Western Engineering Scratch in Space

Below is a list of connections between Western Engineering Scratch in Space lessons and the Ontario STEM Curriculum.

Grade 6-8

Time required: 2 – 45 mins periods

Ontario Science and Technology Curriculum

Grade 6

- *Space*
  - Use a variety of forms to communicate with different audiences for a variety of purposes.
  - Identify components of the solar system, including the sun, the earth, and other planets, natural satellites, comets, asteroids, and meteoroids, and describe their physical characteristics in qualitative terms
  - **Related Activity Extension:** Have students do a research project in order to fill in the Planet facts section of the Scratch program.

Grade 7

- *Interactions in the Environment*
  - **Related Activity Extension:** Have students code a similar Scratch program with parts of an ecosystem. Have students design and a label an ecosystem diagram that they can code.

Grade 8

- *Cells*
  - **Related Activity Extension:** Have students code a similar Scratch program with parts of the cell. Have students design and label a cell diagram that they can code
- *Systems in Action*
  - Use technological problem-solving skills to investigate a system that performs a function or meets a need.
  - Investigate a working system and the ways in which components of the system contribute to its desired function.
  - Demonstrate an understanding of different types of systems and the factors that contribute to their safe and efficient operation.

Ontario Mathematics Curriculum

All Grades

- *The Four-Step Problem-Solving Model*
  - During the Engineering Design process to help students visualize George Polya's four-step model: understand the problem; make a plan; carry out the plan; and look back to check the results.

Grade 6

- *Number Sense and Numeracy*
  - Read, represent, compare, and order whole numbers to 1 000 000, decimal numbers to thousandths, proper and improper fractions, and mixed numbers;
  - Solve problems involving the multiplication and division of whole numbers, and the addition and subtraction of decimal numbers to thousandths, using a variety of strategies.
  - Represent ratios found in real-life contexts, using concrete materials, drawings, and standard fractional notation
  - **Related Activity Extension:** Have students calculate the comparative size of Earth to all the other planets. Have students calculate the comparative sizes of all planets.
- *Patterning and Algebra*
  - Use variables in simple algebraic expressions and equations to describe relationships.
  - Demonstrate an understanding of different ways in which variables are used.
- *Coding Skills*
  - Solve problems and create computational representations of mathematical situations by writing and executing efficient code, including code that involves conditional statements and other control structures
  - Read and alter existing code, including code that involves conditional statements and other control structures, and describe how changes to the code affect the outcomes and the efficiency of the code.

Grade 7

- *Number Sense and Numeracy*
  - Represent, compare, and order numbers, including integers
  - Identify and compare integers found in real-life contexts.
  - Demonstrate an understanding of proportional relationships using percent, ratio, and rate.
- *Patterning and Algebra*
  - Represent linear growing patterns (where the terms are whole numbers) using concrete materials, graphs, and algebraic expressions;
  - Model real-life linear relationships graphically and algebraically, and solve simple algebraic equations using a variety of strategies, including inspection and guess and check.
- *Coding Skills*
  - Solve problems and create computational representations of mathematical situations by writing and executing efficient code, including code that involves events influenced by a defined count and/or sub program and other control structures
  - Read and alter existing code, including code that involves events influenced by a defined count and/or sub program and other control structures, and describe how changes to the code affect the outcomes and the efficiency of the code.

Grade 8

- *Number Sense and Numeracy*
  - Solve problems involving whole numbers, decimal numbers, fractions, and integers, using a variety of computational strategies.
  - Identify and describe real-life situations involving two quantities that are directly proportional.
- *Patterning and Algebra*
  - Represent linear growing patterns (where the terms are whole numbers) using graphs algebraic expressions, and equations

    - Model linear relationships graphically and algebraically, and solve and verify algebraic equations, using a variety of strategies, including inspection, guess and check, and using a “balance” model.
- *Coding Skills*
    - Solve problems and create computational representations of mathematical situations by writing and executing efficient code, including code that involves the analysis of data in order to inform and communicate decisions
    - Read and alter existing code, including code that involves the analysis of data in order to inform and communicate decisions and describe how changes to the code affect the outcomes and the efficiency of the code.