



Spokane Public Schools Exploring Computer Science

Course: Exploring Computer Science		Total Framework Hours up to: 180
CIP Code: 110701	<input checked="" type="checkbox"/> Exploratory Preparatory	Date Last Modified: June 5, 2014
Career Cluster: Information Technology		Cluster Pathway: Programming and Software Development

UNIT 1 EMPHASIS: Human Computer Interaction

COMPONENTS AND ASSESSMENTS

Performance Assessment Examples:

Group Presentation Rubric
Design Tool Associations
Turing Test Activity (Self-Assessment)

Leadership Alignment Individual and Group Emphasis:

(Examples: Computing Affinity Activity; Computer Buying Interview and Project)

- 1.A.1 Use a wide range of idea creation techniques (such as brainstorming)
- 3.A.1 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts
- 3.A.2 Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions
- 3.A.3 Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)
- 4.A.1 Access information efficiently (time) and effectively (sources)
- 4.A.2 Evaluate information critically and competently

Standards and Competencies

ISTE-NETS Standards

- 1a. Apply existing knowledge to generate new ideas, products, or processes.
- 1b. Create original works as a means of personal or group expression.
- 1c. Use models and simulations to explore complex systems and issues.
- 2b. Communicate information and ideas effectively to multiple audiences using a variety of digital environments and media.
- 2d. Contribute to project teams to produce original works or solve problems.
- 3b. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
- 3c. Evaluate and select information sources and digital tools based on the appropriateness to specific tasks.
- 3d. Process data and report results.
- 4b. Plan and manage activities to develop a solution or complete a project.
- 5a. Advocate and practice safe, legal, and responsible use of information technology.
- 6a. Understand and use technology systems.
- 6b. Select and use applications effectively and productively.

Competencies		Total Learning Hours for Unit: up to 20 hours
<ul style="list-style-type: none"> Analyze the characteristics of hardware components to determine the applications for which they can be used. Use appropriate tools and methods to execute Internet searches which yield requested data. Evaluate the results of web searches and the reliability of information found on the Internet. Explain the differences between tasks that can and cannot be accomplished with a computer. Explain the implications of communication as data exchange 		
Aligned Washington State Core Standards (GLE Components and Anchor CCSS unless indicated otherwise)		
Arts	N/A	
Educational Technology	1.2.1 Communicate and collaborate to learn with others. 1.3.2 Locate and organize information from a variety of sources and media. 2.1.1 Practice personal safety. 2.1.2 Practice ethical and respectful behavior. 2.2.1 Develop skills to use technology effectively. 2.2.2 Use a variety of hardware to support learning. 2.3.1 Select and use common applications. 2.3.2 Select and use online applications. 2.4.1 Formulate and synthesize new knowledge.	
Health & Fitness	1.2.1 Apply and/or analyze how to perform activities and tasks safely and appropriately. 3.1.2 Analyze how environmental factors impact health. 3.1.3 Evaluate environmental risks associated with certain occupational, residential, and recreational choices	
Language	9-10.L.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.	
Math	Mathematical Practice	
<i>To be updated through additional curricular work with Code</i>	CCSS.MP.1 Make sense of problems and persevere in solving them. CCSS.MP.4 Model with mathematics. CCSS.MP.5 Use appropriate tools strategically.	
Reading Standards for Literacy in Social Studies, Science and Technical Subjects	9-10.RST.1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. 9-10.RST.2. Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.	
Next Generation Science Standards	PS4-2 Evaluate questions about the advantages of using a digital transmission and storage of information.	
<i>To be updated through additional curricular work with Code</i>		
Social Studies	4.2.3 Analyze and evaluate how technology and ideas have shaped United States and/or world history 5.1.1 Analyze consequences of positions on an issue or event. 5.2.1 Create and uses research questions that are tied to an essential question to focus inquiry on an idea, issue, or event.	
Speaking & Listening	9-10.SL.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on <i>grades 9–10 topics, texts, and issues</i> , building on others’ ideas and expressing their own clearly and persuasively.	

	<p>9-10.SL.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.</p>
<p>Writing for History, Science and Technical Subjects</p>	<p>9-10.WHST.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p>9-10.WHST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.</p> <p>9-10.WHST.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism</p>

UNIT 2 EMPHASIS: Problem Solving

COMPONENTS AND ASSESSMENTS

Performance Assessment Examples:

Information Specialist Report
 CS Unplugged
 Tower Building

Leadership Alignment Individual and Group Emphasis:

(Examples: Data Collection; Handshake; Fencepost Activities)

- 1.A.1 Use a wide range of idea creation techniques (such as brainstorming)
- 1.A.2 Create new and worthwhile ideas (both incremental and radical concepts)
- 1.B.1 Develop, implement and communicate new ideas to others effectively
- 1.B.2 Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work
- 1.B.4 View failure as an opportunity to learn; understand that creativity and innovation is a long-term, cyclical process of small successes and frequent mistakes
- 2.A.1 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation
- 2.D.1 Solve different kinds of non-familiar problems in both conventional and innovative ways
- 2.D.2 Identify and ask significant questions that clarify various points of view and lead to better solutions
- 10.B.1.f Collaborate and cooperate effectively with teams
- 10.B.1.h Be accountable for results

Standards and Competencies

ISTE-NETS STANDARDS

- 1a. Apply existing knowledge to generate new ideas, products, or processes.
- 1b. Create original works as a means of personal or group expression.
- 1c. Use models and simulations to explore complex systems and issues.
- 2b. Communicate information and ideas effectively to multiple audiences using a variety of digital environments and media.
- 2d. Contribute to project teams to produce original works or solve problems.
- 3a. Plan strategies to guide inquiry.
- 3b. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
- 4b. Plan and manage activities to develop a solution or complete a project.
- 4c. Collect and analyze data to identify solutions and/or make informed decisions.

Competencies

Total Learning Hours for Unit: up to 30 hours

- Name and explain the steps they use in solving a problem.
- Solve a problem by applying appropriate problem-solving techniques.
- Express a solution using standard design tools.
- Determine if a given algorithm successfully solves a stated problem.
- Create algorithms that meet specified objectives.
- Explain the connections between binary numbers and computers.
- Summarize the behavior of an algorithm.
- Compare the tradeoffs between different algorithms for solving the same problem.
- Explain the characteristics of problems that cannot be solved by an algorithm.

Aligned Washington State Core Standards (GLE Components and Anchor CCSS unless indicated otherwise)

Arts	N/A	
Educational Technology	1.1.2	Use models and simulations to explore systems, identify trends and forecast possibilities.
	1.2.1	Communicate and collaborate to learn with others.

	<p>1.3.1 Identify and define authentic problems and significant questions for investigation and plan strategies to guide inquiry.</p> <p>1.3.3 Analyze, synthesize and ethically use information to develop a solution, make informed decisions and report results.</p> <p>1.3.4 Use multiple processes and diverse perspectives to explore alternative solutions.</p> <p>2.2.1 Develop skills to use technology effectively.</p> <p>2.4.1 Formulate and synthesize new knowledge.</p>
Health & Fitness	N/A
Language	N/A
<p>Math</p> <p><i>To be updated through additional curricular work with Code</i></p>	<p>Mathematical Practice</p> <p>CCSS.MP.1 Make sense of problems and persevere in solving them.</p> <p>CCSS.MP.2 Reason abstractly and quantitatively</p> <p>CCSS.MP.3 Construct viable arguments and critique the reasoning of others.</p> <p>CCSS.MP.4 Model with mathematics.</p> <p>Mathematical Content</p> <p>Building Functions</p> <p>F-BF.1 Write a function that describes a relationship between two quantities. ★</p> <p>Determine an explicit expression, a recursive process, or steps for calculation from a context.</p>
Reading Standards for Literacy in Social Studies, Science and Technical Subjects	<p>9-10.RST.1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.</p> <p>9-10.RST.2. Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.</p> <p>9-10.RST.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.</p>
<p>Next Generation Science Standards</p> <p><i>To be updated through additional work with Code</i></p>	N/A
Social Studies	N/A
Speaking & Listening	<p>9-10.SL.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively.</p> <p>9-10.SL.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.</p> <p>9-10.SL.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.</p>
Writing for History, Science and Technical Subjects	<p>9-10.WHST.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p>9-10.WHST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.</p> <p>9-10.WHST.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p> <p>9-10.WHST.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>

UNIT 3 EMPHASIS: Web Design

COMPONENTS AND ASSESSMENTS

Performance Assessment Examples:

Web Page Tag Verification
HTML Image Evaluation
Web Project Rubric
Peer Assessment

Leadership Alignment Individual and Group Emphasis:

(Examples: Integrated through web development units; Ethical Dilemma or Worldwide/Community Problem activity)

- 1.A.2 Create new and worthwhile ideas (both incremental and radical concepts)
- 1.A.3 Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts
- 2.B.1 Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems
- 2.C.1 Effectively analyze and evaluate evidence, arguments, claims and beliefs
- 2.C.2 Analyze and evaluate major alternative points of view
- 2.C.3 Synthesize and make connections between information and arguments
- 2.C.4 Interpret information and draw conclusions based on the best analysis
- 2.C.5 Reflect critically on learning experiences and processes
- 4.B.3 Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information
- 5.A.1 Understand both how and why media messages are constructed, and for what purposes
- 5.A.2 Examine how individuals interpret messages differently, how values and points of view are included or excluded, and how media can influence beliefs and behaviors
- 6.A.1 Use technology as a tool to research, organize, evaluate and communicate information
- 10.B.1 Demonstrate additional attributes associated with producing high quality products

Standards and Competencies

ISTE-NETS STANDARDS

- 1b. Create original works as a means of personal or group expression.
- 4b. Plan and manage activities to develop a solution or complete a project.
- 5a. Advocate and practice safe, legal, and responsible use of information and technology.
- 6a. Understand and use technology systems.
- 6b. Select and use applications effectively and productively.

Competencies

Total Learning Hours for Unit: up to 25 hours

- Create web pages to address specified objectives.
- Create web pages with a practical, personal, and/or societal purpose.
- Select appropriate techniques when creating web pages.
- Use abstraction to separate style from content in web page design and development.
- Describe the use of a website with appropriate documentation.

Aligned Washington State Core Standards (GLE Components and Anchor CCSS unless indicated otherwise)

Arts

- 1.1: Understand and apply arts concepts and vocabulary.
- 2.3: Apply a responding process. (engage, describe, analyze, interpret, and evaluate)
- 3.2: Use the arts to communicate for a specific purpose.
- 4.5: Understand how arts knowledge and skills are used in the world of work, including careers in the arts.

Educational Technology	<p>1.1.1 Generate ideas and create original works for personal and group expression using a variety of digital tools.</p> <p>1.3.2 Locate and organize information from a variety of sources and media.</p> <p>1.3.4 Use multiple processes and diverse perspectives to explore alternative solutions.</p> <p>2.2.1 Develop skills to use technology effectively.</p> <p>2.3.1 Select and use common applications.</p> <p>2.3.2 Select and use online applications.</p> <p>2.4.1 Formulate and synthesize new knowledge.</p>
Health & Fitness	<p>1.2.1 Apply and/or analyze how to perform activities and tasks safely and appropriately.</p> <p>3.1.3 Evaluate environmental risks associated with certain occupational, residential, and recreational choices</p>
Language	N/A
Math <i>To be updated through additional curricular work with Code</i>	Mathematical Practice CCSS.MP.1 Make sense of problems and persevere in solving them.
Reading Standards for Literacy in Social Studies, Science and Technical Subjects	N/A
Next Generation Science Standards <i>To be updated through additional curricular work with Code</i>	N/A
Social Studies	<p>5.2.1 Create and uses research questions that are tied to an essential question to focus inquiry on an idea, issue, or event.</p> <p>5.2.2 Evaluate the validity, reliability, and credibility of sources when researching an issue or event.</p> <p>5.3.1 Evaluate one’s own viewpoint and the viewpoints of others in the context of a discussion.</p> <p>5.4.2 Create strategies to avoid plagiarism and respect intellectual property when developing a paper or presentation.</p>
Speaking & Listening	N/A
Writing for History, Science and Technical Subjects	<p>9-10.WHST.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p>9-10.WHST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.</p> <p>9-10.WHST.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.</p>

UNIT 4 EMPHASIS: Programming

COMPONENTS AND ASSESSMENTS

Performance Assessment Examples:

Programmed Games (e.g. Name Sample Rubric)
Peer Assessment
Unit Project Rubric

Leadership Alignment Individual and Group Emphasis

(Examples: Collaborative Programming Activities/Games; Interactive Gallery Walks)

- 1.B.1 Develop, implement and communicate new ideas to others effectively
- 1.B.2 Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work
- 1.B.3 Demonstrate originality and inventiveness in work and understand the real world limits to adopting new ideas
- 1.B.4 View failure as an opportunity to learn; understand that creativity and innovation is a long-term, cyclical process of small successes and frequent mistakes
- 8.C.1 Go beyond basic mastery of skills and/or curriculum to explore and expand one's own learning and opportunities to gain expertise
- 8.C.2 Demonstrate initiative to advance skill levels towards a professional level
- 9.B.2 Respond open-mindedly to different ideas and values
- 9.B.3 Leverage social and cultural differences to create new ideas and increase both innovation and quality of work
- 8.A.1 Set goals with tangible and intangible success criteria

Standards and Competencies

ISTE-NETS STANDARDS

- 1c. Use models and simulations to explore complex systems and issues.
- 2b. Communicate information and ideas effectively to multiple audiences using a variety of digital environments and media.
- 4b. Plan and manage activities to develop a solution or complete a project.
- 6a. Understand and use technology systems.

Competencies

Total Learning Hours for Unit: up to 25 hours

- Use appropriate algorithms to solve a problem.
- Design, code, test, and execute a program that corresponds to a set of specifications.
- Select appropriate programming structures.
- Locate and correct errors in a program.
- Explain how a particular program functions.
- Justify the correctness of a program.
- Create programs with practical, personal, and/or societal intent

Aligned Washington State Core Standards (GLE Components and Anchor CCSS unless indicated otherwise)

Arts	N/A
Educational Technology	1.1.2 Use models and simulations to explore systems, identify trends and forecast possibilities.
	1.3.1 Identify and define authentic problems and significant questions for investigation and plan strategies to guide inquiry.
	1.3.4 Use multiple processes and diverse perspectives to explore alternative solutions.
	2.1.1 Practice personal safety.
	2.1.2 Practice ethical and respectful behavior.
	2.2.1 Develop skills to use technology effectively.
	2.4.1 Formulate and synthesize new knowledge.

Health & Fitness	N/A
Language	N/A
Math <i>To be updated through additional curricular work with Code</i>	<p>Mathematical Practice</p> <p>CCSS.MP.1 Make sense of problems and persevere in solving them.</p> <p>Mathematical Content</p> <p>A-CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.</p> <p>A-CED.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales</p> <p>A-CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context</p> <p>Functions</p> <p>F-IF Interpreting Functions</p> <p>F-IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$.</p> <p>F-IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.</p> <p>F-IF.3 . Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.</p> <p>Building Functions</p> <p>F-BF.1 Write a function that describes a relationship between two quantities. ★ Determine an explicit expression, a recursive process, or steps for calculation from a context.</p>
Reading Standards for Literacy in Social Studies, Science and Technical Subjects	N/A
Next Generation Science Standards <i>To be updated through additional curricular work with Code</i>	<p>ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.</p> <p>ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.</p> <p>ETS1-4 Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.</p>
Social Studies	N/A
Speaking & Listening	<p>9-10.SL.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.</p> <p>9-10.SL.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.</p>
Writing for History, Science and Technical Subjects	9-10.WHST.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

UNIT 5 EMPHASIS: Computing and Data Analysis

COMPONENTS AND ASSESSMENTS

Performance Assessment Examples:

Data Collection Project
Group Presentation Rubric

Leadership Alignment Individual and Group Emphasis

(Examples: Data Collection Project)

- 2.A.1 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation
- 2.B.1 Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems
- 2.C.1 Effectively analyze and evaluate evidence, arguments, claims and beliefs
- 2.C.2 Analyze and evaluate major alternative points of view
- 2.C.3 Synthesize and make connections between information and arguments
- 2.C.4 Interpret information and draw conclusions based on the best analysis
- 2.C.5 Reflect critically on learning experiences and processes
- 3.A.1 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts
- 3.A.2 Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions
- 3.A.3 Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)
- 3.A.4 Utilize multiple media and technologies, and know how to judge their effectiveness a priori as well as assess their impact
- 3.B.1 Demonstrate ability to work effectively and respectfully with diverse teams
- 4.B.1 Use information accurately and creatively for the issue or problem at hand
- 5.B.1 Understand and utilize the most appropriate media creation tools, characteristics and conventions
- 6.A.1 Use technology as a tool to research, organize, evaluate and communicate information
- 6.A.2 Use digital technologies (computers, PDAs, media players, GPS, etc.), communication/networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy
- 6.A.3 Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information technologies
- 7.B.1 Incorporate feedback effectively

Standards and Competencies

- 1d. Identify trends and forecast possibilities.
- 2b. Interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media.
- 2d. Contribute to project teams to produce original works or solve problems.
- 3a. Plan strategies to guide inquiry.
- 3d. Process data and report results.
- 4b. Plan and manage activities to develop a solution or complete a project.
- 4c. Collect and analyze data to identify solutions and/or make informed decisions.
- 5a. Advocate and practice safe, legal, and responsible use of information and technology.
- 6a. Understand and use technology systems.

Competencies

Total Learning Hours for Unit: up to 30 hours

- Describe the features of appropriate data sets for specific problems.
- Apply a variety of analysis techniques to large data sets.
- Use computers to find patterns in data and test hypotheses about data.
- Compare different analysis techniques and discuss the tradeoffs among them.
- Justify conclusions drawn from data analysis.

Aligned Washington State Core Standards (GLE Components and Anchor CCSS unless indicated otherwise)

Arts	N/A
Educational Technology	<p>1.1.1 Generate ideas and create original works for personal and group expression using a variety of digital tools.</p> <p>1.1.2 Use models and simulations to explore systems, identify trends and forecast possibilities.</p> <p>1.2.1 Communicate and collaborate to learn with others.</p> <p>1.3.1 Identify and define authentic problems and significant questions for investigation and plan strategies to guide inquiry.</p> <p>1.3.2 Locate and organize information from a variety of sources and media.</p> <p>1.3.3 Analyze, synthesize and ethically use information to develop a solution, make informed decisions and report results.</p> <p>1.3.4 Use multiple processes and diverse perspectives to explore alternative solutions.</p> <p>2.1.1 Practice personal safety.</p> <p>2.1.2 Practice ethical and respectful behavior.</p> <p>2.2.1 Develop skills to use technology effectively.</p> <p>2.2.2 Use a variety of hardware to support learning.</p> <p>2.3.2 Select and use online applications.</p> <p>2.4.1 Formulate and synthesize new knowledge.</p>
Health & Fitness	<p>1.2.1 Apply and/or analyze how to perform activities and tasks safely and appropriately.</p> <p>3.1.3 Evaluate environmental risks associated with certain occupational, residential, and recreational choices</p>
Language	<p>9-10.L.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</p>
<p>Math</p> <p><i>To be updated through additional curricular work with Code</i></p>	<p>Mathematical Practice</p> <p>CCSS.MP.4 Model with mathematics.</p> <p>CCSS.MP.5 Use appropriate tools strategically.</p> <p>Mathematical Content</p> <p>Interpreting Categorical & Quantitative Data</p> <p>S-ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).</p> <p>S-ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.</p> <p>S-ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).</p> <p>Making Inferences & Justifying Conclusions</p> <p>S-IC.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population.</p> <p>S-IC.2 Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation</p> <p>S-IC.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.</p> <p>S-IC.4 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.</p> <p>S-IC.6 Evaluate reports based on data.</p> <p>Conditional Probability & the Rules of Probability</p> <p>S-CP.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”).</p>

	<p>S-CP.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.</p> <p>S-CP.3 Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.</p>
Reading Standards for Literacy in Social Studies, Science and Technical Subjects	N/A
Next Generation Science Standards <i>To be updated through additional curricular work with Code</i>	<p>ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.</p> <p>ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.</p> <p>ETS1-4 Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.</p>
Social Studies	<p>5.2.1 Create and uses research questions that are tied to an essential question to focus inquiry on an idea, issue, or event.</p> <p>5.4.1 Evaluate multiple reasons or factors to develop a position paper or presentation.</p> <p>5.4.2 Create strategies to avoid plagiarism and respect intellectual property when developing a paper or presentation.</p>
Speaking & Listening	<p>9-10.SL.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.</p> <p>9-10.SL.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.</p> <p>9-10.SL.3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.</p> <p>9-10.SL.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.</p> <p>9-10.SL.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.</p>
Writing for History, Science and Technical Subjects	<p>9-10.WHST.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>

UNIT 6 EMPHASIS: Robotics

COMPONENTS AND ASSESSMENTS

Performance Assessment Examples:

Robot Function
Presentation Rubric

Leadership Alignment Individual and Group Emphasis:

(Examples: Team Robot Planning/Assembly; Team Collaborative Robot Programming)

- 1.B.1 Develop, implement and communicate new ideas to others effectively
- 1.B.2 Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work
- 2.A.1 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation
- 2.B.1 Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems
- 2.D.1 Solve different kinds of non-familiar problems in both conventional and innovative ways
- 2.D.2 Identify and ask significant questions that clarify various points of view and lead to better solutions
- 3.A.1 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts
- 3.A.2 Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions
- 3.A.3 Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)
- 3.B.1 Demonstrate ability to work effectively and respectfully with diverse teams
- 3.B.2 Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal
- 3.B.3 Assume shared responsibility for collaborative work, and value the individual contributions made by each team member
- 7.A.1 Adapt to varied roles, jobs responsibilities, schedules and contexts
- 9.B.2 Respond open-mindedly to different ideas and values
- 11.B.1 Act responsibly with the interests of the larger community in mind

Standards and Competencies

ISTE-NETS STANDARDS

- 2d. Contribute to project teams to produce original works or solve problems.
- 4b. Plan and manage activities to develop a solution or complete a project.
- 6a. Understand and use technology systems.

Competencies

Total Learning Hours for Unit: up to 30 hours

- Identify the criteria that describe a robot and determine if something is a robot.
- Match the actions of the robot to the corresponding parts of the program.
- Build, code, and test a robot that solves a stated problem.
- Explain ways in which different hardware designs affect the function of a machine.
- Describe the tradeoffs among multiple ways to program a robot to achieve a goal.

Aligned Washington State Core Standards (GLE Components and Anchor CCSS unless indicated otherwise)

Arts	N/A
Educational Technology	1.1.2 Use models and simulations to explore systems, identify trends and forecast possibilities.
	1.2.1 Communicate and collaborate to learn with others.
	1.3.1 Identify and define authentic problems and significant questions for investigation and plan strategies to guide inquiry.
	1.3.3 Analyze, synthesize and ethically use information to develop a solution, make informed decisions and report results.
	2.1.2 Practice ethical and respectful behavior.
	2.2.2 Use a variety of hardware to support learning.
	2.4.1 Formulate and synthesize new knowledge.

Health & Fitness	<p>1.2.1 Apply and/or analyze how to perform activities and tasks safely and appropriately.</p> <p>1.2.2 Apply and/or evaluate skills and strategies necessary for effective participation in physical activities.</p> <p>3.1.3 Evaluate environmental risks associated with certain occupational, residential, and recreational choices</p>
Language	<p>9-10.L.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</p>
<p>Math</p> <p><i>To be updated through additional curricular work with Code</i></p>	<p>Mathematical Practice</p> <p>CCSS.MP.1 Make sense of problems and persevere in solving them.</p> <p>CCSS.MP.5 Use appropriate tools strategically.</p> <p>Mathematical Content</p> <p>A-CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.</p> <p>A-CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales</p> <p>A-CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.</p>
Reading Standards for Literacy in Social Studies, Science and Technical Subjects	<p>9-10.RST.2. Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.</p>
<p>Next Generation Science Standards</p> <p><i>To be updated through additional curricular work with Code</i></p>	<p>ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.</p> <p>ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.</p> <p>ETS1-4 Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.</p>
Social Studies	<p>4.2.3 Analyze and evaluate how technology and ideas have shaped United States and/or world history</p> <p>5.1.1 Analyze consequences of positions on an issue or event.</p> <p>5.2.1 Create and uses research questions that are tied to an essential question to focus inquiry on an idea, issue, or event.</p> <p>5.2.2 Evaluate the validity, reliability, and credibility of sources when researching an issue or event.</p> <p>5.3.1 Evaluate one’s own viewpoint and the viewpoints of others in the context of a discussion.</p> <p>5.4.1 Evaluate multiple reasons or factors to develop a position paper or presentation.</p> <p>5.4.2 Create strategies to avoid plagiarism and respect intellectual property when developing a paper or presentation.</p>
Speaking & Listening	<p>9-10.SL.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively.</p>
Writing for History, Science and Technical Subjects	<p>9-10.WHST.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p>9-10.WHST.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>

UNIT 7 EMPHASIS: Societal Impacts of Computing

COMPONENTS AND ASSESSMENTS

Performance Assessment Examples:

Presentation/Project Rubrics (embedded in multiple)
 Website Element
 Programmed Game Element

Leadership Alignment Individual and Group Emphasis:

(Examples: Embedded in and woven throughout each unit with varying emphasis)
 Creativity and Innovation
 Critical Thinking and Problem Solving
 Information Literacy
 Media Literacy
 Information, Communication and Technology Literacy
 Flexibility and Adaptability
 Initiative and Self-Direction
 Social and Cross-Culture
 Productivity and Accountability
 Leadership and Responsibility

Standards and Competencies

ISTE-NETS STANDARDS

5a. Advocate and practice safe, legal, and responsible use of information and technology.
 5.b Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity
 5d. Exhibit leadership for digital citizenship

Competencies

Total Learning Hours for Unit: up to 20 hours

- Describe ways in which computing enables innovation.
- Discuss the ways in which innovations enabled by computing affect communication and problem solving.
- Analyze how computing influences and is influenced by the cultures for which they are designed and the cultures in which they are used.
- Analyze how social and economic values influence the design and development of computing innovations.
- Analyze the effects of computing on society within economic, social, and cultural contexts
- Discuss issues of equity, access, and power in the context of computing resources.
- Communicate legal and ethical concerns raised by computational innovation.
- Discuss privacy and security concerns related to computational innovations.
- Explain positive and negative effects of technological innovations on human culture.
- Identify and describe careers involving computing.

Aligned Washington State Core Standards (GLE Components and Anchor CCSS unless indicated otherwise)

Arts	N/A
Educational Technology	1.2.1 Communicate and collaborate to learn with others.
	1.3.2 Locate and organize information from a variety of sources and media.
	1.3.3 Analyze, synthesize and ethically use information to develop a solution, make informed decisions and report results.
	2.1.2 Practice ethical and respectful behavior.
	2.3.2 Select and use online applications.
	2.4.1 Formulate and synthesize new knowledge.

Health & Fitness	3.1.2 Analyze how environmental factors impact health. 3.1.3 Evaluate environmental risks associated with certain occupational, residential, and recreational choices
Language	9-10.L.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
Math	Mathematical Practice CCSS.MP.3 Construct viable arguments and critique the reasoning of others.
Reading Standards for Literacy in Social Studies, Science and Technical Subjects	9-10.RST.2. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
Next Generation Science Standards	N/A
Social Studies	4.2.3 Analyze and evaluate how technology and ideas have shaped United States and/or world history 5.1.1 Analyze consequences of positions on an issue or event. 5.2.1 Create and uses research questions that are tied to an essential question to focus inquiry on an idea, issue, or event. 5.2.2 Evaluate the validity, reliability, and credibility of sources when researching an issue or event. 5.3.1 Evaluate one's own viewpoint and the viewpoints of others in the context of a discussion. 5.4.1 Evaluate multiple reasons or factors to develop a position paper or presentation. 5.4.2 Create strategies to avoid plagiarism and respect intellectual property when developing a paper or presentation.
Speaking & Listening	9-10.SL.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. 9-10.SL.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source. 9-10.SL.3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence. 9-10.SL.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task. 9-10.SL.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
Writing for History, Science and Technical Subjects	9-10.WHST.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. 9-10.WHST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. 9-10.WHST.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. 9-10.WHST.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. 9-10.WHST.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

21st Century Skills

Check those that students will demonstrate in this course:

LEARNING & INNOVATION

Creativity and Innovation

- Think Creatively
- Work Creatively with Others
- Implement Innovations

Critical Thinking and Problem Solving

- Reason Effectively
- Use Systems Thinking
- Make Judgments and Decisions
- Solve Problems

Communication and Collaboration

- Communicate Clearly
- Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy

- Access and /evaluate Information
- Use and Manage Information

Media Literacy

- Analyze Media
- Create Media Products

Information, Communications and Technology (ICT Literacy)

- Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability

- Adapt to Change
- Be Flexible

Initiative and Self-Direction

- Manage Goals and Time
- Work Independently
- Be Self-Directed Learners

Social and Cross-Cultural

- Interact Effectively with Others
- Work Effectively in Diverse Teams

Productivity and Accountability

- Manage Projects
- Produce Results

Leadership and Responsibility

- Guide and Lead Others
- Be Responsible to Others