4.CSY.1 Computing Systems

The student will model how a computing system works to accomplish a task. (a) Describe how computing systems perceive the world through sensors and other inputs. (b) Compare and contrast how humans and computers process information from inputs. (c) Explain how computing devices may be used to classify and organize input. (d) Diagram and describe a simple computing system indicating processors, inputs, and outputs.



Integration Opportunities

English 4.C.3a Have students work in pairs to organize and create a multimodal visual display explaining how a computing system works.

Math 4.MG.5 Mimic how computers might classify quadrilaterals based on their specific properties and attributes, such as side lengths and angles, and explain the process.

Science 4.3d Use classification systems to identify organisms and compare the process to how a computing device with an identification app might identify the organism.

Understanding the Standard

Computing systems are made up of all the hardware and software components that work together to accomplish a task: input, processors, memory (or storage), and output. Sensors are a tool that computing systems use to gather data via inputs (light or sound sensors on a robot, mouse clicks, and keystrokes). Outputs are the effects of the input after processing: the content seen on screen, the actions of a robot, etc. I/O (inputs and outputs) can also refer to the communication between an information processing system, such as a computer, and the outside world, possibly a human or another information processing system. It is important for fourth graders to know that computers store data that can be retrieved later. The connection should be made that variables in programs are how we store and access data when programming.

Term	Definition
Input	Data that is taken in by a computer for processing.
Output	Data that is produced by a computer as a result of a program.
Processor	Computing component that performs the manipulation to change input into output.
Sensor	Computing component that collects data that would otherwise be difficult to collect by hand.
Storage	Computing component that can hold data to be used at a later time.

Prerequisite Knowledge

Students should have an understanding of computing systems and their basic components. Students should be familiar with the terms input/output or have prior experience using input/output tables.

Summary of a Lesson

Conduct a mini lesson on how the computer system works, providing students with pictures of examples of inputs (microphone, keyboard, mouse, game controller, etc) outputs (monitors, headphones, TV, speakers, headphones, printer, etc) as well as items that are both output and input (ex. touchscreen, flash drive, etc) Students will work in pairs sorting through the pictures and placing them into a Venn diagram. Review the Venn diagram as a class. Each pair will then be asked to create a poster or linear pattern Twine that displays how a computer system works, showing input (including sensors), processing, and output. (Storage or memory may also be included, but is not required until 5th grade.)



