**Overview:**

Students work individually to understand and establish the specifications for a PC dedicated to a specific task or function. (The specific task or function will be assigned to the student from the list below.) The function and features of various hardware components are researched to develop a general understanding. Specific components and features are then selected based on appropriate need for the assigned task or function. The final product is a brochure that will be shared with other classmates during a tradeshow event.

**Objectives:**

* Use correct terminology to describe computer hardware, speed measurements, and size

measurements

* Describe the functions of the internal components of a computer
* Describe the functions of common computer peripheral devices
* Assess user computing needs and select appropriate hardware components for different

situations

**Getting Started:**

1. You will be required to design a “dream machine” personal computer (PC) for one of the tasks assigned to you from the list below.
2. To get started, develop a general understanding of what will be important features and what will be less important features of our dream machine. Consider the following:
   1. Operating system software
   2. Special application software
   3. Processor & motherboard speed
   4. Main memory speed and size
   5. Secondary storage speed and size
   6. Graphics and display speed and resolution
   7. External devices (e.g. keyboard, pointing devices, joysticks, etc.)
   8. Network connectivity
   9. Power and data backup
   10. Printers, scanners, and similar equipment
   11. Portability and durability
   12. Budget (cost) considerations

Specific Tasks & Functions

1. ***Game Computer***: Dedicated to playing PC games in a home environment
2. **Photo Editing & Organization**: Dedicated to editing and producing photographs and images in a home or professional environment
3. ***Business Office Computer***: Dedicated to producing documents and presentations and communicating with other people in a professional office environment
4. ***Student Home Computer***: Dedicated to completing homework, paying bills, communicating with friends and other similar tasks in a home environment
5. ***Factory Floor Computer***: Dedicated to reading documents, filling in forms, processing orders, etc. in a factory or warehouse environment.
6. ***Media Production and Streaming Computer***: Dedicated to production and distribution of video and/or music media in a semi-professional environment
7. ***Web Surfing Computer***: Dedicated to surfing the web, streaming media, and communicating through on-line services in a home environment

**Level 1: Processor & Memory**

1. Research and summarize the main features and function of a CPU processor chip. Consider the following:
   1. Physical packaging shape and size

The CPU has a physical packaging size of usually 1cm by 1cm.They are squares.

* 1. Processing speed and power

The best CPU is the AMD Ryzen 7 2700X. It has a speed of up to 4.3 GHz.

<https://www.techradar.com/news/best-processors>

* 1. Memory speed and size

The memory speed does vary depending on how much the PC or Laptop can take. Good Computers usually vary between 2.5 and 3.5 GHz.

1. Research and summarize the history of how a CPU processor chip has changed over the years. Consider the following:
   1. Typical processor speed, size, model numbers in the early 1990’s

<https://www.computerhope.com/history/processor.htm>

* 1. Typical processor speed, size, model numbers in the early 2000’s
  2. Typical processor speed, size, model numbers in the current time

1. Research and summarize the main features of motherboards. Consider the following:
   1. Physical packaging shape and size

There are 7 different motherboards that are between 6.7in by 6.7in and 15in by 13.6in. They are almost like a square or rectangle.

<https://lanoc.org/review/motherboards/5791-motherboard-sizing>

* 1. Speed and size

The speeds are usually from 66MHz to 800MHz.

<https://computer.howstuffworks.com/motherboard4.htm>

1. Research and summarize the history of how motherboards have changed over the years. Consider the following:
   1. Typical speed, size, model numbers in the early 1990’s

The speed of motherboards in the 1990’s was between 66 and 100MHz. The size is about the same of today motherboards. The model number is Intel 440BX.

<https://www.hardwarezone.com.sg/m/feature-hardwarezones-10th-anniversary-special/motherboard-evolution-decade>

* 1. Typical speed, size, model numbers in the early 2000’s

The speed can go up to 1333MHz. The speed is the same. The model number is Intel P45.

<https://www.hardwarezone.com.sg/m/feature-hardwarezones-10th-anniversary-special/motherboard-evolution-decade>

* 1. Typical speed, size, model numbers in the current time

A good budget motherboard is the Intel Gigabyte Z930 UD. It has a speed of 2666MHz. Its size is 23 cm by 30.5 cm.

<https://motherboarddb.com/motherboards/1347/Z390%20UD/>

1. Research and summarize the main features and function of RAM memory. Consider the following:
   1. Physical packaging shape and size
   2. Speed and size

The speed/size of RAM can go up to 64 GB, or more. They are usually rectangular shapes and can come from two to four pieces, as the same size no matter what.

1. Research and summarize the history of how RAM memory has changed over the years. Consider the following:
   1. Typical speed, size, model numbers in the early 1990’s

In 1995, a computer had about 8mb. It was about the size of the RAM we have today.

* 1. Typical speed, size, model numbers in the early 2000’s
  2. Typical speed, size, model numbers in the current time

With a 32-bit computer, you can have up to 4 GB of RAM. With a 64-bit system computer, you can have up to 128GB of RAM.

<https://www.computerhope.com/issues/ch001778.htm>

1. Research and summarize the main features and function of Hard Disk Drives (HDD). Consider the following:
   1. Physical packaging shape and size
   2. Speed and size

A Hard Disk Drive is a rectangular prism. There are different sizes that come. The highest size available is 16 TB; the exact amount is 15.36 TB.

<https://petapixel.com/2015/08/15/samsung-16tb-ssd-is-the-worlds-largest-hard-drive/>

1. Research and summarize the history of how Hard Disk Drives (HDD) have changed over the years. Consider the following:
   1. Typical speed, size, model numbers in the early 1990’s

The IBM 0663 Corsair was released in 1991. It stores 1GB of data.

<https://www.pcworld.com/article/127105/article.html>

* 1. Typical speed, size, model numbers in the early 2000’s

In 2004, Toshiba’s MK2001MTN was debuted. It stores 2GB on a single platter.

<https://www.pcworld.com/article/127105/article.html>

* 1. Typical speed, size, model numbers in the current time

There is Samsung’s PM1633a. It has 16TB of storage.

1. Explain and justify the processor and memory requirements for your ‘dream machine’ task. Discuss the following:
   1. Minimum and “would be nice” requirements for the CPU chip

A minimum of a i5-7500U is good. There are a lot of things that the computer will be doing, and I think an i7-7500U CPU chip would be a minimum. An i7-9700k chip would be nice as the PC will be fast at doing things.

* 1. Minimum and “would be nice” requirements for the Motherboard

A socket AM4 is a minimum I would say. Something that would be nice is the ASRock B250 Pro4. It is a good motherboard.

* 1. Minimum and “would be nice” requirements for the RAM memory

A minimum requirement for RAM memory is 8GB. Something that would be nice is 32GB of memory.

* 1. Minimum and “would be nice” requirements for the HDD

500GB is a minimum for HDD. 2TB would be nice depending on how much someone needs.

**Level 2: Display & Peripherals**

1. Research and summarize the main features and function of Computer Display Monitor. Consider the following:
   1. Physical construction (CRT, LCD, etc)

The most common PC monitors have Cathode Ray Tube, or CRT, and Liquid Crystal Display, or LCD.

* 1. Display Standards (CGA, VGA, SVGA, XGA, etc.)

The most common display standards are HDMI(High-Definition Multimedia Interface), VGA(Video Graphics Array), and DVI(Digital Visual Interface).

* 1. Resolution & Colour depth

The best resolution is usually around 3,840 x 2160.

1. Research and summarize the main features and function of a Computer Graphics Card. Consider the following:
   1. Physical packaging (e.g. On the motherboard, expansion card, etc.)

It is usually a rectangular prism. There is a part for outside connections and a small motherboard.

* 1. Speed and frame rate (2D vs 3D)

It is usually 2D. The frame rate can usually go up to 200 or 300 FPS if the graphics card is good.

* 1. Resolution, colour depth, and memory size

4GB of VRAM is usually enough. The resolution depends on the display monitor.

1. Research and summarize the history of how Computer Display Technology has changed over the years. Consider the following:
   1. Display standards and capabilities in the late 1980’s

In the late 1980’s, colour CRT monitors were capable of a 1024 x 768 resolution display.

<https://www.computerhope.com/history/monitor.htm>

* 1. Display standards and capabilities in the late 1990’s

LCD monitors started to roll out.

<https://www.computerhope.com/history/monitor.htm>

* 1. Display standards and capabilities in the 2000’s

More LCD displays exist than Plasma displays.

1. Research and summarize the main features and function of External Storage and Backup. Consider the following:
2. Removable media (e.g. floppy disks, CD/DVD-RW, CompactFlash, etc.)

CD/DVD-RW are usually used to store media, such as music or videos. But they can store files. They can be used in most cars and all computers. Computers usually either have a built-in CD player or an external CD player.

1. USB media (e.g. Memory Stick, External HDD, etc.)

USB media stores all types of files, such as MP3, MP4, Word files, and much more. They can range from 8GB to 256GB. External storage can have up to 16GB.

1. Cloud based storage

Cloud-based storage is usually data that is stored on a server. These are usually in online games, websites, schools. They are usually efficient as it does not cost money, unless the website asks you to pay more for more storage.

1. Research and summarize the history of how External Storage and Backup has changed over the years. Consider the following:
2. Typical speed, size, model numbers in the early 1990’s

Floppy disks were popular. They were slim, lightweight, and portable. They held small amounts of data.

<https://www.ubreakifix.com/blog/evolution-external-storage>

1. Typical speed, size, model numbers in the early 2000’s

SD cards were out. They measured 32 by 32 by 2.1 millimeters. They held different amount’s such as 10MB or 100MB.

1. Typical speed, size, model numbers in the current time

There is more of cloud data storage. They are online servers. They can store up to different amounts.

1. Research and summarize the main features and function of Network Connectivity. Consider the following:
2. Connection technology (e.g. Dial-Up, Ethernet, WiFi, Bluetooth, Fibre, etc.)

Ethernet and WIFI allow a device to connect to the internet. Bluetooth allows two devices to connect to each other, such as a device and another device or a device or a media device.

1. Upload and download speed

Upload and download speed are the time and speed it takes for a device to upload or download something. Download speeds tend to be faster than upload speeds. For example, my download speed is 94.22MBps and my upload speed is 13.49MBps.

1. Security

Security is used to protect a computer or laptop from threats from the internet. Threats usually come from downloads and ad’s that convince you to do something.

1. Research and summarize the history of how Network Connectivity has changed over the years. Consider the following:
2. Typical speed, size, model numbers in the early 1990’s

WIFI started to come out. The speeds were very slow, but improving over the time.

1. Typical speed, size, model numbers in the early 2000’s

WIFI speeds were improving and Bluetooth started to come out.

1. Typical speed, size, model numbers in the current time

WIFI speeds are fast and a lot of Bluetooth devices exist, such as speakers, headphones, computers, and lots more.

1. Research and summarize the main features and function of Printer Technology. Consider the following:
2. Printing Technology (e.g. Dot Matrix, Ink Jet, Laser, etc.)

There are mostly inkjet, laser and LED, and solid-ink printers. Printers copy, fax, and scan documents. You can also print stuff from the internet or your computer.

1. Connection Technology (e.g. Parallel Port, USB, WiFi, Network, etc.

Parallel ports, USB ports, WIFI, and Network ports have been on printers for long. They allow a printer to connect to a device over WIFI or by wire.

1. How printing has changed over the years

Printers have changed over the years as they have become smaller. They also now allow people to print from multiple different devices.

1. Explain and justify the processor and memory requirements for your ‘dream machine’ task. Discuss the following:
2. Minimum and “would be nice” requirements for the Computer Display

Minimum requirement for the Computer Display would be a monitor with resolution of 1920x1080 and at least 30”. Something that would be nice is a 4k display with about 40”.

1. Minimum and “would be nice” requirements for External Storage and Backup

A minimum for external storage would be 64GB and a minimum for backup would be 500GB. Something that would be nice is 128GB of external storage and 1 to 2TB of backup.

1. Minimum and “would be nice” requirements for Network Connectivity

A minimum for Network Connectivity would be a speed of 75MBps. Something that would be nice is 150MBps.

1. Minimum and “would be nice” requirements for Printer Technology

A coloured printer is needed. It is both a minimum and “would be nice”. There are a lot of coloured sheets and projects that is going to be needed.

**Level 3: Building Your Dream Machine**

1. Identify the minimum requirements for each component of your dream machine as follows::
   1. CPU processor chip speed and type
   2. Motherboard type
   3. RAM memory speed and size
   4. HDD speed and size
   5. Display Monitor resolution, type, and size
   6. Graphics card resolution and type
   7. Audio card type
   8. Audio Speakers type
   9. External backup type and size
   10. Network interface requirements
   11. Printing Technology
   12. Other Peripherals (e.g. mouse, keyboard, joystick, etc.)
2. Prioritize you list of components from question #1 from those that are essential down to those that would be nice.

Motherboard Type

CPU processor chip speed and type

HDD speed and size

RAM memory speed and size

Graphics card resolution, type and size

Display Monitor resolution, type and size

Network interface requirements

External backup type and size

Printer technology

Audio card type

Audio Speakers type

Other Peripherals

1. Establish a target budget (cost) for your dream machine.

Between $1250 and $1750 would be a target

* 1. Justify your cost based on your projected component needs.

You do need a lot of good things to make your computer. The computer will be expensive because of the high-end things you have to get.

* 1. Justify your cost based on a realistic assessment of your application and target user

Most good photo editing people do get a lot of expensive things that help with creating the best things for their customers or themselves.

1. Build your dream machine or locate a ready to buy machine using on-line vendor web sites.
   1. Find at least two sources for your dream machine

[https://ca.pcpartpicker.com](https://ca.pcpartpicker.com/)

<https://www.bestbuy.ca/en-ca/product/hp-pavilion-desktop-pc-amd-a12-9800-1tb-hdd-16gb-ram-amd-radeon-r7-windows-10-english/12387216.aspx?>

* 1. Provide a copy of the cost and feature list summary for each source

For PC Part Picker, the total cost was 1403.83 without tax for the following parts:

CPU= Intel Core i7-8700K 3.7 GHz 6-Core processor

CPU cooler= Cooler Master-Hyper 212 Black Edition 42 CFM CPU cooler

Motherboard= Asus Prime Z370-A ATX LGA1151 Motherboard

Memory= G.Skill – Aegis 16GB(2x8GB) DDR4-3000

Storage= Western Digital – Blue 1TB 3.5’ 7200RPM Internal Hard Drive

Video Card= MSI – Radeon RX 580 8GB Armor OC

Case= Phanteks – Eclipse P300 Tempered Glass (Black) ATX Mid Tower Case

Sound Card= Asus – Xoner DSX 24-Bit 192 kHz

Monitor= Panasonic – EJMDA32UK 32” 1920x1080 60 Hz Monitor

External Storage= Seagate – Backup Plus Slim 2TB External Hard Drive

For Best Buy, the HP Pavilion Desktop PC was available. The following parts were included:

CPU= 7th Generation AMD A12-9800

RAM= 16GB(2x8GB) DDR4-2400 SDRAM

Hard Drive= 1TB

Graphics Card=AMD Radeon R7 Graphics

Video Memory=2GB

Sound Card=5.1 Surround Sound

c.Explain how the machine from each source matches (or is different) from your ideal configuration.

Both math my ideal configuration. The computer from PC Part Picker is more of a better PC for editing. It would be better overall. The computer has better items than just the minimum.

Suggested Websites:

* [www.dell.com/en-ca](http://www.dell.com/en-ca)
* [www.staples.ca](http://www.staples.ca)11
* [www.tigerdirect.ca/](http://www.tigerdirect.ca/)
* [www.canadacomputers.com](http://www.canadacomputers.com)

**Task & Function Signup**

|  |  |
| --- | --- |
| **Task** | **Student Name** |
| ***Game Computer*** |  |
| **Photo Editing & Organization** | Harman Goraya |
| ***Business Office Computer*** |  |
| ***Student Home Computer*** |  |
| ***Factory Floor Computer*** |  |
| ***Media Production and Streaming Computer*** |  |
| ***Web Surfing Computer*** |  |
| ***Game Computer*** |  |
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