Create a Computer

Design a computer! Construct a 2D computer model and learn how computer components work together to operate devices from smartwatches to giant supercomputers.

TEKS:

TA 7.6.E: The student is expected to identify, understand, and use hardware systems.

Materials:

- 7x7 grid (attached)
- Crayons or markers
- Paper
- Pencil

How To:

The Challenge: Every computer needs certain internal parts to function. The challenge today is to add all of these parts onto a computer grid! Take out the 7x7 grid. This grid is the space you have to create your "computer." Can you add all of the computer components, listed below, to this grid? You must ensure that all of the conditions listed below each component are met!

Tips:

- Sketch out your computer with a pencil first!
- **No parts can overlap** (except for the motherboard), and certain parts will need to be near other parts in order to function properly. Read carefully so you understand where each component can (and can't) go!
- Once everything is in its place, go back and label all components and color them with markers or crayons.

Computer Components

Motherboard
- 5x5 square
- The motherboard is a large circuit board that contains and connects many different parts of a computer.

Central Processing Unit (CPU)
- 2x2 square
- Must go somewhere on the motherboard, but cannot touch the edge of the motherboard.
- The CPU is the brain of a computer. It is responsible for carrying out all of the computer's commands.

Graphics Processing Unit (GPU)
- 1x2 rectangle
- Must go somewhere on the motherboard.
- The GPU helps a computer process images and graphics and display them on its screen.

Random Access Memory (RAM)
- 1x3 rectangle
- Must go somewhere on the motherboard.
- RAM is the short-term memory that the computer uses when it performs calculations. Files cannot be stored here, because RAM is cleared every time a computer is shut off. The more RAM a computer has, the more things it can do at the same time.

Hard Drive
- 2x2 square
- Must go somewhere on the motherboard. Should touch RAM, but not overlap.
- A hard drive provides long-term storage for a computer. It contains all of the computer's data, even when the computer is turned off. The faster a computer's hard drive, the more quickly it can start and load programs.

USB Ports
- 2 1x1 squares
- Must go somewhere on the motherboard. Both must touch the edge of the motherboard.
- USB stands for Universal Serial Bus. USB ports attach many different different types of devices, such as printers, scanners, webcams, and mice, to a computer. Other types of ports that many computers contain include sound ports, video ports, and ethernet ports.

Power Supply Unit
- 2x2 square
- Must go outside of the motherboard
- A computer's **power supply unit** provides power from a wall outlet to all of the components that need power.

Battery
- 2x4 rectangle
- Must go outside of the motherboard. Should touch the Power Supply Unit, but not overlap.
- The **battery** supplies power to a computer, allowing it to work without a power cord. This is what makes laptop computers portable.

Fan
- 2x2 square
- Must go outside of the motherboard.
- **Fans** are required to cool computers down! All of the different electrical components of computers can get very hot, and fans help prevent computers from overheating.

STEM Explanation:
Were you able to fit all of the necessary components into the computer you created? What was the most difficult piece of hardware to fit in? Even if you were unable to make everything fit on the first try, that's okay! Do you think computer hardware engineers are able to make everything fit into a computer on their first try? No! That is what engineering is about. Designing, trying, and redesigning until they create what works.

What type of computer did you just create? The computer you just created could be any type of computer! It's easier to imagine how all of these parts could fit inside a large laptop or desktop, but imagine how tiny they would need to be to fit inside a smartphone or smartwatch! Computer hardware engineers use their creativity and spatial skills daily to design new and unique computer components to fit into new, innovative technologies.

Career:
Computer hardware engineers create various computer components, including circuit boards, processors, memory devices, and/or mice. They research, design, develop, and test computer systems to create efficient and effective computer hardware.
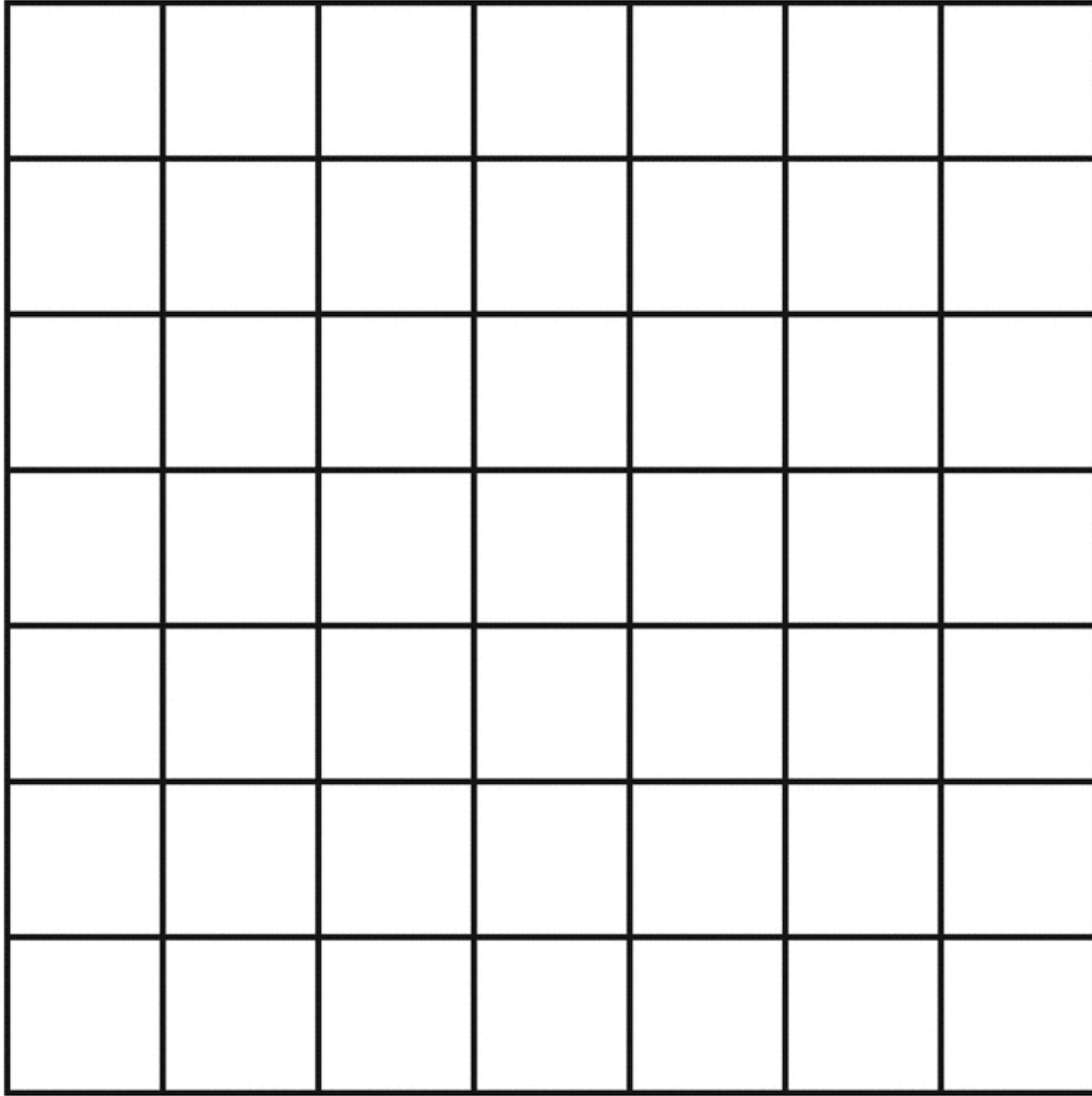
Resources:
https://www.helloruby.com/play/11
https://edu.gcfglobal.org/en/computerbasics/inside-a-computer/1/

7x7 Grid