

# C++ Unit 3: Functions and Advanced Data Types

| ESTABLISHED GOALS:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| <p><u>Competencies:</u></p> <ul style="list-style-type: none"> <li>Students will demonstrate the ability to explain the process used to translate high level languages to low level languages in order to create executable images.</li> <li>Students will demonstrate the ability to analyze machine code to utilize its correct interpretation in order to solve a problem.</li> <li>Students will demonstrate the ability to analyze and summarize text and integrate knowledge to make meaning of discipline-specific materials.</li> <li>Students will demonstrate the ability to produce coherent and supported writing in order to communicate effectively for a range of discipline-specific tasks, purposes, and audiences.</li> <li>Students will demonstrate the ability to speak purposefully and effectively by strategically making decisions about content, language use, and discourse style.</li> </ul> <p><u>Content Standards:</u><br/>CSTA - Computer Science Teacher Association</p> <p>CSTA 3B-A-5-7: Decompose a problem by creating new data types, functions, or classes.</p> <p>CSTA 3B-A-5-8: Demonstrate code reuse by creating programming solutions using libraries and APIs (e.g. graphics libraries, maps API.)</p> <p>CSTA 3B-D-4-25: Discuss how data sequences (e.g. binary, hexadecimal, octal) can be interpreted in a variety of forms (e.g. instructions, numbers, text, sound, image.)</p> <p>CSTA 3B-A-7-3: Modify an existing program to add additional functionality and discuss intended and unintended implications (e.g. breaking other functionality.)</p> <p>CSTA 3B-A-4-12: Evaluate algorithms (e.g., sorting, searching) in terms of their efficiency, correctness, and clarity.</p> <p>CSTA 3B-A-6-21: Evaluate key qualities of a program (e.g. correctness, usability, readability, efficiency, portability, scalability) through a process such as a code review.</p> | Transfer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <div> <p>Students will know...</p> <ul style="list-style-type: none"> <li>that C++ uses memory addresses to access objects such as Strings.</li> <li>that C++ uses functions to create named sections of code; these sections of code may send and receive messages from other sections of code.</li> <li>that string variables contain an address that points to the string object.</li> </ul> <p><u>vocabulary:</u><br/>argument, function, getline function, length function, parameter, scope, string, value returning function</p> </div> <div> <p>Students will be skilled at...</p> <ul style="list-style-type: none"> <li>declaring and using memory addresses to access data objects.</li> <li>designing and writing functions that pass and/or receive messages to perform specific tasks.</li> <li>breaking down problems by creating new data types, functions, or classes.</li> <li>creating a program solution that shows code reuse.</li> <li>making changes to existing programs to improve functionality.</li> <li>discussing the intended and unintended implications of making changes to a program's functionality.</li> <li>explaining how data sequences can be interpreted.</li> <li>evaluating algorithms.</li> <li>evaluating key qualities of a program through a specific process.</li> </ul> </div> |
| Content Area Literacy Standards                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <p>RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text</p> <p>RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 21 <sup>st</sup> Century Skills                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <ul style="list-style-type: none"> <li>Make Judgements and Decisions</li> <li>Manage Goals and Time</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

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| technical context relevant to <i>grades 11-12 texts and topics</i> .<br>WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.<br>WHST.11-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. | <ul style="list-style-type: none"> <li>• <i>Be Self-directed Learners</i></li> <li>• <i>Solve Problems</i></li> </ul> |
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| <i>Evaluative Criteria</i> | <i>Assessment Evidence</i> |
|----------------------------|----------------------------|
|                            | PERFORMANCE TASK(S):       |
|                            | OTHER EVIDENCE:            |

| <i>Summary of Key Learning Events and Instruction</i>          |  |                                                                |  |
|----------------------------------------------------------------|--|----------------------------------------------------------------|--|
| <i>Language Arts Integration</i>                               |  | <i>Mathematics Integration</i>                                 |  |
| <ul style="list-style-type: none"> <li>• 1.OA.1 Use</li> </ul> |  | <ul style="list-style-type: none"> <li>• 1.OA.1 Use</li> </ul> |  |
| <i>Technology Integration</i>                                  |  | <i>District Materials</i>                                      |  |
| <ul style="list-style-type: none"> <li>• 1.OA.1 Use</li> </ul> |  |                                                                |  |