Unit 1: Digital Information

Content Area: **Mathematics**
Course(s): **Generic Course**
Time Period: **Semester 1**
Length: **3 weeks**
Status: **Published**

Standards

8.1.12.CS.1	Describe ways in which integrated systems hide underlying implementation details to simplify user experiences.
IC	Impacts of Computing
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.
8.1.12.DA.2	Describe the trade-offs in how and where data is organized and stored.
8.1.12.DA.3	Translate between decimal numbers and binary numbers.
8.1.12.DA.4	Explain the relationship between binary numbers and the storage and use of data in a computing device.
	Engineering design is a complex process in which creativity, content knowledge, research, and analysis are used to address local and global problems. Decisions on trade-offs involve systematic comparisons of all costs and benefits, and final steps that may involve redesigning for optimization.
8.2.12.ITH.3	Analyze the impact that globalization, social media, and access to open source technologies has had on innovation and on a society's economy, politics, and culture.

Essential Questions

- How are Binary Numbers used to represent data?
- How do we compress data?
- What are the legal and ethical concerns with our intellectual property?

Enduring Understanding

- The way a computer represents data internally is different from the way the data is interpreted and displayed for the user.
- Programs are used to translate data into a representation more easily understood by people.
- While computing innovations are typically designed to achieve a specific purpose, they may have unintended consequences.

Knowledge and Skills

Students explore how computers store complex information like numbers, text, images, and sound, and they debate the impacts of digitizing information. Alternating between lessons away from the computer ("unplugged"), and lessons that use digital tools called "widgets," this unit encourages an exploratory and collaborative approach to learning about digital information. For example, in one activity students design a device using household items like pipe-cleaners, cups, string, etc. that will allow them to communicate simple messages across a room. As students are challenged to send increasingly complex messages, they must improve their device collaboratively with their partner while confronting some of the challenges underlying the representation of digital information. To close out the unit, students debate the pros and cons of digitizing information and the impacts of digital information on society and culture at large.

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