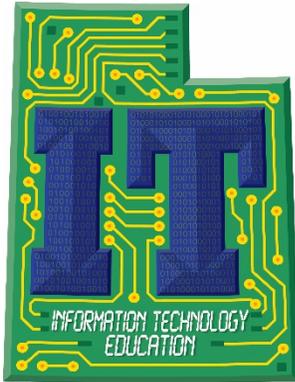# STRANDS AND STANDARDS
EXPLORING COMPUTER SCIENCE 1

Course Description

Exploring Computer Science 1 is designed to introduce students to the breadth of the field of computer science through an exploration of engaging and accessible topics. Rather than focusing the entire course on learning particular software tools or programming languages, the course is designed to focus the conceptual ideas of computing and help students understand why certain tools or languages might be utilized to solve particular problems. The goal of Exploring Computer Science 1 is to develop in students the computational thinking practices of algorithm development, problem solving and programming within the context of problems that are relevant to the lives of today's students. Students will also be introduced to topics such as interface design, limits of computers and societal and ethical issues.

Intended Grade Level	7-9
Units of Credit	0.5
Core Code	35.02.00.00.007
Concurrent Enrollment Core Code	N/A
Prerequisite	N/A
Skill Certification Test Number	802, 9830
Test Weight	0.5 or 1.0
License Type	CTE and/or Secondary Education 6-12
Required Endorsement(s)	
Endorsement 1	Exploring CS, or
Endorsement 2	Web Development, or
Endorsement 3	Computer Programming (Historic), or
Endorsement 4	Multimedia, or
Endorsement 5	Computer Science Level 1, or
Endorsement 6	Computer Science Level 2, or
Endorsement 7	Business & Marketing Information Technology

STRAND 1

Human and Computer Interaction (suggested time frame: 6-8 weeks). Students learn the components and uses of a computer.

Standard 1

Analyze the characteristics of hardware components including processor, operating system, RAM, ROM, hard drive, and input and output devices. Discuss gigahertz, kilobyte, megabyte, gigabyte and terabyte.

Standard 2

Determine the software applications for which computers can be used including word processing, presentation, and spreadsheets and browsers.
- Resource-Exploring Computer Science Curriculum V7 Day 3-4

Standard 3

Use tools to yield requested data for Web searches including search engines and appropriate keywords.
- Resource- Exploring Computer Science Curriculum V7 Day 5-7

Standard 4

Evaluate the results of web searches and the reliability of information found on the Web including authority, purpose, coverage, accuracy, objectivity, currency, and accessibility.
- Resource- Exploring Computer Science Curriculum V7 Day 5-7

Standard 5

Computers and tasks they perform
- Identify required functions for a device to be classified as a computer (takes input, processing; output; storage)
- Identify examples of tasks that can and cannot be accomplished with a computer.
    - Resource- Exploring Computer Science Curriculum V7 Day 15-16, 17-19

Standard 6

Describe changes technology has made on communication, privacy and social interactions.
- Appropriate uses of Social Media
- Permanence of online information
- Methods of communication appropriate for different situations
- Online safety
    - Resource -Exploring Computer Science Curriculum V7 Day 8-9

Performance Skills

- Compare and contrast options for hardware and operating system software in computers and devices available today.
- Learn the characteristics that make certain tasks easy or difficult for computers.
- Become "computational thinkers" by applying a variety of problem-solving techniques.
- Students are able to apply the problem-solving process to a real–world situation.
- Identify ethical behavior including responsibilities of software users and software developers with respect to privacy and software development.

STRAND 2

Problem Solving (4 weeks). This unit focuses on developing computational practices and understanding the connections between problem solving, mathematics and computer science.

Standard 1

Define computational practices (thought processes involved in expressing solutions to problems that can be carried out by a computer)
- Role of communication and collaboration in problem solving (computational thinking)
- Designing and implementing creative solutions
    - Persevering and troubleshooting-break down the problem
        - Resource- Exploring Computer Science Curriculum V7 page 12

Standard 2

Solve a problem by applying appropriate problem solving techniques (1: Understand the Problem, 2: Plan the Solution, 3: Carry out the Plan, 4: Review and Discuss your Solution)

- Resource- Exploring Computer Science Curriculum V7 Day 3, 4-6, 7-9

Standard 3
Define algorithm (a set of clearly defined, logical steps to solve a problem.)
- Resource- Exploring Computer Science Curriculum V7 Day 3, 4-6, 7-9

Standard 4
Create algorithms to solve a problem
- Define and compare Sorting algorithms (include selection sort, quicksort)
  - Resource - Exploring Computer Science Curriculum V7 Day 3, 4-6, 7-9
- Create and use visual artifacts to solve a problem (diagram, chart, graph, table, etc.)
- Use an algorithm to solve a minimum spanning tree
- Give a real-world application of a minimum spanning tree (pipes, electrical grids)

Standard 5
Explain why binary numbers are used in computer science
- Count in binary from 0-31
- Understand the binary system or pattern for counting up to 8 digits.
- Explain when a binary search would be more efficient than a linear search Resource - Exploring Computer Science Curriculum V7 Day 10-12

Performance Skills
Insert performance objective text
- Learn the characteristics that make certain tasks easy or difficult for computers.
- Become "computational thinkers" by applying a variety of problem-solving techniques.
- Students are able to apply the problem-solving process to a real–world situation.
- Use problem solving skills to troubleshoot programs.
- Design algorithms and create programming solutions to a variety of computational problems using block programming software.

STRAND 3
Introduction to Programming (6 weeks). Students are introduced to some basic programming scenarios associated with code design and development.

Standard 1
Create Programs that correspond to a set of specifications including: create dialogue between two sprites, move sprites with accuracy, broadcast a message and receive the broadcast, and respond to different events.
- Design (storyboard) a program
  - Resource - Exploring Computer Science Curriculum V7 page 136
- Know the Scratch environment including sprites, screen/stage size and the following block categories
  - Events (green flag, sprite cli9ked, key pressed, broadcasting)

- Motion (move, turn, go to, glide)
- Looks (say/think, show/hide, switch costume, change size)
- Control (loops, conditionals, wait)
- Operators/Math (variables, randomness)
- Resource - Exploring Computer Science Curriculum V7 page D5-6 (139)
- Test- troubleshoot, locate and correct errors in a program.
- Execute- run final working program

Standard 2

Explain the term iteration (repeating something multiple times) and give an example of iteration in programming.
- Exploring Computer Science Curriculum V7 page 5-6

Standard 3

Analyze and explain how a particular program functions.

Standard 4

Discuss the ethical responsibility to society when creating apps or programs- including the following: improve the world around you, efficiency-making things easier, viruses, potential liability for misuse, potential security issues.

Performance Skills

Insert performance objective text
- Design algorithms and create programming solutions to a variety of computational problems using block programming software.

STRAND 4

(Optional)--Computing and Data Analysis. Students explore how computing has facilitated new methods of managing and interpreting data.

Standard 1

Students will use computers to translate, process and visualize data in order to find patterns and test hypotheses.
- Describe the features of appropriate data sets for specific problems.
- Use computers to find patterns in data and test hypotheses about data.
- Justify conclusions drawn from data analysis.

Standard 2

Students will work with a variety of large data sets that illustrate how widespread access to data and information facilitates identification of problems.
- Apply a variety of analysis techniques to large data sets.
- Compare different analysis techniques and discuss the tradeoffs among them.

Standard 3

Students will collect and generate their own data related to local community issues and discuss appropriate methods for data collection and aggregation of data necessary to support making a case of facilitating a discovery.

Work Place Skills

Communication, Problem Solving, Teamwork, Critical Thinking, Dependability, Accountability, Legal requirements/expectations

Skill Certificate Test Points by Strand

Test Name	Test #	Number of Test Points by Strand										Total Points	Total Questions
		1	2	3	4	5	6	7	8	9	10		
Exploring Computer Science	802	20	14	15								49	31