Lesson Overview

Learning Objectives and Evidence Statements

Learning Objective 8: The student can develop an abstraction.
Evidence Statement 8a: Creation of an abstraction for hardware, software or conceptual purpose.

Learning Objective 9: The student can use multiple levels of abstraction in computation.
Evidence Statement 9c: Identification of hardware, software and conceptual abstraction in the design, development, and analysis of applications and systems.

Prerequisite knowledge
Students should be able to use the internet to conduct research. Project options vary so students should be able to choose a project medium that they will be successful when completing the project.

Essential/Guiding Question(s)
- What are the major components that can be found in a computer?
- What is the job of each component?
- How do these components work together to make the computer work?
- How can we categorize these components to illustrate their equivalent level of abstraction?

Lesson Summary
Students will learn about the major hardware inside the computer as well as peripherals. Students will categorize hardware components based on their common level of abstraction. For example, a video game can use a keyboard, touch screen, joystick or accelerometer are all as input devices that can be used to turn a vehicle. Since technology is constantly changing, student will have to do research for the most up to date components.

Students will utilize the internet and some provided resources to research how the computer works, and what major components can be found in the computer, such as CPU, motherboard, RAM, and the peripherals such as monitor, keyboard, mouse, etc. Students will put together some form of presentation or tutorial that can be used by other students to learn about the hardware in a computer. Students should organize their project based on different levels of abstraction.

Students will create a tutorial project using their choice of a variety of Web 2.0 tools. Their options include creating a pop-up book, video, game or simulation. Students can work in pairs to complete this project.

Outline of lesson
- Introduce topic: Short discussion on what hardware components students already know about the different hardware components that can be found in the computer. (5 - 10 minutes)
- Watch video from How Stuff Works Article: What’s inside my computer? http://computer.howstuffworks.com/inside-computer.htm (5 minutes)
- Students will read the How Stuff Works Article: What’s inside my computer? [http://computer.howstuffworks.com/inside-computer.htm](http://computer.howstuffworks.com/inside-computer.htm) and take notes in the form of 2 column reflections. Left column for quotes from the article, right column should include their thoughts, reflections and connections they are making with this quote. (20 minutes)
- Discussion of hardware abstraction as it relates to input devices: How can different input devices be utilized to accomplish the same task? Are some better than others? Examples? (Students should address other abstractions in their project.) (5 – 10 minutes)
- Discussion of the project and what will be expected. Overview of available Web 2.0 tools (5 - 10 minutes)
- Student projects (2 - 3 days)
- Presentations (1 day)
- Quiz on hardware (15 – 20 minutes)
Lesson Details

Student Activities
Students will be sharing what they know about the hardware components of a computer and what components are inside the computer. What are the jobs of these components? After this discussion, students will watch a video about what is inside the computer, and then read an article. While reading the article, students will write a 2 column reflection. The left column will include quotes from the article. The right column will include the student’s reflection on these quotes. What does the quote make them think about, what connections can be made to prior knowledge, what opinions might they form when reading these quotes? (link provided in material resources below)

Lead a discussion on hardware abstraction as it relates to input devices. How can we utilize a variety of input devices to accomplish the same goal? How does each different device change the way we interact with the computer and the software? When is one device better than another? Can you provide examples?

Students will then be paired with other students to create a tutorial project or presentation regarding the hardware in a computer and the peripherals we use to control and interact with it. Their project could be a presentation, video, game or simulation. Several links will be provided so that students will have a choice as to how to present their findings. Students will research the internet as needed to find up to date information as it pertains to computer hardware. These resources should be cited and included in their project. Students will present their projects to the class at the conclusion on the project. (project outline and rubric will be provided to students)

A quiz on computer components will be given. The quiz will require students to label the parts of a computer, and fill in definitions of terms. (hardware quiz)

Teaching and Learning Strategies
- Many students will have prior knowledge about computer hardware. Begin class with a discussion on computer hardware.
  - What is computer hardware?
  - What are some examples of computer hardware?
  - When students give you an example, ask, what job does is accomplished with this piece of hardware?
  - Is there a similar piece of hardware that accomplishes the same task, only differently?
- Watch video on what is inside the computer. You can utilize http://todaysmeet.com/ to have students type in their response, and share with the class.
- Ask students to share any of their reflections with the class.
- Go over project plan and objectives. Share rubric with students. Discuss various options of Web 2.0 tools and programming tools that can be used to complete project.
- Divide students up into groups. At this point, you may not know your students’ abilities, so you may want to group randomly, or allow students to choose their own groups. Groups of 2 will probably be best.
- Students should spend roughly 2 – 3 days researching and creating their projects. Time outside of class may need to be contributed if students are unable to complete their work in class.
• Presentations: Students will share their projects with the class. Time spent on presentations will vary depending on class size. If time is an issue, consider having projects loaded on computers, having students examine and rate projects in a round robin fashion. Require students to evaluate a certain number of student projects, and turn in their rating sheet.
• Hardware components quiz.
Appendices

Materials and Resources
Provide any student handouts, instructional documents, or other materials needed for the lesson. Items to be distributed to students should be labeled as “Handouts”; other items that are primarily supporting items for teacher use, such as lists of lesson materials or instructional notes, should be labeled as “Instructional Resources.”

Handouts:
- Article Reflection Assignment
- Hardware Project Outline
- Hardware Project Rubric
- Student rating sheet
- Hardware Quiz

Instructional Resources:
- Access to flip cameras for videos may be helpful

Supplemental Resources
Hardware resources:
[http://www.build-your-own-computer.net/index.html](http://www.build-your-own-computer.net/index.html)

The following are ideas for Web 2.0 tools that students can utilize to complete their projects.

[http://animoto.com/](http://animoto.com/) - make animated videos
[http://video.co/](http://video.co/) - make videos
[http://www.xtranormal.com/](http://www.xtranormal.com/) - turn your words into 3D animated videos
[http://www.wevideo.com/](http://www.wevideo.com/) - create your own video or commercial
Scratch

Image resources:
What's Inside My Computer?

Read the article, *What's Inside My Computer?* While reading the article, write a 2 column reflection. As you are reading, are there parts that make you think? parts you can connect to your prior knowledge? Write these quotes in the quote column below. In the corresponding reflections column, write a few sentences describing what this quote made you think about. You can expand the table as necessary to fully encompass the article.

Click here for article: [http://computer.howstuffworks.com/inside-computer.htm](http://computer.howstuffworks.com/inside-computer.htm)

<table>
<thead>
<tr>
<th>Quote</th>
<th>Reflection</th>
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Hardware Project

Using your existing knowledge, what you learned through reading *What’s Inside My Computer?* and other research into current hardware components, create a hardware tutorial presentation for others.

Your presentation can take many forms, but cannot be a PowerPoint. Here is a list of suggested forms your presentation can take.

- [http://goanimate.com/](http://goanimate.com/) - make animated videos
- [http://animoto.com/](http://animoto.com/) - make animated videos
- [http://wideo.co/](http://wideo.co/) - make videos
- [http://www.xtranormal.com/](http://www.xtranormal.com/) - turn your words into 3D animated videos
- [http://www.wevideo.com/](http://www.wevideo.com/) - create your own video or commercial
- [http://piktochart.com/](http://piktochart.com/) - create your own picture poster

Use Scratch to create a game or scenario

Your tutorial should address the following components:

- monitors
- keyboards
- mouse
- disk drive
- cpu
- motherboard
- memory
- sound and graphics cards
- drives
- modems

Answer the following questions about the components above:

- What is the job of each component?
- How does this component work together with others to make the computer work?
- How can we categorize these components to illustrate their equivalent level of abstraction?

Be sure to include a resources page for images and researched information. Images need to be royalty free. Your media center database is a great resource for royalty free images. Here is another website that can be helpful:

# Hardware Project Rubric

<table>
<thead>
<tr>
<th>Project</th>
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<th>8</th>
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<th>10</th>
<th>/10 pts</th>
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<tbody>
<tr>
<td>Includes all 10 components</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>7</td>
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<tr>
<td>Component Correctly Defined</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>5</td>
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<td>7</td>
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<tr>
<td>Job of the component is accurately described</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>How this component works with the other components is accurately described</td>
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<tr>
<td>Abstraction between different devices that accomplish the same or similar tasks is accurately described</td>
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<td>Creative Presentation</td>
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<td>8</td>
<td>9</td>
<td>10</td>
<td>/10 pts</td>
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<tr>
<td>Resources Page - content and images</td>
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## Class Presentation

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Vocabulary: Define each of the terms below.

1. motherboard: ___________________________________________________
   ___________________________________________________
   ___________________________________________________

2. microprocessor: _________________________________________________
   ___________________________________________________
   ___________________________________________________

3. CPU: ___________________________________________________________________
   ___________________________________________________
   ___________________________________________________

4. ROM: ___________________________________________________________________
   ___________________________________________________
   ___________________________________________________

5. RAM: ___________________________________________________________________
   ___________________________________________________
   ___________________________________________________

6. BIOS: ___________________________________________________________________
   ___________________________________________________
   ___________________________________________________

7. Input Device: (Give examples) _______________________________________
   ___________________________________________________
   ___________________________________________________

8. Output Device: (Give examples) _______________________________________
   ___________________________________________________
   ___________________________________________________
9. Hard Drive: ____________________________________________________
   ____________________________________________________

10. Modem: ________________________________________________________
    ____________________________________________________

11. Graphics and Sound Cards: _________________________________________
    ____________________________________________________

Identify these hardware components:

12. ____________________________

13. ____________________________

14. ____________________________
Images taken from: http://unrestrictedstock.com/