IGNITEMYFUTURE

CURRICULUM CONNECTOR | MATHEMATICS

Computational thinking goes beyond computers

Computational thinking teaches students to apply strategies that computers use to solve real-world problems. The seven computational thinking strategies equip students with valuable problem-solving skills such as analyzing data in order to make inferences and breaking a problem down into manageable pieces. As a math educator, you know that these skills overlap with CCSS math practices. These engaging and fun standards-aligned resources give you the tools to integrate computational thinking into your math classroom.

Computational thinking strategies:

Collecting data—in order to solve a problem, you need to find the right information

Canadian Space Agency

Collecting quantitative data about a phenomenon allows for mathematical problem solving. The Canadian Space Agency hosts a project called "Throw your own asteroids to see how craters form" that studies how craters on Earth change over time. Using measurements and angle data, students can use geometry and algebraic methods to determine volume of erosion and infill of craters over time. Other applications include lessons about diameter and radius of a circle, as well as dimensions and angles.

Analyze data—interpret data to find relationships, identify trends and predict outcomes

Create a Graph using Statistics Canada

Producing charts and graphs helps mathematicians look for patterns and come up with various solutions to a problem when looking at a lot of information. Statistics Canada hosts a web page that allows users to create a variety of graphs based on collected government data.

Decompose—solve a complicated problem by breaking it into smaller pieces

Thinking Mathematically

Breaking down information within the text of a mathematics word problem is key to finding a solution. Students decompose math riddles into smaller tasks on the way to solving the larger problem. These challenges are good for a variety of ages and mathematical concepts. Additional links provides suggestions for starter riddles, how to use riddles in school, a blog discussion.

Find Patterns—identify themes and connections in order to simplify problems

Find the pattern (University of Waterloo)

Finding patterns is easier when we look for them using mathematical rules. This is true of various real-world applications. This package of activities from the University of Waterloo tests students' problem solving and knowledge with ready to go activities to encourage pattern thinking.

Find more easy-to-implement resources to integrate computational thinking practices into your classroom by visiting **ignitemyfutureinschool.ca**

Abstract—remove details to see the big picture

Youth Engagement in STEM

Using an abstract concept to solve a new problem is the domain of invention. The website of Engineers Canada contains a page dedicated to how youth can engage with the profession through STEM thinking and problem solving. Students see how abstract ideas in mathematics and science are applied to real-world problems. The site makes connections between math, science, engineering and technology.

Build models—test, experiment and simulate to fix errors

Government of Canada Mathematical Modelling

Visualizations and simulations of mathematical models allow students to experiment, find and fix errors, and simulate real-life events using mathematics. The government of Canada's website on mathematical modelling and COVID 19 allows teachers and students to learn more about how math can be used to locate, trace, predict and control infectious diseases in Canada using the example of COVID 19.

Develop algorithms—step-by-step instructions on how to perform a task

The Sound of Sorting—Sorting Algorithms

Mathematical tasks such as sorting by some value are often made more efficient using an algorithm. In the Sound of Sorting—Sorting Algorithms, a program made in Scratch by MIT, a visual and audio representation demonstrates computer processes for sorting information. Multiple algorithms are shown. Students can infer the rules and sequence of steps being used for each algorithm, then click on "See Inside" to see the block coding behind the representation. Students can develop their own algorithm for sorting sounds and represent it visually and with sound, or can apply algorithmic thinking more broadly to develop a program in Scratch for math curricula currently under study, such as operations with fractions or percents, or solving for variables in functions or equations.