

02_Unit 2 Data and Society

Content Area: **Math**
Course(s):
Time Period: **Cycle**
Length: **7 lessons (22 lesson marking period cycle; 1 of 3 units)**
Status: **Published**

General Overview, Course Description or Course Philosophy

Computer Programming 8

Computer science and design thinking education prepares students to succeed in today's knowledge-based economy by providing equitable and expanded access to high-quality, standards-based computer science and technological design education. During 8th grade, students will focus on the core ideas of computing systems, networks, impacts of computing and data analysis, programming, engineering design, ethics and culture of technology, and the interaction and effects of technology with and on humans and the natural world. They do so by completing three specific units entitled "The Design Process", "Data and Society", and "Physical Computing". These follow a logical sequence and come AFTER the 7th-grade units (entitled "Problem-Solving and Computing", "Web Development", and "Interactive Animation and Games").

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Unit Summary:

Computing affects many aspects of the world in both positive and negative ways at local, national, and global levels. Individuals and communities influence computing through their behaviors and cultural and social interactions, and, in turn, computing influences new cultural practices. Computing systems exist to process data. The amount of digital data generated in the world is rapidly expanding, so the need to process data effectively is increasingly important. Data is collected and stored so that it can be analyzed to better understand the world and make more accurate predictions.

Essential Question(s):

- How can digital data help society understand real world problems?
- How, then, can this data guide computer programmers to develop technological solutions to help problems that arise?

Enduring Understandings:

- Advancements in computing technology can change individuals' behaviors.
- Society is faced with tradeoffs due to the increasing globalization and automation that computing brings.
- People use digital devices and tools to automate the collection, use, and transformation of data.
- The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.
- Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it.
- The purpose of cleaning data is to remove errors and make it easier for computers to process.
- Computer models can be used to simulate events, examine theories and inferences, or make predictions.

CONTENT AREA STANDARDS

CS.6-8.8.1.8.DA.1	Organize and transform data collected using computational tools to make it usable for a specific purpose.
CS.6-8.8.1.8.DA.2	Explain the difference between how the computer stores data as bits and how the data is displayed.
CS.6-8.8.1.8.DA.3	Identify the appropriate tool to access data based on its file format.
CS.6-8.8.1.8.DA.4	Transform data to remove errors and improve the accuracy of the data for analysis.
CS.6-8.8.1.8.DA.5	Test, analyze, and refine computational models.
CS.6-8.8.1.8.DA.6	Analyze climate change computational models and propose refinements.
CS.6-8.8.1.8.IC.1	Compare the trade-offs associated with computing technologies that affect individual's everyday activities and career options.
CS.6-8.8.1.8.IC.2	Describe issues of bias and accessibility in the design of existing technologies.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

LA.RI.7.10	By the end of the year read and comprehend literary nonfiction at grade level text-complexity or above, with scaffolding as needed.
LA.L.7.1	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
TECH.9.4.2.CT.1	Gather information about an issue, such as climate change, and collaboratively brainstorm

ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGl.2).

TECH.9.4.2.CT.3

Use a variety of types of thinking to solve problems (e.g., inductive, deductive).

STUDENT LEARNING TARGETS

Refer to the 'Declarative Knowledge' and 'Procedural Knowledge' sections.

Declarative Knowledge

Students will understand that:

- Collections of data are used to solve problems.
- Computers can help in and automate the process of using data to solve problems.
- Different systems are used to represent information in a computer; there are challenges and tradeoffs posed by using them.
- Data can help solve world problems and be interpreted to predict changes in society and needs of people.

Procedural Knowledge

Students will be able to:

- View data as an important tool for solving problems.
- Understand the importance of representation systems in computing.
- Appreciate the advantages and disadvantages of automated decision making.
- Use data to develop an automated solution to a problem.

EVIDENCE OF LEARNING

Refer to the 'Formative Assessments' and 'Summative Assessments' sections.

Formative Assessments

For this unit, formative assessments may include:

- observation
- one-on-one assistance
- questioning skills
- graphic organizers
- anecdotal notes
- exit tickets
- student interviews and check-ins

Summative Assessments

For this unit, summative assessments may include:

- graphic organizers
- homework, when applicable
- mini projects at the end of units
- culminating activities in the code.org units

RESOURCES (Instructional, Supplemental, Intervention Materials)

[Code.org Website](#)

All lessons and resources can be accessed via this website.

INTERDISCIPLINARY CONNECTIONS

English/Language Arts - implementation of conventions of Standard English

Technology/Multi-Media - audio/visual media analysis

Math - computations

Visual and Performing Arts- presentations on app lab and website design

Social Studies - ethical codes of components of technology

Science- computer science, physics

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.