

## BIG IDEAS

Decomposition and abstraction improve our ability to understand and solve problems.

Algorithms describe the process of solving computational problems.

Programming is a tool that allows us to implement computational thinking.

Data representation allows us to understand and efficiently solve problems.

## Learning Standards

Curricular Competencies	Content
<p><i>Students are expected to do the following:</i></p> <p><b>Reasoning and analyzing</b></p> <ul style="list-style-type: none"> <li>Use <b>reasoning and logic</b> to analyze and apply mathematical ideas</li> <li><b>Estimate</b> algorithmic correctness</li> <li>Demonstrate <b>fluent and flexible thinking</b></li> <li>Use <b>tools</b> or technology to analyze relationships and test conjectures</li> <li><b>Model</b> mathematics in contextualized experiences</li> </ul> <p><b>Understanding and solving</b></p> <ul style="list-style-type: none"> <li>Develop, demonstrate, and apply <b>conceptual understanding</b> of mathematical ideas</li> <li><b>Visualize</b> to explore and illustrate mathematical concepts and relationships</li> <li>Apply <b>flexible strategies</b> to solve problems in both abstract and contextualized situations</li> <li>Engage in problem-solving experiences that are connected to place, story, cultural <b>practices</b>, and perspectives relevant to First Peoples communities, the local community, and other cultures</li> </ul> <p><b>Communicating and representing</b></p> <ul style="list-style-type: none"> <li>Communicate mathematical thinking in <b>many ways</b></li> <li>Use mathematical and computer science vocabulary and language to contribute to <b>discussions</b></li> <li><b>Represent</b> mathematical ideas in a variety of ways</li> <li>Explain and justify mathematical and computational ideas</li> </ul>	<p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none"> <li><b>ways</b> to access variables in memory</li> <li>ways in which <b>data structures</b> are organized in memory</li> <li><b>uses</b> of multidimensional arrays</li> <li><b>algorithms</b>, including sorting and searching</li> <li>performance <b>analysis</b> by Big-O notation</li> <li><b>recursive problem solving</b></li> <li><b>persistent memory</b></li> <li><b>encapsulation</b> of data</li> <li>ways to model <b>mathematical problems</b></li> </ul>

Learning Standards (continued)

Curricular Competencies	Content
<p><b>Connecting and reflecting</b></p> <ul style="list-style-type: none"> <li>• <b>Reflect</b> on mathematical and computational thinking</li> <li>• Use mathematics and computer science to support personal choices</li> <li>• Connect mathematical and computer science concepts to each other and to <b>other areas and personal interests</b></li> <li>• <b>Incorporate</b> First Peoples worldviews and perspectives to make connections to computer science concepts</li> </ul>	

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