# **Hardware Discussion Guide (for use during or after reading)**

1. How are hardware and software different from one another? (How Does a Computer Work?, p. 4-5)
   1. Hardware refers to the physical parts of any computer system. Hardware can include such things as a computer’s mouse, a phone screen, a keyboard, as well as a power supply, memory chips, and processors. Software, on the other hand, is not physical. Software refers to computer programs that can be run using a machine’s hardware.
2. List and describe at least 5 pieces of external hardware highlighted in the text. (External Hardware, p. 8-9)
   1. External hardware refers to the physical pieces found on the outside of a machine. Examples of external hardware include computer mice, keyboards, monitors, cases, external hard drives, cameras, video game controllers, charging cables, and more!
3. Describe the main functions of computer chips such as processors and memory chips. (Chips, p. 14-15)
   1. Computer chips can be both internal and external pieces of hardware. They are made of silicon so they can send electric signals through circuits and to the machine. A processor is a special kind of computer chip that performs calculations and carries out instructions for a computer. A memory chip is a special kind of computer chip that stores data, or information.
4. Why are computer chips made of silicon? (Chips, p. 14-15)
   1. Computer chips are made of silicon because silicon is a semiconductor. That means silicon is able to conduct electricity. This allows a computer chip to transmit electric signals to other pieces of a computer’s hardware.
5. Explain what makes the CPU the most important chip in a computer. What are its functions? (CPU, p. 16-17)
   1. The Central Processing Unit, also known as the CPU, is the most important chip in a computer because it is the brains of the operation. The CPU must tell all a computer’s hardware what to do. The CPU receives messages, interprets them, and then communicates those instructions to the correct hardware needed to complete them.
6. What is a heat sink and why is it needed? (CPU, p. 16-17)
   1. A heat sink is a small device made of aluminum that fits around the CPU. The purpose of the heat sink is to keep the CPU cool, so it does not overheat and cause malfunctions with the device. Even though there are fans in devices to help prevent overheating, heat sinks are used by the CPU because it has so many jobs and multitasks to complete them, making it even easier to overheat.

1. What is a motherboard and how does it share information with a computer’s hardware? (The Motherboard, p. 18-19)
   1. A motherboard is the main circuit board found in a device that connects all the different pieces of hardware together. It includes slots, sockets, and other connectors to allow the hardware to be plugged into it. The motherboard is used to share information with the rest of the computer system. The motherboard contains chipsets, bundles of circuits the CPU uses to send instructions to the rest of the hardware in a device.
2. Compare RAM and ROM memory chips. (Memory, p. 20-21)
   1. Both RAM and ROM memory chips are used to store data. RAM stands for Random-Access Memory and temporarily stores data while a computer is being used. When a computer is turned off, RAM will not remember or store any data. ROM (Read-Only Memory), on the other hand, is a type of computer memory that stores data long term. Because ROM can remember data even when a computer is off, it is used to hold the computer’s permanent instructions. ROM can also be used to save progress in a game or in a word-processing document.
3. What are expansion cards and how do they benefit computers? List and describe the three main types of expansion cards. (Expansion Cards, p. 24-25)
   1. Expansion cards are used to enhance a computer’s performance. There are three main types of expansion cards: network, graphics, and audio. Network cards allow the computer to connect to the internet and other computer networks. Graphics cards help the computer process and display graphics. They also improve the quality and speed of picture and video displays. Sound cards turn audio data into analog sounds that then come out of speakers or headphones. Computers do not need expansion cards to function, but they can help boost the computer’s performance.
4. Explain how hardware and software rely on one another to function. (Hardware and Software Work Together, p. 26-29)
   1. Hardware and software rely on one another. Without software, the hardware has no programs to run. Likewise, without hardware to carry out instructions, software has no purpose. However, when combined, hardware and software can be used to create endless technical possibilities.