Unit 5 Devices & Networks

Content Area: **Computer Science**
Course(s):
Time Period: **Marking Period 2**
Length: **3-4 Weeks**
Status: **Published**

Brief Summary of Unit

This final unit begins by exploring the components of a computer, and then we examine the concept of a network. Then, we discuss how computers are connected in a network and how they communicate. Students gain an introduction to Wireshark. We conclude by discussing Internet communication protocols and packet delivery.

Revised Date: July 2025

Standards

MATH.K-12.1	Make sense of problems and persevere in solving them
CS.6-8.8.1.8.NI.1	Model how information is broken down into smaller pieces, transmitted as addressed packets through multiple devices over networks and the Internet, and reassembled at the destination.
CS.6-8.8.1.8.NI.2	Model the role of protocols in transmitting data across networks and the Internet and how they enable secure and errorless communication.
CS.9-12.8.1.12.CS.1	Describe ways in which integrated systems hide underlying implementation details to simplify user experiences.
CS.9-12.8.1.12.CS.2	Model interactions between application software, system software, and hardware.
CS.9-12.8.1.12.CS.3	Compare the functions of application software, system software, and hardware.
CS.9-12.8.1.12.IC.1	Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.
CS.9-12.8.1.12.IC.3	Predict the potential impacts and implications of emerging technologies on larger social, economic, and political structures, using evidence from credible sources.
CS.9-12.8.1.12.NI.1	Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing.
CS.9-12.8.1.12.NI.4	Explain how decisions on methods to protect data are influenced by whether the data is at rest, in transit, or in use.
WRK.K-12.P.1	Act as a responsible and contributing community members and employee.
WRK.K-12.P.6	Model integrity, ethical leadership and effective management.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.

Essential Questions

- How are devices on a network identified and what are some ways they can communicate?
- How are packets delivered across networks between devices?
- How can students communicate through devices in the activity?
- How does a computer work?
- What is the difference between a WAN and a LAN and what are some basic network components?

Enduring Understandings

- Different network architectures can be useful in allowing computers to communicate.
- There are established protocols allowing different devices to communicate on a network.
- While electronics have grown increasingly complex, all computers still have components in comment that carry out the basic functions of a computer.

Students Will Know

- How networks can be used to allow devices to communicate.
- Some of the protocols used to share information between devices on a network.
- The anatomy of data packets.
- The basic components of a computer.
- The role of protocols in the transmission of data through the Internet.

Students Will Be Skilled At

- Identifying different network architectures from a diagram.
- Identifying different parts of a computer.
- Using Wireshark to analyze network traffic.

Assessment

Assessments

- Formative: Teacher observations, student-centered discussions, classwork, student-centered labs.
- Summative: Quizzes, tests, projects.
- Alternative: Verbal discussions and debrief.

Learning Plan

This curriculum follows cyber.org's "Cybersecurity 1" course as listed in the "One Semester Plan." Go to https://cyber.instructure.com/login/canvas and apply for a teacher account. Under "High School 9-12," you will find the Cybersecurity 1 course with detailed lesson plans and pacing. They assume roughly 45 minute classes. Below is a modified pacing guide to align more smoothly with our rotating drop schedule.

There are 5 assessment days that can be used throughout the course with the timing below if none of the "if time allows" lessons are taught. These days can be used for quizzes/tests as the teacher sees fit.

- Section 5.1 - Computer Components
  - 5.1.1 - Computer Components **(2 Classes)**
- Section 5.2 - Networking Fundamentals
  - 5.2.1 - Network Connections **(2 Classes)**
  - 5.2.2 - Network Naming **(2 Classes)**
- Section 5.3 - Protocols & Packets
  - 5.3.1 - Communicating in a Network **(2 Classes)**
  - 5.3.2 - Packet Delivery & Protocols **(3 Classes)**

Materials

- Core instructional materials: Core Book List
- Supplemental materials: Resources from the cyber.org curriculum "Cybersecurity 1."

- Computers
- Teacher created activiites
- Teacher created notes
- Websites to research current events

Integrated Accommodation & Modifications

Possible accommodations/modification for Introduction to Cybersecurity