

“The Motherboard is A City”

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Introduction

As I am not an English major, I am a techy, please bear with me. In this unit, I want my students to dissect a basic element in technology the motherboard. I want them to be able to identify eight of the components that connect to the motherboard. Then they will describe how working together the components make a computer run. Finally, they will put write a story placing the components into layman terms so anyone can understand the components. The end result, I’m hoping, will encourage students to become more creative, think outside of the box, learn to put their thoughts into writing, and to be able to communicate effectively.

Technology is everywhere and is growing by leaps and bounds every day. As a teacher I am very concerned that students are taking technology for granted and depend on it without knowing how and why it works. In working with high school students, they have access to more technology than I even thought was possible when I was their age. Whereas technology can be useful it can also become detrimental. One of the largest problems I find, occurs when the students have forgotten the basic elements of actually writing and speaking to one another.

Early on in my high school teaching career I was quickly shocked and transported to a different reality on what is common vocabulary. I was trying to engage my students in a conversation about flash drives. My question to them was, as I was holding a flash drive up, “What is this called?”. In my mind this was a very simple question, however, I was proven wrong. The first response I received was from a very kind young man who said, “The jawn”. “Um, the what?” I replied. “You know the jawn thingy that goes in the computer to save stuff.” he said. “I’m sorry, I don’t understand, the what thingy?”, I am sure I had a look of utter confusion on my face. “The jawn thingy.” Thus is my first experience with a whole new vocabulary from my students. I have come to learn that jawn is what they use when they can’t think of a word. In my day it was just the thingamajig or the thingy. My have times changed!

Demographics

Howard Technical High School is one of four vocational schools located in Wilmington, Delaware. Howard has a 1:1 iPad initiative for approximately 950 students which is composed of primarily minority students. Our students can choose from 13 different career areas: Computer Networking Administration Program, Culinary, Cosmetology, Dental Assisting, Medical Assistant, Nurse Technology, Engine Technology, Automotive, Building Automation Systems, Carpentry, Legal Assistance, Legal Support Services and Academy of Finance.

Rationale

This unit will be taught to vocational ninth grade students in the Computer Networking Administration Program. Our primary curriculum is based off of CompTIA's A+ certification. This certification is a two part exam. The first exam covers the basic fundamentals of computer technology, mobile devices, safety procedures, customer service and printers. The second exam covers in more detail the operating system, networking and security.¹ Our purpose is to teach students the ins and outs of a computer, how the computer works and the basics of how a Windows operating system runs. My job as a vocational teacher is to also help the students become college and career ready – which includes real world experiences.

With the introduction of Common Core, there is a more urgent need for students to be able to practice their writing skills as much as possible. Studies have also shown that students struggle with informal versus formal writing². Many students have a misconception that if they work on computers or in the technology field, they won't ever need to write. However, in the real world this is not the case. I explain to students that often, as a technician, you will have to write reports and memos. Of course this is often followed up with disbelief and disdain! I then explain a good technician will have to write a detailed log on the solutions to a problem with a customer's site and often a weekly/monthly report will have to be submitted to their superiors. It is also further explained to students that writing will never go away and there will always be a need for clear and concise writing.

Strategies

With the introduction of this unit, students will learn about motherboards in a variety of ways. Students will be given information about motherboards through the teacher, textbook and research on the Internet. While performing research they will be able to learn and identify different types of motherboards. They will learn about how the motherboards have developed as technology has grown exponentially. They will also

watch guided videos and be given a motherboard as a sample so they can touch, observe and learn. There will also be additional assignments such as building a model motherboard out of things at home such as Legos, and a labeling activity.

As I am teaching this unit, the students will write a creative story. Studies have shown that using creativity helps to engage the student with learning.³ My thoughts are to have the students articulate the components in laymen's terms into a story. This serves as a two part purpose, the first being it will help them remember the components on the motherboard. The second, is to be able to explain to a customer what is going on without having the customer feel overwhelmed with tech jargon.

The fiction story they are writing can take any form. It can become a science fiction story, fairy-tale, or better yet, and action adventure story such as the chase to the Fords of Bruinen from Tolkien's *The Fellowship of the Ring*. A motherboard on its own, looks like a city with the circuits running through it resembling streets and the capacitors looking like buildings. The students will be assigned the task of assigning eight of the components that connects to the motherboard as a character, place or event. The first lines in the story could go something like this, "A young man with the name of Enter Key has awoken and found himself in the city of Motherboardopolis. As this city is new to him, he will travel through this new city and discover the wonders the city beholds to get him back to his own world of Internet." My hope is that this will help students use their creativity and encourage them to use their imagination to write. It also has the added benefit of helping them memorize the parts of the motherboard in a way that they can remember.

Unit Overview

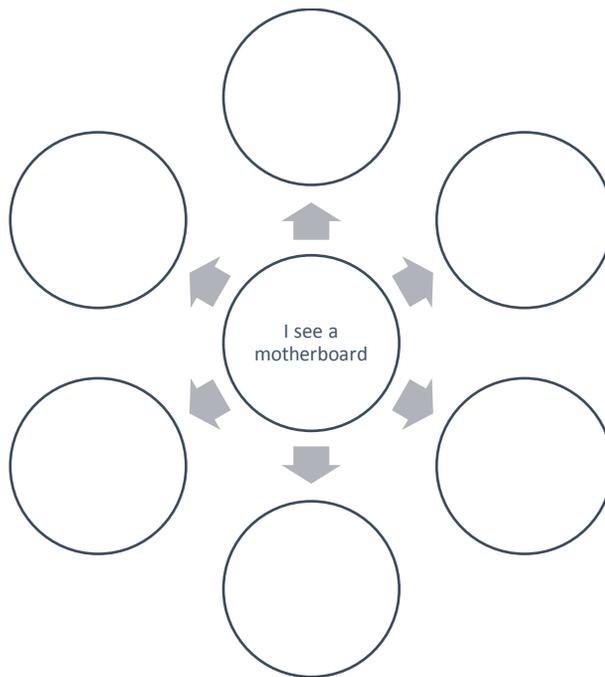
Over a period of a few days, I will introduce and explain to the students the various components on the motherboard. As I am talking about the components such as the heatsink, I will have to sure to give it a description that they will remember such as it's an air conditioning unit. Provide each student several picture graphic organizers. I have found that when I introduce the terms and immediately also provide it a term that they know, it's easier for them to recall.

All of the activities are designed to reinforce the concepts of the motherboard while also strengthening their writing and being able to take techy terms and put them in laymen's terms for those who are not tech savvy. They are also decided to help the students lean to be able to speak the language and understand what I am discussing.

Activity One – What is a Motherboard?

Provide the students a motherboard where they can touch and observe what they are holding. Have them begin writing down what they are observing, this activity is not looking for component names. If they already know some of the components that is great, emphasize observance, such as you would approach a science experiment. There will probably be a little nervousness from the students because they always want to get it right the first time, but let them know it is ok to think.

I will have to prompt the students. What do you see? Normal responses would be its green, it's rectangular, it has a lot of stuff on it etc. Then prompt, would you say it looks like an aerial view of a city? This should help kick start their imaginations. Have them use their imaginations and write what they see. The potential problem that may arise and I have seen it many times is students are actually stumped when it comes to using their imagination.⁴ During this process encourage that there is not right or wrong answers – feel free to think outside the box. To help them along, provide a brainstorm graphic organizer that looks like the following:



This activity should not take more than 20 minutes.

Activity Two – Learn and Share

Review the picture graphic organizers the students created as I have covered them in the lessons. Share the students' responses for the other ways I can remember it section. As I am going over the graphic organizers, be sure to review and use both the proper name and the example name. Repetition is the key!

This activity expands upon the first activity. I will now start to introduce students to components that are attached to the motherboard. Students will still have a motherboard to look at. In this lesson, give them a CPU, again having them touch and observe it. Let them know that a CPU, is known as the central processing unit. The CPU is also known as the brain of the computer. If you don't have a CPU, your computer will not work. The CPU is the part that does all of the calculations. During this lesson be sure to discuss all of the form factors (size and shape) and speeds that they come in. Once they have completed this section in their graphic organizer, refer to the Motherboard is a City model. What could this represent in a city? Library, or a university maybe or the CIA? Let them think on this and see what they think of.

In this part of the lesson give them a RAM stick. What is RAM? RAM is random access memory. RAM is temporary storage for data and programs that are accessed by the CPU. This is a volatile type of memory, which means that once a computer is rebooted, it is wiped clean and become ready to "learn" again. Ask them if they have ever used their Smart phones or a computer and received the message that their temporary storage is full. When they respond yes, refer to RAM. Once you reboot voila, it's ready to go again. At this point refer back to a city. What could RAM represent in a city, a Post Office maybe? Mail comes in and out every day and starts fresh every day.

Continue on and introduce the students to the heatsink. As computers are used, they generate a lot of heat. They need to be cooled because if computers overheat, damage can be caused to components and the computer may shut down. The heatsink is essentially a fan that sucks air away from the CPU. Another perspective that I can use for them is if you work out on a hot summer day, what do you do to cool yourself? Go to the pool, go into air conditioning, etc. When I am sure they have the concept, refer to the Motherboard is a City concept - in a city what could this component represent. Examples could include the AC unit for the university? City pool?

In this part of the lesson introduce them to the Northbridge and Southbridge. These are two components I will have to point out on the motherboard. The Northbridge is normally closest to the CPU. The purpose of the Northbridge is to control the RAM, video cards and to help regulate the speed of the CPU. The Southbridge allows the CPU to communicate the sound card, hard drive and Input/Output (I/O) ports. Alert the students that these functions could vary a little, depending on the manufacturer. At this point refer to the Motherboard is a City concept, in a city what could these represent?

Northbridge could be a police station since it regulates the speed? Southbridge possibly a phone company since it allows communications?

In this part of the lesson discuss expansion slots. Point them out on the motherboard that they have. Ask them what does the word expansion mean? Now, have them brainstorm out loud, what they think it means in terms of a computer. The expansion slots are to allow the user to expand and build upon a computer. Reference the Motherboard is a City concept, what would this be in the city? Building sites for skyscrapers?

In this part of the lesson discuss busses. The gold little paths on the motherboard are the busses. Of course expect the students to talk about the big yellow busses that bring them to school. Allow them to continue with this process. The bus on a motherboard does the same thing, it is used as a transport method. Refer to the Motherboard is a City concept, what would this be in the city? The bus routes!

Assessment: Use a ticket out the door and have them identify four components that can be found on a motherboard. Have them use the proper term and their term.

Activity Three – Make Your Own Project

The students will receive a project to make their own motherboard out of household objects. The purpose is to again, have them use their imagination, think outside the box and use the knowledge gained. They may choose to create a map to go with their story. In addition, they must correctly label and provide the technical definition for their motherboard.

The motherboard assignment will be to make a motherboard that is a standard size sheet of paper, 8 ½ by 11 inches. On this paper, preferably construction paper, create the motherboard using household objects and identify and correctly place the following components: CPU, bus, RAM, heatsink, Northbridge, Southbridge, CMOS battery, expansion slots, video card, and PCI-slots. They will have to include a separate sheet of paper that is used as the key and identifies the components and their definitions.

Activity Four – The Story

Read one of the chase excerpts from Michael Crichton's *The Lost World*, or another book with a chase scene. See if the students can identify the book. As time permits, also read *The Most Dangerous Game* by Richard Connell. The purpose is to get their imaginations going and getting them involved with different types of adventures. I can also provoke

them by asking what is your favorite chase scene in a movie? ⁵ Allow them time to research and see if they can find chase scenes that are suitable in class on YouTube. Once you have peaked their interest provide them a motherboard.

With the motherboard in hand, have them look over previous graphic organizers discussed and begin to use their imaginations and propose to them, “The Motherboard is A City”. With this activity they may work in pairs. My goal for them is to have them begin to formulate a setting for the story they are about to embark upon. Stress to the students that a story has a beginning, middle and an end. They will write a story where the person, also known as, the Enter Key is going around the city, aka the motherboard, and encounters various characters or places, the components.

As this will seem very overwhelming to many students. Provide the character development and constructing a story graphic organizers. Let them break it out into chunks. Make it seem very low key and let them know that it is okay to revise their story as they go.

Once the students have formulated their stories have them share their stories with other students for peer review. Make corrections on the recommendations if necessary. Stress to the students not to take it personally, but to take it as constructive criticism. No one is perfect and even accomplished published authors have to go through several revisions before their work is finalized.

Activity Five – A Mini Movie

The premise is to have the students make a video to go with their story. Using their iPads, they can make a Stop Motion Video, an iMovie or use any media they are comfortable with. These mini-movies will be showcased to the entire class.

Since this will be a new adventure and a new concept to the class, allow time for a little research. Explain to them that the great thing with Stop Motion Videos, is they don't need a lot of props to make them work. With iMovies they can make drawings or use items such as Legos, Tinker Toys or Connects to make their sets. What other types of mediums can they find to go with a story? Let the students decide what will work better for them, make sure you tell them to get my approval first.

Express to the students the beauty of this project is to once again allow their imaginations to run free. There is nothing as exciting to see such as something you have crafted in writing to come to life before your eyes. I may decide at some point to change it up and actually assign someone else's story to be assigned to a different group. This will allow students to learn the importance of conveying words in a story and the power of using their words.

Unit Assessment – Identify Motherboard Components

The students will receive a picture of a motherboard with callouts. They must correctly identify the components on the motherboard. A word bank will not be provided. Then, they may pick five out of the 10 components and provide an explanation for what the component does.

Appendix A

Standards

Common Core standards this unit uses is as ⁶:

- CCSS.ELA-Literacy.W.9-10.3 - Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.
 - CCSS.ELA-Literacy.W.9-10.3.a - Engage and orient the reader by setting out a problem, situation, or observation, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events.
 - CCSS.ELA-Literacy.W.9-10.3.b - Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters.
 - CCSS.ELA-Literacy.W.9-10.3.c - Use a variety of techniques to sequence events so that they build on one another to create a coherent whole.
 - CCSS.ELA-Literacy.W.9-10.3.d - Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters.
 - CCSS.ELA-Literacy.W.9-10.3.e - Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.
 - CCSS.ELA-Literacy.W.9-10.3 - Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

CompTIA A+ standards this unit is based on is as follows⁷:

1. Differentiate between motherboard components, their purposes, and properties.

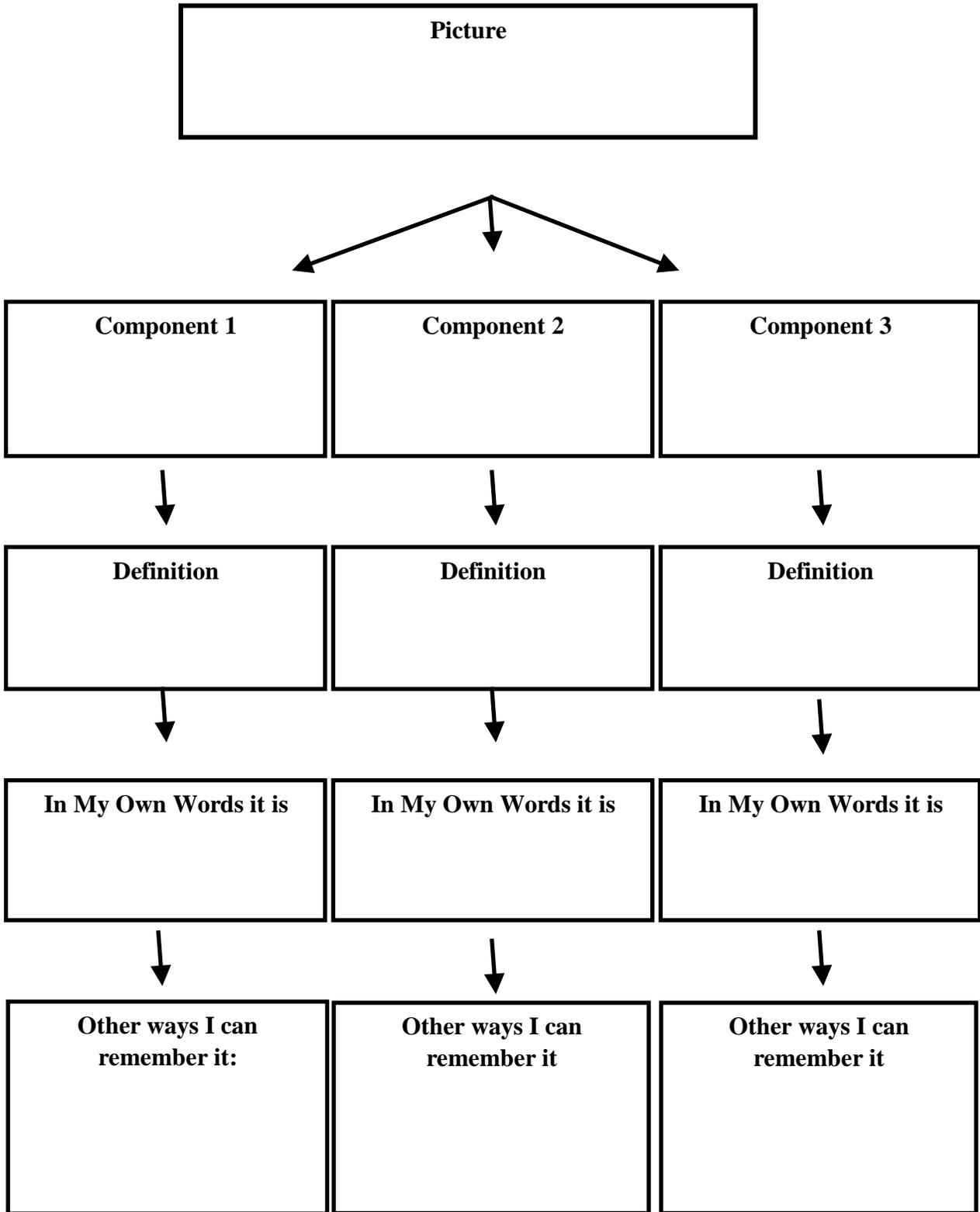
- Sizes
 - ATX
 - MicroATX
 - ITX
- Expansion slots
 - PCI
 - PCI-X
 - PCIe
 - miniPCI

- RAM slots
- CPU sockets
- Chipsets
 - North Bridge
 - South Bridge
 - CMOS battery
- Jumpers
- Power connections and types
- Fan connectors
- Front panel connectors
 - USB
 - Audio
 - Power button
 - Power light
 - Drive activity lights
 - Reset button

- Bus speeds

Appendix B

Picture Clues Organizer - Motherboards



Appendix D

Constructing a Story

Main Idea:
Beginning: Supporting Details:
Main Event 1: Supporting Details:
Main Event 2: Supporting Details:
End/Conclusion: Supporting Details:

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Notes

¹ (CompTIA A+ Certification n.d.)

² (Purcell 2013)

³ (Cremin 2006)

⁴ (O'Callaghan 2014)

⁵ (American Literature n.d.)

⁶ (Initiative n.d.)

⁷ (CompTIA n.d.)

**Curriculum Unit
Title**

Motherboards

Author

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KEY LEARNING, ENDURING UNDERSTANDING, ETC.

To be able to identify and describe the components on the motherboard.

ESSENTIAL QUESTION(S) for the UNIT

What are the names, purposes and, and characteristics of components that are located on the motherboard?

VOCABULARY

motherboard, chipset, Northbridge, Southbridge, CPS, front side bus, heat sink, RAM, memory module, expansion slots, mini-PCI, adapter card, accelerated graphics card, Universal Serial Bus, PCI Express, network interface card, CMOS, ROM, RAM, address bus

ADDITIONAL INFORMATION/MATERIAL/TEXT/FILM/RESOURCES

Motherboards will be needed. Use excerpts from the book *The Lost World* by Michael Crichton, *The Most Dangerous Game* by Richard Connell. Textbook, pictures of motherboards, picture graphic organizer, Internet, iPads and imaginations!