LearningWell

My Book Of
Computer

6

Teacher's
Resource Book

Table of Contents:

LESSON I: BE A SAFE AND ETHICAL COMPUTER USER

LEARNING OBJECTIVES

1. To understand how viruses hinder the normal functionality of a computer
2. An introduction to virus types mainly found to infect a computer
3. To familiarize the student with useful safety practices
4. To inform the student how ordinary net users can bring mischief

LESSON STARTERS

Ask yourself how you may be able to initiate the class into the topic of the lesson at hand.

The gist we are dealing with is "viruses". That involves the concept of precaution, of circumspection and discretion.

Your students would surely know about how an illness can affect the human body. So, you can start with that. Begin in a thought-provoking manner.

Ask if anyone has had a viral infection. Surely, someone will respond.

Allow them to share their experience.

Compare the state of a virally infected person to a computer carrying a virus.

Start a casual conversation about various illnesses that pupils have seen in their lives and their causes. Differentiate between biological viruses (exist naturally) and computer viruses (created by a human being) .Then come to different kinds of computer viruses and their traits.

TEACHING STRATEGY

Remember that to be able to teach effectively, you need to be more of a facilitator than a teacher

in the traditional sense. Rather than wanting to talk like a book, you should engage the students with the core concepts.

Before class timings, it is always helpful to find words in the lesson that you think may not be readily understood by the learners.

Work on the whiteboard instead of going on verbally in front of the class. Certain types of virus are talked about in this lesson, whose names you may list on the whiteboard for the students to take a ready cue from.

An important theme in the lesson is that of "identity theft". Pick a pupil X from the class and ask them to state a few facts about themselves. Instruct them to outline those particular facts which define their identity in front of their classmates. Then ask X what they think would happen if one day someone else entered the class with everyone else thinking that someone was X. Talk about what conditions would that "someone" have to fulfill to be taken as X in the eyes of others. This would help you hold your pupils' attention and give them an idea of the consequences of a thing like identity theft.

A common passage for a virus to enter our computers is through the process of downloading. It would help if you explain downloading to your students since it is one of the primary aspects of internet usage. You may give away the names of some trustworthy download websites. Discuss

how ads are commonly seen on web pages and how blindly clicking on one of those ads can get something unwanted into their PC.

EXTENDED TEACHING

Net Extra:

As it has been mentioned that the Net extra is especially designed for the teachers and the students. Here you can find not only the text material but also the related information, activities and exercises. You can guide your students to use net extra for more information.

Log on to net extra account at

www.learningwell.pk

SUPPORT MATERIAL

http://computer.howstuffworks.com/virus.htm

https://www.brainpop.com/technology/computersandinternet/computerviruses/preview.wel

ANSWERS TO COMPREHENSION ASSESSMENT

1. What are the signs by which we can identify that our computer is being affected by virus?

The most basic sign that your computer might have a virus is when you notice it is not acting the way you expect it to. There can be an unexpected change in the normal procedure followed by the computer's functions.

Most commonly slowing down, saved files not opening and lengthy periods of getting hung are pointers that a virus is working behind the scenes. In some extreme cases of being infected your PC may even refuse to boot or shut down when you want it to.

2. What role do viruses play in the computing world?

Viruses are themselves computer programs written with a view to damage data, harm the software or hardware making up a computer. Viruses are also designed to steal classified information and even occupy hard disk space to carry out invasion or alteration of the data present on it.

3. Define threat levels of different viruses.

The threat level of a particular kind of virus can be defined according to the area of a computer's function that it is meant for. Some of the most commonly encountered viruses may include.

Memory Resident Virus which are made for RAMs. This virus activates each time an operating system is run and changes the performance rate of all the applications on the PC.

Program Virus which can be removed easily since it does not infect data files. Files with an extension are the main targets of this type.

Boot Virus which is meant to affect the start-up (boot) function of your computer. It may not start at all if this type manages to overwrite the master boot records of the hard drive.

Worms (this is a quality of a family of viruses called "spyware" these may or may not include worms). These are ~~also~~ designed to consume the user's bandwidth but do not infect any files on the hard drive.

Browser Hijacker which controls the internet browser to automatically redirect you to a particular site.

Trojan Horse which is a program that steals one's private information like important passwords.

It is a characteristic of this type of virus to pretend like a normal website or program that you are usually accustomed to, thus primarily targeting users of online banking services.

4. Describe ways in which we can protect a computer against viruses and threats.

The following methods can be utilized to achieve the above:

- Install and keep updated antivirus software on your computer.
- Scan portable data drives like USBs and memory cards with your antivirus software.
- Before plugging them into your computer.
- Do not download software, songs, videos and wallpapers from unknown websites.
- Do not open e-mails from unknown senders no matter how important they may seem.
- Never share an internet connection or Wi-Fi networks with strangers.
- Never share your login IDs, passwords or other personal information online.
- Avoid clicking on ads while using the internet even if they look tempting.
- Always shut down your computer properly and use a login password.

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LESSON 2: THE STRUCTURE AND WORKING OF A COMPUTER (PART I)

LEARNING OBJECTIVES

1. Getting the student to understand what actually goes on inside the machine when a PC is turned on
2. To let the learner know what components are in play when they view a working computer screen
3. To give the student some know-how on image resolution
4. To let them know how the cursor functions
5. Letting the student know, how applications are executed by a PC
6. Shedding light on things inside a PC which account for its working speed

LESSON STARTERS

To get the learner interested in this lesson is a little demanding. It would be too easy for the class to drift from your lecture on it.

In today's era, children are usually found to be enchanted by sleek tech-gadgets. That can be a good start-off for you to use as a teacher. Everyone is fond of what they see on the screens of

iPads and tablets and smart-phones. Their shape, their colours and their tinkles draw children to them. But how many really wonder what actually goes on inside such gadgets?

Your students would be more interested in what meets the eye and the trick would be to get them interested in the idea that there is more than that which meets the eye.

You may ask pupils to tell you about any machines they have been fond of at home. You may ask them if they ever wondered what the inner workings of those machines were.

Doing the above would help you give your class a taste of what is to come in the lesson.

TEACHING STRATEGY

Egging the student to wonder about a dozen unseen operations taking place whenever we press a button will form your strategy for this lesson.

There is one thing you could do which would require you to visit a scrap-store to find parts of a computer LCD or LED. It would prove useful if you could lay hands on an LCD backlight and an LED backlight to take and show in front of the class.

It is always dull for the student to only read about gadgetry from a textbook but getting to see it can spark new interest in their mind about the subject.

Acquiring a RAM and a ROM chip would not take much. Your class will focus more if they can hold and examine something they are studying. Similarly, you could take storage devices to hold up in front of the class and pass them around. Such storage devices would otherwise be invisible to the learner.

The figure on the bottom right of page 11 shows the Windows Task Manager window. It is important you show this window to students on a computer screen, telling them the method to open it.

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SUPPORT MATERIAL

http://www.ee.ncu.edu.tw/~jfli/computer/lecture/ch02.pdf

http://www.slideshare.net/115362/presentation-of-computer-memory

ANSWERS TO COMPREHENSION ASSESSMENT

1. What is the relation between ROM and firmware? What is the role of firmware in a computer?

There's a feature inside a CPU in the form of a chip known as the ROM. This chip is meant to store data permanently. We (or the PC) may read and use that data to do specific tasks on our computer but the data itself cannot be changed or removed. This permanence of data is due to

firmware which firmly sits on the chip and is undeletable even by power failure. Firmware itself is incorporated software. Thus, without the firmware a ROM would be incapable of retaining the basic functions performed by the hardware. For instance, the function of a PC to boot up is always there for it to remember each time you switch it on. Likewise, it is the firmware on the ROM which enables the computer to access booting data so we may run whatever app or program we want to on it.

2. Define the booting process.

The booting process is the starting up of a computer and aligning itself with all the given functions ready to be employed by a user. When a PC is switched on it immediately starts to ascertain which hardware is connected to it, and what storage devices are on hand. This the computer does by reading the boot record or booting data on the firmware. Components like CD ROM, hard disk and networks card comprise the storage devices in a computer.

3. What is the link between RAM and the utilities of your operating system?

The RAM is the linkage between data on a hard drive and the operating system being used to connect with that data. We may think of it as a pipeline, whose capacity will decide accessing of data and performance of functions (whether we run programs on a pc or browse various links through the browser) at a low or high speed. So, the more room there is in the RAM the more convenient it is for the computer to bypass the hard drive and pick up required data directly from it. That means the operating system will be more efficient.

4. Write the difference between LCDs and LEDs.

The major difference between an LCD and an LED is the type of light source behind the screen. Cold Cathode Fluorescent Lamp (CCFT) is used to provide the backlight in an LCD, whereas an LED uses light emitting diodes as backlight sources.

LEDs came after LCDs had been in use and today both kinds of monitor-screens with newer features are available in the market.

5. How does the kernel help an application to run?

The kernel is the core component of an operating system and so it is crucial to run any kind of app on an operating system. It can be thought of as an internal program of an operating system, which is automatically loaded at startup. Since it is indispensable to carrying out functions, the OS(operating system) loads the kernel into a protected area of the RAM. In this way, the kernel stays safe from any external interference. The main job of the kernel is to convey the instructions in an app to the hardware. It deals with three major components of the computer to execute an app:o CPU; the kernel decides which part of your program should run on priority. It allocates an amount of CPU usage required by each program.o RAM; depending upon the amount of RAM (physical memory) the kernel allocates resources to the desired software, thus deciding once again the extent to which the memory be used by each program.o Input & Output Devices (I/O); the kernel plays an intermediary between user and hardware. It

transfers data from the I/O devices such as monitor, mouse, keyboard, printer and scanner to the desired software.

6. What do you understand by the speed of a computer with respect to 32 and 16-bit CPUs?

A computer's speed is determined by its specifications (or specs). Certain specs matter the most in deciding the speed of the computer. The number of bits of a CPU isamong them.

The number of bits make up the bit size and the bit size that a CPU can cope with makes it go slow or faster. The higher this number the higher the chance for the CPU to:☐ Handle larger portions of data in a single attempt.☐ Point towards a larger number of addresses in the RAM.

The most commonly found processors in home computers are 32-bit and 64-bit. The OS loaded into a computer also depends on the bit size of the processor fitted into the motherboard. A machine carrying a 64-bit processor can handle 4.2 billion times more memory addresses than those carrying 32-bit processors.

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LESSON 3: THE STRUCTURE AND WORKING OF A COMPUTER (PART II)

LEARNING OBJECTIVES

1. Describing the internal procedure a browser follows to bring the webpage to screens
2. Telling the student about the relation between a website name and its IP address
3. Understanding how images are printed by printers
4. Getting to know how a computer manages a printer
5. Delivering know-how on various types of printers to the class

LESSON STARTERS

How do we know something called the" internet" exists? We can say the internet is a world on its own but unlike the world we see around us it is a world which cannot be seen in the same way.

Of course, we need computer screens to see it, and we need computers to step into and travel around in it. Computers are doorways to the internet world.

As can be guessed from the title, this lesson is an extension of the previous one, carrying the student further into the workings of a computer. However, the theme here is the connection of a computer to the internet and how computers show us the websites we want to visit.

Furthermore this lesson deals with colours in computer images and the method computers use to perform print functions.

TEACHING STRATEGY

Your lecture for this lesson would benefit by having the theme of communication tied in.

The lesson in its former parts mainly deals with how the internet is communicated to a PC. To make communication possible we need the means to make it so, and here the means is the technology used to bring the internet to our computer screens.

It would not be easy for your students at the present level to fully understand internet connection modes mentioned in these parts of the lesson, nonetheless you can compare websites to people and servers to houses those people live in. TCP and IP can be compared to highways and thorough fares.

Further on, the lesson talks about colour spaces used to portray images on screens. If you personally have a liking for fine art, it might be interesting for you to carry out a little exercise in class. Get the students to dabble in the given colours i.e. yellow, green, cyan, blue, magenta and red. If possible, set students into groups and encourage them to mix these colours on paper. It will take them some time to do so. Then ask them to think how rapidly the same process is performed by computers to display images.

It is advisable to take your class into the computer lab to demonstrate how printers work in compatibility with PC machines. It would be great if there's a computer without the designated driver along with one that has.

EXTENDED TEACHING

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www.learningwell.pk

SUPPORT MATERIAL

http://www.theshulers.com/whitepapers/internet_whitepaper/

http://computer.howstuffworks.com/internet/basics/internet.htm

http://computer.howstuffworks.com/inkjet-printer.htm

ANSWERS TO COMPREHENSION ASSESSMENT

1. What is the difference between RBG and CMYK colour modes?

•   The RGB Colour Mode

RGB stands for colours red, green and blue. This property mixes these three basic colours to obtain all other colours to be shown/displayed in an image. Devices like TVs, monitors, tablets, video projectors, cameras and scanners use this colour mode to create images. This kind of colour mode works through a transmissive medium. Something like a monitor or a scanner transmits images to the viewer and so stands as transmissive.

•   The CMYK Colour Mode

CMYK stands for cyan, magenta, yellow and black. Cyan is a greenish-blue whereas magenta is a dark purplish-red colour. This property is employed by colour printers. Such a kind of colour mode works through a reflective medium i.e. paper which reflects an image that is printed.

2. Define ISP and its different features with respect to internet protocol.

ISP means Internet Service Provider whereas IP stands for Internet Protocol. An ISP is the service that a user subscribes to for an internet connection, just like anyone would subscribe to a phone company for a phone line. Names like Wi-tribe, Qubee, PTCL which we keep hearing are ISPs.

IP is an address which a subscriber is given or assigned once they get an internet connection installed through an ISP. It is a combination of four numbers, each ranging from 0 to 225 with three dots separating them. This address is public and can be googled by typing "IP" in the search-bar from the respective computer.

There are cases where a user's computer is directly connected to the internet and the ISP assigns the IP to the user. In cases where the computer is indirectly connected, the ISP assigns the IP to the network router from which the user's computer is receiving an internet connection through a wired or wireless link.

The router then assigns a local IP to the user's wireless switch and to other computers that might be connected to it. Therefore the device (router) keeps the public IP whereas the computer connected to such a device keeps its local IP in activation.

3. What is DNS and how does it help to find IP addresses to different names of websites?

We must understand that any website on the internet, take www.bbc.co.uk, is like a person that has a server which is that person's home and this home has an address which is that server's IP address.

For the browser to connect to a website, it must obtain the address or the IP of the server which hosts that website. This is precisely where the role of DNS comes in. The DNS is a directory of the internet where all domain names and the IPs of the servers of those domains are stored and ready to be consulted. So, for a browser to directly connect with a particular website it must send for it to the DNS. The domain website name goes up to the DNS and the IP of that website's server comes back down to the browser. Thus, the browser finds the path it has to follow to take the user to a certain website.

4. Why can't printers be used without specific drivers being installed?

The reason why printers can't be used without their specific drivers is that the drivers installed beforehand in the computer are generic in nature. They're not able to cope with and execute specific functions. A printer is a special hardware and for it to work it needs a special driver.

Unless the respective driver is there among the other drivers, the OS will not read all the functionalities of the printer attached to the machine.

5. What do you understand by colour space?

The term colour space here refers to the mode or manner which a computer utilizes to show images on the screen or to print it on paper. We could also say the colour space is the types of colours which a computer uses to deliver images on screen and paper.

Three kinds of colour spaces are used by computers:

1. RGB; this space comprises the colours red, green and blue. The OS makes use of these three to form all other colours required in an image.
2. CMYK; this space comprises cyan, magenta, yellow and black. Here these colours are used to form all other required shades.
3. Greyscale; used to print black and white images through 256 levels of shades between the colours black and white.

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LESSON 4: KEYBOARDING: YOUR KEY TO COMPUTER PROFICIENCY

LEARNING OBJECTIVES

1. To let the learner in on some facts concerned with the history of keyboards
2. To have the student appreciate the edge that can be enjoyed by typing on a computer keyboard
3. To familiarize the student with different typing techniques
4. To teach the basic steps in acquiring touch-typing skills

LESSON STARTERS

Your students can have a whole new way of writing their school assignments and presenting school projects. This lesson not only talks about typing on a keyboard but typing on the keyboard in the most beneficial manner.

Ask your students if anyone of them has ever typed anything on a computer before. If anyone has, ask them what happens when they do it. Does it require them to keep looking at the keys? Of course this is not a efficient typing style.

There is good news for them as this lesson tells of a specific manner of typing to adapt oneself to which develops much better computer habits in a person.

TEACHING STRATEGY

This is a demo-based lesson. Before you begin to help your students with typing, teach them the benefits of touch typing. You can ask them whether they would want to chat with their friends online in a fast, error-free manner. Clarify to them the benefits of touch typing as mentioned in text. For instance, touch-typing greatly aids a writer or typist in transferring thoughts to written form without much interruptions. The mind has the tendency to race ahead of the movement of the typing hand. If someone types by any other method than touch-typing they are bound to keep looking at the keys and so lose their train of thought. Touch-typing means a person will type by being blind to the keys, thus keeping the typing speed up with the thinking speed.

Next, give them practical typing tasks in the computer lab. This could be a typing task for a single page (prefer using text they are comfortable with, for instance, text in this lesson).

You can also give similar tasks as home assignments. A healthy class activity could be a 'typing race'. Such a race would create a competitive learning environment among the students and motivate them to learn on their own.

As a challenge, ask children to attain a speed of 45 words per minute. To assess typing speed, you could install typing software in your lab PCs (Typing Master, for example).

EXTENDED TEACHING

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www.learningwell.pk

SUPPORT MATERIAL

http://www.sense-lang.org/typing/tutor/keyboarding.php

http://www.keybr.com/#!game

http://digitalunite.com/guides/computer-basics/how-to-use-a-computer-keyboard

ANSWERS TO COMPREHENSION ASSESSMENT

1. What is the difference between a modern keyboard and a typewriter?

The difference between the two gadgets is primarily that of being mechanical and electrical.

Typewriters are machines meant to print words and numbers directly on paper. With a keyboard matter is typed on the screen in software like MS Word.

Typewriters work through mechanical arms attached to keys and these arms move to strike on paper through an ink-ribbon. Keyboards of computers have no such arms attached to their keys, rather the keys are made to transmit electrical impulses which we keep reading on the screen in the form of what we are writing.

2. How does typing on a computer with a keyboard make our work effective and efficient?

Knowing how to type on a computer is something advantageous. When we work with word-processing software like MS Word we can make use of various options in it that gives more accuracy to what we are writing.

The most basic tools which are available to us while typing on a computer are:

- Auto Correct
- Formatting
- Dictionary

Such tools would not be available in a similar manner if we preferred to type on a typewriter.

3. Which method of typing is the best and why? Explain.

The recommended method of typing is touch-typing. It is most efficient because using this method allows you to focus only on the screen. This means you notice all the errors as they happen and therefore shake them off much faster.

4. Explain the steps of touch-typing in your own words.

The basic steps involved in learning to touch-type are as follows:

- Become acquainted with the home row of the keyboard

Place the four fingers of your left hand on the keys A, S, D, F. Place the four fingers of your right hand ~~of~~ on the keys J, K, L, ;.This will be your initiation into knowing the home row or the centre row of the keyboard by heart.

Look straight at the screen and without looking down, with your left hand type "asdf" and "fdsa" spacing out the two. Keep typing this in a row.

Similarly, type "jkl;" and ";lkj" with your right hand.

- Now it is turn/time to use both hands instead of using one at a time. Bringing both your hands into play type the following:

fd fds fdsa jk jkl jkl;

fd fds fdsa jk jkl jkl;

fd fds fdsa jk jkl jkl;

fd fds fdsa jk jkl jkl;

- Relax your fingers so they can be moved around the current position

With your hands positioned the way they are up till now, the remaining keys in the home row are G and H.

Type "g" and "h" with spaces like this

gh gh gh gh gh gh gh gh gh gh

Now extend your left index finger to the key T and type this

th th th th th th th th th ght ght ght ght ght ght ght

- Further stretch your fingers but keep returning to the home row

Now practice taking your finger to the top row but keep in mind that you have to drop back to your basic keys in the home row. You must do this to gradually help yourself to type faster.

Keep your left index finger for R, T, F and G and the left middle finger for E and

D. Likewise, your right index finger will control U, H and J whereas the job of the right middle finger is to hit the keys I and K.

With your left hand, type the followingdeed frrf deer reed red deed frrf deer reed red deed frrf deer reed redfree freed fred feed fed free freed fred feed fed free freed fred feed fed

With your right hand type

juuj kiik juj kik juuj kiik juj kik juuj kiik juj kik juuj kiik juj kik

Apply both your hands to type the following

juut jut jute kiit kit kite juut jut jute kiit kit kite juut jut jute kiit kit kite

jud judder jug jugger judge judged juud judder jug jugger judge judged

igh high thigh ight fight right fright igh high thigh ight fright right fright

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LESSON 5: MANIPULATING AND IMPROVING IMAGES

LEARNING OBJECTIVES

1. Familiarizing the learner with types of photo-editing software
2. Telling the class about some basic techniques to keep in mind when capturing photographs
3. Introducing the student to the fundamentals of photo-editing

LESSON STARTERS

Probably, this is the lesson you would most easily get your class interested in.

Ask your pupils how they may feel if they knew the fundamental skills to take pictures with a camera and edit them. You can bet you are going to get an enthusiastic response.

You can tell your students that this lesson promises them the joy of being able to preserve the most memorable moments of their lives.

TEACHING STRATEGY

If you manage to arrange for a camera before your lecture for this lesson, it is going to give your students a hands-on experience of taking snaps.

If you have not had any experience with a camera yourself, try finding someone who keeps a camera and may help you with it. Make sure a computer in your school's computer lab has photo-editing software like ACD See installed in it.

Take the students into the lab and have them take pictures of any objects in the room. You may even take them outside the classroom for a while and let them take pictures there. Afterwards all of you can head into the computer lab to study how photographs can be edited with photo-editing software.

While supervising, allow your students to fiddle with the camera and have them take snaps of a single subject from varying angles.

Find out yourself the aesthetics of proper framing through a camera lens, so you can tell your class how to compose a shot i.e. which area in a shot should be left out and which should be taken in when focusing on a subject. Remember, you need not become an expert photographer to get the very initial hang of composition and you need not be an expert in photo composition either.

It is just to get your students moving. Once inside the lab, you may set the class into individual groups and assign exercises in photo-editing to each group.

To start them off, you can pick a single photograph which has been taken previously and have all the groups work on it following the steps given on pages 28, 29 and 30. If it is possible to set up a multi-media projector to show on a vertically flat surface in the lab for you to lead from, nothing would be more ideal.

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SUPPORT MATERIAL

http://www.jpma.org.pk/full_article_text.php?article_id=4312

http://www.astropix.com/HTML/J_DIGIT/ETHICS.HTM

ANSWERS TO COMPREHENSION ASSESSMENT

1. Why is there a need of any photo-editing software?

The need for such software arises when pictures from a camera are transferred on to a hard disc. When pictures are viewed on a computer screen some of them look duller, poorer and darker than that on the camera screen.

Some of the pictures can even show unnecessary elements, objects and people. Unbalanced colours and contrasts may even be seen. Sometimes, eyes of people in a picture appear red. To do away with all these unwanted elements photo-editing software is required.

2. What are some of the basic tools provided by any photo-editing software?

Some of the generic tools or edit features provided by any such software are

- Rotating and straightening of the image
- Adjusting brightness of the image
- Controls for adapting and modifying colour and contrast in an image

3. What do you understand by red-eye correction? Explain.

Red-eye correction means removing an error which occurs when the flash from a camera hits the light at the back of the eye instead of at the dark pupil, which we expect to see in a person's photograph. This error is set straight with the red-eye removal feature available in photo-editing software. It works by replacing the red pupil with a more natural black or blue one.

4. Name at least three different photo-editing software.

Three photo-editing software names are as follows:

a. Adobe Photoshop

b. ACD See

c. Irfan View

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LESSON 6: DRAWING AND PAINTING ON A VECTOR PROGRAM

LEARNING OBJECTIVES

1. To clarify the need of special programs for drawing and painting when the same can be done with photo-editing software
2. Familiarizing the student with basic tools in Adobe Illustrator

LESSON STARTERS

This lesson focuses on drawing and colouring on the computer screen.

You can begin by talking to your students about what they have learnt to draw in art class. Get them into a discussion about shapes and figures and whether they think they would be interested in learning to create shapes using drawing software.

Ask them if they have ever heard about haunted houses. Well, if they have they will see a picture of just such a house in the lesson's pages so they can practice drawing it on the screen.

TEACHING STRATEGY

The strategy here is quite simple. The program you are dealing with is Adobe Illustrator.

Let your students know that drawing on a computer screen is not the same as drawing on paper.

Some people who draw well on paper may not manage to do the same on a screen and the other way round.

You need to entice your children about the capabilities of Adobe Illustrator. Show them some amusing illustrations drawn using this program. Get some at Shutterstock.

http://www.shutterstock.com/s/illustrator/search.html

The image used in the lesson can also be redrawn in the computer lab. Introduce all options and tools one by one and let the children experiment with them. They don't need to be perfect at this stage. All they need is to feel the immense possibility of the software and try their hand at it. Of course, not all of them are to become graphic designers.

EXTENDED TEACHING

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SUPPORT MATERIAL

http://en.wikipedia.org/wiki/Vector_graphics_editor

http://www.instructables.com/id/Digital-Painting-Lesson-1-The-basics-of-using-a-gr/

https://helpx.adobe.com/photoshop/how-to/photoshop-vector-shape-tools.html

http://www.digitaltutors.com/tutorial/262-Fundamentals-of-Digital-Drawing

ANSWERS TO COMPREHENSION ASSESSMENT

1. What do you understand by the word image and drawing? Explain.

An image may be in the form of a photograph or in the form of a drawing. But a drawing is not the same thing as a photograph and is distinct from it. The word "image" has other meanings too in the English language but let us not be concerned with those. In the present context images on the computer screen can be drawn with drawing software or they can be photographs taken with a camera and transferred on to the hard disc. We can say photo-editing software is suited to working with photographic images whereas drawing software is suited to work with drawn images.

2. Why do we use separate software for image editing and drawing?

Photo-editing programs and drawing programs have one difference which explains why they separately suit image editing and drawing respectively.

The Difference

Raster graphics is what constitutes programs like ACDSee and Adobe Photoshop. This graphics does not allow an image to be made up of a start and end point along with other curves and angles on the way. If an image done by such graphics is enlarged it becomes pixilated and starts to crack at the edges.

Drawing software like Adobe Illustrator uses vector graphics. Images designed or drawn through this graphics technique can easily be enlarged without spoiling their quality. Furthermore, vector images can conveniently be converted into raster images but it is a complicated task to accomplish the opposite. Therefore, it is always advisable to go for drawing software when drawing figures and colouring them.

3. Which basic principles does vector graphics rest on?

The answer to this question forms part of the answer to the preceding question. The principle behind vector graphics is an unlimited number of dots. With well-defined boundaries, all details through this graphics are mathematically described by the computer. This sets the advantage for images and diagrams drawn by such graphics to not disintegrate when scaled up in size.

4. Name core tools of Illustrator and explain any two of them.

The core tools of Illustrator are as follows:

i.   Pen tool
ii.   Pencil tool
iii. Line tool
iv.   Rectangle tool
v.   Ellipse tool
vi.   Mesh tool

vii.   Selection tool
viii.   Direct selection tool
 ix.   Gradient tool
  x.   Paintbrush tool
 xi.   Ellipse tool

This is used for drawing circles and ovals.

Gradient tool

This tool adjusts the beginning and ending points and angles of gradients within objects.

<div align="center">*** *** *** ***</div>

LESSON 7: GOING PRO WITH WORD

LEARNING OBJECTIVES

1. Having the student learn how the Cover Page may be designed for multiple-page documents
2. Training the learner to make Table of Contents using headings
3. Familiarizing the student with the method to format a document by assigning it a chosen design
4. Bringing the SmartArt tool to the attention of the student
5. Showing the student how to make a chart and dress it up

LESSON STARTERS

This is one of the most important lessons from this book, as it's about something with everyday practical value.

MS Word is one of the most needed software programs anywhere you go. Being skilled in it is extremely important.

You may begin by saying what your pupils will learn here is going to help them efficiently and presentably prepare countless academic assignments.

Besides, beginning to learn how to work with MS Word(Microsoft Word) means you are giving yourself the chance to be able to store numerous and diverse data for yourself in a systematic and professional manner.

That working knowledge of this program is permanently connected with being literate will not be an overstatement.

TEACHING STRATEGY

Before you head on to demonstrating the advanced options of MS Word, it is important to make a recall of the previous understanding of the software. Outline the importance of Word Processors in general and MS Word in particular.

Word processors are one of the most used computer programs. Their purpose is to create, edit and modify text-based documents that can be printed or used electronically.

MS Word is everywhere. Most public computer cafés have it, most offices are using it and most people prefer it. If you are not using it, sharing your documents will be difficult. Aside from that, most word processing programs can read the Word format but they cannot create one.

Next, help your students try hand at MS Word's advance options presented in the text, gradually. Most of these options help students with formatting. Hence, an effective activity would be to demonstrate a successive tasks involving advanced document formatting and reviewing.

EXTENDED TEACHING

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SUPPORT MATERIAL

http://web.simmons.edu/~gslislab/website/howto/word2007.pdf

ANSWERS TO COMPREHENSION ASSESSMENT

1. **What is the reason for MS Word being the most popular word processing software in the world?**

MS Word is the most user-friendly word processing program. The icons on top are easy to locate and understand. Everything a novice needs is there on the standard toolbar. One may easily learn creating, saving, closing and retrieving a document in no time.

It has all the essential tools you need in making documents. There is a dictionary and thesaurus to help you choose the right word in a sentence. There is a spelling and grammar checker which automatically reviews your document as it is being created. You can download fonts that suit your taste and format them in whatever form you like.

It is compatible with Microsoft Office and the easiest to learn among the programs in Microsoft Office. Most of them operate in the same way, having the same keyboard shortcuts and icons

2. **Other than a document, what else can we create using Word? How does Word make our document look better and professional?**

Although the primary function of MS Word is to make text documents, other tasks can also be done using this program such as:

- Using menus and dialogue boxes
- Defining and using Styles
- Document and page setup for research papers
- Equation editor
- Placing and sizing graphics

- Converting one's documents into HTML format
- Using the drawing toolbar
- Sending e-mails
- Designing tables and charts of various shapes

3.   What is the importance of SmartArt tools in Word?

SmartArt is a group of editable and formatted diagrams. There are 115 preset SmartArt graphics layout templates in categories such as list, process, cycle, and hierarchy. When a category of SmartArt is selected, a Text Pane appears next to it to guide the user through entering text in the hierarchical levels.

Each SmartArt graphic, based on its design, maps the text outline, automatically resized for best fit, on to the graphic. There are a number of "quick styles" for each graphic that apply largely different 3D effects to the graphic, and the graphic's shapes and text can be formatted through shape styles and WordArt styles. In addition, SmartArt graphics change their colours, fonts, and effects to match the document's theme.

4.   What feature of Word given in this lesson do you like most?

The answer to this question should present the individual student's opinion.

Since, there can be no single answer in this place, it is left vacant. You will encourage each student to formulate their individual answer with a personal reason for the feature chosen.

For instance, a student may answer like this

'I like SmartArt options because it makes things more clearly for me'

*** *** *** ***

LESSON 8: GOING PRO WITH EXCEL

LEARNING OBJECTIVES

To prepare the student to develop professional data keeping skills by learning how to handle the following Excel features:

1. To create and name a worksheet
2. To assign values to cells
3. To operate auto-expanding
4. To assign names to cells
5. To work with formulas
6. To format and decorate tables
7. To use a few other features like currency symbols

LESSON STARTERS

After MS Word, the next relevant program to study is Excel.

The relevance of this program is such that any kind of office work nowadays cannot be done without it. Let your students know that to move exceed in any kind of professional environment in the future they would need to know how to work in Excel.

This program is a spreadsheet application. It can be used for simple and complex calculations designing graphics (not to concern with at this stage) making pivot tables (not to concern with at this stage) using a macro programming language called Visual Basic for Applications (not to concern with at this stage)

The above points are to be taken for general knowledge only and the learner can pursue them at a later time after having become versed in the features covered in this lesson.

What is a Spreadsheet?

Simply speaking, a spreadsheet is a computer application.

What is it used for?

It is used for arrangement of data in tabular form i.e. in the form of tables.

What was the forerunner of the Spreadsheet?

In older times in the first half of the 20th century there used to be paper based accounting worksheets. The Excel spreadsheet is the modern electronic version of that thing.

TEACHING STRATEGY

The strategy in at this point centres on letting students open Excel on the computer by themselves and getting accustomed to how it looks.

Take them through each segment of the lesson piecemeal and do not rush.

As you complete each segment let them take a while to absorb the instruction given. Assign them practice-tasks as you get done with each segment.

Tell your students to get MS Excel installed in their computers at home.

A basic function that spreadsheets perform can be said in the following manner:

Let us say that because of x, y and z there are d, e, f and g.

Here x, y and z are stored values and d, e, f and g are calculated values.

What if x is not x and it is v while y and z remain what they are, what effect will this bring on d, e, f and g?

Likewise, what change to the calculated values would a change in either of the other two stored values bring? So, spreadsheets are extremely useful in conducting a probability analysis of this sort.

An analysis of this kind has a purposeful and pragmatic value for financial forecasting, strategy building and setting targets in various businesses.

EXTENDED TEACHING

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SUPPORT MATERIAL

http://www.desiurduhit.com/2014/01/ms-excel-2007-course-in-urdu.html

http://www.premcs.com/free_manuals/Excel_2007_Advanced.pdf

ANSWERS TO COMPREHENSION ASSESSMENT

1. How basic functions of Excel work?

A. The basic functions of Excel work using built-in formulas. To make use of them, we need to use cell references and ranges before clicking on 'Insert Function fx´ option.

2. How you can visually enhance your Excel sheet?

A. We can visually enhance Excel sheets by making use of charts to show data in a graphical format. For example, a pie chart can show relative expenses in food and clothes in two colors. We can also visually enhance Excel sheet by beautifying tables using the Table Tools Design Tab.

*** *** *** ***

LESSON 9: UNDERSTANDING SCRATCH

LEARNING OBJECTIVES

1. Telling students how to download and install Scratch

2. Familiarizing the learner with the Scratch interface

3. Taking students gradually through each step of planning a computer program through Scratch

LESSON STARTERS

Before the lecture, talk about the significance of programs in the world of computers.

You need to give a little introduction about what a computer program is. When you have an organized set of instructions which can make a computer to behave in a calculated manner upon execution, you have a program.

Without programs computers are almost useless because there is nothing they can perform without them.

A program is like a recipe. It contains a list of ingredients (called variables) and a list of directions (called statements) that tell the computer what to do with the variables. The variables can/may represent numeric data, text or graphical images.

TEACHING STRATEGY

The best way to carry out this lesson with students is in a computer lab.

Go to the MIT *(Massachusetts Institute of Technology)* website where Scratch software is available and download it on the computers in front of students. The URL to this website is given on page 54.

Your students up till this point only have a hazy idea about what it is that actually makes a computer tick. Getting them in on this software will begin to give them a clearer idea of the internal workings of a computer.

Tell your class why this program has been named "Scratch". There is an idiom in English which goes "from scratch" which means to begin something from the very start; to start something from scratch, to go back to scratch etc. Thus this program allows children to understand the dynamics of programming from scratch i.e. from the very basics.

Before this lesson you must yourself get acquainted with Scratch. This will not take long. It is better for you to have used it to design a few simple programs on your PC so you may understand how to help your students move forward with this lesson.

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SUPPORT MATERIAL

http://www.instructables.com/id/How-to-use-Scratch/

https://scratch.mit.edu/

ANSWERS TO COMPREHENSION ASSESSMENT

1. Why was Scratch introduced?

Scratch was designed to help people aged 8 and up to develop 21st century learning skills. It is meant to prepare them to create entry-level computer programs. Indulging in this activity helps young minds learn important mathematical and computational ideas, while gaining a deeper understanding of the process of design. The development environment is "visual" in nature. The basic logic statements are shown and the programmer can drag them into place and type in new variables. There is a ton of configurable statements you can use to make just about any kind of program you want. If one looks at the categories, each category has several components that are completely customizable for your needs.

Scratch is supported by a website for sharing projects and a forum for sharing ideas and getting support.

2. Where was Scratch developed and how can it be installed?

Scratch was developed by the Media Lab at MIT as a free, simple-to-learn but potentially powerful programming software. Its installation is fairly simple, all one needs to do is go to the web address given on page 54 of the course book.

You can also use this software offline by downloading the particular version. The download-page also gives you the option of selecting the program version that suits your OS.

3. What are Sprites? What can we do with them?

Sprites are objects on the "stage", such as people, animals, moving balls or vehicles. Here the term "stage" refers to the area where Scratch displays animations and games. Children can use these Sprites to create interactive stories, animations, games, music and art.

By moving blocks of coded directions students can build scripts that tell sprites how to act. These Sprites may also be referred to as images which are broken down in easy-to-identify categories.

*** **** ***

LESSON 10: WORKING WITH SCRATCH

LEARNING OBJECTIVES

1. Helping the learner how to start a new project with Scratch

2. Making the student grasp how to control the flow of the program being constructed

3. Giving the young student an intuitive feel of the thinking that an adult programmer has to deal with while constructing a real-world software

LESSON STARTERS

By this point, your students recognize the user interface of Scratch. They know what the features of this program are called and what functions they perform.

Now it is time for them to put that information to use. You are their facilitator and you will help them come up with ideas for basic programs. They do not need to come up with something very impressive. What matters at this stage is that they are able to make any kind of program that works. Anything with a starting point, that follows a logical series of steps and has an ending point to match the rest.

Remember to tell your class that their efforts must be for the very simple tasks. Complex ideas can always be pursued later.

TEACHING STRATEGY

A workable plan of action here would be to encourage young programmers to break down their activity into three steps:

*   Imagine
*   Program
*   Share

An appropriate way to carry out this plan is to amuse children with a basic 'dog chases cat' game in scratch. The activity should take about 20 minutes and you show them how the program is being used for creating the game. Full tutorial for the said task is available at http://www.teachict.net/ks3/year7/game_generation/rob_easton/basics/TheBasics.swf

The video tutorial shows all motions, sensors, and controls that are to be defined for developing this game.

You may also create any game or challenge your students to experiment and create any game they may like. However, the purpose here is not to make them full-time game developers. Just instill the thirst for more knowledge in their minds. That's it.

EXTENDED TEACHING

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SUPPORT MATERIAL

https://scratch.mit.edu/

http://wiki.scratch.mit.edu/wiki/Scratch

http://www.instructables.com/id/How-to-use-Scratch/

ANSWERS TO COMPREHENSION ASSESSMENT

1.   What is a program?

A program is like a recipe. It contains a list of ingredients (called variables) and a list of directions (called statements) that tell the computer what to do with the variables. The variables can represent numeric data, text or graphical images.

2.   What were the core functions that we used in making the game?

The core functions utilized in making the football game were:

- Selecting three Sprites that were needed for the idea
- Adding the three blocks of scripts for each of the three Sprites
- Renaming and resizing the three Sprites
- Using coordinates to determine the position the Sprites on the stage
- Adding a background in the form of a football field
- Using loops to repeat sets of codes which defined movement of the Sprites
- Setting the "if then else" control
- Setting the final code of the ball and player

3.   What are loops?

Loops tell the program to keep repeating a set of codes. This technique is used a lot in the world of real computer programming. This essential function of loops is found in most programming software.

In Scratch there are three types of loops:

a. Repeat

b. Forever

c. Repeat until

*** *** *** ***

LESSON 11: COMPUTER AS A PERSONAL ASSISTANT

LEARNING OBJECTIVES

To learn how to use the following features in a computer:

1. Sticky Notes

2. My Documents

3. Sound Recorder

4. Calculator

5. Calendar, Date, Time

6. Task Scheduler

LESSON STARTERS

The theme of this lesson is how to become personally organized by utilizing the computer as a personal assistant through its features that help us save time, effort and money.

To begin this lesson, show them examples of how computer can help them organize things in an orderly manner.

For instance, you can compare the sticky notes application with similar real-life sticky notes we use in office documents and files.

TEACHING STRATEGY

This lesson is demo-based. Although students may already be using some of the Windows features mentioned in the text, the lesson will make them feel at home when they get caught up during general computer tasks such as creating a planner for studies (aided by the calendar tool) or making a short note (aided by the sticky notes tool).

Consecutively demonstrate use of each tool. Ask quick learners to make a small demonstration for the whole class. Like all demo-based lessons, the lesson would effectively be taught in the computer lab.

EXTENDED TEACHING

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SUPPORT MATERIAL

http://windows.microsoft.com/en-us/windows7/products/features/sticky-notes

http://windows.microsoft.com/en-us/windows7/record-audio-with-sound-recorder

http://windows.microsoft.com/en-us/windows/schedule-task#1TC=windows-7

http://en.wikipedia.org/wiki/Windows_Task_Scheduler

ANSWERS TO COMPREHENSION ASSESSMENT

1.   What do you understand by the statement "computer as a personal assistant"?

Human "personal assistants" help a person stay up to date with a certain schedule. They make notes, jot down reminders and inform the person when a duty has to be fulfilled. The exact same sense can be applied to a computer here. It has features which perform the same task for its user. This way a person would not need to hire a live personal assistant as the same role would be managed by their computer.

2.   How do sticky notes work and what is their significance in daily office jobs?

One may use a computer sticky note by opening the Start Menu and typing sticky notes to launch this tool.

Sticky notes do not need to be saved. Just write on them, add multiple notes, change colour for each of them and they stay stuck to the desktop. They cannot be discarded by plainly closing them or restarting the machine.

They help in keeping reminders in front of one's eyes in daily life.

3.   How can you take advantage of the sound recorder and what are its features?

The sound recorder can come in handy when you need to record an idea adubily (adverb; capable of being heard) that may be forgotten easily but which is useful for you in some way.

For instance if you are writing an assignment or (if you happen to be affiliated with music) writing a rudimentary tune, you can record it whenever you get an instant flash of an idea and want to retain it for later use.

It has very basic features

Start recording

Stop recording

'Help' tab

'About' tab

Windows help and support

LESSON 12: POPULAR COMMUNICATION APPLICATION: SKYPE

LEARNING OBJECTIVES

1. To introduce the learner to telecommunication applications and software that are used to engage in conversations through the internet with other users at a remote/different location.

2. To help students understand the variety of conversation tools and services that Skype offers.

3. To elaborate how technology behind Skype works to enable the application to work the way it does at the user end.

4. To help the class understand the entire procedure of downloading Skype, creating their account, and using it in association with other internet telecommunication applications like Facebook.

5. To discuss how Skype plans to grow better in future through introducing newer language features.

LESSON STARTERS

Help student realize the usefulness of instant communication

How effectiveness of communication increases with video facility

How being able to communicate with anyone at any hour of the day is a great advantage to an individual's learning and development

TEACHING STRATEGY

Advantages of having Skype as distant communication software:

Not having to travel long distances

Sharing information with people

Making friends/increasing social interaction form your own location with people anywhere in the world

Education through the video feature

Free of cost text messaging, video chatting, illustrating with action etc, saving time and money

Communication does not go unattended for long. If the receiver is not present at the moment, a text message can always explain the purpose of communication

Sharing files through the internet is possible

Skype also works in association with other software like Facebook and through this feature information can be backed up in ways more than one

It is important to have a concept of back end working model of any form of communication for users in order to be aware of the disadavantges/weaknesses/shortcomings of that communication method. This is only way a user can be well prepared to overcome these shortcoming through some other method.

Significance of having a P2P connection and where it becomes most essential/ effective/cost effective

Why is it important to think of having cost effective methods of communication in today's world

EXTENDED TEACHING

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SUPPORT MATERIAL

https://www.youtube.com/embed/zni56lVckb0

http://www.digitaltrends.com/web/how-does-skype-work/

ANSWERS TO COMPREHENSION ASSESSMENT

1. What do you understand by instant communication?

Instant communication is a facility that is provided through the internet by creating a chat room for interacting individual in which they can have real time information transmission i.e. talking back and forth with a negligible delay

Messaging software like G Talk, AOL messenger, Skype are tools for instant communication. Instant communication is text-based and keeps users informed about who they can instantly start a conversation with through an alert system among their established contacts.

2. Which of the Skype features you think is most important?

Skype offers a set of amazing features the best of which is probably cost free communication for unlimited amount of time including both text messaging and video calls. Skype can also be used for conference or group calls for unlimited time free of charge.

Another feature is that it allows users to share their desktops with each other and this is highly convenient for educational purposes.

3. Explain which kind of technology works behind Skype?

Skype works through a P2P network. Such a network can be instantly created between contacts without the need of a server unlike many other forms of telecommunication networks. Only the Skype backend server is essential to support the software to keep running.

A P2P network helps contact share on various levels like their processing power, resources, disk space and bandwidth etc with each other.

The other important technological feature behind Skype is VoIP, which proves ultimately cost-effective. Unlike telephonic communication, VoIP is cable free and allows the voice to be

transferred through the same internet protocol which is being used for normal text-based information browsing.

**** **** ****

LESSON 13: GETTING MORE OUT OF GOOGLE

LEARNING OBJECTIVES

This chapter highlights the usefulness of search engines for education/al purposes.

It is important to learn how to make the best use of Google as a search engine in order to achieve the best results for your search/problem.

Google is more than just a search page. It can be used randomly for searching topics using keywords but Google offer more comprehensive tools for enhanced searching and once they are applied, the quality of results is unbelievable.

Google Apps is another feature of Google to organize one's data and tasks. It also offers universal accessibility which provides greater convenience for users.

LESSON STARTERS

A good way to launch this understanding is by asking the class how their experience with Google search has been.

Have they felt successful in searching their desired topics on Google, were they able to find exactly what they intended to look for about their topic or they ended up using whatever search they managed to receive with heir method of using Google.

You will likely hear a mix of "yes'es" and "no's" to this query of yours.

You can pick examples from your students and demonstrate to them how they can improve their searching method by tips provide in this lesson.

Using the students own experiences to improve will help them remember your guidance and they are more likely to apply it once again when they are using Google alone to see if it works the same way.

TEACHING STRATEGY

You can start off by using children's favorite story book character like Harry Potter, Pokémon, or a popular figure from the world of sports .Let them see how the search works by only putting the name without any additional characters in the search bar.

Next ask them what they are particularly interested in knowing about the character

Then show them how putting the characters like – and : add detail to the search results

Do not forget to tell the class the components of the Google search page.

Do ask them why the page looks like this:
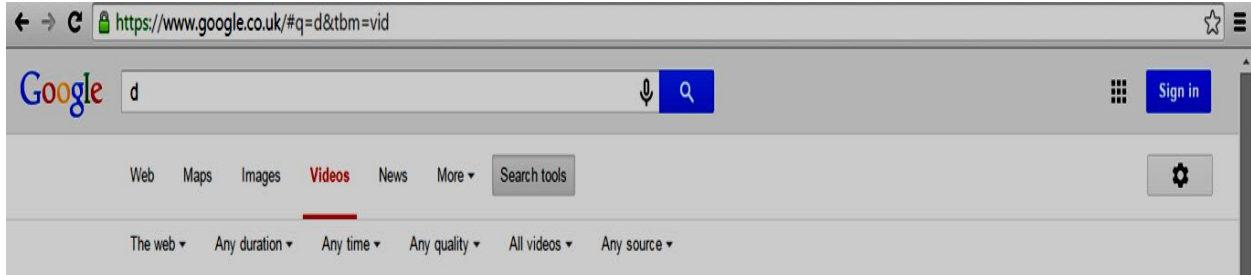
See their responses and help them figure out where they are wrong or where they are not able to understand the need for these features through further examples.

Emphasize how important it is to limit your search and keep a check on time while carrying it out. Tell them any project or task has its meaning only when it can be finished in time.

Then move on to Google Apps. Tell them how Google Docs is an important tool for organizing their work.

It helps them share, complete and be reminded of their work anywhere they are connected to the internet. They can utilize their time better being anywhere and keeping in touch with their work despite being away from their personal desktop. Moreover they do not need to carry additional devices to access their work as Google can save their data in its Google Docs application and all they need is an email account to reach it.

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SUPPORT MATERIAL

http://www.hongkiat.com/blog/better-google-searching/

https://support.google.com/websearch/answer/134479?hl=en

ANSWERS TO COMPREHENSION ASSESSMENT

1.　Which is the most popular search engine so far and why?

Google is by far the most popular search engine because of its advanced search tools and for providing the largest number of the most relevant search results in lesser time than other search engines.

2.　How Google makes itself user friendly?

Google is more user friendly than others because it understands its users' search needs and has provided additional search options that simplify the search methods and save their time.

3. Which features you think are the best for Google's users and why?

If a user is not interested in viewing results from a certain website in his required search, a simple – (minus) added before the website's name in search bar completely omits that website from the thousands of search results that will thus appear and the user will not have to go through each link showing on the page to choose and open pages apart from that.

Also Google offers to classify searches through options like images, news, and video on the similar topic in one click alone. Users can also specify time range and required length and quality of their results in their search queries.

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LESSON 14: THE COMING REVOLUTION: 3D PRINTING

LEARNING OBJECTIVES

The chapter intends to give an insight to the students about the modern day large scale manufacturing of products that we use daily and how computer technology is aiding in its improvement.

Giving students the basic concept of the processes involved in regular 3D printing on a desktop.

Then move onto explaining how these processes are useful in creating prototypes and their testing that are to be later manufactured on a large scale.

Giving them an idea how 3D printing will revolutionize human life through helping medical science in its research on various health issues.

LESSON STARTERS

Children must be helped in understanding the benefits of this kind of printing technique and how it is useful in practical life where we all have to use properly manufactured items like cars, houses, gadgets, etc.

They must also be told how 3D printing makes use of different materials for different kinds of printing in order to increase accuracy and decrease the cost of production processes.

The class must be allowed to imagine the possibilities of 3D printing in making our lives better and easier. For instance, Bio printing examples make one think that probably nothing related to human health will remain unaccomplished in times to come. They can also be given the concept of how to use nature and man-made technology together in the best way.

TEACHING STRATEGY

The teacher may ask the students to build a car with recycled materials in class. Each will visualize the car using his knowledge about cars and will imaginatively use the materials to build its different parts. Then all the models could be compared in terms of their functionality. Some will have more functionality than others.

This way they can understand what a prototype is and why is it essential to build one before manufacturing anything in bulk.

The weaknesses in some models can be compared with others and this way they can be given the concept of the need to developing a model through computer software mainly because of the accuracy of shape and size that can be managed with that.

They should also be informed how cost is saved through using recycled materials for manufacturing through this computer based technology.

Ask them how they wish implement Bio-printing to benefit someone they know with a health disability.

You can improve their concept of Bio-printing by listening to their ideas and correcting them.

EXTENDED TEACHING

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SUPPORT MATERIAL

http://3dprinting.com/what-is-3d-printing/

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4189697/

ANSWERS TO COMPREHENSION ASSESSMENT

1. What are basic concepts of 3D printing?

3D printing or Additive manufacturing is a process of making three dimensional solid objects from using computer designing software and a 3D printer. In an Additive process an object is created by laying down successive layers of material until the entire object is created. Each of these layers can be seen as a thinly sliced horizontal cross-section of the eventual object.

A drawing is different from a 3D model as it only demonstrates the height and width and not the depth of the drawn object. 3D printing satisfies the sense of feeling an object by just looking at it.

2. What are the different techniques of 3D printing?

3D printing results may appear in several desired forms but most commonly used are these:

Wire: In which a wire is melted and used on the surface of the object being printed.

Granular: In which a selected raw material is powered over the object's surface through a jet, which is melted using laser to achieve the desired surface finish.

Sheet lamination: Lamination is actually the technique of manufacturing an object in multiple layers, to give it improved strength and appearance using various materials. In 3D printing, materials mostly sensitive to heat are used to form objects.

Light polymerized: In this type of printing, light is used to change the physical property of materials on the surface to achieve the desired texture of the object being printed.

What do you understand of the CAD software and why is it used?

CAD(Computer Aided Design) is the most common commercially used computer program for the purpose of 3D modeling specially prototypes. CAD enables engineers and architects to design everything from furniture to airplanes.

CAD allows its users to view a design from any perspective and to zoom in or out for close-ups and long-distance views. Changes being made to the design in CAD occur to the entire design in a pre-defined proportion to all its dimensions together unlike regular drawing software's in which height, width and depth have to be dealt with separately.

What are the possible drawbacks of tailor-made implants supported by 3D printing?

Tailor-made Bio-printed 3D implantations need to undergo a wide range of trials and field testing before they can be used on the human body. Such implants are being manufactured in a limited amount and are being tested on animals.

Also, most of the materials used in this kind printing have to be obtained from human body sometimes which hinders their mass use. Thus, the use of this medical technology is limited at the moment. However, it is undergoing rapid development and in future it is deemed to take over most of the traditional medical methods to eliminate health deficiencies and disease.

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