**Area of Learning: MATHEMATICS — Computer Science Grade 12**

**BIG IDEAS**

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| Decomposition and **abstraction** help us to solve difficult problems by managing complexity. |  | **Algorithms** are essential in solving problems computationally. |  | Programming is a tool that allows us to implement **computational thinking**. |  | **Solving problems** is a creative process. |  | **Data representation** allows us to understand and solve problems efficiently. |

**Learning Standards**

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| **Curricular Competencies** | **Content** |
| *Students are expected to do the following:*Reasoning and modelling* Develop **fluent, flexible, and strategic thinking** to analyze and create algorithms
* Explore, **analyze**, and apply mathematical ideas and computer science concepts using **reason**, **technology,** and **other tools**
* **Model** with mathematics in **situational contexts**
* **Think** **creatively** and with **curiosity** **and wonder** when exploring problems

Understanding and solving* Develop, demonstrate, and apply conceptual understanding through experimentation, **inquiry**, and problem solving
* **Visualize** to explore and illustrate computer science concepts and relationships
* Apply **flexible and strategic approaches** to **solve problems**
* Solve problems with **persistence and a positive disposition**
* Engage in problem-solvingexperiences **connected** with place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures
 | *Students are expected to know the following:** **access variables** in memory
* ways in which **data structures** are organized in memory
* **uses** of multidimensionalarrays
* classical algorithms,including **sorting and searching**
* use of Big-O notation to help predict run-time **performance**
* **recursive problem solving**
* **persistent memory**
* **encapsulation** of data
* ways to **model mathematical problems**
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**Area of Learning: MATHEMATICS — Computer Science Grade 12**

**Learning Standards (continued)**

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| **Curricular Competencies** | **Content** |
| Communicating and representing* **Explain and justify** computer science ideas and **decisions** in **many ways**
* **Represent** computer science ideas in concrete, pictorial, and symbolic forms
* Use computer science and mathematical vocabulary and language to contribute to **discussions** in the classroom
* Take riskswhen offering ideas in classroom **discourse**

Connecting and reflecting* **Reflect** on mathematical and computational thinking
* **Connect mathematical and computer science concepts** with each other, other areas, and personal interests
* Use **mistakes** as **opportunities to advance learning**
* **Incorporate** First Peoples worldviews, perspectives, **knowledge**, and **practices** to make connections with computer science concepts
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