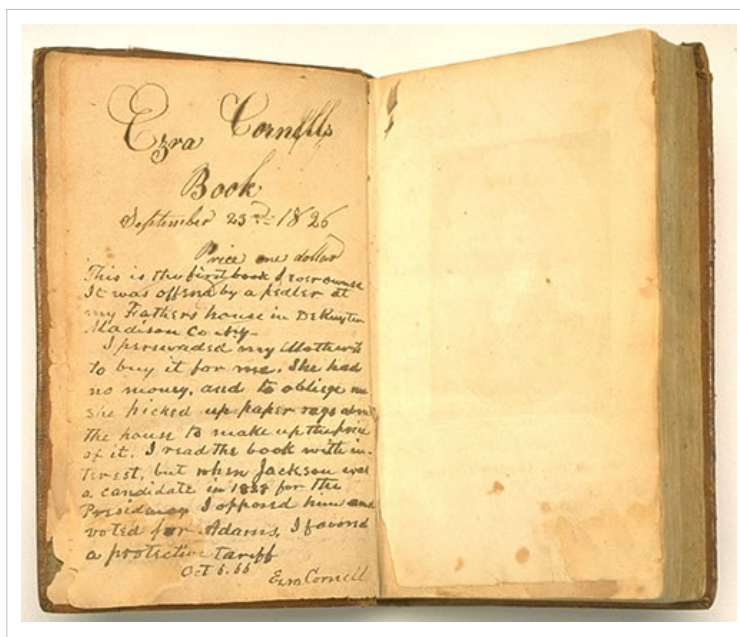


ICT student textbook/Print version



ICT student textbook

The current, editable version of this book is available at
http://teacher-network.in/OER/index.php/ICT_student_textbook

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Preface

Through the course of human history, there have been discoveries and inventions that have changed social processes and structures greatly. The agricultural revolution and industrial revolution created the agrarian and industrial societies respectively. We are now in another such age, brought on by Information Communication Technologies (ICT). With information creation, access, processing and sharing becoming quicker and simpler, society is now being shaped these processes, so much so that to be called the Information Society. Participating in this society requires the development of new skills as well as an understanding of how these processes are impacting justice and equity in society. It is the responsibility of the education system to respond to this by bringing into school education, an understanding of ICT, the impact of ICT and society, the possibilities for learning through ICT while at the same time building skills in students that will make them capable of functioning and responsive to a society shaped by ICT.

In this context, the Telangana Education Department is seeking to implement an ICT program in the state through an integrated approach that will focus on teacher capacity building, development of a comprehensive syllabus for ICT learning, development of content to support learning and provisioning of adequate infrastructure. The department is upgrading the school labs in 3,000 schools by building a digital lab and through equipping the classrooms with digital resources. The Telangana SCERT has decided to also develop an ICT syllabus and text book which will be used by the school teachers transacting the ICT classes from Class 6-10. The SCERT has developed the state syllabus and the textbook based on the National ICT curriculum developed by NCERT, which seeks to bring to school education the possibilities of ICTs for connecting and learning and creating and learning.

Approach and intent of the state ICT syllabus

The state ICT syllabus has been based on the aspirations and guidelines set in the National ICT Policy which focuses on building the skills of computing, creating and collaborating through safe, ethical, legal means of using ICT.

The syllabus has emphasised the different possibilities of ICT in society, briefly discussed below.

1. **Connecting with the world:** Technology is providing new ways for us to access information and learn. Along with this, evaluating information and using it appropriately become skills to be developed. This theme will focus on accessing the internet, evaluating resources available and creating meaningful personal digital libraries for self learning. This will also include an introduction to
2. **Connecting with each other:** A related dimension of connecting through ICT is in possibilities for learning in communities from each other. The focus of this theme will be on how to interact and learn in peer learning settings and through online, virtual forums. Collaborating an learning is a key learning expectation from this curriculum.
3. **Interacting with ICT:** Building skills and aptitudes in a technology environment is an important expectation of this curriculum. The theme will focus on building a more proactive approach to engaging with technology, evaluating appropriate technology choices, maintaining ICT infrastructure and becoming critical users of technology, being aware of the social and economic implications of technology.
4. **Creating with ICT:** This is a theme that focuses on building computing and creating skills in students and teachers using various ICT applications. These include data analysis and processing, creating graphics, creating audio visual communications, working with mapping applications, creating resources with specific school subject related applications and programming.

Ability to handle ICT environment, creating original content, sharing and learning and focusing on educational and learning processes rather than on specific applications are the key principles of this syllabus design. The syllabus has been designed keeping in mind the various possibilities of creative expression possible through ICT applications and platforms available today and also seeks to build a mindset that will explore and such applications on an ongoing basis. Without taking a conventional approach to building digital literacy on specific applications the syllabus

emphasizes a thematic, project based approach to ICT learning. Such an approach will also enable integration of ICT with multiple school subjects.

To facilitate such an approach to ICT learning, the technology environment in schools must be free and open. The syllabus has prescribed the use of free and open source technologies wherever available to facilitate such a free and open access. The educational content used in the schools will also be licensed as open content allowing teachers and students to modify and adapt the content to reflect their contexts.

How is the textbook structured

The SCERT has anticipated the attainment of the competencies and objectives outlined in the National ICT curriculum and ICT Policy in two stages, covering classes 6-8 and classes 9-10 and has developed a syllabus for 5 years, taking into account the student curriculum set out in the National ICT curriculum. This will be covered through two books

1. Book 1 - which will have three levels to cater to the classes 6-8
2. Book 2 - which will have two levels to cater to the classes 9-10

The following sets of materials have been prepared to support this syllabus:

1. A textbook for students, that introduces ICT skills and applications in a project based way, integrated with the different school subjects. The core competencies and skills to be covered in the text book will be determined based on the National ICT curriculum and the Telangana state subject text books and academic standards. The text book will take a project based approach to the attainment of these learning competencies.
2. A handbook for teachers and teacher educators to help them implement the syllabus as well as support their own knowledge and learning of the ICT applications based on the NCERT ICT curriculum. This accompanying handbook will facilitate the transaction of the ICT syllabus and also provide meaningful linkages to curricular and co-curricular areas. The teacher handbook will also have a component for teachers to build their own competencies in using ICT.

Focusing on open content creation, teacher capacity building as well as integrating technology to develop new methods of learning, we hope, can demonstrate an effective model of technology integration in the school system across the country. We also believe such an approach will strengthen the government school system such that the vision of education of 'equitable quality' set out by the Indian Right to Education Act is realised.

Keeping in line with the spirit of the National ICT Policy, the textbook is released under Creative Commons License, allowing teachers and other education departments to reuse, revise and modify. The copyright is held by the Telangana SCERT.

Introduction

Why ICT

Today's society is called the information society. Ability to gather information, methods of gathering information, processing it, analyzing it, communicating and making decisions to act on it are very important skills. Computers, cell phones, tablets - these are all words that are being used everywhere. As students, you have been introduced to some of these terms in your school, in your family or in your neighbourhood. The cell phone tower, your nearest ATM, your mother's mobile phone, games, whatsapp chats, email, the selfie, internet, videos and songs on your computer - all these are examples of a new kind of technology - a technology that has changed the way we are accessing information, the methods we are communicating and the ways we are working. The computer is becoming like a television, the phone is becoming like a computer, you can use the computer to make voice calls, you can speak to your phone- these and many such innovations are taking place rapidly. All these technologies - mobile,

television, computers, tablets - are together called Information Communication Technologies (ICT). ICT refers to those set of technologies that help us create information, access information, analyze information and communicate with each other. This current set of technologies are also called Digital Technologies.

[1] Chimpanzee using a stick to gather food	[2] Driver less car	When it was first discovered that chimpanzees can make tools, which had been considered an activity restricted to the human species, Dr Louis Leakey, a noted primatologist said " We have to define what is a tool, or we have to define what is a human being or we have to accept that chimpanzees are human beings!". <i>Do you think such a question can be asked about humans and computers? How will you feel about it?</i>
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Computers are no longer mere output devices but rather devices that can help us create, draw, compose music, communicate and do so much more; the idea of ICT has moved far beyond the mere computer. ICT and broadly digital technologies are changing the way we talk, we learn and we work.

This textbook will introduce you to the various possibilities of learning and doing and communicating that are possible now with ICT. As students, you are encouraged to explore this new area and make connections to your own daily life, the impact these ICT have on your life, how you would like to interact with this technology and how you can equip yourself to understand this new way of thinking, learning and communicating.

What can you expect to learn

In this new subject called ICT, we can expect to learn the following:

Information

1. What is ICT
2. How did ICT develop
3. Effect ICT has on family, neighbourhood, school and village
4. Use of ICT ethically, safely and responsibly

Performance

1. Use ICT to express your ideas, using available resources (using images, audio, text, videos)
2. Use ICT to learn school subjects and general knowledge
3. Use ICT to talk to your friends, to work together and to play together
4. Use ICT to help in the development of the local community, socio cultural activities and development.

How is this book organized

This book will present ideas and activities at three different levels to address the classes 6-8 and your teacher will determine the appropriate level of activity. We will be required to work on projects, individually or in groups, to explore a particular idea or a problem. We will use appropriate digital methods, tools and processes in this.

There will be hands-on projects for working with different applications and this will be combined with classroom discussion as well as individual readings for students. Different groups in the class will work on different examples for a given theme and share their analysis, findings and creations. It is expected that students will learn together and teach the other, as they explore the different possibilities with digital technologies.

There is a printed book which will be accompanied by a digital resource collection. This can be used for further exploration or reading or doing more activities. The textbook will indicate which resource will be used for which activity, alongwith an accompanying glossary.

overall suggestions

1. Add a glossary
2. Table
3. Write a short para on how each unit is organized
4. Box of all resources used in a unit

Overview

Objectives

In this unit you will be learning about:

1. The nature of ICT - how technology has grown in society, how ICT has developed and how it has changed the way society is organized today
2. How to use technology for self learning and collaborating with your friends
3. The various things you can do with ICT (like writing, painting, singing)
4. How to use ICT safely and also what are the principles to keep in mind when we use ICT to learn about legal aspects of technology, safety aspects of technology

How is the unit organized

In this unit, there are three levels of activities, to match roughly to classes 6-8. The activities will increase in difficulty - based on the ICT skills needed as well as subject knowledge that you will be building. As you work on the various activities for the different ICT areas in the each level, you will also get experienced with more ICT skills and this would help you with the subsequent level.

The levels of the unit have been defined based on the ICT skills that we expect to build as well as the overall understanding and subject levels expected. You can imagine this somewhat like a spiral staircase where you learn some topic at a basic level, you move along to the next class and you can come back to discuss the same topic at a more advanced level.

At each level you will be exploring different digital skills and you will also be required to create outputs that will explain your process of learning and demonstrate a particular digital skills. Some of the outputs will be such that you can keep adding to it in each unit.

The detailed description of objectives for each level are discussed here.

Level	Objectives	Digital Literacy Component	Looking at your learning
Level 1	<ol style="list-style-type: none"> 1. Introduction to the idea of computing 2. What makes the computer special 3. Data is of different kinds and can be edited, processed, combined in multiple formats 4. Different devices can be different for reading, representing data 5. Data can be organized in files and folders 	<ol style="list-style-type: none"> 1. Understanding what makes the computer special 2. Skills to handle ICT equipment safely 3. Familiarity with an operating system, file organising 4. Using input devices for entering data 5. Introduction to multiple applications 	<ol style="list-style-type: none"> 1. Mindmaps representing your understanding of information and various formats 2. Logs of lessons using applications for keyboard input

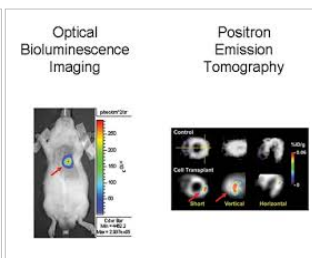
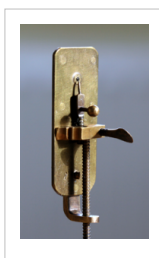
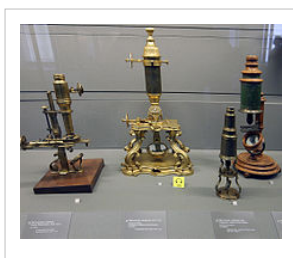
Level 2	<ol style="list-style-type: none"> Trace the history of technology and science Locating the history of ICT within this Understanding technology safety and ethical use 	<ol style="list-style-type: none"> Understanding that ICT has evolved/ evolving We have what is now called digital and non digital ICT Understanding what makes the computer special Able to handle ICT equipment safely Familiar with an operating system, file organising Introduction to multiple applications 	<ol style="list-style-type: none"> Demonstrated familiarity with input devices through lesson logs Concept maps to represent student conception of technology Text document with images to demonstrate student understanding of the evolution of technology
Level 3	<ol style="list-style-type: none"> Internet is becoming more prominent in our society Internet is a place for learning Safe use of internet Connecting is an important aspect of ICT Peer learning is enabled by ICT 	<ol style="list-style-type: none"> Accessing the internet Downloading information Safety while accessing the internet Using emails to communicate Safety while using email Skills of communicating using email 	<ol style="list-style-type: none"> Print to file copies of email conversations Text document with links to useful websites accessed alongwith a summary of the information on the site A short reflection on the role of technology and society and how students should interact with it - this can be in the form of a presentation or a text document with graphics

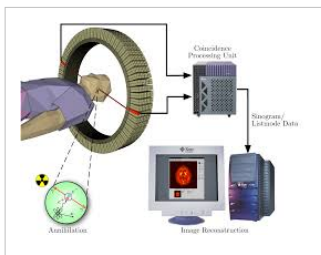
Science and technology

Many times you hear the word science and technology together. What is the connection between the two? Do you know? Study of science includes a method of observing things around us, thinking about why those events happen, explaining why the events happen, recording information about the events and also predicting what might happen. Often, scientists imagine what might be the solution and what might be the answer to the puzzles around us. The understanding of phenomena can lead to the development of tools – this is what we call technology. The technology can provide us more methods of observing, experimenting and recording. And this in turn results in the advancement of science. Thus, science and technology share a symbiotic relationship.

A symbiotic relationship is when two phenomena work together and one affects the other. This term originated in biology and ecology to describe interactions between different organisms. Watch the attached video for examples of symbiotic relationship.	START_WIDGETd175374b68f51bb4-0END_WIDGET
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Can you think of examples of where technology has helped the growth of science? One area is that of cell biology. Until the microscope was invented by Robert Hooke and Anthony Leeuwenhoek, the study of cells was not possible. Now we study structure of cells, growth of cells, disease-affected cells, cell reproduction, gene sequencing and DNA using many advanced microscopes, cameras; the data and images are analysed using computers.





As you can see the microscope started with simple magnification; now, the images captured by the microscope and camera can be input into the computer for further study and research. It has even become possible to scan parts of the body for diagnosing illnesses. Many complex problems in biology are being studied through the use of computers. Some of these areas include cancer research, study of how certain diseases develop and development of medicines.

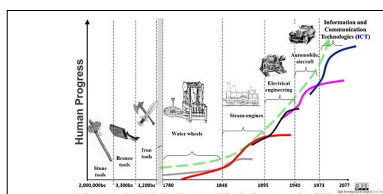
Similarly, our understanding of astronomy has been expanded after the invention of the telescope. But to make a telescope or microscope, we need to understand the properties of light. We must understand how a lens works, how light travels. Thus, science and technology are very closely connected.

Your teacher will discuss with you more examples of how technology has impacted the way we understand many natural phenomena.

Information and communication technologies (ICTs)

Information is not new for human beings; communication has been known since the time human beings lived in caves. Thus ICT are as old as human beings themselves; human beings needed to communicate with one another, beginning with symbolic (non verbal) ways, before language was invented. The language we speak could be seen as first 'ICT', it enabled (oral) communication amongst human beings. Writing and script was the next technological advancement - around 5000 years ago - which enabled information could be created and communicated at different times and in a different place. Oral communication does not have this benefit, Writing also enabled easier recording of human history and thus the invention of script was a landmark in the history of ICTs. Next came printing which made it possible replicate writing. The invention of radio and television was the next advancement in ICT as it became possible for more and more people to access information.

Thus, the technology for information creation and communication has been changing, connected with the advancements in scientific knowledge. Changes happened in the way computing evolved and changes happened in the way communication technology evolved, each impacting the other to produce the ICT environment we are now in; and which is still changing rapidly.



Growth of ICT can be seen to be broadly in terms of 4 ages

1. premechanical
2. mechanical
3. electromechanical and
4. electronic

While technology for information creation, storage and processing has been developing continuously, one important development which changed the course of technology is the development of digital technologies in the electronic area. Whereas during the electromechanical area, information was stored largely stored in analog formats. During the electronic age, information was stored in analog and digital formats.

Analog and digital technologies

Impact on computing and development of computers

<p>During the mechanical and electric analog phases of technology, information was created by a series of physical changes converted into electrical impulses for storing and machine, and each analog information storage required a specialized equipment to decode and read the information. A cassette player or a gramophone disc is an example of such a device. Analog machines could be programmed for specific applications as well as for generalized computation. Representing information for computing using physical changes often meant that the results could not be accurate as the changes could not be replicated exactly.</p>	<p>See below how a difference engine, designed by Charles Babbage worked. START_WIDGETd175374b68f51bb4-1END_WIDGET</p>
<p>An important breakthrough came when the binary system was invented. In the binary system information can in a series of "0"s and "1"s thus allowing information to be accessed through only a combination of "1"s and "0"s. This allowed information to be communicated in discrete bits which could be combined and recombined. Such a computer which uses "0"s and "1"s to perform computations a digital computer. What makes our society now different from ever before is the presence of digital technologies. Combined with the development of new methods of designing circuits like transistors and micro chips, it became possible to design computers which performed computations using digital methods. This improved the reliability and ease of computations significantly over the analog machines. The digital electronics changed operations in many applications including manufacturing, however the impact on ICT has been almost revolutionary. This has led to the growth of computers as we know it - from large clunky computers to the computer on your desktop to the laptop and now the smart phone.</p>	<p>slideshow - [3] See the slideshow here for a glimpse of how the digital technology revolutionized history of computing.</p>

Impact on communication technologies

What is the word that comes to your mind when you say communication? The phone, precisely the cell phone. We will now look at how the communication technologies evolved.

Radio communication

The earliest electronic communication devices functioned using radio technology. Many communication devices we know today also function through radio waves. Radio waves are electromagnetic waves. They carry energy through repeated propagation of electric and magnetic fields. Radio waves carry a certain amount of energy and can travel over large distances. When the wave reaches the destination, the receiver gets the amount of information. We cannot see radio waves but we can detect them by building receivers that can detect them. These are called as antennae. They scan the environment for radio signals and respond when they find a signal. They detect the radio signal by the effect of the changing electrical and magnetic fields. Frequency gives a measure of how fast the radio wave is being produced and depends on the source from where the radio waves start. Different radio waves come at different frequencies and we need to build transmitters that detect them. Sound is a pressure wave – when we produce a sound it travels by disturbing the air particles. If there is no medium, sound cannot travel. What happens when we hear something on a radio? Originally sound is produced and then it converted into radio waves. These waves are sent and received through instruments called antennae. When your radio antennae receives this radio wave, this is converted back into sound and is played.

Use of radio waves in astronomy : Radio waves are also produced by many celestial objects. By detecting the radio waves that travel through the atmosphere, it is possible to construct images of the astronomical objects. Radio waves can pass through dust and gas unlike light. Radio astronomy along with optical observation is allowing us to understand the universe better.

Telephone

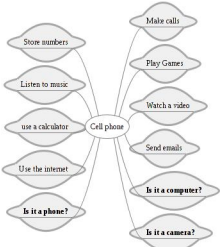
Before the cell phone came, most of the long distance voice communication was through the regular telephone. This was based on the idea of travelling sound waves. They cause the mouthpiece to vibrate and this vibration is carried to the receiver at the other end. When a call came from one number, there will be an operator who sits at an office who will connect the call to another receiving number. Now this is different with automatic switches which connect the calls. The transmission of the signals has also become different now with voice being converted into electrical signals. All these transmissions used to happen through physical cables. These cables were either made of copper or optical fibres.

When you make a phone call, the voice signals from your phone get transmitted through these fibres to the nearest telephone exchange and through a series of switches sent to the receiver. Usually the first few numbers in our telephone number indicates the exchange information. In the earlier days, long distance calls (outside of the local exchange) could only be made by booking a trunk call. The users had to 'book' or rent the line through which the call can be made and this used to be done manually by the telephone operators in the exchange. Now-a-days, with automatic switches, long distance calls can be made directly to any number, even outside the country.

The cell phone

The telephone and the radio came together - And we call that the cell phone! We saw how a telephone works. We also saw what radio waves are and we have some idea of what frequencies mean. There are many frequencies available for the users to talk on. Any geographic area is divided into small plots, and in each area a fixed number of frequencies is used. Each of these areas are called cells. The cell phone is called a cell phone because it functions by dividing a geographical area into small plots or cells through which the transmission takes place. It is possible to make and receive calls when there is a cell phone tower near your area for receiving and sending that frequency. Now do you understand what we mean when we say 'my cell phone has no coverage here'? It is because of this also that cell phones sometimes do not work inside buildings when the radio signals are disturbed. Just like an exchange for regular telephone calls, there is a mobile switching that allows you to make calls even when you move from one cell to another!

Can you make a list of all the things a cell phone does?

	<p>A cell phone functions like a phone, a camera and a computer. Yet, it does all of this using a few components. If you open up a cell phone, you will see the following parts:</p> <ol style="list-style-type: none"> 1. A circuit board : This is the brain of the cellphone and gives all the instructions to the phone. This contains a set of integrated circuits for giving instructions to the cell phone also. A computer has a similar circuit board also. 2. A keyboard : This is also very similar to the computer keyboard and you use the key board to operate the cell phone. 3. Display : This is similar to the computer monitor. <p>Other parts include a microphone, antenna, speaker and a charger. One of the important parts of the cell phone is called the SIM card. The SIM card connects the phone to the network, your location. This helps the phone connect to a cell phone network and can also store phone numbers. It can be removed from one phone and put in any other cell phone.</p>
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What can ICT do

ICT have changed the society

Look around you - can you make a list of things that have digital technologies involved in them? Yes, that is right. Starting from the computer in your school, television, movies, videos and other materials for subject learning mobile communication, Aadhar card, land records, bank accounts, pension accounts and so many more things, ICT have become integrated into society in many ways.

ICT can create information in so many different ways - maps, audio, video, text, numeric data. How we are able to generate information means more and more possibilities of knowledge creation and sharing. ICT have brought together people, made it possible to learn in different ways. How we learn and what is needed to be learnt have become different. For example, we no longer need to learn about a withdrawal slip, we need to know how to use the ATM. Your teacher can now take a video of a class in your school and share it. There is a great convergence of many technologies that is happening, a mobile is approaching the computer, the internet taking over.

If so many things are impacted by ICT, it is important to understand how these work, and how they should be used safely and ethically. Technology should be treated like a common resource where everyone can access it, interact with it, benefit from it and contribute to it. It should be used such that more and more people can get access in society should be treated like a public information good.

Objectives

1. Introduction to the idea of computing
2. What makes the computer special
3. The computer communicates with data
4. Data is of different kinds and can be edited, processed, combined in multiple formats which is what makes it possible to do many things with ICT
5. Different devices can be different for reading, representing data
6. Data can be organized in files and folders
7. Computers can connect with one another

Digital Literacy Component

1. Understanding what makes the computer special
 2. Skills to handle ICT equipment safely
 3. Familiarity with an operating system, file organising
 4. Using input devices for entering data
 5. Introduction to multiple applications
 6. Introduction to internet
-

Looking at your learning

1. Mindmaps representing your understanding of information and various formats
2. Logs of lessons using applications for keyboard input

Activities

1. Activity 1 - How is a computer different from a fridge
2. Activity 2 - What all can you do with a computer
3. Activity 3 - Internet of things

How is a computer different from a fridge

How is a computer different from a fridge

Objectives

1. A computer can do many things; unlike many other electronic appliances
2. A computer can connect to other computers
3. The computer works with data

What prior skills are assumed

1. Academic levels as per class level; no specific ICT skills

Resources needed

Hardware, software, Files

1. Computer installed with Ubuntu Operating System
2. Projection Equipment
3. Images to show of the computer
4. Basic digital literacy Handout
5. Freemind Handout.

[4] Image [5]	[5] Image [5]
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Digital skills

1. Interacting with the ICT environment
2. Understanding the role of an Operating system
3. Understanding the difference between operating system and application software

Description of activity with detailed steps

Teacher-led component

1. Students in small groups can make a of list all the items a washing machine does and a list of all the things they think a computer can do.
2. In a group activity the teacher will compile all the group comments in a digital mindmap using a concept mapping tool and encourage students to classify the various things the computer will do.
3. The teacher will discuss why an operating system needed is and how it works with different applications to ensure that data is communicated
4. With the help of a schematic the teacher will discuss the parts of a computer
5. In small groups the students can switch on a computer and identify the parts they know

Student activities

1. With your friends, compare a mobile phone and the computer and list the things each does
2. Discuss with your friends is there any difference
3. For any one mobile application, draw a flowchart/ concept map to document all the steps in using the application

Portfolio

1. All mind maps/ charts to be digitized and add it to the cumulative portfolio

What all can a computer do

What all can a computer do

Objectives

1. The computer communicates with data
 2. Data is of different kinds and can be edited, processed, combined in multiple formats which is what makes it possible to do many things with ICT
 3. Different devices can be different for reading, representing data
 4. Data can be organized in files and folders
 5. Getting familiar with input devices
-

What prior skills are assumed

1. An understanding of an operating system
2. Application software
3. Use of mouse and keyboard

Resources needed

Hardware, software, Files

1. Videos, images to show
2. Text files
3. Geogebra Animations
4. Internet availability to demonstrate a web page
5. Handout for Tux Typing
6. Handout for Tux Paint

Digital skills

1. Learning to work with multiple applications
2. Learning to work with input devices

Description of activity with detailed steps

Teacher led activity

1. Watch the video shown by your teacher and see if any of the applications are familiar to you
2. Your teacher will demonstrate a file folder different kinds of files to you, which are opened by different applications. With your friends, you need to focus and point out the features of each application:
 1. What is the file name and file extension
 2. How the application was opened (from a menu or right click)
 3. What all did they see on the application
 4. What input had to be given (for example, opening a browser and typing an URL)
 5. What controls are available (increase in size, volume, etc)
3. Your teacher will also demonstrate the Applications Menu to demonstrate Tux Typing and Tux Paint.

Student activities

1. On student computers, open the files that have been saved in a folder. There will be a folder with an image, video, text document stored. Students must open the folder on the computers and each of the files.
 2. Open the Application called Tux Typing and take turn with your friends in a group to practice
 3. Students must create their own work folders on the computer=
 4. Open the Application called Tux Paint and take turn with your friends in a group to practice
-

Portfolio

1. Lesson logs of Tux Typing
2. Files created with Tux Paint

How to use the template

1. {{subst:ICT-Project}}
2. After the template is inserted go to the side box syntax and add the corresponding chapter link from the teacher handbook

Add a link to the Teacher Handbook

Internet is the computer

Internet is the computer

Objectives

1. Understand that computers can connect to one another, a term called Networking
2. The internet is such a network

What prior skills are assumed

1. Knowledge of what an operating system is and what an operating system is
2. Familiarity with keyboard and mouse input
3. Understanding folders and files
4. An understanding that computers work with data

Resources needed

Hardware, software, Files

1. Computer lab
2. Internet access

Digital skills

1. Working with input devices
 2. Working with a browser software to access the internet
 3. Handout Firefox Web Browser
 4. Handout Basic digital literacy
-

Description of activity with detailed steps

Teacher led activity

1. The teacher will open an application called Firefox and will try to access information. In your school lab, the computers may or may not be connected, but it is possible for computers to be connected.
 2. The Internet is such a network of things. https://upload.wikimedia.org/wikipedia/commons/a/ab/Internet_of_Things.jpg
- . The teacher will also demonstrate some websites which show how the internet is helping in communicating.

Student activities

1. In small groups, make a list or a concept map of all the areas where you think computers are connected.
2. Practise with typing with the keyboard and mouse.

Portfolio

1. The mind maps made by the groups can be collected and digitized.
2. Lesson logs of use in Tux Tping.

Objectives

1. Trace the history of technology and science
2. Locating the history of ICT within this
3. Understanding technology safety and ethical use

Digital Skills

1. Understanding that ICT has evolved/ evolving
 2. We have what is now called digital and non digital ICT
 3. Understanding what makes the computer special
 4. Able to handle ICT equipment safely
 5. Familiar with an operating system, file organising
 6. Introduction to multiple applications
-

looking at your learning

1. Demonstrated familiarity with input devices through lesson logs
2. Concept maps to represent student conception of technology
3. Text document with images to demonstrate student understanding of the evolution of technology

When did it all begin

When did it all begin

Objectives

1. To develop a historical perspective on technology
2. To see technology as a human process

Resources needed

START_WIDGETd175374b68f51bb4-2END_WIDGET

Hardware, software, Files

Digital skills

1. Link to tool page as needed
2. Link to tool page as needed

Description of activity with detailed steps

How to use the template

1. {{subst:ICT-Project}}
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Add a link to the Teacher Handbook

The human story behind the computer

Title of Activity

Objectives

1. To understand the role ICT play in society - the potential and the problem

What prior skills are assumed

1. Level 1 skills of the ICT program

Resources needed

Hardware, software, Files

1. Slide show of The story of Enigma ^[6]
2. Computer with projection equipment

Digital skills

1. Link to tool page as needed
2. Link to tool page as needed

Description of activity with detailed steps

Student activities

1. Students make a list of all technology artefacts they are aware of
2. Students make a storyline of the ICT they are familiar with - using a concept map

How to use the template

1. {{subst:ICT-Project}}
2. After the template is inserted go to the side box syntax and add the corresponding chapter link from the teacher handbook

Add a link to the Teacher Handbook

Objectives

1. What makes internet is special - internet is becoming more prominent in our society
2. Internet is a place for learning
3. Safe use of internet
4. Connecting is an important aspect of ICT
5. Peer learning is enabled by ICT

Digital skills

1. Accessing the internet
2. Downloading information
3. Safety while accessing the internet
4. Using emails to communicate
5. Safety while using email
6. Skills of communicating using email

Looking at your learning

1. Print to file copies of email conversations
2. Text document with links to useful websites accessed alongwith a summary of the information on the site
3. A short reflection on the role of technology and society and how students should interact with it - this can be in the form of a presentation or a text document with graphics

The machine is using us

The machine is using us

Objectives

1. To develop an understanding of the role the Internet is playing in the society
2. To be able to use the internet as a learning resource

What prior skills are assumed

1. Skills of creating using multiple applications
2. Familiarity with creating different applications

Resources needed

Hardware, software, Files

1. Computer lab with projection
 2. Internet access
 3. START_WIDGETd175374b68f51bb4-3END_WIDGET
-

Digital skills

1. An understanding of what is the internet
2. Browsing the web

Description of activity with detailed steps

How to use the template

1. {{subst:ICT-Project}}
2. After the template is inserted go to the side box syntax and add the corresponding chapter link from the teacher handbook

Add a link to the Teacher Handbook

The global digital library

The global digital library

Preparation

Resources needed

Hardware, software, Files

Digital skills

1. Link to tool page as needed
2. Link to tool page as needed

Description of activity with detailed steps

How to use the template

1. {{subst:ICT-Project}}
2. After the template is inserted go to the side box syntax and add the corresponding chapter link from the teacher handbook

Add a link to the Teacher Handbook

Objectives

We saw how computers work by converting everything into data. Whether we see a picture, or listen to a song or perform calculations, we are working with data. In today's world data is becoming more and more important and we should develop skills of understanding data to make decisions.

In this unit, you will be learning the following:

1. How to read data in various formats and representations and analyze
2. Methods of data organizing, analysis and representation
3. Processing and representing data in textual, image and numeric formats with different tools
4. Understanding the power of data visualization

As in the previous unit, this unit will also have three levels with different activities in each level.

Overview

Data representation and processing level 1

Objectives

1. Understanding data is around us, in the various things we see
2. Data can be represented as numbers, text, pictures
3. Reading pictures, graphs and plots to make meaning
4. Representing findings through concept maps and text documents

Digital skills

You will build upon the digital skills developed from the previous unit.

1. Operating system and interacting with the ICT environment
2. Reading images, pictures, photos
3. Concept Mapping
4. Textual analysis

Looking at your learning

You will be producing different outputs demonstrating the process of data analysis and your understanding

1. Text document with analysis
2. Text document with image, chart inserted
3. Concept Map with presenting the findings/ exploring data

Data can tell stories

Data can tell stories

Objectives

1. Understand that data can be in different formats
2. Reading different kinds of data to make meaning
3. Analyzing and expressing

What prior skills are assumed

1. Creating folders and saving files
2. Opening a given file with the correct application
3. Familiarity with using a key board

Resources needed

Hardware, software, Files

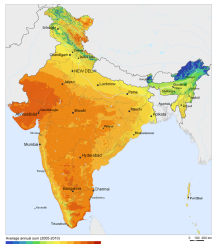
1. Data in the form of bar graphs, pictographs, maps (images)
2. Computer lab with projection
3. Access to internet
4. Handout - Learn Ubuntu
5. Handout - Learn LibreOffice Writer

Digital skills

1. Navigating a folder
2. Opening multiple files with multiple applications
3. Text entry (local languages)

Description of activity with detailed steps

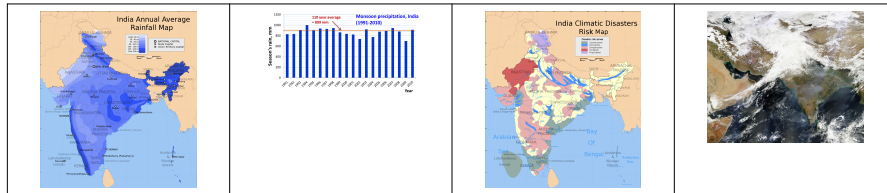
Teacher led activity

[7]		<ol style="list-style-type: none">1. You will look at an example of a data representation in the form of a graph with your teacher.2. In small groups, discuss what are the various kinds of analysis you can make from this graph.3. Your teacher will summarize this analysis using a text document.
-----	---	--

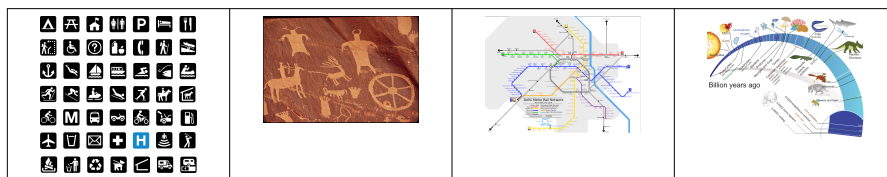
Student activities

1. Folders with different data sets will be shared on each computer
2. Each group of students will get one data set to work with - this will comprise maps, satellite images, pictographs and bar graphs. Your teacher will also give you a set of questions for each data set.
3. # Summarize your findings in a text document. Data sets are given below:

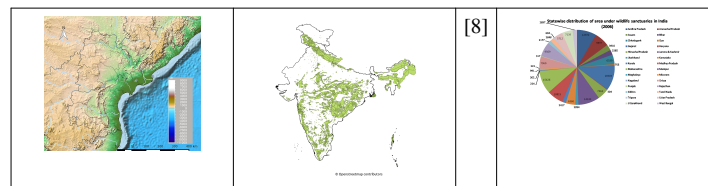
Rainfall



Pictographs-one per group



India's forests



Portfolio

1. Text document with analysis of data

How to make data meaningful

Title of Activity

Objectives

1. Data can be organized for meaning making
2. Identifying data elements to capture for organizing data
3. Identifying method of organizing that will allow you to answer the questions (building a table for data)
4. Understanding the importance of representing data in pictures

What prior skills are assumed

1. What prior skills are assumed
2. Understanding of different types of data
3. Creating folders and saving files
4. Opening a given file with the correct application
5. Familiarity with using a key board and text input (Telugu)

Resources needed

Hardware, software, File


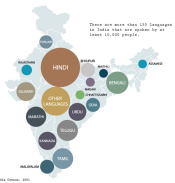
1. Data in the form of bar graphs, pictographs, maps (images)
2. Computer lab with projection
3. Handout - Learn Ubuntu
4. Handout - Learn LibreOffice Writer
5. Handout - Learn Tux Typing

Digital skills

1. Working with different files and applications
2. Creating and editing a text document

Description of activity with detailed steps

Teacher led activity

		<ol style="list-style-type: none"> 1. Your teacher will use these data sets to discuss how data elements can be identified for any set of data 2. Each data element will have a value associated with it and the data can be organized along those values 3. It is also possible to pictorially represent the data once it is organized
---	---	--

Student activities

In this section we will focus on creating data sets in the class. The following activities can be take up by different sets of students.

1. **Know your neighbourhood:** In groups, students could take up surveys of the school or home neighbourhood. Some of the parameters for building the data set include the types of houses, the number of household members, the number of houses with school going students, the number of houses with students in college, the number of houses with cooking gas connection.
2. **Profile of the newspaper :** Pick 3-4 newspapers from your library. Collect the following data for each newspaper.
 1. Date of the newspaper.
 2. Day
 3. Total number of pages in it.
 4. Price of the newspaper.
 5. Name of the editor.

6. Number of comic strips/ games/ puzzles/ crossword.
7. Number of Letters to editor.
8. Number of advertisements.
3. **What are we eating** This is to track the nutrition for students. Collect the various data elements around the mid-day meal in terms of the ration , fuel, grains and lentils consumed and vegetables
4. **Organizing our ICT resources:** Revisit the data sets created in the school lab computers for the activity What all can a computer do. Organize the resources in terms of features like size of the file, type of the file, application needed to open it and how this file could be used.
5. **Studying the flags of the world:** #With a collection of flags of various countries, try to organize them based on various parameters like colour, shapes contained, symbols contained and so on. This data can be tabulated for analysis.

Portfolio

1. Data collected and tabulated (this can be non digital and can be digitized in subsequent activities)
2. Text document with the data sets collected

A concept map of my data

Title of Activity

Objectives

1. Understanding concept mapping as a method of expression
2. Using a concept map to explain the connections within data, further explorations, etc

What prior skills are assumed

1. An understanding that data is of different kinds
2. Familiarity with reading multiple kinds of data
3. Organizing data and creating data sets
4. Working with folders and files

Resources needed

Hardware, software, Files

1. Computer with Ubuntu installed
 2. Learn Ubuntu
 3. Learn Freemind
-

Digital skills

1. Introduction to working with a concept mapping tool
2. There are different formats in which data can be captured
3. One data format can be converted to another and multiple formats can be combined

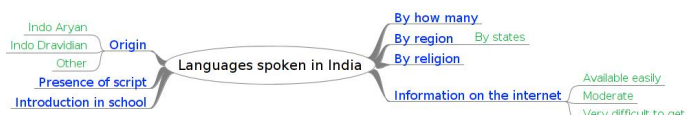
Description of activity with detailed steps

Teacher led activity

1. Your teacher will take you through a process of explaining data organization and method. For this she will use a concept mapping tool.
2. We will use an existing data set to work on this. (We will use the languages of India map used in the previous activity)
3. Your teacher will discuss with you how the mind map can be used to organize a process as well as be used as an output format. The mind map can be used as a live mind map or as an image.
4. The mind map to explore the data is given below.

Teacher led activity

1. Your teacher will take you through a process of explaining data organization and method. For this she will use a concept mapping tool.
2. We will use an existing data set to work on this. (We will use the languages of India map used in the previous activity)
3. Your teacher will discuss with you how the mind map can be used to organize a process as well as be used as an output format. The mind map can be used as a live mind map or as an image.
4. The mind map (dynamic) and image (static) are both given below.



Student activities

1. For the data collection activities described in the previous section, make a mind map representing the various data elements, the methods of organizing and possible ways of representing
2. You can create a mind map as an introduction to the data analysis and store it in your folder.

How to use the template

1. {{subst:ICT-Project}}
2. After the template is inserted go to the side box syntax and add the corresponding chapter link from the teacher handbook

Add a link to the Teacher Handbook

Making a text document

ICT student textbook/Representing data analysis with text

Data representation and processing level 2

Objectives

1. Understanding number patterns
2. Using spreadsheet to organize data, analyse data and represent
3. Using concept maps and text documents to output data analysis

Digital skills

1. Analyzing data using a spreadsheet
2. Studying plots and graphs
3. Visualization allows us to see how data behaves, what conclusions can be drawn (what can a plot show that sort cannot)
4. Presentation for output with concept map, text document

Looking at your learning

1. Concept map to represent a data analysis
2. Text document to summarize data analysis

Numbers and patterns

ICT student textbook/Playing with number patterns

Columns and rows!

ICT student textbook/Data analysis with spreadsheet

Inferences from plots and graphs

ICT student textbook/Plots and graphs

Presenting data analysis with a concept map

ICT student textbook/Concept map to present data analysis

Text document with data analysis

ICT student textbook/Text document to present data analysis

Objectives

1. Querying data to make analysis
2. Reports and graphs base on data
3. Making a presentation on data analysis

Digital Skills

1. Using spreadsheet for advanced data analysis
2. Using a text editor to produce a multi-page document

Looking at your learning

1. Output in a multipage document
2. Spreadsheet with different data analysis

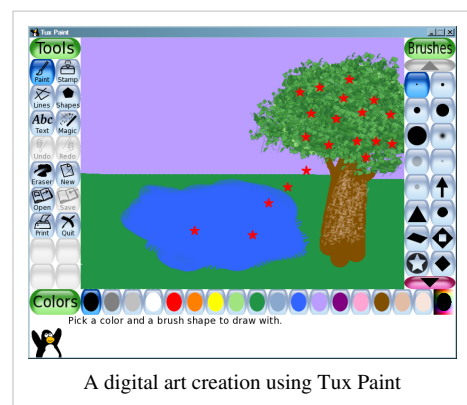
Multi page text document

ICT student textbook/Text document with advanced formatting

Communication with graphics

Overview

A picture tells a thousand stories, they say! We all have enjoyed beautifully drawn, illustrated story books. With digital technologies, a new whole new world has been created in terms of expressing oneself through art. The availability of new tools has also made it possible for us to create new communication outputs; moving away from a text-only approach. Some people communicate better with text, some with pictures, some with speech - ICTs allow for ways of expression using these multiple methods.



Effective communication now, therefore, depends on how well we are able to construct a story, the appropriate use of images, audio and video. In this unit we will focus on how we can use graphics tools to make richer and more meaningful communication.

Objectives

In this unit you will be learning the following:

1. Power of story telling as a method of communication
2. Interpretation of picture stories
3. Creating digital art
4. Developing a storyline with appropriate choice of illustrations and media
5. Creating a graphic communication - combining images and text

Communication with graphics level 1

Objectives

1. Understanding story telling as communication
2. Pictures can tell a story
3. Text can be added to pictures to tell a story

Digital Skills

1. Capturing an image using multiple methods
 1. Screenshot
 2. Camera
 3. Mobile
 4. Snapshot from a video
2. Organizing images in a folder
3. Creating image slide shows
4. Combining text and images

Looking at your learning

1. Folder with images and pictures
2. Image slideshows

Photo and image essays

Photo and image essays

Objectives

1. Capturing an image so as to tell a story, communicate
 2. Understanding that a sequence of images can be created as an essay
 3. Getting familiar with different methods of image capture
 4. Ability to build a script to tell a story
-

What prior skills are assumed

1. Ability to operate ICT equipment safely, including mobiles, camera, etc (If this is not the case, a short introductory session can be done by the teacher)
2. Familiarity with the ICT environment and managing files and folders
3. Text typing in local languages - through concept mapping or text editing

Resources needed

Hardware, software, Files

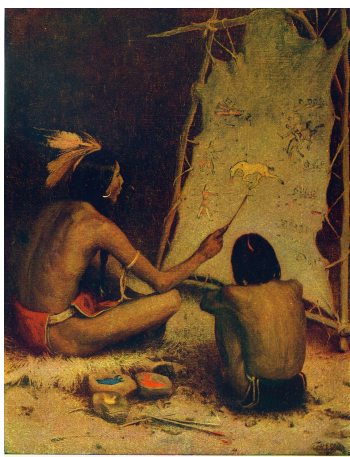
1. Images, photos
2. Camera. mobile
3. Computer lab with projection equipment
4. Learn Ubuntu
5. Learn LibreOffice Writer
6. Learn Kolor Paint

Digital skills

1. Capturing images and organizing them in folders
2. Viewing images
3. Combining different formats together - text and image

Description of activity with detailed steps

Teacher led activity



THE HISTORIAN
The Indian artist is painting in sign language on buckskin, the skin of a buffalo with American soldiers. When finished at the Supreme Academy this picture was considered one of the most important paintings of the year. Now it can be found in the walls of the Indian, the United States Capitol and the office of the president. The date is 1870, the artist, the artist.

1. Your teacher will show you an image for you to tell a story about.
2. This will involve looking at all the data elements in the image and making connections.
3. She will demonstrate how there can be different stories.
4. Discuss with your teacher what are the elements of story telling that are involved - listing the important events, sequence them, determine the medium and format of communication.
5. For the image shown, discuss as a class how you will tell the story and the teacher will document this story either as a mind map or a text document
6. Your teacher will also show you other kinds of images -infographics, timelines and a series of images for you to understand how each communicates

Student activities

1. Single image essays of an event or a place
2. Multi-image essays of an event or a place
3. In small groups create a collaborative story through pictures

Portfolio

1. Images to be digitized and organized into folders

Tell a story

Tell a story

Objectives

1. To add narratives to a picture essay
2. To build language communication skills
3. Promote multi-lingual expression

What prior skills are assumed

1. Familiarity with text editor - basic text entry, inserting images into a document
2. Local language typing

Resources needed

Hardware, software, Files

1. Computer lab
2. Collection of image files

Digital skills

1. Local language text typing
 2. Combining images and text
 3. Simple formatting and layout
-

Description of activity with detailed steps

How to use the template

1. {{subst:ICT-Project}}
2. After the template is inserted go to the side box syntax and add the corresponding chapter link from the teacher handbook

Add a link to the Teacher Handbook

Communication with graphics level 2

Objectives

1. Understanding story telling as communication and ability to develop a story line
2. Combining text and pictures
3. Images are formats of data that can be edited and combined with other formats
4. Using digital art creations to tell a story

Digital Skills

1. Using a mind map to develop a story line
2. Capturing images
3. Creating digital images
4. Combining text and images
5. Text input in multiple languages
6. Image editing tools

Looking at your learning

1. Folder with images and pictures
2. Image slideshows
3. Document with picture stories
4. Digital art creations

Stories come alive with pictures

ICT student textbook/Making a picture book

Songs come alive with pictures

ICT student textbook/Illustrating local songs

Communication with graphics level 3

Objectives

1. Making communication outputs with tools
 1. Comic strips
 2. Posters
 3. Dialogues and story boards
2. Communicating about processes and events
 1. Complex communication combining different skills
 2. Designing, layout and creation skills
3. Creating animations
4. Critical perspective on communication for community

Digital Skills

1. Combining text and images
2. Creating digital images
 1. Digital art creation tool
 2. Image editing tools
3. Creating a formatted, communication piece

Looking at your learning

1. Folder with images and pictures
2. Document with picture stories
3. Digital art creations
4. Posters, Brochures

Making comic strips

Making comic strips

Resources needed

Hardware, software, Files

Digital skills

1. Link to tool page as needed
2. Link to tool page as needed

Description of activity with detailed steps

How to use the template

1. {{subst:ICT-Project}}
2. After the template is inserted go to the side box syntax and add the corresponding chapter link from the teacher handbook

Add a link to the Teacher Handbook

Making posters

Making posters

Resources needed

Hardware, software, Files

Digital skills

1. Link to tool page as needed
2. Link to tool page as needed

Description of activity with detailed steps

How to use the template

1. {{subst:ICT-Project}}
2. After the template is inserted go to the side box syntax and add the corresponding chapter link from the teacher handbook

Add a link to the Teacher Handbook

Audio visual communication

Objectives

1. Audio is a form of communication
2. Audio can be verbal and non verbal
3. Audio can be combined with images
4. Video can be a combination of images and audio
5. Audio visual communication can be combined with text
6. Ability to narrate a story, developing a story board

Audio visual communication level 2

Objectives

1. Ability to narrate a story, developing a story board
2. Making an audio visual communication

Audio story telling

Title of Activity

Resources needed

Hardware, software, Files

Digital skills

1. Link to tool page as needed
2. Link to tool page as needed

Description of activity with detailed steps

How to use the template

1. {{subst:ICT-Project}}
2. After the template is inserted go to the side box syntax and add the corresponding chapter link from the teacher handbook

Add a link to the Teacher Handbook

Audio_visual_communication_level_3

ICT student textbook/Audio visual communication level 3

Make the pictures sing

ICT student textbook/Adding audio to song illustrations

I am a movie maker

ICT student textbook/Adding audio to a video

Educational applications for learning your subjects

Objectives

We have so far learnt the different dimensions in which ICT can help create knowledge - whether graphics or audio visual communication or spreadsheets. You may be having a question how do these things help me in my subject learning? Can a graphic creation help me learn social science or help me with Telugu language or can an animation help me with doing a science experiment? You are correct!! The power of ICT to represent content in different ways has led to the development of new applications that cater to specific subjects. These applications can either help you build the skills needed for learning a subject or help you understand the concept better by adding audio visual or graphic content. Some of your classes will even become very different when the teacher starts using these resources.

In this unit, you will be learning the following:

1. An understanding of the various features of a tool and be able to apply the knowledge of such features for using in other similar applications
2. Use the features of the tool to make create resources that are relevant to your subjects
3. Enhance your conceptual understanding by playing with the tool and extending the knowledge of your subjects

Help build your vocabulary with Kanagram

Objectives

1. Familiarise yourself with the interface of Kanagram
2. Playing with the word lists to test yourself and your friends
3. Build new vocabularies with the tool

Activities

1. Build a vocabulary list for water
 2. Build a vocabulary list for the poem *In the Bazaars of Hyderabad*.
 3. Build a vocabulary list for the poem (Telugu)
-

Objectives

1. Understanding how the interactive environment of Geogebra
2. Playing with the features to construct, explore and evaluate
3. Explore math concepts with Geogebra

Activities

Draw the given figure

1. With dot grid make shapes
2. Free shapes
3. Defined shapes

START_WIDGETd175374b68f51bb4-4END_WIDGET

Tessellate and tile

1. Translation
2. Rotation
3. Symmetry

Construct given shape

1. Lines and Angles become important
2. Draw and measure
3. Draw a given measure
4. Properties of lines and angles
5. Complementary and supplementary

Your desktop atlas with KGeography

The globe on your table with Marble

In summary

We hope you have found this journey with technology enjoyable. As you would have experienced, this is an area of knowledge, where rapid changes are taking place. Not only are ICT changing how we learning, they are also defining what learning is to be had. Occupations and vocations are no longer limited to the traditional ones of teaching, engineering or medicine. ICT also have an enormous potential for allowing greater access and opportunities for more people to express and create knowledge, in multiple ways. When the possibilities for knowledge creation change, more knowledge will be produced from areas which would have earlier been left unexplored. However, for this vision to be realised, we need to approach ICT as if it is a public resource - of all, by all and for all. The power of ICT must be guided by the spirit of participation and democracy.

We will explore more areas of technology learning in Book 2 of this subject, in classes 9 and 10.

We hope you have enjoyed this journey and do share your feedback below.

Feedback

Feedback is very important in many topics, especially when writing a book like this. We would like to learn from your experience using this book.

1. How did the book help you in technology learning?
2. How did the book help you in subject learning?
3. What did you like the most about the book? Why?
4. What did you like the least about the book? Why?
5. Which topics did you have problem understanding?
6. Wish three things that should be included in the book!

References

- [1] https://upload.wikimedia.org/wikipedia/commons/thumb/5/57/Chimpanzee_and_stick.jpg/250px-Chimpanzee_and_stick.jpg
- [2] https://upload.wikimedia.org/wikipedia/commons/thumb/e/ee/Google_driverless_car_at_intersection.gk.jpg/220px-Google_driverless_car_at_intersection.gk.jpg
- [3] <http://www.computerhistory.org/timeline/computers/>
- [4] https://upload.wikimedia.org/wikipedia/commons/thumb/8/87/Operating_system_placement_%28software%29.svg/2000px-Operating_system_placement_%28software%29.svg.png
- [5] https://upload.wikimedia.org/wikipedia/commons/thumb/4/4e/Personal_computer_exploded_6.svg/2000px-Personal_computer_exploded_6.svg.png
- [6] <http://www.bbc.co.uk/timelines/z8bgr82>
- [7] https://upload.wikimedia.org/wikipedia/commons/7/72/Sachin_Tendulkar_cricket_centuries_against_countries.JPG
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