Context of the Lesson

The Big Idea: Students will model how a computing system works.

Prerequisite Knowledge and Skills:
- Knowledge of computing devices
- Basic understanding of computing networks
- Basic understanding of how to use computing devices

Connections to SOLs:
- Computer Science 5.7

Objectives of the Lesson

Learning Targets (I can...):
- I can model how a computing system works including input and output, processors, sensors, and storage

Formative Assessment
- Extended time on assignment
- Verbal testing
- Selective student seating
- Group and individual activities
- Instructional aids
- Written testing

Materials
- Visual Aid for instructor to write on (e.g., chalkboard, projector, dry erase board, easel)
- Handouts and writing utensil for students (optional)
- Computer (optional)
- Means to play video (optional)

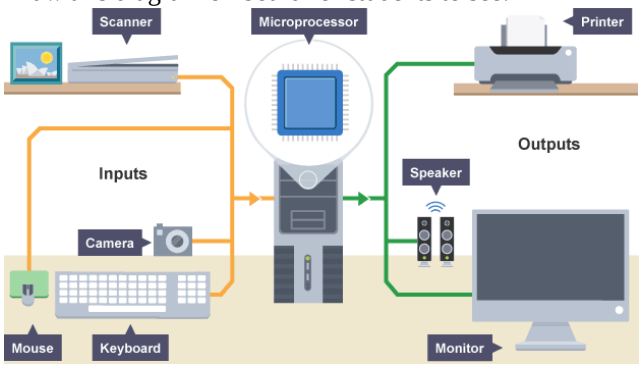
Lesson Structure and Activities

Warm Up *[5-10min]* , answers to be written out by instructor on visual aid

Ask: What are some input components to computing devices?
- Responses will very. (mouse, keyboard, pen, touch screen, etc.)

Ask: How is information on a computer displayed?
- Responses will very. (display, monitor, touch screen, projector, etc.)

Draw this diagram on board for students to see:



[Source: http://stangroundcomputing.co.uk/gcse/3_4_1_Hardware_and_software.php]

Launch (Engage) *[5-10min]* :Teacher Directed Instruction:

All computers have two things in common: hardware and software. Hardware is any part of your computer that has a physical structure, such as the keyboard or mouse. It also includes all of the computer's internal parts. Software is any set of instructions that tells the hardware what to do and how to do it. Examples of software include web browsers, games, and word processors. Everything you do on your computer will rely on both hardware and software.

Ask: What are some popular computer hardware devices and popular software apps?

- Responses will very.

No matter what kind of computing device you are using, they all share some similar hardware and software components.

The central processing unit (CPU), also called a processor, is a physical piece of equipment located inside the computer. It is sometimes called the brain of the computer, and its job is to carry out commands. Whenever you press a key, click the mouse, or start an application, you're sending instructions to the CPU.

An operating system is the most important software that runs on a computer. It manages the computer's memory and processes, as well as all of its software and hardware. It also allows you to communicate with the computer without knowing how to speak the computer's language. Your computer's operating system (OS) manages all of the software and hardware on the computer. Most of the time, there are several different computer programs running at the same time, and they all need to access your computer's central processing unit (CPU), memory, and storage. The operating system coordinates all of this to make sure each program gets what it needs. An app (or application) is a type of software that allows you to perform specific tasks. Applications for desktop or laptop computers are sometimes called desktop applications, while those for mobile devices are called mobile apps.

Ask: How many of you using a windows based computer? How many use a mac or apple product?

- This is to gauge audience attention

Ask: How do you interact with these devices?

- Responses will very.

A display device, such as a monitor, displays images and text on the screen. The keyboard is one of the main ways to communicate with a computer. The mouse is another important tool for communicating with computers. Commonly known as a pointing device, it lets you point to objects on the screen, click on them, and move them. A touchpad—also called a trackpad—is a touch-sensitive pad that lets you control the pointer by making a drawing motion with your finger. Touchpads are common on laptop computers. You can plug many different types of devices into the extra ports on your computer. These devices are called peripherals.

Computing devices may be connected to other devices or components to extend their capabilities, such as sensing and sending information. Connections can take many forms, such as physical or wireless. Together, devices and components form a system of interdependent parts that interact for a common purpose. Computing devices often depend on other devices or components. For example, a robot depends on a physically attached light sensor to detect changes in brightness, whereas the light sensor depends on the robot for power. A smartphone can use wirelessly connected headphones to send audio information, and the headphones are useless without a music source.

RAM is your system's short-term memory. Whenever your computer performs calculations, it temporarily stores the data in the RAM until it is needed. This short-term memory disappears when the computer is turned off. If you're working on a document, spreadsheet, or other type of file, you'll need to save it to avoid losing it. When you save a file, the data is written to the hard drive, which acts as long-term storage.

[Source: https://edu.gcfglobal.org/en/computerbasics/setting-up-a-computer/1/] and [Source: https://k12cs.org/wp-content/uploads/2016/09/K%E2%80%9312-CS-Framework-Statements-Concepts-View.pdf]

Explore *[25min]* :Joint/Guided Practice | Student Practice:

Group activity building off the lecture discussed above. Different activities to choose from with different topics and difficulty levels.

Lesson Plan with exercises: https://www.commonsense.org/education/lesson-plans/computer-basics

Computer Basics- What is a computer?

High level
Link to detailed information and videos:

https://edu.gcfglobal.org/en/computerbasics/what-is-a-computer/1/

Basic Parts of a Computer

More detail of the computing parts
Link to detailed information and videos:

https://edu.gcfglobal.org/en/computerbasics/basic-parts-of-a-computer/1/

Summarize *[15min]* :Debrief :

Small Group or individual exercise. Ask these questions, give time for answer, entire group discussion of answers.

- Ask: Give at least 3 examples of input devices
- Ask: What is the job of the processor in a computer?
- Ask: Draw a diagram of a computing system. Include inputs, outputs, processor, and storage

Extensions:	