Unit 2: The Internet

Content Area: **Mathematics**
Course(s): **Generic Course**
Time Period: **Semester 1**
Length: **2 weeks**
Status: **Published**

Standards

CS	Computing Systems
	The usability, dependability, security, and accessibility of devices within integrated systems are important considerations in their design as they evolve.
8.1.12.CS.1	Describe ways in which integrated systems hide underlying implementation details to simplify user experiences.
	A computing system involves interaction among the user, hardware, application software, and system software.
8.1.12.CS.2	Model interactions between application software, system software, and hardware.
8.1.12.CS.3	Compare the functions of application software, system software, and hardware.
	The scalability and reliability of the Internet are enabled by the hierarchy and redundancy in networks. Network topology is determined by many characteristics.
8.1.12.NI.1	Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing.
	Network security depends on a combination of hardware, software, and practices that protect data while it is at rest, in transit, and in use. The needs of users and the sensitivity of data determine the level of security implemented. Advanced attacks take advantage of common security vulnerabilities.
8.1.12.NI.2	Evaluate security measures to address various common security threats.
	The design and use of computing technologies and artifacts can positively or negatively affect equitable access to information and opportunities.
8.1.12.IC.1	Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.
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.
8.2.12.EC.1	Analyze controversial technological issues and determine the degree to which individuals, businesses, and governments have an ethical role in decisions that are made.
8.2.12.EC.2	Assess the positive and negative impacts of emerging technologies on developing countries and evaluate how individuals, non-profit organizations, and governments have responded.
8.2.12.ETW.4	Research historical tensions between environmental and economic considerations as driven by human needs and wants in the development of a technological product and present the competing viewpoints.

Essential Questions

- How does the Internet work?
- How can computing devices can be connected to form a network?
- Why do we need open and shared protocols for communicating on the Internet?
- How is data is routed through the Internet?

- How does the redundant nature of networks can lead to dynamic, fault tolerant routes?
- What are the differences between the different protocols of the Internet and how do they rely on each other?

Enduring Understanding

- Computer systems and networks facilitate how data are transferred.
- While computing innovations are typically designed to achieve a specific purpose, they may have unintended consequences.

Knowledge and Skills

Students learn how the Internet works and discuss its impacts on politics, culture, and the economy. Throughout this unit, students use a digital tool called the Internet Simulator that simulates how different parts of the Internet work and forces students to grapple with and solve the problems each aspect of the Internet was designed to solve. At the conclusion of the unit, students investigate an “Internet Dilemma,” both from the standpoint of its technical background and its impacts on different groups of people.

Transfer Goals

There are trade offs between decisions/actions.

Computers can offer a way to analyze and interpret findings.

Resources

1. Various YouTube videos that visually explain concepts and ideas.

2. Various widgets found on code.org.

3. Test banks created on Edulastic and code.org

4. Use of Google Classroom, Google Slides, Google Docs and Google Sheets