Making Connections

Energy

Computer Science

grade 3

Organizing Idea	**Computer Science: Problem solving and scientific inquiry are developed through the knowledgeable application of creativity, design, and computational thinking.**
Guiding Question	**How does creativity contribute to computational thinking?**
Learning Outcome	**Students investigate creativity and its relationship to computational thinking.**

Knowledge	Understanding	Skills & Procedures
Computational thinking includes ● breaking a task into smaller chunks ● finding patterns and similarities in tasks ● identifying the important details when reading or solving a problem ● designing instructions ● working backward if a mistake is made Computational thinking can be used by humans to communicate with computers more efficiently; e.g., apps, virtual reality, and robotics.	Computational thinking is a problem-solving process that uses creativity.	Create a set of instructions that could be followed by a human or a machine to complete a task. Identify computational thinking used to solve problems or achieve desired outcomes.

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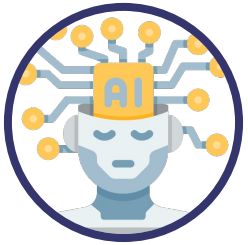
The same outcome, such as arriving at school, can be achieved in different ways. Divergent thinking is the process of generating multiple unique ideas or solutions. Creativity is an important part of computer science, technology, and engineering; e.g., computer programming, robotics. Creativity involves combining, changing, or reapplying existing ideas to produce something new. Canadians are responsible for many creative inventions, such as the Canadarm.	Creativity involves divergent thinking and can be used to develop different ways to achieve the same outcome. Creativity involves imagination, observation, and making connections.	Collaborate to write two different sets of instructions that achieve the same outcome. Relate creativity to engineering, computing, and the development of new technologies. Create something new by combining, changing, or reapplying existing ideas. Examine a Canadian invention. Identify examples of creativity in computer science, technology, or engineering.

Computational Thinking

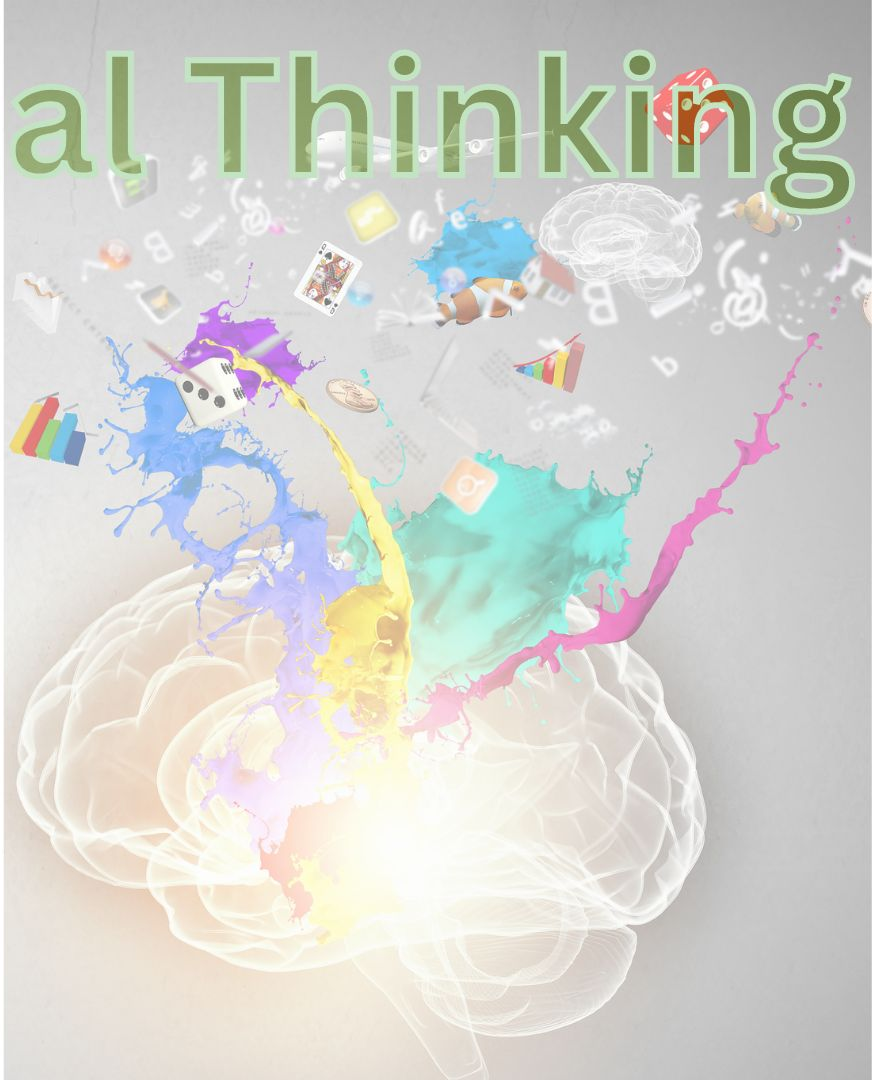


Decomposition

Pattern Recognition

Pattern Abstraction

Algorithm Design



Design Thinking Process

Learn About
Your Audience

Empathize

Define

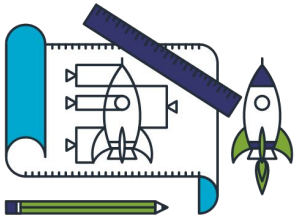
Construct Point
of View Based
on User Needs

Brainstorm and
Come up with
Creative Solutions

Ideate

Prototype

Build
Representation
of Your Ideas



Test Your Ideas

Test

Creativity

Finding different ways to reach the same outcome.

Problem solving to overcome obstacles to achieve a desired outcome.

Organizing Idea	**Energy: Understandings of the physical world are deepened by investigating matter and energy.**
Guiding Question	**How can forces relate to changes in movement?**
Learning Outcome	**Students investigate and explain how forces affect the movement of objects.of objects, humans, and other animals.**

Skills & Procedures

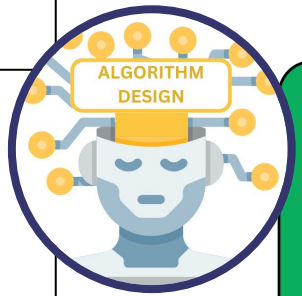
Describe where forces may exist in everyday situations.

Describe the strength and direction of forces applied to objects.

Compare the strength of forces applied to objects.

Predict how an object will be affected by different strengths and directions of force.

Conduct investigations to demonstrate the effects of forces on the movement of objects.



Sort the cards by whether they involve the forces of push or pull.

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Create a set of instructions that could be followed by a human or a machine to complete a task.

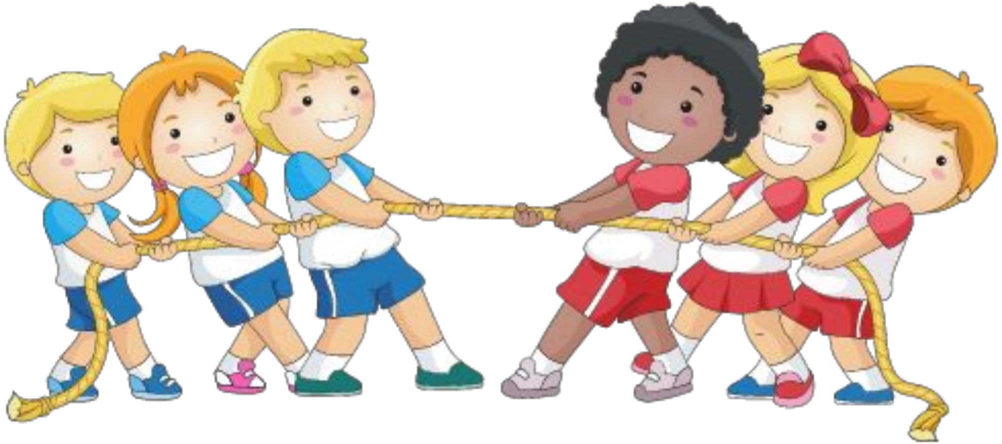
SKILLS & PROCEDURES

Create something new by combining, changing, or reapplying existing ideas.

SKILLS & PROCEDURES

Create a set of instructions for how to play tug of war.

Create a set of instructions for how to WIN tug of war.



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Skills & Procedures

Conduct investigations to demonstrate how forces can change the shape or size of objects.

Explore how simple machines reduce the effort needed to move objects.

Design a device that uses simple machines.

Safely work with tools, materials, and equipment.

Describe the purpose of simple machines used by local First Nations, Métis, and Inuit.

Have you heard of the Canadarm?
Do you know how important it is?

Examine a Canadian invention.

SKILLS & PROCEDURES

Identify computational thinking used to solve problems or achieve desired outcomes.

SKILLS & PROCEDURES

Identify examples of creativity in computer science, technology, or engineering.

SKILLS & PROCEDURES

Relate creativity to engineering, computing, and the development of new technologies.

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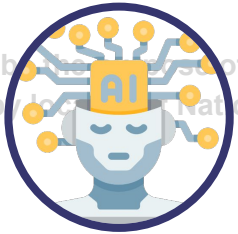

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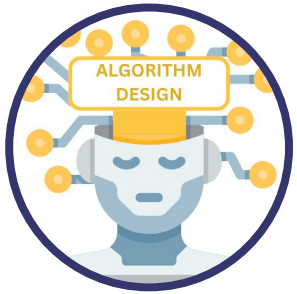

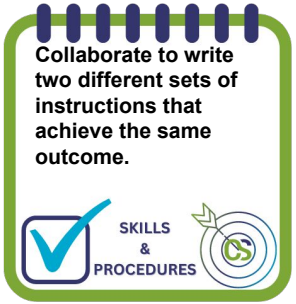

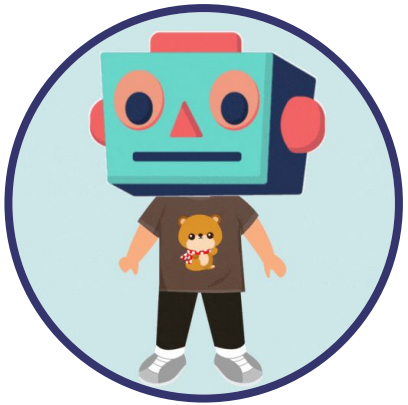

Can you write a set of instructions for the experiment we are doing today/did yesterday/etc?

Work with a partner to figure out 2 different ways to test our machines?

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What do you think it would have been like to only use these simple machines?

What do you think we have today that came from these simple machines?