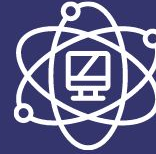


# Making Connections



Earth  
Systems



Computer  
Science



grade 4

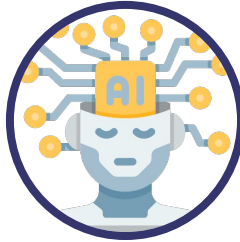
<b>Organizing Idea</b>	<b>Computer Science: Problem solving and scientific inquiry are developed through the knowledgeable application of creativity, design, and computational thinking.</b>
<b>Guiding Question</b>	<b>How can design meet needs?</b>
<b>Learning Outcome</b>	<b>Students examine and apply design processes to meet needs.</b>

<b>Knowledge</b>	<b>Understanding</b>	<b>Skills &amp; Procedures</b>
<p>Design processes include</p> <ul style="list-style-type: none"> <li>• understanding the problem</li> <li>• forming ideas (ideating)</li> <li>• planning</li> <li>• creating</li> <li>• analyzing</li> <li>• testing</li> <li>• troubleshooting</li> </ul> <p>Feedback helps to ensure all needs are considered during the design process.</p> <p>An algorithm is a sequence of instructions.</p> <p>Artifacts are objects or products made by humans, machines, or computers through the process of design.</p>	<p>Design involves processes that can transform ideas into artifacts that meet needs.</p>	<p>Plan and create an artifact to meet a need.</p> <p>Provide feedback to others during the design process.</p> <p>Test an artifact to confirm that it meets intended needs.</p> <p>Collaborate to design an algorithm to solve a problem.</p> <p>.Examine availability and cost of materials during design.</p>

<b>Organizing Idea</b>	<b>Computer Science: Problem solving and scientific inquiry are developed through the knowledgeable application of creativity, design, and computational thinking.</b>	
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<b>Knowledge</b>	<b>Understanding</b>	<b>Skills &amp; Procedures</b>
<p>Design can produce many artifacts, including</p> <ul style="list-style-type: none"> <li>• algorithms</li> <li>• models</li> <li>• prototypes</li> <li>• blueprints</li> <li>• programs</li> <li>• experiments</li> <li>• objects</li> </ul> <p>Design can deal with complex problems.</p> <p>Availability of materials and costs are considerations in design.</p>	<p>Design involves processes that can transform ideas into artifacts that meet needs.</p>	<p>Plan and create an artifact to meet a need.</p> <p>Provide feedback to others during the design process.</p> <p>Test an artifact to confirm that it meets intended needs.</p> <p>Collaborate to design an algorithm to solve a problem.</p> <p>Examine availability and cost of materials during design.</p>

# Computational Thinking

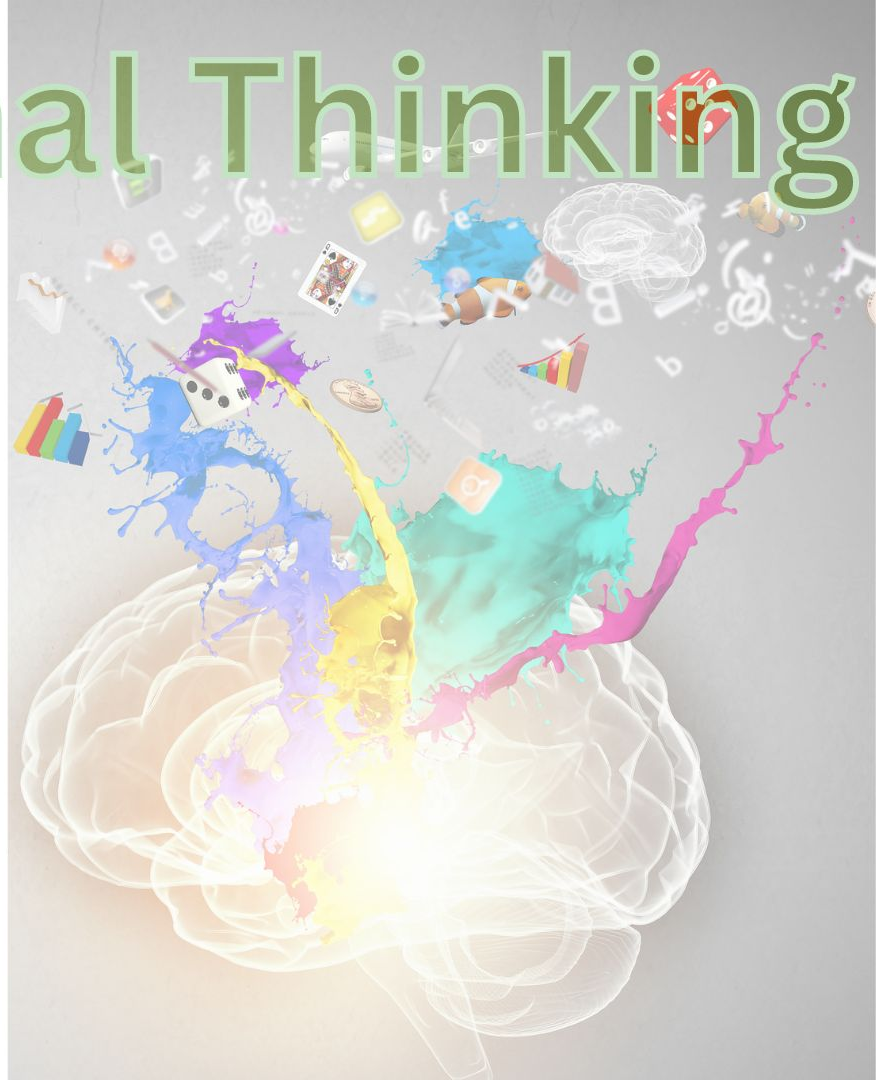
Decomposition



Pattern Recognition

Pattern Abstraction

Algorithm Design



# Design Thinking Process



*Learn About  
Your Audience*



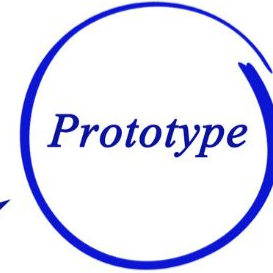
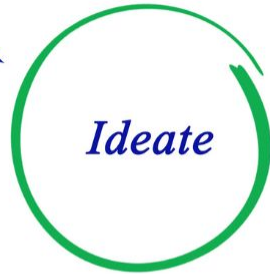
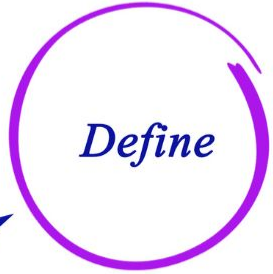
*Brainstorm and  
Come up with  
Creative Solutions*



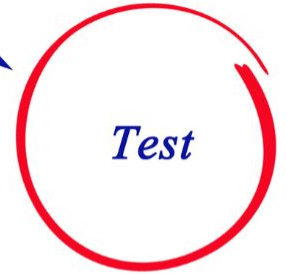
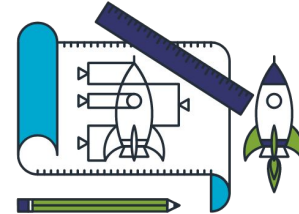
*Test Your Ideas*



*Construct Point  
of View Based  
on User Needs*



*Build  
Representation  
of Your Ideas*



# Creativity

Finding different ways to reach the same outcome.

Problem solving to overcome obstacles to achieve a desired outcome.



Organizing Idea	Earth Systems: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.
Guiding Question	How does Earth sustain life?
Learning Outcome	Students investigate the systems of Earth and reflect on how their interconnections sustain life.

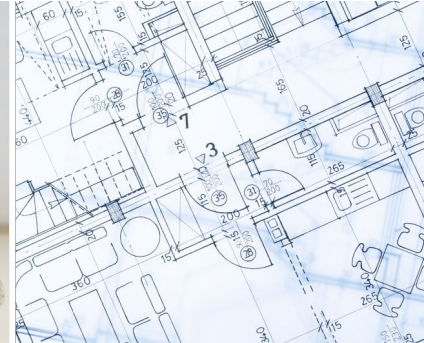
## CS KNOWLEDGE

Design can produce many artifacts,

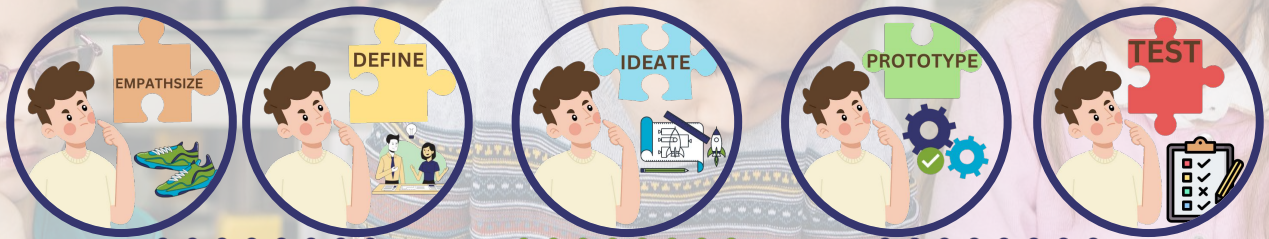
- including
- algorithms
- models
- prototypes
- blueprints
- programs
- experiments
- objects



Plan and create an artifact to meet a need.



Organizing Idea	Earth Systems: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.
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**Plan and create an artifact to meet a need.**

✓ SKILLS & PROCEDURES

**Provide feedback to others during the design process.**

✓ SKILLS & PROCEDURES

**Test an artifact to confirm that it meets intended needs.**

✓ SKILLS & PROCEDURES

**UNDERSTANDING**  
Design involves processes that can transform ideas into artifacts that meet needs.

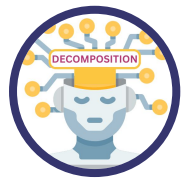
<b>Organizing Idea</b>	<b>Earth Systems:</b> Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.
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**Skills & Procedures**

**Make connections between human activity and Earth's systems.**

**Analyze the interconnectedness of Earth's systems.**

**Explain how changes in one system can have impacts on other systems.**



**Breaking the atmosphere down into its parts.  
Breaking each system down into its attributes.**



**Identify patterns in temperature changes, air pressure and composition across the layers.**



**Determine which human activities contribute to changes in Earth's systems.  
Simplify the atmospheric process through models.**



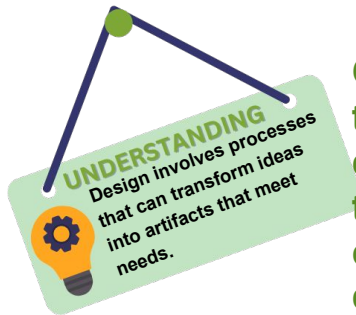
**Create instructions or rules for interactions between the different layers and humans.**

<b>Organizing Idea</b>	Earth Systems: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.
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**Skills & Procedures**

Describe the importance of the amount of sunlight and warmth on a variety of organisms.

What do you think it's like to live somewhere that doesn't get snow?

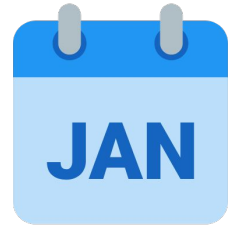
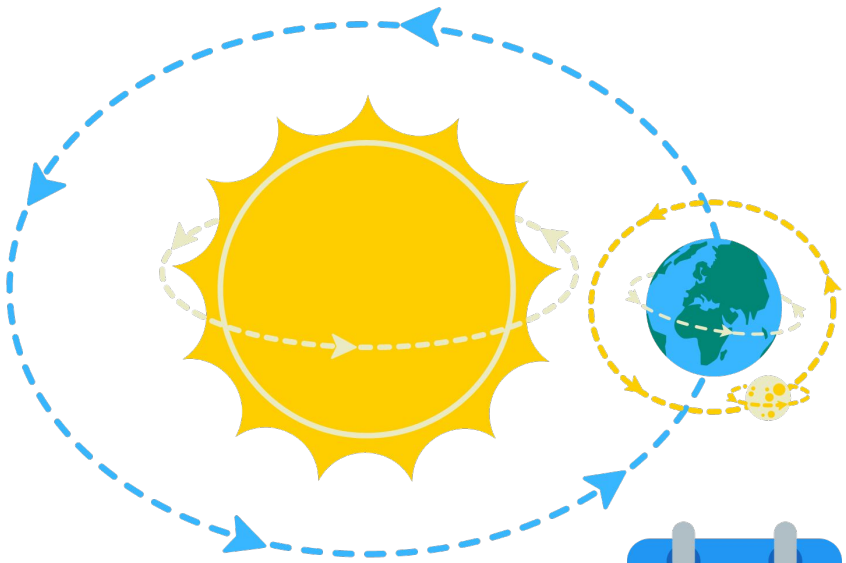


Create a model that demonstrates temperature changes over a day/year



Why do different parts of the world have different plants and animals?

How does where you live on Earth change the types of clothing you wear?



<b>Organizing Idea</b>	Earth Systems: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.
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**Skills & Procedures**

Discuss ways that plants and animals use water to meet their basic needs.

Identify plants and animals that exist in various bodies of water.

Demonstrate respect for water in the local environment.

Discuss the importance of water to First Nations, Métis, and Inuit.

**DECOMPOSITION**

**PATTERN RECOGNITION**

**PATTERN ABSTRACTION**

**ALGORITHM DESIGN**


**EMPATHIZE**

**DEFINE**

**IDEATE**

**Write a set of instructions for how to demonstrate respect for water in our local environment.**

**Collaborate to design an algorithm to solve a problem.**



SKILLS & PROCEDURES



Organizing Idea	Earth Systems: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.
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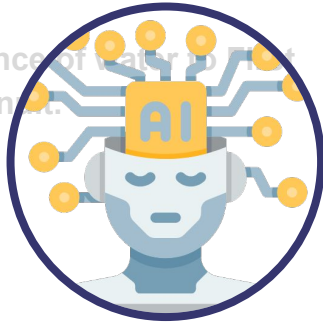
### Skills & Procedures

Discuss ways that plants and animals use water to meet their basic needs.

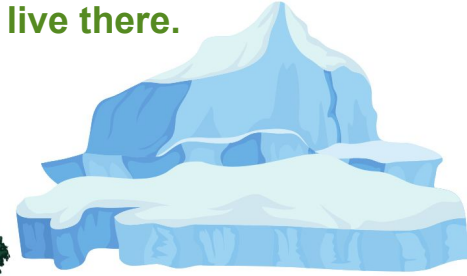
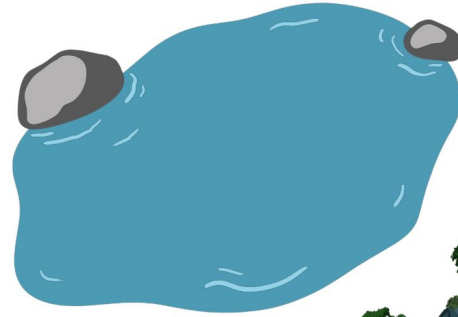
Identify plants and animals that exist in various bodies of water.

Demonstrate respect for water in the local environment.

Discuss the importance of water to First Nations, Métis, and Inuit.



Create a model of a water ecosystem including animals and plants that live there.



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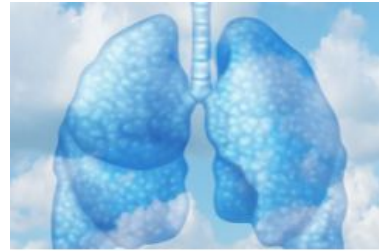
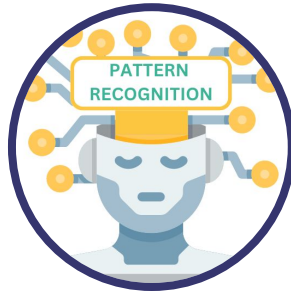
### Skills & Procedures

Investigate natural resources found in Alberta and how they are used to meet human needs.



Examine availability and cost of materials during design.

SKILLS & PROCEDURES



<b>Organizing Idea</b>	<b>Earth Systems:</b> Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.
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**Skills & Procedures**

**Investigate conservation practices in natural and human-made areas.**

**Discuss the interconnectedness between human use of parks and conservation practices.**

**Explain how changes in one system can have impacts on other systems.**

**Discuss the importance of governments, conservation groups, and First Nations, Métis, and Inuit communities working alongside Parks Canada.**

**DECOMPOSITION**

**PATTERN RECOGNITION**

**PATTERN ABSTRACTION**

**ALGORITHM DESIGN**

**CONNECTIONS**

**EMPATHIZE**

**DEFINE**

**IDEATE**

**SKILLS & PROCEDURES**

**ENVIRONMENTAL EFFECTS OF AGRICULTURE**

<b>Organizing Idea</b>	<b>Earth Systems: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.</b>
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<b>Learning Outcome</b>	<b>Students investigate the systems of Earth and reflect on how their interconnections sustain life.</b>

### Skills & Procedures

**Describe examples of personal actions that contribute to conservation in daily life.**

**Create a plan to implement a conservation practice in a local community.**



## REDUCE YOUR CARBON FOOTPRINT

**SMALL ACTIONS, BIG IMPACT!**

**Energy-Efficient Lifestyle:**

- Unplug electronics when not in use.
- Adjust your thermostat to conserve energy.
- Opt for energy-saving appliances and LED lights.
- Use natural light and open windows for ventilation.

**Sustainable Transportation:**

- Walk or bike for short distances.
- Combine multiple errands into one trip.
- Opt for fuel-efficient vehicles or electric cars.
- Choose public transportation, carpooling, or biking.

**Smart Energy Consumption:**

- Switch to renewable energy providers.
- Use energy-efficient insulation in your home.
- Minimize air conditioning and heating usage.
- Harness solar energy with rooftop solar panels.

**Reduce, Reuse, Recycle:**

- Cut down on single-use plastics.
- Recycle paper, plastic, glass, and aluminum.
- Compost food waste and use it for gardening.
- Embrace reusable bags, bottles, and containers.

**Water Conservation:**

- Collect rainwater for watering gardens.
- Fix leaks and dripping faucets promptly.
- Water plants efficiently, avoiding excessive irrigation.
- Take shorter showers and install water-saving devices.

**Conscious Consumerism:**

- Choose eco-friendly and sustainable products.
- Prioritize quality over quantity when purchasing items.
- Repair and repurpose items instead of discarding them.
- Support companies with transparent and ethical practices.

**Sustainable Food Choices:**

- Support sustainable farming practices.
- Opt for locally sourced, organic produce.
- Reduce meat consumption and try plant-based meals.
- Minimize food waste through mindful shopping and meal planning.

DESIGN THINKING BRAINSTORM LOG

understand your users needs

EMPATHIZE:	DEFINE:
IDEATE:	PROTOTYPE:
TEST:	

Develop a bunch of awesome ideas! Nothing is too crazy!

return to your users for feedback