**Learning Goal**:

* Students will be able to identify hardware and software components of a computer.
* Students will be able to determine if a hardware device is an input device, output device or a device that does both (such as a touch screen).

**Resources needed for lesson:**

Examples of hardware devices:

* keyboard, mouse, printer, tablet, laptop, doc camera, projector, projector screen.

Examples of software:

* desktop screen with program icons: email, docs, spreadsheets.
* Mobile apps icons: Facebook, Snapchat, etc.

Examples of Input devices:

* Microphone, keyboard, mouse, touchpad

Examples of Output devices:

* Speakers, screen, printer, cell phone vibration

Example of devices that are input and output devices:

* Touch screen on a cell phone or tablet
* Compared to skin:
  + Output: can turn red if too hot, can produce goose bumps
  + Input: touch sensation, heat sensation

Other resources:

* Sea Salt
* Raw Sugar
* Wet wipes

**Activity**:

Introduce hardware, software, input and output devices by comparing computer components with the students’ bodies.

Hardware vs. Software

Explain that hardware is the physical parts of the computer, you can touch it, and software is the programs that you interact with but cannot touch. Explain that we can compare a hardware and software with our body’s parts and our senses.

* Hardware: the physical components of computers (laptops, desktops, cell phones, tablets, etc.) and peripheral devices (printer, doc camera, screen, mouse, etc.) You can touch hardware! Hardware is designed to interact with software.
* Software: Programs and applications you interact with to create something, to communicate with others, perform a task, play a game, ect. Must have hardware to interact with software; you cannot touch software!

**Our Bodies**:

* Hardware: ears, tongue, eyes, skin, vocal cords, nose
* Software: hearing, taste, vision, sensation of touch, voice, sense of smell
* Input devices: tongue, eyes, nose
* Output devices: vocal cords,
* Input/output device: skin

Whole group activity: Hardware vs. Software

Ears and Hearing compared with speakers and microphone.

* Ask students to touch their ears. Then ask them to decide if they are hardware or software. Reinforce that you can touch hardware.
* Then make a loud annoying noise. (I did not ask the students to listen, I just made the noise to engage their hearing scene without prior warning). I then asked the students if their hearing is hardware or software.
* Then asks the students, what computer component would be the computer’s ears? This was interesting because they had to think how the sound got into the computer: microphone
* We then discussed voice and vocal cords and compared this with the computer’s hardware: Speaker, and software: sound.
* Continue through each body part and how it relates to hardware and software

Input vs Output devices: Once the students have a pretty good idea of the difference between hardware and software. Introduce there are three types of hardware devices: Input devices, Output devices, and devices that do both, such as a touch screen.

* Input devices: Hardware that is used to input information into the computer to interact with the program: microphone, mouse, touch screen, touch pad, light sensors,
* Output devices: Hardware that is used to send information from the computer to the user or environment: speakers, screen, touch sensors on cell phones (vibration), printer,
* Input/Output device: through touch sensors and other components, it gives and takes information through interaction with the user: touch screen, Haptic sensations when typing on a cell phone or tablet.

Whole group activity

**Input Devices**

Tell the students you are going to give them something to taste. Ask them to wait until everyone has tasted the item before they share what they have identified it as.

* Explain they are using their hardware: tongue, to give information to their brain.
* Give each student a sample of sea salt and a wet wipe
* After all students have tasted the sample ask them to share what they have identified it as
* Explain that we use our tongue (hardware) to interact with our taste (software) to retrieve information from our brain to identify the item we were tasting.
* Second sample for taste: raw sugar, before giving the sample, they'll the students you want them to think about how their tongue and taste is interacting to retrieve the information.
* Have students taste the sample and identify the sample
* Ask them to give their ideas about how their tongue and taste interact to give their brain to identify the sample.

Have the students identify other body parts that can be categorized as input devices.

Then, in pairs or small groups, have students comparing these parts to computer hardware and create a list of computer hardware that are input devices.

Output Device

* Vocal Cords (hardware) to produce sound (software).
* Have students touch their throats and say, “Hello”.
* Ask them to explain what is happening in their throat to produce the noise: vocal cords are vibrating to make the noise
* In their group or with partner, ask students to come up with how they think their vocal cords, voice, and brain interact to produce what they want to say.
* Have students share their ideas.
* Then have students work in their group to identify other body parts as hardware output devices, what would be the software? Then, have them compare this with computer hardware output devices.
* The group then makes a list of computer hardware that is output devices and explain how the devices give information to the user or environment.

**Extension**: Processing Information

* Ask the students if they liked the flavors. Would they like salt on their bananas? Why or why not?
* How about salt on a pretzel? Introduce the concept of prior knowledge and exposure. If we grew up eating salt on our bananas, we may enjoy the flavor combination.
* Connect this to how a computer intakes information, processes, and outputs information