**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:

a. Operating system software

b. Special application software

c. Processor & motherboard speed

d. Main memory speed and size

e. Secondary storage speed and size

f. Graphics and display speed and resolution

g. External devices (e.g. keyboard, pointing devices, joysticks, etc.)

h. Network connectivity

i. Power and data backup

j. Printers, scanners, and similar equipment

k. Portability and durability

l. Budget (cost) considerations

Specific Tasks & Functions

A. ***Game Computer***: Dedicated to playing PC games in a home environment

B. **Photo Editing & Organization**: Dedicated to editing and producing photographs and images in a home or professional environment

C. ***Business Office Computer***: Dedicated to producing documents and presentations and communicating with other people in a professional office environment

D. ***Student Home Computer***: Dedicated to completing homework, paying bills, communicating with friends and other similar tasks in a home environment

E. ***Factory Floor Computer***: Dedicated to reading documents, filling in forms, processing orders, etc. in a factory or warehouse environment.

F. ***Media Production and Streaming Computer***: Dedicated to production and distribution of video and/or music media in a semi-professional environment

G. ***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:

a. Physical packaging shape and size

Packaging is usually much larger than the actual chip, and the chip is pretty small, about 3-4cm in length and width.

b. Processing speed and power

There is a wide range of speed and power of a processing chip, starting with 5 MHz to 5GHz in high end CPU chips

c. Memory speed and size

All the way to 1Terrabyte of memory, starting from 128mb of ram.

2. Research and summarize the history of how a CPU processor chip has changed over the years. Consider the following:

a. Typical processor speed, size, model numbers in the early 1990’s

Pentium processors got introduced, as well as the original 8086 by intel.

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

Launched their I series and i3, i5, and i7 got introduced, and AMD created their lineup of processors also.

c. Typical processor speed, size, model numbers in the current time

i9 chips introduced and xeon and other more powerful chips are introduced into the flagships.

3. Research and summarize the main features of motherboards. Consider the following:

a. Physical packaging shape and size

Motherboards got larger, with higher speeds and more capacity to hold more parts for more powerful computers.

b. Speed and size

Speed and size both increased, to hold more parts for higher speeds.

4. Research and summarize the history of how motherboards have changed over the years. Consider the following:

a. Typical speed, size, model numbers in the early 1990’s

Around 40MHz RAM speeds, around the same size as today, maybe smaller by a few centimeters, and those types of motherboards were used in the Macintosh IIfx.

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

Speed increased to around 100MHz memory capacity, and with slightly larger boards, they were able to make more powerful computers with motherboards like the Epox MVP3C2.

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

Speeds have increased a lot over the years, reaching overclocked speeds all the way to 4400MHz in memory, and are obviously larger for more hardware capacity, with an example being the Asus ROG Maximus XI Code Z390 Gaming for $500 canadian.

5. Research and summarize the main features and function of RAM memory. Consider the following:

a. Physical packaging shape and size

RAM memory serves the purpose of storing cache and other data types that need to be stored and used very quickly, to run applications that the system needs for the user. The shape and size remained the same, for laptops use SODIMM, a smaller form factor for the same RAM. desktop RAM remained the same over the years, with a few pins added or removed for higher end ram (DDR1, DDR2, DDR3, DDR4)

b. Speed and size

As stated, RAM has changed to accommodate speed, as well as increased memory capacity and speeds from 800MHz, to 4400MHz in current technology.

6. Research and summarize the history of how RAM memory has changed over the years. Consider the following:

a. Typical speed, size, model numbers in the early 1990’s

RAM got released in slow speeds and fit in the first DDR dimms.

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

RAM speed increased and has evolved in size to about 2-4 GB.

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

Almost every type and size or RAM is available, with up to 1 TB of RAM for whoever wants it. Speeds can reach up to 4400MHz, and can be used with most systems.

7. Research and summarize the main features and function of Hard Disk Drives (HDD). Consider the following:

a. Physical packaging shape and size

The physical shape and size of a hard drive has changed over the years, and they have gotten significantly smaller, to be to the size of 2 and a half inches. There are also hard drives that have larger capacities, and are smaller than some larger hard drives with less capacity.

b. Speed and size

The speed of hard drives have increased over the years, and new technology has arrived so that drives can be faster with solid state technology.

8. Research and summarize the history of how Hard Disk Drives (HDD) have changed over the years. Consider the following:

a. Typical speed, size, model numbers in the early 1990’s

Hard drives are big, and usually take up alot of space inside the hard drives. They tend to be a bit slow when loading up applications and documents.

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

Hard drives became smaller, and were available in a smaller more space friendly size that would be convenient in a computer. Speeds also increased and loading up files were faster than before.

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

The current standard suze for hard drives is basically the same as the medium ones in most computers, but have way more storage, than what they used to have. They also got faster, and alot of hard drives these days are only 2 and a half inches, for laptops and ssd’s. Speeds have increased greatly, as mentioned in ssd’s.

9. Explain and justify the processor and memory requirements for your ‘dream machine’ task. Discuss the following:

a. Minimum and “would be nice” requirements for the CPU chip

A pentium with around 300MHz clock speed. That’s the minimum, because you could web browse on windows xp just fine if you wanted to. An i3 or better cpu with at least a 6th generation version would be nice for a web browsing computer with windows 10.

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

Minimum would be an internet connection of any speed, as long as you are connected to be able to load web pages. Would be nice would be at least 50mb/s internet speed or more.

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

At least 2gb or more, is the minimum and at least 8gb or more would be nice for opening multiple tabs and having to play videos or stream music.

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

Any hard drive would suffice, but at least have 20gb of storage for system files. A would nice hard drive would be 128gb or more storage.

**Level 2: Display & Peripherals**

1. Research and summarize the main features and function of Computer Display Monitor. Consider the following:

a. Physical construction (CRT, LCD, etc)

And lcd monitor would be good, bit if you would want higher end specs and more colour accuracy or frame rate, then you can opt for a more expensive monitor. The function is to view what the computer is trying to display for your visuals.

b. Display Standards (CGA, VGA, SVGA, XGA, etc.)

Any display interface would be alright, but vga or dvi would be recommended. Hdmi for bonus points, although it doesn’t matter. This is used so that the computer can send the data to the monitor for the monitor to be able to display.

c. Resolution & Colour depth

Any resolution would be okay, but at least have 720p to not drive you insane, and 1080 if you can. Going up to 1440p and 4k is a luxury, and it would be nice without being necessary. Any colour depth is ok, but get ips or oled monitors if you really want the luxury. This functions as how clear and crisp the monitor displays to your eyes, and minor more smaller details are visible with higher resolution monitors.

2. Research and summarize the main features and function of a Computer Graphics Card. Consider the following:

a. Physical packaging (e.g. On the motherboard, expansion card, etc.)

This goes into the PCIE X16 slot on the motherboard, and operates to render frames in order for the monitor to display and view. The physical packaging is generally a little larger than the card itself.

b. Speed and frame rate (2D vs 3D)

The more memory and clock speeds, the higher the frame rate and speed. This is lowered in 3d, and the frame rates might be slower than worse graphics cards on 2d.

c. Resolution, colour depth, and memory size

This all depends on the capabilities of the graphics cards, and how much the card can handle pushing frames to a certain limit.

3. Research and summarize the history of how Computer Display Technology has changed over the years. Consider the following:

a. Display standards and capabilities in the late 1980’s

Crt’s and little colour depth or frame rates with some displays being black and white.

b. Display standards and capabilities in the late 1990’s

Dvi, vga, and that's basically it for the 1990’s with little technology to go further.

c. Display standards and capabilities in the 2000’s

Hdmi, dual hdmi, dvi is still great, display ports, both versions and vga are all available with great capabilities and limits. Some are limited more than others, but all are great and acceptable for web surfing.

4. Research and summarize the main features and function of External Storage and Backup. Consider the following:

a. Removable media (e.g. floppy disks, CD/DVD-RW, CompactFlash, etc.)

This is used for storing data, as you would need for local and cloud storage. System files also need to get stored on top of personal data, leading to more storage. Removable data can also be used for personal data on the go.

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

Can be used to store removable media for easy transportation of files as well as a backup storage for the data already on your computer.

c. Cloud based storage

Can be used for data storage that isn’t physical to your pc, and would require an internet connection with a paid subscription most of the time. This is mostly used to store personal files that are important and you wouldn’t want getting corrupted on your physical drives.

5. Research and summarize the history of how External Storage and Backup has changed over the years. Consider the following:

a. Typical speed, size, model numbers in the early 1990’s

Slow and small storage amounts typically around a few gigabytes. Storage devices are large in physical size and take up alot of space.

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

Storage has gotten smaller in physical size with more storage size to be available to users with alot of need for local storage.

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

Storage has gone beyond what people have imagined in the 1990’s, and you can get a terabyte of storage on a micro sd card that is less than a cubic centimetre in size.hard drives have also came a long way with a bunch or storage with cloud storage available. Cloud storage has a lot of capabilities with backing up storage for users to use along with local storage.

6. Research and summarize the main features and function of Network Connectivity. Consider the following:

a. Connection technology (e.g. Dial-Up, Ethernet, WiFi, BlueTooth, Fibre, etc.)

Ethernet is recommended, since it tends to be faster than WiFi. everything ese is nice, but not a need since you wouldn’t need any of that to web browse. The function of connection technology is so that the pc can connect to devices and services that aren’t physically inside or connected to the pc.

b. Upload and download speed

A higher upload and download speed is recommended, but it’s not needed since you only need the speed for web browsing, and not for anything else. So the extra speed would be unnecessary, and the load would never be demanded. Upload speeds are used to transfer data from the pc to the servers, while download speed is used to transfer data from the servers or cloud storage to your home pc.

c. Security

Security is needed somewhat when dealing with online web surfing, because you never know what sites you may encounter. Security is used to protect your device from online dangers that may threaten your computer.

7. Research and summarize the history of how Network Connectivity has changed over the years. Consider the following:

a. Typical speed, size, model numbers in the early 1990’s

Ethernet, and slow, usable internet connection is available to most computers.

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

Wireless internet called wifi was available, with faster speeds on wired, ethernet connections.

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

Wifi and ethernet both became available in almost every home, and wifi is fast and available in almost every company or business for customers to use.

8. Research and summarize the main features and function of Printer Technology. Consider the following:

a. Printing Technology (e.g. Dot Matrix, Ink Jet, Laser, etc.)

Function is to print what was visible on the computer screen to be visible on paper where you do not need electronics to display the information.

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

You can connect to a printer via wires or wirelessly, although wireless connections are usually with newer printers that have connection to the internet.

c. How printing has changed over the years

Printing technology has changed to laser printing and other means, so that the print result is higher quality, resolution, or better colours.

9. Explain and justify the processor and memory requirements for your ‘dream machine’ task. Discuss the following:

a. Minimum and “would be nice” requirements for the Computer Display

Minimum would be at least a 720p TN panel at 30hz at least, although 1080p at 60hz is standard and if you want nice quality then get an ips panel, oled or qled. or just get a higher resolution monitor at 1440p or more.

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

Storage should be at least 20gb, but a would be nice should be 128gb or 512gb with an ssd for fast load up times.

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

Any connection is the minimum, but a good ethernet port is nice, maybe gigabit or Wifi cards can be great for less cable managing.

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

You do not need a printer for web browsing, but a printer connected wirelessly to your pc would be nice.

**Level 3: Building Your Dream Machine**

1. Identify the minimum requirements for each component of your dream machine as follows::

a. CPU processor chip speed and type

I3-8100 at 3.6GHz, 8th gen and costs $119 for budget machines.

[https://ark.intel.com/content/www/us/en/ark/products/129942/intel-core-i3-8300-processor-8m-cac](https://ark.intel.com/content/www/us/en/ark/products/129942/intel-core-i3-8300-processor-8m-cache-3-70-ghz.html)

[he-3-70-ghz.html](https://ark.intel.com/content/www/us/en/ark/products/129942/intel-core-i3-8300-processor-8m-cache-3-70-ghz.html)

b. Motherboard type

Mini ITX, and the ROG B360 would be a good option at only $130 USD.

<https://www.asus.com/us/Motherboards/ROG-STRIX-B360-I-GAMING/>

c. RAM memory speed and size

DDR4, with 8GB of RAM. Taking advantage of dual channel with an 8GB kit of (2x4GB). Costs

$60-Corsair Vengeance LPX.

<https://www.amazon.com/Corsair-Vengeance-2400MHz-PC4-19200-Memory/dp/B00S51XM5Q/ref=asc_df_B00S51XM5Q/?tag=hyprod-20&linkCode=df0&hvadid=309751315916&hvpos=1o1&hvnetw=g&hvrand=9822841189823025757&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=21137&hvtargid=pla-440420919599&psc=1&tag=&ref=&adgrpid=67183599252&hvpone=&hvptwo=&hvadid=309751315916&hvpos=1o1&hvnetw=g&hvrand=9822841189823025757&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=21137&hvtargid=pla-440420919599>

d. HDD speed and size

210mb/s, and has 2TB of storage for $59 at Best buy. This is the Seagate Barracuda, and is a 3.5

inch internal SATA hard drive.

<https://www.bestbuy.com/site/seagate-barracuda-2tb-internal-sata-hard-drive/6164929.p?skuId=6164929>

e. Display Monitor resolution, type, and size

Samsung 390 series 24” curved 1080p IPS glossy and black. This is a good deal for the value

and price. Ony $180 and with great colour accuracy and comfortable viewing experience.

<https://www.bestbuy.com/site/samsung-390-series-24-led-curved-fhd-freesync-monitor-high-glossy-black/5044601.p?skuId=5044601>

f. Graphics card resolution and type

Integrated Intel UHD Graphics 360.

g. Audio card type

Integrated.

h. Audio Speakers type

Turtle Beach wireless gaming headset for $80, the Ear Force Stealth 450.

<https://www.bestbuy.com/site/turtle-beach-ear-force-stealth-450-over-the-ear-wireless-gaming-headset-for-pc-black-red/9584136.p?skuId=9584136>

i. External backup type and size

Portable SSD T5 for backup. Its 1TB in size for $220.

<https://www.samsung.com/us/computing/memory-storage/portable-solid-state-drives/portable-ssd-t5-1tb-mu-pa1t0b-am/>

j. Network interface requirements

Wifi Card- MU-MIMO 802.11 AC included in the motherboard, or ethernet port in the io

configuration.

k. Printing Technology

Samsung Xpress, a wireless laser printer for $280.

<https://www.bestbuy.com/site/samsung-xpress-c480fw-wireless-color-all-in-one-laser-printer/4934100.p?skuId=4934100>

l. Other Peripherals (e.g. mouse, keyboard, joystick, etc.)

Razer Cynosa Chroma-$50, and the MX Anywhere 2s-$80. Cooler master case elite 130-$50.

Startech 300 watt power supply-$34.

<https://www.razer.com/gaming-keyboards-keypads/razer-cynosa-chroma-pro>

<https://www.logitech.com/en-us/product/mx-anywhere-2s-flow>

<http://www.coolermaster.com/case/mini-itx-elite-series/elite130/>

2. Prioritize you list of components from question #1 from those that are essential down to those that would be nice.

Motherboard, power supply, CPU, RAM, Monitor, Hard Drive, Keyboard, Mouse, case, Headset, Printing Technology,

External Backup.

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

a. Justify your cost based on your projected component needs.

$1342 is the total cost of all the materials gathered above.

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

$632 is the total cost for the computer without the external backup, printer and peripherals that you wouldn’t need realistically if you are purchasing a new computer.

4. Build your dream machine or locate a ready to buy machine using on-line vendor web sites.

a. Find at least two sources for your dream machine

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

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

<https://www.bestbuy.com/site/dell-inspiron-desktop-intel-core-i3-8gb-memory-1tb-hard-drive-black-with-silver-trim/6228202.p?skuId=6228202>

* Different motherboard
* Has windows 10
* Has dvd burner
* Has bluetooth 4.0, when my configuration has 5.0
* Mine has Display port, more SATA ports, and an addressable RGB header.
* Mine has an extra TB of storage
* This is $197 less expensive
* No monitor included
* 2 more usb 2.0

<https://www.staples.ca/en/cyberpowerpc-gamer-xtreme-gxi1060-gaming-desktop-computer-3-6-ghz-intel-core-i3-8100-1-tb-hdd-8gb-ddr4-nvidia-geforce-gt-730/product_2872593_1-CA_1_20001>

* Nvidia Geforce GT 730
* Mine has a TB more storage
* Has windows 10
* No bluetooth
* 4 more usb 3.0
* 2 more usb 2.0
* No monitor included
* $81 more expensive

Suggested on-line computer sources:

·  [www.bestbuy.ca/](http://www.bestbuy.ca/)

·  [www.dell.com/en-ca](http://www.dell.com/en-ca)

·  [www.staples.ca](http://www.staples.ca/)

·  [www.tigerdirect.ca/](http://www.tigerdirect.ca/)

·  [www.canadacomputers.com](http://www.canadacomputers.com/)

**Level 4: Sharing Your Dream Machine**

1. Prepare a brochure documenting your dream machine options and choices.

a. The target audience is other students in the class

b. You should explain your target task (e.g. game computer) and how this affects configuration choices.

c. You should explain your configuration choices in greater detail

d. Your two purchase options should be explained and compared

2. Share your brochure

a. By uploading it to your repository

b. By presenting it during the in-class tradeshow (date TBD)

3. Visit and report on other trade show presentations / brochures

a. Complete the Passport Template (TBD) as you participate in the in-class tradeshow.

**Task & Function Signup**

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