IGNITEMYFUTURE

Computational thinking helps students explore the world

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 science educator, you know that these skills overlap with the practices of scientists and engineers. These engaging and fun standards-aligned resources give you the tools to integrate computational thinking into your science classroom.

Computational thinking strategies:

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

Collecting data starts with understanding the question or the problem to be solved and determining what data will be relevant and needed to answer the question or solve the problem. The Great Lakes water levels and related data archive collects data about the conditions of the lakes throughout the year. Scientists want to know if rising and falling tides affect the surface currents, water conditions, and ecosystems in the Great Lakes and if the weather changes the air quality in the areas bordering the lakes. You can use their data gathering instruments to collect data.

Analyze data—interpret data to find relationships, identify trends and predict outcomes
The Canadian Museum of Science and Technology

Data analysis is a foundational skill. Computers analyze data by building models, constructing visual representations and testing hypotheses. The Canadian Museum of Science and Technology website was created for students, teachers and families to learn about Canada's history of science, technology and innovation.

Decompose—solve a complicated problem by breaking it into smaller pieces
The Canadian Space Agency

Students can identify ways that The Canadian Space Agency decomposes the problem of space travel and exploration as they read through the various sections and activities. Explore more details of the mission and how it engages students and teachers throughout the country to promote the spirit of innovation and exploration.

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

Finding patterns allows us to make predictions and forecasts. Environment Canada is a government agency dedicated to demonstrating how forecast models are developed and used. The page describes how local, regional, national and global patterns are analyzed to make predictions about temperature and related weather in order to solve or prevent problems for society. It also explores the challenges of turning patterns into rules for accurate prediction, and the resulting ongoing changes to forecast models. Students can analyze patterns in weather data in their region in order to predict weather events such as blizzards or droughts.

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

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Abstract—remove details to see the big picture
Canadian Innovation Space

The computational skill of abstraction teaches students how to reduce complexity in order to make one solution applicable to many different problems. Canadian Innovation Space seeks to provide educational resources to teachers, students and communities to help understand innovation and enable it in children and youth in a school setting.

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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.

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

Students might not realize it, but they rely on algorithms every day. Algorithms form the basis of video games, GPS navigation, search engines and more. CanCode Canada initiatives offers a list of all government funded computer science programs and resources that are geared towards educators and students across the nation. Teach your students about algorithms by adding these searching, sorting and routing processes to your program.