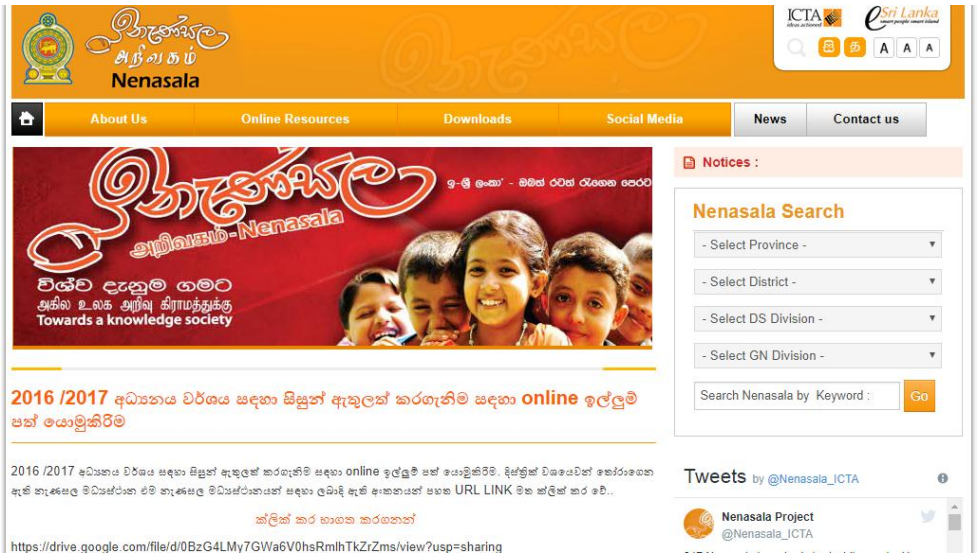


Fig 6.1.7 - Nenasala

- **www.vidumanpetha.com**

Fig 6.1.8 - **Vidumanpetha**

Competency 6 **:** Appreciates the Internet for information gathering and communication

Competency Level 6.2: Uses search engines to obtain information

Time **:** 05 periods

Learning Outcome:

- Lists different search engines
- Obtains information using search engines

Contents:

- Introduction to search engines
- Information searching on a specific topic using search engines

Concepts and terms to be highlighted:

- Introduction to search engines
- Different search engines
- Use of search engines

Guidance for lesson Plan:

- Define the search engines
- Discuss with the students the available search engines
- Discuss the use of search engines
- Search for information using search engines

Guidance for assessment and evaluation:

- List down different search engines
- Compare the features of the different search engines
- Find out the most suitable search engine
- Find out information by using search engines

Quality inputs:

- Internet facility, Computer , Software

Reading Material

- **Introduction of a search engine**

  A search engine is a web site that collects and organizes content from all over the Internet. Search engines are designed for Internet users to find any information easily. The search results are generally presented in a line of results often referred to as search engine results pages. The information may be a mix of web pages, images, videos and other types of files.

- **Why use a search engine**

  Web sites largely contain information on the Internet. If we want to obtain information from a web site, we should know the address of the web site. There is an unlimited number of websites in the Internet. So practically it is very difficult to remember the addresses of the web sites. Therefore, search engines are necessary for locating, sorting, storing and ranking the value of that information on the web. Most people use search engines to gather information. Some people use a search engine for research purposes. They generally look for answers or at least for data with which to make a decision.

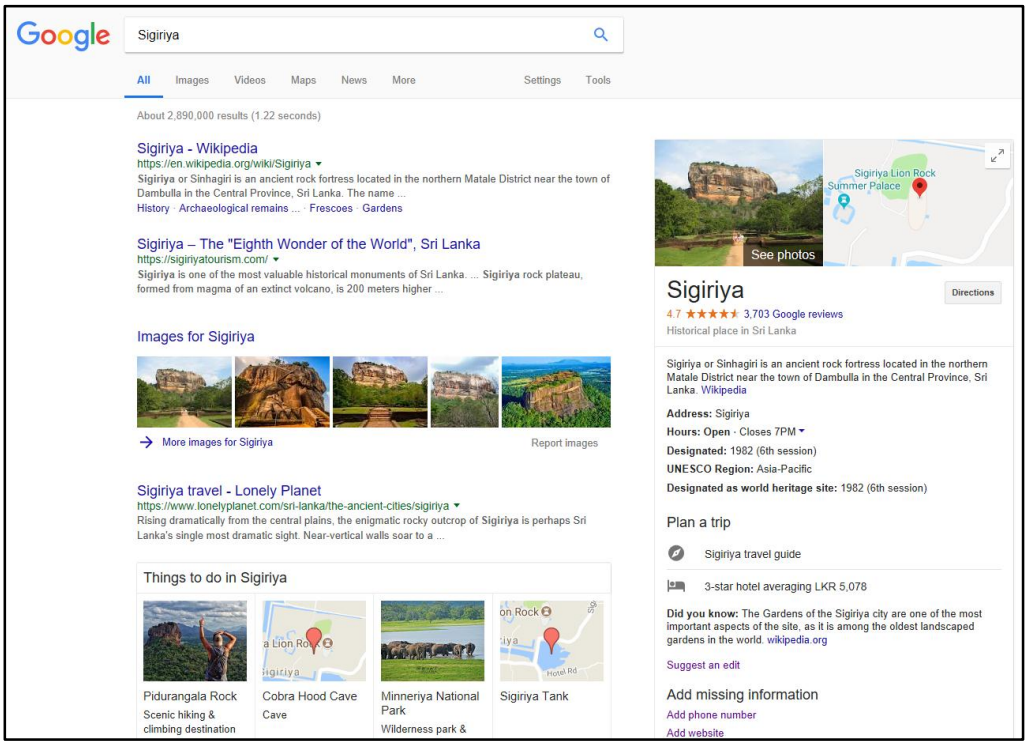
- **Most popular search engines in the world**
  - Google (www.google.com)
  - Bing (www.bing.com)
  - Yahoo (www.yahoo.com)
  - Ask.com (www.ask.com)
  - AOL.com (www.aol.com)
  - DuckDuckGo (www.duckduckgo.com)
  - msn (www.msn.com)

Fig 6.2.1 - Search engines

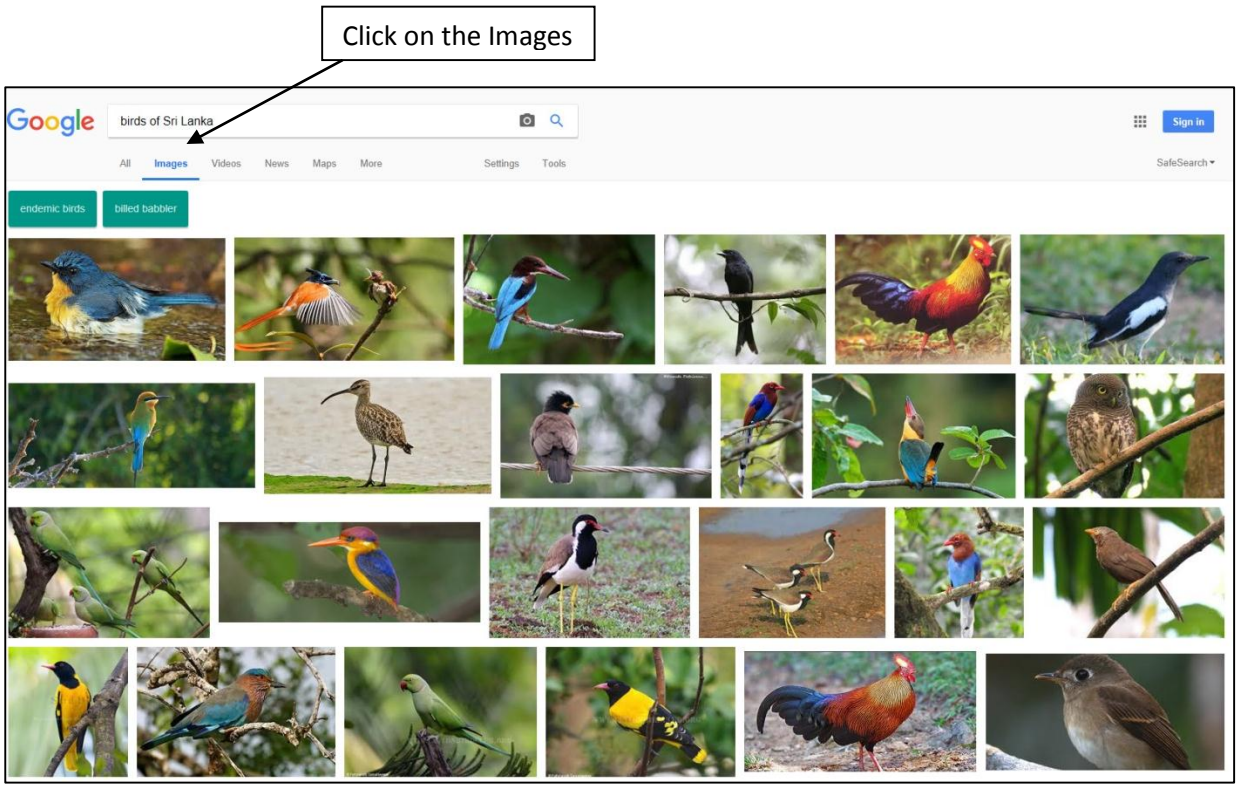
Fig 6.2.2 - www.google.com - Google web site

- **Obtains information using Search Engines**
  - Open a web browser.
  - Type search engine web address in the address bar.
  - Choose your search terms carefully.
  - Type these key terms in the search box of the search engine.
  - Click on the search button.
  - You will get a large number of web sites with hyperlinks which contain the information you need.
  - You can obtain the necessary information by clicking one or several hyperlinks.

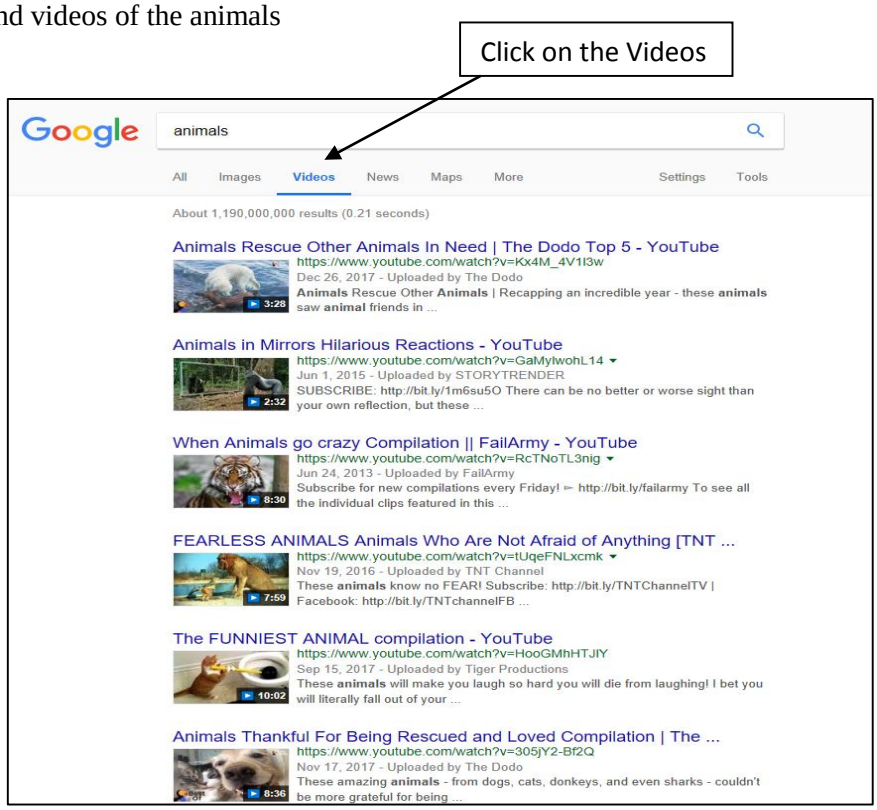
Ex : - Find about Sigiriya



Ex : - Find images of the birds of Sri Lanka



Ex : - Find videos of the animals



Competency 6 **:** Appreciates the Internet for information gathering and communication

Competency Level 6.3: Uses computers and data safely and securely

Time **:** 01 period

Learning Outcome:

- Follows safety and security procedures
- Realizes the importance of guidance of trusted mentors

Contents:

- Application of access control mechanism (Username, Passwords, etc.)

Concepts and terms to be highlighted:

- Importance of following safety and security procedures
- Available access control mechanism (Username, Passwords, etc.)
- Data stored on a computer can be made secure from viewing/accessing by unauthorized users
- Importance of the guidance of trusted mentors

Guidance for lesson Plan:

- Discuss the first step in safe computing which begins with username and password
- Discuss the importance of creating different accounts (administrator, user, guest)
- Discuss with students the importance of understanding the harmful effects of computer viruses and the importance of using antivirus software
- Discuss the importance of taking backups regularly, use file level security, password protected documents
- Discuss the importance of the guidance of trusted mentors when accessing the internet

Guidance for assessment and evaluation:

- List down three things the user can do to protect computer data.
- Find out available access control mechanisms
- Write down the importance of the guidance of trusted mentors when accessing the internet

Quality inputs:

- Internet facility, Computer , Software

Reading Material

- **Application of access control mechanism**
  - First Step in safe computing begins with username and password

    A username is essential so that when you log into a computer, it can identify you and assign to you all the folders, files and access rights that you should have. Usernames are used by the system only to identify you and not really for security so you should set a password.

Fig 6.3.1 - Login Page

  - Use different user accounts
    - Always set up all accounts that require good passwords. Do not allow a password to be empty or blank. The hackers can access the computer easily.
    - Remove or disable all guest and other accounts you do not need. Change all the initial passwords that might have come with your system.
    - Using different accounts, your personal info will be more secure since you will have the choice to protect important documents and files from being erased or changed by someone else.

Fig 6.3.2

- **Safety and security procedures to protect computer data**

  - **Antivirus software**

    Some computer viruses are harmful and it will alter, delete or damage the data in files stored on a computer system. Antivirus software should be kept up to date and used regularly to scan a computer system to remove any viruses. It should also be used to scan for viruses any files that are leaving or entering your computer to try and prevent the spread of viruses.

  - **Backup early and often**

    The single most important step in protecting your data from loss is to back it up regularly. It is important to store a copy of your backup off site in case of fire, floods, or other natural disaster that can destroy your backup tapes or discs along with the original data.

Fig 6.3.3

  - **Use file level security**

    To keep others out of your data, the first step is to set permissions on the data files and folders. User can set permissions for user accounts and user can allow or deny various levels of access from read-only to full control.

  - **Password protected documents**

    Many productivity applications, such as Microsoft Office applications and Adobe Acrobat, will allow user to set passwords on individual documents. To open the document, you must enter the password. You can require a password to open the file and/or to make changes to it.

    A password should be:

    - Something that only you know
    - Not shared with anyone, i.e. do not tell it to a friend or let them use it
    - Not be easy to guess, e.g. your pet or best friend's name, or even a word at all
    - Can be remembered easily but be complicated enough not to be worked out; it is recommended that a password be a mixture of letters in upper and lower case and include digits, preferably at random

Fig 6.3.4

- **Importance of the guidance of trusted mentors**

  - **When accessing the internet**

    There have been reports of children becoming victims of various crimes committed by some Internet users. Children are vulnerable for threats by organized wrong doers. Therefore, it is always safe if they are monitored by trusted adults when using the Internet. Children must be advised to make parents and guardians aware of those with whom they keep relationships over the Internet. Also, any possible threat must be reported to the relevant authority for necessary action.