

TECHNO Specialist

A Senior Technology Project

Teacher Guide

For Microsoft Office 2016



Table of Contents

Introduction - Getting Started

How to Use This Guide	i
How to Use the Resource Files	iii
Project Overview	v
Preparing to Teach TechnoSpecialist	vii

Session 1 – Introduction to the Computer

Getting Started	1-1
Overview	1-1
Materials	1-1
Teacher Preparation	1-1
Teaching Strategy	1-1
Lesson Plan	1-5
Learning Objectives	1-6
Assignment 1: Become an IT Specialist	1-7
What is an IT Specialist?	1-7
Where Do You Work?	1-8
Assignment 2: What is a Computer?	1-9
What is a Computer?	1-9
Different Types of Computers	1-9
What Computer is Right for the Job?	1-11
What is the Impact of Computers on Society?	1-12
Assignment 3: Input Devices	1-13
Keyboard	1-13
Mouse	1-14
Scanner	1-14
Microphone	1-15
Joystick	1-15
Trackball	1-15
Touch Pad	1-15
Touch Screen	1-15
Light Pen	1-15
Putting Information IN	1-16
Assignment 4: Output Devices	1-17
Speakers	1-17
Headphones	1-17
Monitor	1-17
Video or Digital Projector	1-17
Printer	1-17
Plotters/Large Format Printer	1-18
Speech Synthesizers	1-18
Information is Given OUT	1-18
Assignment 5: Introduction to Microsoft PowerPoint	1-19
Open Microsoft PowerPoint	1-19
Label the Parts of the PowerPoint Window	1-19
Change the View	1-20
A Closer Look at the Ribbon	1-21
Questions About the Ribbon	1-21
Change the Zoom Level	1-22

Exit PowerPoint	1-22
Assignment 6: Slide Master Design	1-23
Open PowerPoint	1-23
View the Slide Master.....	1-23
Select the Default Slide Master	1-24
Change the Background Color of the Slide Master	1-24
Change the Look of the Text on the Slide Master	1-26
Change the Bullets on the Slide Master.....	1-27
Insert a Clip Art to Act as the Company Logo	1-27
Format the Company Logo	1-28
Draw a Shape on the Slide Master.....	1-29
Format a Shape on the Slide Master.....	1-29
Insert a Header or Footer on the Slide Master	1-31
Close Slide Master View.....	1-31
Test the Layout and Design of the Slide Master.....	1-32
Save the Information Package and then Exit PowerPoint	1-32
Session 1 Review: About the Computer	1-33
Session 1 Skill Review: History of the Computer	1-35
Session 1 Extension Activity: More About Computers.....	1-37

Session 2 – Storage Devices

Getting Started.....	2-1
Overview	2-1
Materials	2-1
Teacher Preparation	2-1
Teaching Strategy	2-1
Lesson Plan	2-3
Learning Objectives	2-4
Assignment 7: Understanding Data Storage	2-5
Why Does a Computer Need Data Storage?	2-5
You and Data Storage.....	2-5
How Does The Computer Store Data?	2-6
Bits, Bytes, and Binary Code.....	2-7
Data Storage and Your Name.....	2-7
Understanding Storage Terminology.....	2-8
Assignment 8: About Storage Devices	2-9
Storage Mediums	2-9
CD and DVD	2-9
Flash Memory	2-11
Hard Disks.....	2-12
Assignment 9: Information Package and Storage Devices.....	2-13
Open Information Package in Microsoft PowerPoint	2-13
View Slide 2	2-13
Create a Slide Explaining the Purpose of Storage Devices	2-13
Create Slides About Types of Storage Devices	2-14
Save Changes to the Information Package and Exit PowerPoint	2-14
Assignment 10: Comparison of Storage Devices	2-15
Storage Capacity of a CD	2-15
Storage Capacity of a DVD.....	2-15
Storage Capacity of a Flash Drive	2-16
Storage Capacity of a Hard Disk.....	2-16
Assignment 11: Information Package and Comparison Chart	2-17
Open Information Package in Microsoft PowerPoint	2-17

View the Last Slide	2-17
Insert a Table for the Comparison Chart	2-17
Apply a Style to the Table	2-18
Resize the Table	2-19
Add Table Headings to the Top Row	2-19
Add Information About the Storage Devices to the Table	2-20
Complete the Storage Device Comparison Slide.....	2-20
Save Changes to the Information Package and Exit PowerPoint	2-20
Session 2 Review: Data Storage	2-21
Session 2 Skill Review: Storing Data on the Hard Drive.....	2-23
Session 2 Extension Activity: More About Data Storage.....	2-25

Session 3 – Types of Memory

Getting Started.....	3-1
Overview	3-1
Materials	3-1
Teacher Preparation	3-1
Teaching Strategy	3-1
Lesson Plan	3-3
Learning Objectives	3-4
Assignment 12: About Memory	3-5
What is ROM?.....	3-5
What is RAM?	3-6
Test your Memory	3-8
Assignment 13: Information Package and Memory.....	3-9
Open Information Package in PowerPoint	3-9
View the Last Slide.....	3-9
Insert a Graphic Organizer	3-9
Change the Layout and Design.....	3-11
Complete the Memory Slide	3-11
Save Changes to the Information Package and Exit PowerPoint	3-12
Session 3 Review: RAM and ROM.....	3-13
Session 3 Skill Review: Computers in Society.....	3-15
Session 3 Extension Activity: More About Memory.....	3-17

Session 4 – The Microprocessor

Getting Started.....	4-1
Overview	4-1
Materials	4-1
Teacher Preparation	4-1
Teaching Strategy	4-1
Lesson Plan	4-3
Learning Objectives	4-4
Assignment 14: About the Microprocessor	4-5
What is a Microprocessor?	4-5
Where is the Microprocessor Located?.....	4-5
How Does the Microprocessor Work?.....	4-6
How Fast is the Microprocessor?.....	4-6
The Microprocessor and Computer Performance	4-7
Are You as Quick as the Microprocessor?.....	4-8
Assignment 15: Produce a Video Clip about the CPU.....	4-9
Assignment 16: Information Package and the CPU	4-11
Open Information Package in Microsoft PowerPoint	4-11

View the Last Slide	4-11
About the CPU	4-11
View the Video Clip in Slideshow View	4-12
Complete the CPU Slide	4-12
Save Changes to the Information Package and Exit Microsoft PowerPoint	4-12
Session 4 Review: About the CPU	4-13
Session 4 Extension Activity: More About the CPU	4-15

Session 5 – Sight and Sound

Getting Started	5-1
Overview	5-1
Materials	5-1
Teacher Preparation	5-1
Teaching Strategy	5-1
Lesson Plan	5-3
Learning Objectives	5-4
Assignment 17: About the Monitor and Graphics Card	5-5
Types of Monitors	5-5
Monitor Attributes	5-5
Compare LCD Monitors	5-7
What is a Graphics Card?	5-8
About the Graphics Card	5-8
Assignment 18: Information Package, the Monitor and Graphics Card	5-9
Open Information Package in Microsoft PowerPoint and View the Last Slide	5-9
Create a Slide about the Monitor	5-9
Create a Slide about the Graphics Card	5-12
Complete the Monitor and Graphic Slides	5-12
Save Changes to the Information Package and Exit PowerPoint	5-12
Assignment 19: The Sound Card	5-13
What is a Sound Card?	5-13
How does the Sound Card Work?	5-13
What Type of Sound Card Do I Need?	5-13
What is that Sound?	5-14
Assignment 20: Information Package and the Sound Card	5-15
Open Information Package in PowerPoint and View the Last Slide	5-15
Create a Slide about the Sound Card	5-15
Listen to the Sound in Slideshow View	5-16
Complete the Checklist	5-16
Save Changes to the Information Package and Exit PowerPoint	5-16
Session 5 Review: Monitor, Graphics Card, and Sound Card	5-17
Session 5 Extension Activity: Personalize your Computer	5-19
Session 5 Extension Activity: Move, Hide, and Delete Slides	5-20

Session 6 – Your Computer, Your Way!

Getting Started	6-1
Overview	6-1
Materials	6-1
Teacher Preparation	6-1
Teaching Strategy	6-1
Lesson Plan	6-4
Learning Objectives	6-6
Assignment 21: Spell Check and Speaker Notes	6-7
Open Information Package in PowerPoint	6-7

Check Spelling	6-7
Add Speaker Notes	6-8
View Notes Page	6-9
Create Notes for Every Slide in Notes Page View.....	6-9
Print Notes.....	6-10
Save the Changes to the Presentation and then Exit PowerPoint	6-10
Assignment 22: Present Information about the Computer	6-11
Open Information Package in PowerPoint	6-11
View a Slide Show.....	6-11
Advance the Slide Show	6-11
Using the Pen During a Presentation.....	6-12
Turn the Mouse into a Laser Pointer	6-13
Change the Pen and Laser Pointer Color Before a Slide Show	6-13
Presentation and Customers.....	6-14
About the Presentation.....	6-15
Save the Changes to the Presentation and then Exit PowerPoint	6-15
Assignment 23: Create an Interactive Tutorial	6-17
Open Information Package in PowerPoint	6-17
Save as Company Name Kiosk	6-17
Add Hyperlinks to Slides	6-17
Add Action Buttons to Change Slides in Slide Master View	6-18
View the Slide Master.....	6-18
Set Up Slide Show	6-20
Play Slide Show as an Interactive Tutorial.....	6-20
Save the Changes and then Exit PowerPoint	6-20
Interactive Tutorial and Customers	6-20
Assignment 24: Produce a Video.....	6-21
Open Information Package in PowerPoint	6-21
Save the Information Package as a Video.....	6-21
Close PowerPoint.....	6-21
Play the Information Package Video	6-22
Explore the Presentation as a Video	6-22
Exit Windows Media Player.....	6-22
Assignment 25: View as a Handout	6-23
Open the Presentation in PowerPoint.....	6-23
Preview Handouts.....	6-23
Add a Header and Footer to the Handout.....	6-24
Print the Handout	6-24
Save the Changes to the Presentation and then Exit PowerPoint	6-24
Handout and Customers	6-24
Session 6 Review: Computer Parts and PowerPoint.....	6-25
Session 6 Extension Activity: Apply Animations and Transitions	6-27

Session 7 – Review

Getting Started.....	7-1
Overview	7-1
Materials	7-1
Teacher Preparation	7-1
Teaching Strategy	7-2
Summary of Skills.....	7-3
TechnoSpecialist Marking Sheet	7-5

Appendices

Appendix A: Terminology List	A-1
Appendix B: Glossary	B-1
Appendix C: Contact Information	C-1

Project Overview

Introduction to TechnoSpecialist

In this project, students become information technology specialists who work for a company that manufactures and sells personal computers. The business has launched a new initiative that will have consumers choose components for their computer. It is called "Your Computer, Your Way!" To help the customer pick the right hardware component to suit their needs, students create an information package using Microsoft PowerPoint. The package explains the aspects to consider when selecting devices using bulleted lists, tables, graphic organizers, clip art, picture files, video, and sound clips. The information package is transformed into a presentation, interactive tutorial, video, and handout to educate the purchaser.

- In session 1, students become Information Technology Specialists. Their job is to help customers purchase computer hardware by creating an information package that explains computer parts in simple terms. To prepare for this task, students learn about different types of computers, input devices, and output devices. Afterwards, they use Microsoft PowerPoint to customize the slide master to make a unique design for their information package. Upon completion, students use the slide master to create a title and introduction slide.
- In session 2, students learn about the importance of data storage. To start, they consider the reasons a computer needs to store data and are introduced to terminology used to measure storage capacity. Next, they learn about storage devices including a floppy disk, CD, DVD, flash drive, and hard drive. They apply their knowledge to create slides about each device to educate consumers about the purpose of various data storage devices. Next, students compare the storage capacity of each device and create a slide that contains a comparison chart.
- In session 3, students learn about the two types of memory, RAM and ROM. They read information to discover why the computer needs memory and how it affects performance. Afterwards, students summarize the facts about RAM and ROM using a graphic organizer. This new slide in the information package will help customers gain an understanding of what to consider when purchasing a computer.
- In session 4, students become familiar with the microprocessor. To understand why this computer part is the main factor in computer speed and efficiency, the history, function, and operation are studied. Afterwards a slide is constructed that explains to customers, in a simple way, the importance of the microprocessor and what should be considered when making a purchasing decision.
- In session 5, students learn about the monitor, graphics card, and sound card. To start they study the attributes that affect picture quality, such as contrast ratio, pixel pitch, and resolution. They summarize this information in a table. Next, students gain an understanding about how the computer produces sound. Afterwards, they write a simple explanation about the sound card and place a recorded sound clip about this component onto the slide.

- In session 6, students prepare to launch the company initiative: Your Computer, Your Way. To start, they edit the spelling and add speaker notes to each slide. Students then practice sharing the information package with customers by presenting the slide show to an audience, using the recently created speaker notes and pen to illustrate important points. Next, they save the information package with a new filename, to create an interactive tutorial that uses hyperlinks and action buttons to allow customers to access the information at a kiosk. Afterwards, they save the presentation as a video so that it can be viewed on any computer, emailed, or posted to the Internet. Finally, students print the information package as a handout. Customers will now be able to select computer components competently thanks to the versatile Your Computer, Your Way information package.

Assignment 1: Become an IT Specialist

In this project, you will become an Information Technology (IT) Specialist, who works for a company that manufactures and sells personal computers.

The business has launched a new initiative that will have consumers choose their components for their computer. It is called "Your Computer, Your Way!"

To help the customer pick the right hardware component to suit their needs, you must create an information package that can be used to educate the purchaser.



What is an IT Specialist?

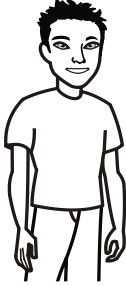
An IT Specialist is someone who has expertise when working with computers. It is a general term used to describe this profession, but most people have a specialty such as networking, data management, software, or customer support.

What are the job duties of an IT Specialist?

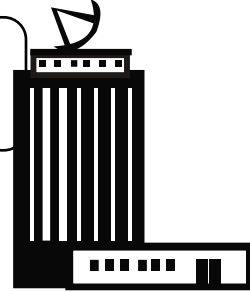
- plan the installation of new hardware and software
- install hardware and software
- repair hardware and software
- test hardware and software
- maintain hardware and software
- network computers
- maintain security of the computer network
- manage system resources such as printers and files
- develop a procedure for data management such as sharing and storing files
- maintain the security of data such as back up procedures
- assist co-workers with using hardware and software
- assist customers with using hardware and software sold by company

1. What do you know about computers that could help someone who knows nothing about computers?

Where Do You Work?



To get started, you need to decide on a name for the company where you work. Below are some tips that will give you some great ideas.



- Combine your name with your product – Karen's Computers
- Say it with initials – K.M. Computers
- Salute your street – Kenilworth Computers
- Abbreviate your name – Kar Computers
- Say what you do – Computer Customization
- Be first in the telephone book – AAAmazing Computers
- Be last in the telephone book – ZZZany Computers
- Link what with where – Computers for Home or Office
- Link benefit with product with superiority – Quality Customized Computers
- Make a name for yourself – Karen's
- Say what your customers should do – Computers for Connections
- Nominate your neighborhood – Hamilton Mountain Computers
- Tell of your town – Hamilton Computers

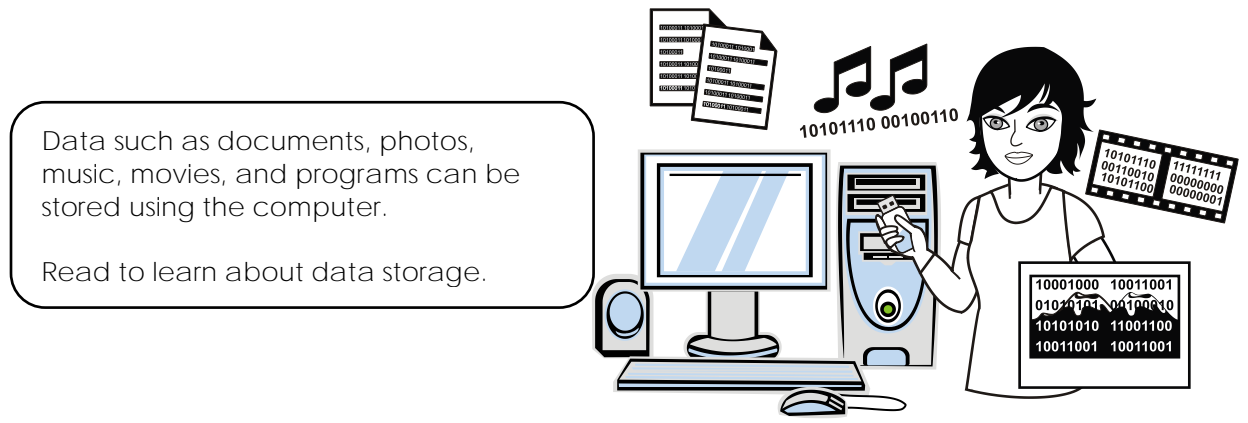
2. What do you want to call your business?

3. Why did you choose this name for your business?

This is a preview of the teacher guide.
Pages have been omitted.

SAMPLE

Assignment 7: Understanding Data Storage



Why Does a Computer Need Data Storage?

Data storage is the ability of the computer to save information permanently. The computer can store programs, apps, documents, photos, music, and movies. If the computer could not store data, then each time the computer was turned off, it would *lose* the information.

You and Data Storage

1. What programs do you have on your computer?

2. Do you use the computer to store your work? If yes, how many files do you think you have saved?

3. Do you use the computer to store photos? If yes, how many picture files do you think you have saved?

4. Do you use the computer to store songs? If yes, how many music files do you think you have saved?

5. Do you use the computer to store movies? If yes, how many video files do you think you have saved?

How Does The Computer Store Data?

A computer only understands data written as ones or zeros that are put together as a special code. This special code is called *binary code*. Binary code is the language of the computer, which unlike the language people speak only has two words – ON or OFF. ON is written as the number 1 and OFF is the number 0.

All information, whether it is a word-processing document, digital photograph, or music, is converted into this format by stringing together various combinations of zeros and ones. The computer knows what sound to play, what letter to type, and where to position the mouse pointer on the screen based on binary code.

All information no matter whether it is text, pictures, or sound is converted to bits of data. A bit is the smallest unit of data that a computer can understand. A bit is the binary digit 0 or 1. Binary code is made up of 8 bits of data called a *byte*. The bits and bytes are turned into electronic pulses that are ON or OFF – the pulses are the computer's language. The computer must use this language to decipher all the information given to it.

What does binary code have to do with data storage?

Lots! When the computer stores information it converts the data into binary code and breaks it down into bytes. For example, the letter 'O' would look like this: 01001111. When stored the letter 'O' equals one byte of computer memory. The bytes are stored on a storage medium such as a hard disk as a file.

A file is simply a collection of bytes that have a filename. The more detailed a picture or the longer a word-processing document, the more bytes the file contains, hence the larger the file size and the more storage space needed. When a program running on the computer requests a file, the storage device retrieves the bytes and sends them to the central processing unit (CPU).



Bits, Bytes, and Binary Code

6. Text is written in using binary code. Write your name using the table below. Notice how long it takes you to complete each letter. The computer does this for you instantly!

A	01000001	B	01000010	C	01000011	D	01000100	E	01000101	F	01000110
G	01000111	H	01001000	I	01001001	J	01001010	K	01001011	L	01001100
M	01001101	N	01001110	O	01001111	P	01010000	Q	01010001	R	01010010
S	01010011	T	01010100	U	01010101	V	01010110	W	01010111	X	01011000
		Y	01011001	Z	01011010						

Letter	Binary Code								
L	0	1	0	0	1	1	0	0	
A	0	1	0	0	0	0	0	1	
U	0	1	0	1	0	1	0	1	
R	0	1	0	1	0	0	1	0	
I	0	1	0	0	1	0	0	1	
E	0	1	0	0	0	1	0	1	

Data Storage and Your Name

7. How many bits are in your name?
Remember: A bit is the smallest unit of data that a computer can process or understand. A bit is the binary digit 0 or 1

8. How many bytes are in your name?
Remember: There are 8 bits in a byte.

Understanding Storage Terminology

When a file is very large it has many bytes. This requires the need for prefixes like *Kilo*, *Mega*, *Giga*, and *Tera* as in Kilobyte, Megabyte, Gigabyte, and Terabyte (shortened to KB, MB, GB, and TB).

Name	Abbreviation	Size
Kilobyte	KB	1,024 bytes
Megabyte	MB	1,048,576 bytes
Gigabyte	GB	1,073,741,824 bytes
Terabyte	TB	1,099,511,627,776 bytes
Petabyte	PB	1,125,899,906,842,624 bytes
Exabyte	EB	1,152,921,504,606,846,976 bytes
Zettabyte	ZB	1,180,591,620,717,411,303,424 bytes
Yottabyte	YB	1,208,925,819,614,629,174,706,176 bytes

Notice in the chart that the increments used to measure data storage increases by 1024 bytes each time. For example, there are about one thousand bytes in a kilobyte. There are about one thousand kilobytes in a megabyte. There are about one thousand megabytes in a gigabyte and there are about one thousand gigabytes in a terabyte.

You will also notice by looking at the table that a *kilobyte* is about a thousand bytes, *megabyte* is about a million bytes, and *gigabyte* is about a billion bytes. So when someone says, "This computer has 120 gigs", what they mean is that the hard drive has 120 gigabytes of storage, which means approximately 120 billion bytes, or exactly 128, 849, 018, 880 bytes.

How could you possibly need 120 gigs of space? It is easy to need a 120 GB of data storage:

Programs: A computer has programs installed. Different programs are used to create a document, design a presentation, listen to music, watch videos, or protect the computer from viruses. Programs require quite a bit of data storage space.

Documents: A computer can be used to store your work. For example, you may store reports made using Microsoft Word, a presentation designed using Microsoft PowerPoint, or a graph created using Microsoft Excel. Over time, the amount of work that you store can take up lots of data storage space.

Photos: A computer can be used to store photos of family and friends. Each picture taken with a digital camera is typically between one to three megabytes in size. You can easily have hundreds or even thousands of pictures. This means that several gigabytes of data storage space can be needed for photos.

Music: A computer can be used to store music files that are transferred to a music player. A song is often four or five megabytes in size. If you had just one music album by your favorite artist, it would take up about 50 megabytes. If you had 200 songs, or about 20 music albums, you would already have used up one gigabyte of space. Since most people like thousands of songs, lots of data storage space is needed to store music files.

Movies: A computer can be used to store movies. Movies can be created using a recording device or they can be downloaded from an online store using the Internet. Movie files are very large. Often one movie can take up one gigabyte. You need a lot of data storage space to store movies.

9. How many bytes are in a kilobyte?

1024 bytes

10. About how many megabytes are in a gigabyte?

About 1000 MB are in a GB

Assignment 8: About Storage Devices

If the computer could not store data, each time you turned the computer off, you would lose everything. You would not be able to install any programs or save your work.

The computer uses different storage devices to store data. Read the information to learn about floppy disks, CDs, DVDs, flash drives, and hard disks.

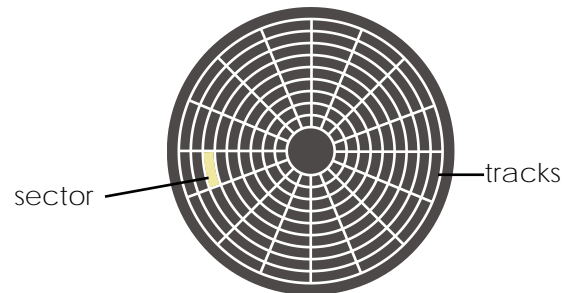
In the next assignment, you will add slides to the information package that explains storage devices to customers.



Storage Mediums

Over the years, the technology used to store information has changed dramatically. The storage mediums used today are faster, have a larger capacity, are more durable, and in many cases are more portable, than those used in the past.

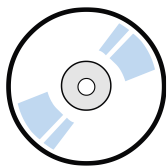
Each storage medium has a surface that stores information. This surface is divided into small sections that are used to store data. The reason a storage medium is divided into sections is so the computer knows where to look for the information stored on the disk.



A disk is divided into sectors that are shaped like wedges.
Data is stored in each sector.

There are different types of storage mediums used to store data. Often the type used depends on the purpose. For example, there are floppy disks, CDs, DVDs, flash memory, and the hard disk.

CD and DVD



CD is a short form for compact disc and DVD is a short form for digital versatile disc. Both are round storage devices that are about 4.75 inches (12 cm) in diameter. They are commonly used to store software programs, music files, and movies. As well, they can be used to save a backup of important data files.

How is information read and written to a CD?

Data on a CD or DVD is read and written using an optical drive. Once a CD or DVD is inserted into an optical drive, a motor starts to spin the disc. A laser scans the surface looking for changes in light. It is the lightness or darkness of the surface that tells the computer about the data that is stored on the disc.

Both a CD and DVD are made out of plastic. Information is added or *written* to the disc with a laser that heats the surface. This is why creating a disc is called *burning*. Information is stored in a track that is in the shape of a spiral. The track goes from the center of the disc to the outer edge.



Is burner speed important?

CD and DVD optical drives are rated based on burning speed. The burning speed is how many times faster the drive spins the CD or DVD when burning data to the storage medium than when it is just reading a CD or DVD. Reading a CD or DVD is 1x. Therefore, a burning speed of 16x means that the optical drive is spinning the CD or DVD 16 times faster than normal. A faster burning speed is preferred. However, to avoid errors, it is often a good idea to burn a CD or DVD at a speed slower than the maximum rate.

Why does a DVD hold more data than a CD?

Although a CD and DVD look the same, each device can hold different amounts of data. For example, a CD can hold 650 MB of data, whereas a DVD can store 4 GB. Data on a CD or DVD is stored in tracks. In the case of a DVD, the tracks are thinner than on a CD, which means more information can be burned onto the same size surface. There are also Blu-ray Discs (BD), which hold even more data at a greater density: 25 GB of data and 50 GB for dual-layer discs. This storage medium allows video and audio to be stored with greater definition than on a DVD. It is named after the blue laser that is used to read the disc, as compared with the red laser used for a DVD.

Why are there different types of CDs and DVDs?

There are several types of CDs and DVDs. Some CDs and DVDs are designed so that you can look at the information on the disc, but you cannot edit, add, or delete files. Others are designed so you can add data but afterwards the data is permanent and cannot be edited or deleted. Still others can add, edit, and delete files repeatedly.

CD-ROM and DVD-ROM: ROM stands for *read only memory*. Information on the disc is permanent and cannot be added, edited, or deleted. This method of data storage is used for software, audio CDs purchased from a store, or a movie that you rent.

CD-R and DVD-R: R stands for *recordable*. Information on the disc can be added, but once on the disc it is permanent. This type of disc is good if you want to burn data and then never change the content. For example, if you were making a custom music CD, video of a family trip, or back up of important data files you would use a CD-R or DVD-R.

CD-RW and DVD-RW: RW stands for *recordable and writeable*. These discs can have files added, edited, and deleted from the disc repeatedly.

3. What advantage is there to using a DVD to store data in comparison to a CD?

A DVD stores four times more data than a CD.

Flash Memory

Flash memory is a computer chip that is used to store information. Flash memory is commonly used in phones, cameras, fax machines, and other electronic devices to save photos, music, user settings, or other data. They are also being used in smart cards, which may be credit cards, identification cards, or door-entry access cards with built-in microprocessors to provide security. Flash memory chips are also used in a storage device called a *flash drive* or *USB drive*. A flash drive is a small device the size of a thumb.



A flash drive contains a flash memory chip that is used to store data. The flash memory chip is protected by a small plastic case. The plastic case has a USB slot at the top that is used to plug the flash drive into the USB port on a computer. Information can then easily be read or written to the flash drive. Since the device is plugged into the USB slot, it is sometimes called a *USB drive*.

Storing data happens in a *flash!* Data on a flash drive is added or erased with electronic pulses. Flash memory has a grid of columns and rows that divide the surface into blocks that can be erased or written to without affecting the other areas. Flash memory offers a quick method of data storage, because the information is erased one block at a time, instead of one byte at a time.

The use of the flash drive continues to grow in popularity. This is likely because it is an affordable portable device that can hold lots of information. You can purchase a flash drive that holds 1GB, 2 GB, 4 GB, 8 GB, 16 GB, 32 GB or more! It is easy to see why more and more people are using it to store files instead of using a CD or DVD.

4. Why do you think the device is called a *flash drive*?

5. Do you have a flash drive? If yes, what files do you store?

6. List three reasons why flash memory is a popular storage medium.

portable

inexpensive

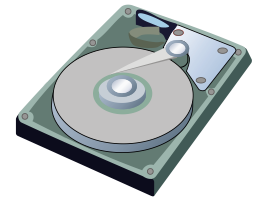
large storage capacity

A flash drive can be called a thumb drive, USB drive, or memory stick.



Hard Disks

A hard disk or *hard drive* is a storage medium used to store programs, user settings, and files. Hard disks were invented in the 1950s. They started as large disks up to 20 inches in diameter holding just a few megabytes. Today, they are the size of your hand and can hold one terabyte of data.



Nearly every desktop computer and server in use today contains one or more hard disks. Every mainframe and supercomputer is normally connected to hundreds of them. The hard disk is used to store digital information in a relatively permanent form. They give computers the ability to remember things when the power goes out.

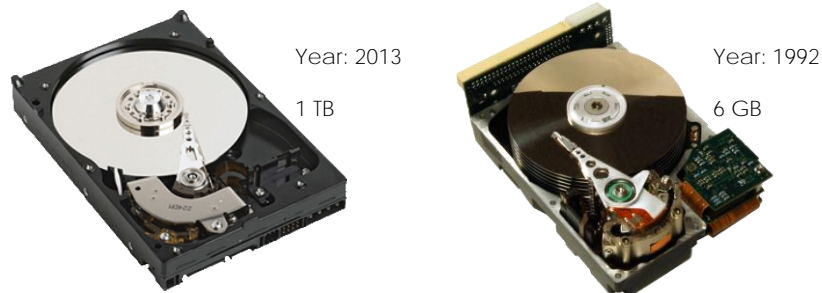
Hard disks have an aluminum or glass disk that is layered with a magnetic recording material. Information is read and written to the disk using read/write heads.

How does a hard drive work?

When the computer requests information the circuit board inside the hard drive box, tells a motor to spin, which causes the hard disk or platter to turn. A mechanism moves an arm that holds the read/write heads. The arm moves quickly from the center of the disk called the hub to the outer edge of the platter to locate the information in the proper sector. Once the information is found, the read/write heads send the information to the circuit board, which then relays it to the computer, or more specifically, the CPU. This all happens without the read/write heads ever touching the platter. Instead, they rest directly over the platter.

Hard disks have dramatically increased their storage capacity over the years, although the overall design has changed very little. *How is this possible?*

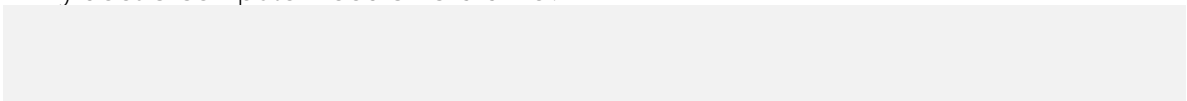
The difference between hard disks from the past and today are the size of the heads. Since the heads are made tinier, it is possible to divide the platter into smaller sectors. The more sectors, the more data storage.



There are three ways to measure the performance of a hard disk:

- Storage Capacity: amount of bytes of data the hard disk can store
- Data Rate: number of bytes per second that the drive can deliver to the CPU
- Seek Time: amount of time it takes between the time that the CPU requests a file and the first byte of the file starts being sent to the CPU

7. Why does a computer need a hard drive?



Assignment 9: Information Package and Storage Devices

You are going to create a set of slides in the information package that explains to customers about storage devices. For each device, you will explain the purpose, offer recommendations about purchasing, and include a picture.



Open Information Package in Microsoft PowerPoint


- ☞ Go to the place where you saved your work.
- ☞ Select the company name file and double click to *Open*.

View Slide 2


- ☞ To move to Slide 2 press the PAGE DOWN key on the keyboard or click the Slide 2 thumbnail in the Slides Tab.




Create a Slide Explaining the Purpose of Storage Devices

- ☞ On the Home tab, click the *New Slide* arrow. 
- ☞ Select *Title and Content* from the gallery.
- ☞ In the *Click to add title* placeholder, type About Storage Devices.
- ☞ In the *Click to add text* placeholder, ask the question, "Why does a computer need storage devices?" Press ENTER.
- ☞ Type There are several types of storage devices including: Press ENTER.
- ☞ Press TAB to indent the bullets. Create a list of storage devices:
 - Optical Drive
 - Flash Drive
 - Hard Drive

Create Slides About Types of Storage Devices

- ☞ On the Home tab, click the *New Slide* arrow. 
- ☞ Select *Two Content* from the gallery.
- ☞ In the *Click to add title* placeholder, type Optical Drive.
- ☞ In one of the content boxes, answer the following questions:
 - What is the purpose of an optical drive?
 - What should a person look for when selecting an optical drive?
- ☞ In the second content box, click *Online Pictures*.



- ☞ Type optical drive in the search box and then click *Search*. 
- ☞ Click on a picture and click *Insert* to add it to the slide.

- ☞ Make a slide for each storage device. Include a picture of each device on the slide.

Flash Drive

- What is a flash drive?
- Why are flash drives popular?

You can use your skills to format the picture. Double click on the picture. Use the commands on the *Picture Tools* tab.





Hard Drive

- What is the purpose of a hard drive?
- What should a person look for when selecting a hard drive?

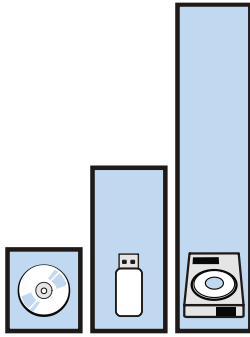


You need to write about each storage device using descriptions that people who do not know a lot about the computer will understand.

Save Changes to the Information Package and Exit PowerPoint

- ☞ Click *Save* on the Quick Access Toolbar. 
- ☞ Click the *Close* button. 

Assignment 10: Comparison of Storage Devices

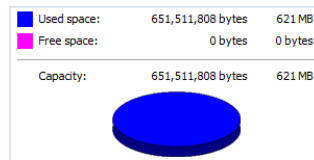


Follow the instructions to compare the storage capacity of a CD, DVD, flash drive, and hard disk.

In the following assignment, you will add this information to the Information Package using a table.

Storage Capacity of a CD

- ☞ Insert a CD that has content into the optical drive.
- ☞ Click *Computer*.
- ☞ Right click on the optical drive. Click *Properties*.
The amount of used and free space will be listed.



A CD-ROM will have no free space because it cannot have data added to the device. However, a CD-RW will have free space because data can be added, deleted, and changed.

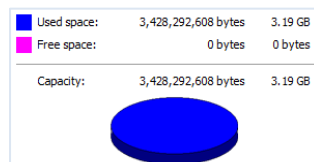


1. A CD can hold 650 MB.

How much space is used on the CD?

Storage Capacity of a DVD

- ☞ Insert a DVD that has content into the optical drive.
- ☞ Click *Computer*.
- Right click on the optical drive. Click *Properties*.
The amount of used and free space will be listed.



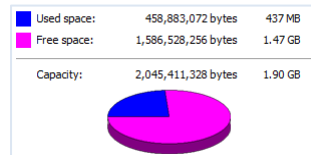
2. A DVD can hold 4 GB.

How much space is used on the DVD?

Storage Capacity of a Flash Drive

- ☞ Insert a flash drive into a USB slot on the computer.
- ☞ Click *Computer*.

Right click on the optical drive. Click *Properties*.
The amount of used and free space will be listed.



3. A flash drive can hold 1 GB, 2 GB, 4 GB, 8 GB, 16 GB, 32 GB, 128 GB, 256 GB, 1 TB or more!

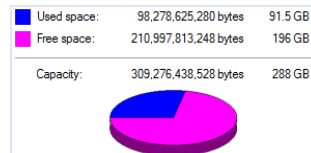
What is the capacity of the flash drive?

How much space is used on the flash drive?

How much space is free on the flash drive?

Storage Capacity of a Hard Disk

- ☞ Click *Computer*.
- ☞ Right click on the C: drive. Click *Properties*.
The amount of used and free space will be listed.



4. A hard disk can hold 500 GB, 1 TB, or more!

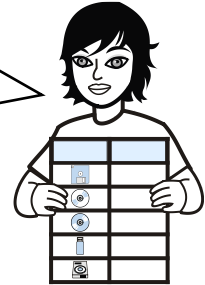
What is the capacity of the hard disk?

How much space is used on the hard disk?

How much space is free on the hard disk?

Assignment 11: Information Package and Comparison Chart

You will create a table that compares the storage capacity of a CD, DVD, flash drive, and hard drive.



Open Information Package in Microsoft PowerPoint

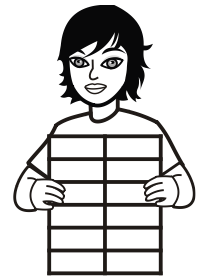
- ☞ Go to the place where you saved your work.
- ☞ Select the company name file and double click to *Open*.

View the Last Slide

- ☞ To move to the last slide use the PAGE DOWN key on the keyboard or click the last slide in the Slides Tab.

Insert a Table for the Comparison Chart

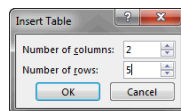
You will insert a table onto the slide. It will have two columns and six rows.



- ☞ On the Home tab, click the *New Slide* arrow.
- ☞ Select *Title and Content* from the gallery.
- ☞ In the *Click to add title* placeholder, type Comparison of Storage Capacity.
- ☞ Click *Insert Table* on the placeholder.



- ☞ Type in the number of columns and rows for the table.



2 columns
5 rows

- ☞ Click OK.



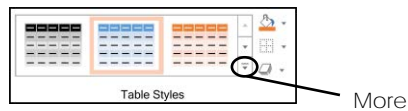
Look for the *Table Tools* contextual tabs that show up on the ribbon. There are two contextual tabs– the Design and Layout tabs.

Apply a Style to the Table

You can change the style of the table. Pick a style from the gallery.

Pick a Style

- ☞ On the *Table Tools Design* tab, find the *Table Styles* group.
- ☞ Click the *More* arrow to see more designs.



- ☞ Click on a style you like.

Change the Shading, Borderlines, and Effects

You can customize the table by changing the shading color, borderlines, and effects.


- ☞ Select the table.

Click inside a cell or click and drag the mouse to select a row or column.

- ☞ On the *Table Tools Design* tab, find the *Table Styles* group. Try the following commands to change the way the table looks. After using each command, put a checkmark in the box.

 Fill a cell with a color, gradient, texture, or picture.

 Apply borderlines to each cell.

 Add an effect to the table such as a cell bevel, shadow, or reflection.

- ☞ Use your skills to format the table.

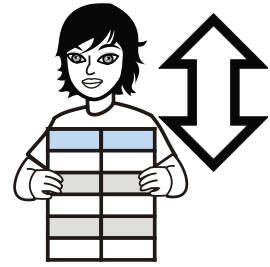
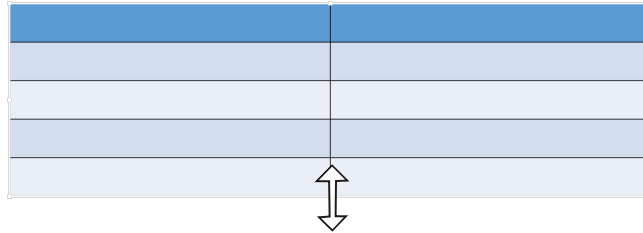
You can edit the borderline color, line style, and width using the commands in the *Draw Borders* group on the *Table Tools Design* tab.
To exit *Draw Borders*, click *Draw Table*.



Resize the Table

You need to resize the table to make it fill the slide. When you resize the table, the height of each cell is adjusted, to make each the same height.

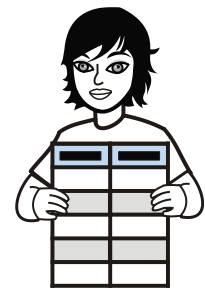
- ☞ Place the mouse pointer over the bottom sizing handle.
- ☞ Click and drag downwards to make the table larger.









Add Table Headings to the Top Row

You need to add the headings **Storage Device** and **Storage Capacity** to the top row of the table. You will then change the alignment of the cells to make the headings look great.

- ☞ Click inside the top left cell. Type **Storage Device**.
- ☞ Press **TAB**. Type **Storage Capacity**.
- ☞ Place the mouse pointer beside the top row. When the mouse pointer changes to a black arrow, click the mouse to select the row.



- ☞ Click the *Table Tools Layout* tab and find the *Alignment* group. Try each command to change the alignment of the words in the cell. After using the command, put a checkmark in the box.

-  Align the words to the left side of the cell.
-  Align the words in between the left and right side of the cell.
-  Align the words to the right side of the cell.
-  Align the words to the top of the cell.
-  Align the words in between the top and bottom of the cell.
-  Align the words to the bottom of the cell.

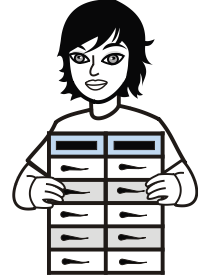
- ☞ Use your skills to align the words in the cells.

Add Information About the Storage Devices to the Table

You need to add the storage devices to the table.

☞ In the LEFT column under the *Storage Device* heading add:

- CD
- DVD
- Flash Drive
- Hard Drive



☞ In the RIGHT column under the *Storage Capacity* heading, add the amount of information stored by each device.

☞ Use your skills to change the alignment of the words in the cells.

You can resize the width of columns. Place the mouse pointer over the center borderline. When it changes to a two-way arrow, click and drag to the left or right.



Complete the Storage Device Comparison Slide

☞ Use your skills to finish the slide. Complete the checklist:

- Does the slide title say *Comparison of Storage Capacity*?
- Does the table have headings that are easy to read?
- Does the slide have a list of storage devices?
- Is the storage capacity for each storage device accurate?
- Does the table have a style that makes the information easy to read?
- Is the information aligned in the table cells?

Save Changes to the Information Package and Exit PowerPoint

Session 2 Review: Data Storage

What storage medium is right for the job?

- DVD Hard Drive Flash Drive

1. Kyle works for a company that needs to create a backup of important files. They need to back up 3.5 GB of data. What storage medium is right for the job? Why?

A DVD is a reliable device to use to store a backup of files because it can be burned and then stored easily on or off site. A DVD can hold 4 GB, therefore it has enough storage capacity for all the data.

2. Cheryl is working on the school year book. She needs to share the photos and articles with a friend. There are many files and they take 8 GB of storage space. What storage medium is right for the job? Why?

A flash drive is a great way to store lots of information in a portable way.

3. Alex wants to install a program. Where should he store the program on his computer? Why?

Programs need to be permanently installed on a computer to run efficiently. For this reason, it is a good idea to install the program on the hard drive.

/6

Match each term with the correct description.

d 4. MB

a. A language used by the computer that uses 1's or 0's.

e 5. Sectors

b. The smallest unit of data a computer can understand.

b 6. Bit

c. Eight bits.

a 7. Binary Code

d. Short form for megabyte.

c 8. Byte

e. A location where data is stored on a disk.

/5

Match the device to the storage capacity.

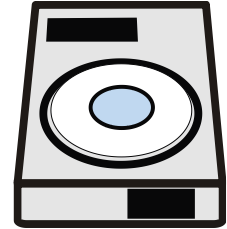
- | | | | | |
|---|-----|---------|----|-------------|
| b | 9. | 1.44 MB | a. | flash drive |
| c | 10. | 1 TB | b. | CD |
| a | 11. | 16 GB | c. | hard drive |
| d | 12. | 4 GB | d. | DVD |

/4

TOTAL: /15

Session 2 Skill Review: Storing Data on the Hard Drive

Create a comparison chart that summarizes the advantages and disadvantages to storing data on the hard drive.



1. Open PowerPoint.
2. On the title page:
 - a) Type Storing Data on the Hard Drive in the title placeholder.
 - b) Type Student Name in the subtitle placeholder.

TIP: To insert a picture onto the title slide, click the *Insert* tab. Click *Online Pictures*. Type hard drive into the search box and then click *Search*. Click on a picture you like and click *Insert* to add it to the slide.

3. Insert a new slide. Select the *Title and Content* layout.
4. In the *Click to add title* placeholder, type Hard Drive.
5. Insert a table with 2 columns and 3 rows.
6. Change the table style.
7. Resize the table to make it larger.
8. Add the table headings Advantage and Disadvantage to the top row of the table.
9. Change the alignment of the headings. Format the text.
10. List the advantages and disadvantages to storing data on the hard drive in each cell under the correct column heading. Consider the following factors:
 - capacity
 - types of files stored
 - access to files
 - portable
 - affordable
 - reliable

TIP: To insert a new row, place the mouse pointer in the last row of the table. Now from the *Table Tools Layout* tab click *Insert Below*.

11. Change the alignment of the information. Format the text.
12. Save the file in your student folder.
 - a) Click *Save* on the Quick Access Toolbar.
 - b) Go to your student folder. Name the file hard drive. Click *Save*.
13. Exit PowerPoint.

Session 2 Extension Activity: More About Data Storage

1.

A 01000001	B 01000010	C 01000011	D 01000100	E 01000101	F 01000110
G 01000111	H 01001000	I 01001001	J 01001010	K 01001011	L 01001100
M 01001101	N 01001110	O 01001111	P 01010000	Q 01010001	R 01010010
S 01010011	T 01010100	U 01010101	V 01010110	W 01010111	X 01011000
		Y 01011001	Z 01011010		

a. Write a word or short sentence using binary code.

b. How many bits are in the word or sentence?

c. How many bytes are in the word or sentence?

d. Give the code to your friend to decipher. Can they "crack" the code?

2. Compare the cost of purchasing a hard drive. Who has the best deal? Why?

3. What does it mean to *back up* a file? Why would a person want to back up their files? Make a backup copy of the *Information Package* presentation.

4. When you are working on a document and it is not saved to any storage medium, what happens to your work if the power goes out?

5. What are the benefits of saving your work onto a flash drive? What are the disadvantages?

6. What are the benefits of storing data on the hard drive? What are the disadvantages?

7. A CD holds 650 MB of data. A DVD holds 4 GB of data. How many CDs would you need to equal one DVD?

10. A file can be compressed or *zipped* to make it smaller. This is done using a compression program. Although data is already coded in digital form for computer processing, it can often be coded more efficiently by using fewer bits. The program replaces strings of repeated characters with a single character thus making the file smaller. Although file compression is a great way to reduce file size, compressed data must be decompressed or *unzipped* before it can be used.

Check File Size Before Compression:

- a. Go to student folder and locate the *Information Package* presentation file.
- b. Right click on the presentation file and select *Properties* from the menu.
- c. Look in the *Size* area. What is the file size?

Compress a File:

- a. Right click on the file name and select *Send To* from the menu.
- b. Select *Compressed (zipped) Folder*.
- c. What does the icon of the new file look like?

Check File Size After Compression:

- a. Right click on the compressed file and select *Properties* from the menu.
- b. Look in the *Size* area. What is the file size?

Decompress a File:

- a. Right click on the compressed file and select *Extract All* from the menu.
- b. Click *Extract*.

11. Files can be transferred to different storage devices. This is a good way to transport files or back up your work. Try it!

- a. Connect a flash drive to the computer.
- b. Display the contents of the flash drive. To do this click *Computer* and then right click on the flash drive icon. From the menu, select *Open*.

KEEP THE WINDOW OPEN.

- c. Display the contents of your student folder.

KEEP THE WINDOW OPEN.

- d. Right click on the *Information Package* presentation file.
- e. From the menu, click *Copy*.
- f. Right click inside the *flash drive* window.
- g. From the menu, click *Paste*.

This is a preview of the teacher guide.
Pages have been omitted.

SAMPLE

TechnoSpecialist Marking Sheet

Information Package			
Slide Master	<ul style="list-style-type: none"> customize the background fill format the text draw and format a shape design is suitable for an information package 	<ul style="list-style-type: none"> select a bullet style for each level insert and format a picture include a header and footer 	/8
Title Slide	<ul style="list-style-type: none"> includes name of company 	<ul style="list-style-type: none"> includes name of student 	/2
Information Slide	<ul style="list-style-type: none"> introduces company initiative 	<ul style="list-style-type: none"> lists computer devices 	/2
Storage Devices Slide: optical drive, flash drive, and hard drive	<ul style="list-style-type: none"> description of device is accurate explanation is easy to understand 	<ul style="list-style-type: none"> picture is formatted to look attractive information is helpful to customers 	/16
Storage Device Comparison Slide	<ul style="list-style-type: none"> storage capacity is accurate information is aligned in the table cells 	<ul style="list-style-type: none"> table has headings that are easy to read table style makes information easy to read 	/4
Memory Slide	<ul style="list-style-type: none"> description of rom is accurate description of ram is accurate 	<ul style="list-style-type: none"> information is helpful to customers graphic organizer is easy to read 	/4
Processor Slide	<ul style="list-style-type: none"> description of device is accurate explanation is easy to understand information is helpful to customers 	<ul style="list-style-type: none"> video is informative video is good quality 	/5
Monitor Attribute Slide: resolution, pixel pitch, contrast ratio, viewing angle, response rate, brightness	<ul style="list-style-type: none"> description of attributes is accurate information is helpful to customers pictures are formatted attractively 	<ul style="list-style-type: none"> table has headings that are easy to read table style makes information easy to read 	/15
Graphics Card Slide	<ul style="list-style-type: none"> description of device is accurate explanation is easy to understand 	<ul style="list-style-type: none"> picture is formatted to look attractive information is helpful to customers 	/4
Sound Card Slide	<ul style="list-style-type: none"> description of device is accurate information is helpful to customers 	<ul style="list-style-type: none"> sound clip is informative sound clip is good quality 	/4
Slide Show	<ul style="list-style-type: none"> advance slides during presentation speaker notes are useful reference 	<ul style="list-style-type: none"> pen is used to emphasize information 	/3
Interactive Tutorial	<ul style="list-style-type: none"> file saved as a kiosk text hyperlinks show related slide 	<ul style="list-style-type: none"> action buttons display first, last, previous, next, and last slide viewed 	/5
Video	<ul style="list-style-type: none"> file saved as a video 		/1
Handout	<ul style="list-style-type: none"> handout type is suitable for purpose 	<ul style="list-style-type: none"> customized header and footers 	/2
Comments:			/75