	Computer Science: A Problem-Solving Approach
STRAND 1: Creative Development	
Collaboration is crucial when developing computing innovations, because having multiple perspectives offers additional opportunities to find solutions.	
Standard 1	
Collaboration	
· Explain how collaboration affects the development of a solution.	
· Collaborate in the development of solutions.	
Standard 2	
Program Function and Purpose	
· Investigate the situation, context, or task.	pp. 211-212
· Investigate the purpose of a program.	p. 211
· Understand how to break down program specifications into smaller tasks using top-down design and pseudocode.	pp. 211-212
· Generalize data sources through variables.	
· Understand the uses of different data types (examples: integer, float/double, characters/strings, boolean, etc.)	pp. 117-118, pp. 127-128, p. 173-174
· Explain how a code segment or program functions.	pp. 69-75
Standard 3	
Identifying and Correcting Errors	pp. 365-366
· Identify and correct errors in algorithms and programs, including error discovery through testing.	pp. 365-366
· Identify different types of errors such as logic, run-time, and syntax errors.	pp. 365-366
STRAND 2: Computing and Data	
Processing data is the main benefit of computer use.	
Standard 1	
Hardware/Software	pp. 2-9
· Explain the differences between hardware and software and how they relate to input, storage, processing, and output.	pp. 2-9
· Understand the different file sizes (bit, byte, kilobyte, megabyte, gigabyte, terabyte, and petabyte).	pp. 53-56
Standard 2	
Binary Numbers	pp. 54-56, p. 61
· Calculate the binary (base 2) equivalent of a positive integer (base 10) and vice versa.	p. 61
· Compare and order binary numbers.	pp. 54-56
Standard 3	
Data Compression	
· Lossy - Compression algorithm in which some of the data from the original file is lost.	
· Lossless - Compression algorithm in which file size is reduced without any quality loss.	
STRAND 3: Algorithms and Programming	
Algorithms and programming languages are essential for solving problems and completing tasks.	
Standard 1	
Variables and Assignments	
· Use variables of different data types (examples: integer, float/double, characters/strings, boolean, etc.)	pp. 121-130, p. 261
· Convert data types to other data types.	pp. 129-130
· Determine the value of a variable as a result of an assignment.	pp. 121-130

Standard 2

Mathematical Expressions

· Implement arithmetic operators (=, +, -, *, /, and MOD) and order of operations (PEMDAS). p. 159, p. 225

Standard 3

Input / Output pp. 115-116

· Receive and store user input. pp. 115-116

· Print to console pp. 116-119

Standard 4

Strings

· Evaluate expressions that manipulate strings. pp. 135-136

· String concatenation joins together two or more strings end-to-end to make a new string. pp. 135-136

Standard 5

Boolean Expressions pp. 172-177

· Write and evaluate expressions using relational operators (==, ≠, >, <, ≥, and ≤). pp. 173-174

· Write and evaluate expressions using logical operators (AND, OR, NOT). pp. 254-260

Standard 6

Conditionals

· Write conditional statements, such as IF statements and ELSE IF statements. pp. 237-240

· Determine the result of conditional statements. p. 227

Standard 7

Iteration/Looping p. 191, pp. 323-326

· Write iteration statements, such as for loops and while loops. p. 191, pp. 323-326

· Determine the result of iteration statements. p. 191

Standard 8

Calling and Developing Procedures/Functions/Methods

· Write statements to call Procedures/Functions/Methods pp. 394-399

· Determine the result of a Procedures/Functions/Methods pp. 394-399

STRAND 4: The Internet

The Internet is built on systems that use protocols to transfer data.

Standard 1

The Internet

· Explain how computing devices work together in a network (Network, Path, Routing, Packets, Bandwidth). p. 6

· Explain how the Internet works (Fault Tolerance, Protocols, HTTP, HTTPS).

· Understand the difference between the Internet and the World Wide Web.

Standard 2

Web Development

Students will understand that the HTML programming language is used to create all websites on the internet and acts as the structure for a website.

· Students will code the foundation for a basic webpage including the element tags <!DOCTYPE html>, <html>, <head>, <title>, and <body>.

· Students will create pages with tags and attributes at the inline level. (<!DOCTYPE html>, <html>, <head>, <title>, <body>, <h1>, <h2>, <h6>, <p>,
, etc.)

STRAND 5: Impact of Computing

The impact of computing extends to societal, economical, and cultural issues.

Standard 1

Beneficial and Harmful Effects

· Explore how an effect of a computing innovation can be both beneficial and harmful.

· Explore advances in computing that have generated and increased creativity in other fields, such as medicine, engineering, communications, and the arts. p. 78

Standard 2

Digital Divide and Computing Bias p. 45

· Explore issues that contribute to the digital divide (demographics, geographics, socioeconomic, equity, access, influence). p. 45

· Explore how bias exists in computing innovations. p. 45

Standard 3

Legal and Ethical Concerns

· Explain how the use of computing can raise legal and ethical concerns. pp. 523-531

· Understand how ease of access and distribution of digitized information raises intellectual property concerns regarding ownership, value, and use. pp. 523-525

· Understand the differences between Copyright, Creative Commons, Public Domain, & Trademark pp. 523-525

Standard 4

Safe Computing

· Describe the risks to privacy from collecting and storing personal data on a computer system. pp. 533-535

· Explain how computing resources can be protected (password strength) and can be misused. p. 530

· Explain how unauthorized access to computing resources is gained. pp. 529-530

· Understand essential cybersecurity concepts. pp. 529-530

· Malware (adware, trojan horse, virus, ransomware, etc.) pp. 529-530

· Social Engineering (phishing, etc.) p. 530