

01_Unit 1 Problem Solving and Computing

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 7

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 7th 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 "Problem Solving and Computing", "Web Development", and "Interactive Animation and Games".

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Unit Summary:

People design for enjoyment and to solve problems, extend human capabilities, satisfy needs and wants, and improve the human condition. Engineering Design, a systematic approach to creating solutions to technological problems and finding ways to meet people's needs and desires, allows for the effective and efficient development of products and systems. Interaction of Technology and Humans concerns the ways society drives the improvement and creation of new technologies, and how technologies both serve and change society.

Essential Question(s):

- How can people design and engineer technology to solve problems, extend human capabilities, and improve the human condition?
- How can these technological advances serve and change society?

Enduring Understandings:

- Engineering design is a systematic, creative, and iterative process used to address local and global problems.
- The process includes generating ideas, choosing the best solution, and making/testing, and redesigning models or prototypes.
- Technology interacts with society, sometimes bringing about changes in a society's economy, politics, and culture, and often leading to the creation of new needs and wants.
- New needs and wants may create strains on local economies and workforces.
- Improvements in technology are intended to make the completion of tasks easier, safer, and/or more efficient.

CONTENT AREA STANDARDS

CS.6-8.8.2.8.ED.1	Evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer.
CS.6-8.8.2.8.ED.2	Identify the steps in the design process that could be used to solve a problem.
CS.6-8.8.2.8.ED.3	Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).
CS.6-8.8.2.8.ED.4	Investigate a malfunctioning system, identify its impact, and explain the step-by-step process used to troubleshoot, evaluate, and test options to repair the product in a collaborative team.
CS.6-8.8.2.8.ITH.2	Compare how technologies have influenced society over time.
CS.6-8.8.2.8.ITH.3	Evaluate the impact of sustainability on the development of a designed product or system.
CS.6-8.8.2.8.ITH.4	Identify technologies that have been designed to reduce the negative consequences of other technologies and explain the change in impact.
CS.6-8.8.2.8.ITH.5	Compare the impacts of a given technology on different societies, noting factors that may make a technology appropriate and sustainable in one society but not in another.

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.GeoGI.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:

- Varying types of problem-solving processes should be applied based on specific needs and constraints. These processes will be referenced and applied throughout studies in computer programming.
- There are specific ways in which computers input, output, store, and process information to help humans solve problems.

Procedural Knowledge

Students will be able to:

- build a collaborative classroom environment.
- view computer science as relevant, collaborative, fun, and empowering.
- design an application that helps solve a problem of their choosing.

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](https://code.org)

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.