Unit 3: Kano Computers

Content Area: **Technology**
Course(s): **Technology**
Time Period: **Full Year**
Length: **Ongoing throughout the year**
Status: **Published**

Unit Overview

4th graders will grasp the difference between hardware and software. They will understand the hardware and software components that make up a computer systems, and how they communicate with one another and with other systems

Standards

TECH.8.2.5.A.1	Compare and contrast how products made in nature differ from products that are human made in how they are produced and used.
TECH.8.2.5.A.CS2	The core concepts of technology.
TECH.8.2.5.B. 6	Compare and discuss how technologies have influenced history in the past century.
TECH.8.2.5.B.CS4	The influence of technology on history.
TECH.8.2.5.C.5	Explain the functions of a system and subsystems.
TECH.8.2.5.C.6	Examine a malfunctioning tool and identify the process to troubleshoot and present options to repair the tool.
TECH.8.2.5.C.7	Work with peers to redesign an existing product for a different purpose.
TECH.8.2.5.D.2	Evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process to evaluate potential solutions.
TECH.8.2.5.D.3	Follow step by step directions to assemble a product or solve a problem.
TECH.8.2.5.D.4	Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.
TECH.8.2.5.D.5	Describe how resources such as material, energy, information, time, tools, people and capital are used in products or systems.
TECH.8.2.5.D.CS2	Use and maintain technological products and systems.
TECH.8.2.5.D.CS3	Assess the impact of products and systems.
TECH.8.2.5.E	Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.
TECH.8.2.5.E.1	Identify how computer programming impacts our everyday lives.
TECH.8.2.5.E.2	Demonstrate an understanding of how a computer takes input of data, processes and stores the data through a series of commands, and outputs information.
TECH.8.2.5.E.3	Using a simple, visual programming language, create a program using loops, events and procedures to generate specific output.
TECH.8.2.5.E.4	Use appropriate terms in conversation (e.g., algorithm, program, debug, loop, events, procedures, memory, storage, processing, software, coding, procedure, and data).

TECH.8.2.5.E.CS1	Computational thinking and computer programming as tools used in design and engineering.

Essential Questions

- What components make up a computer system?
- What are the differences between hardware and software?
- How do components of the computer communicate with one another and with other systems?

Application of Knowledge and Skills...

Students will know that...

- common uses of information technology beyond school
- Components of the computer communicate with one another and with other systems
- Engineers have an impact on the world they live in and their daily lives.
- Hardware and software components make up a computer system

Students will be skilled at...

- Communicating using digital media
- Computing Practice & Programming
- Understanding the difference between hardware and software
- Understanding the hardware and software components that make up computer systems
- Using technology safely, respectfully and responsibly

Assessments

The teacher will formally assess students throughout the unit by using rubrics for the following project or other projects determined by the teacher:

- Successful building of a working computer

Activities

- Students will start each class by navigating to Google Classroom and responding to a writing prompt.

In responding to the writing prompt, students will be collaboratively conversing with each other and their teacher digitally, using their schema of keyboarding and mouse skills.

- Engineer of the Week: Each week, a new engineer will be briefly introduced to the class, highlighting their impact on their current world.
- Building a Kano computer from the inside out
- Coffeescript (Make Art)
- Python (Make Snake)
- Kano Blocks (Make Minecraft, Make Pong)
- HTML
- Javascript
- CSS
- Swift

Activities to Differentiate Instruction

Differentiation for special education:

- General modifications may include:
  - Modifications & accommodations as listed in the student's IEP
  - Assign a peer to help keep student on task
  - Modified or reduced assignments
  - Reduce length of assignment for different mode of delivery
  - Increase one-to-one time
  - Working contract between you and student at risk
  - Prioritize tasks
  - Think in concrete terms and provide hands-on-tasks
  - Position student near helping peer or have quick access to teacher
  - Anticipate where needs will be
  - Break tests down in smaller increments
- Content specific modifications may include:
  - Flash cards
  - Visual Directions

Differentiation for ELL's:

- General modifications may include:
  - Strategy groups
  - Teacher conferences
  - Graphic organizers
  - Modification plan
  - Collaboration with ELL Teacher
- Content specific vocabulary important for ELL students to understand include: Circuit boards, raspberry pi, Kano, Operating system, screen, wires

Differentiation to extend learning for gifted students may include:

- Students can use NAO robot to learn Python and program a humanoid robot

Integrated/Cross-Disciplinary Instruction

Through a variety of creative and practical activities, 4th graders will be taught the knowledge, understanding and skills needed to engage in a design and making process.

Resources

- Kano computer kits
- Handouts

21st Century Skills

CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.