Teaching New Science Curriculum

Active, Transdisciplinary and Fun!

Part 1 *What's new in the Science?*

Part 2 *What resources will support us to design for learning?*

Part 3 *How might we make connections with other subjects?*

Calgary Regional Consortium

Link to slides:
https://bit.ly/G2-3science

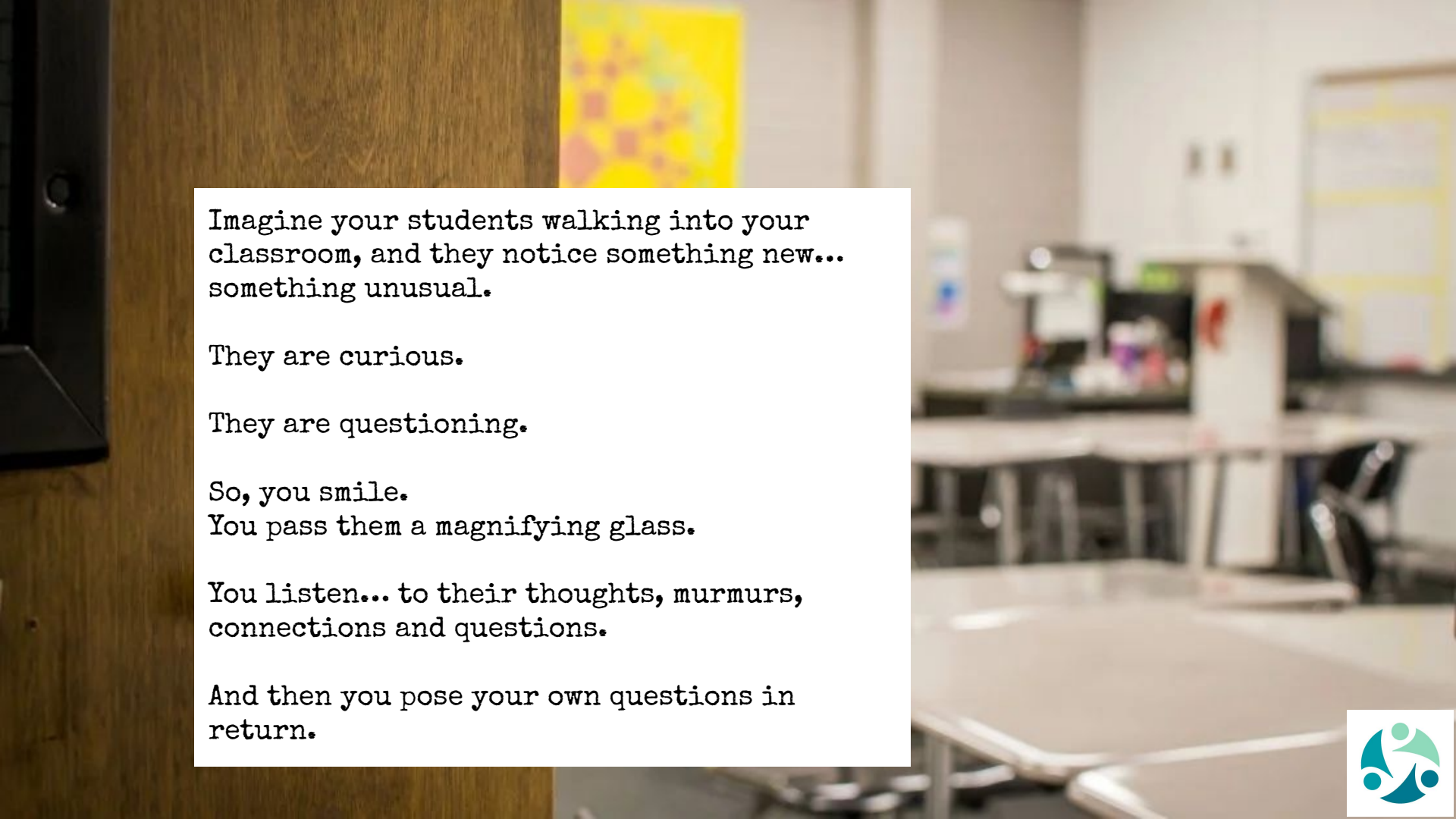
pd Alberta Regional Consortia

“If citizenship is a matter of shared beliefs, then I believe in the democracy of species.

If citizenship means an oath of loyalty to a leader,
then I choose the leader of the trees.

If good citizens agree to uphold the laws of the nation,
then I choose natural law,
the law of reciprocity,
of regeneration,
of mutual flourishing.”

Robin Wall Kimmerer
Author of Braiding Sweetgrass



Imagine your students walking into your classroom, and they notice something new... something unusual.

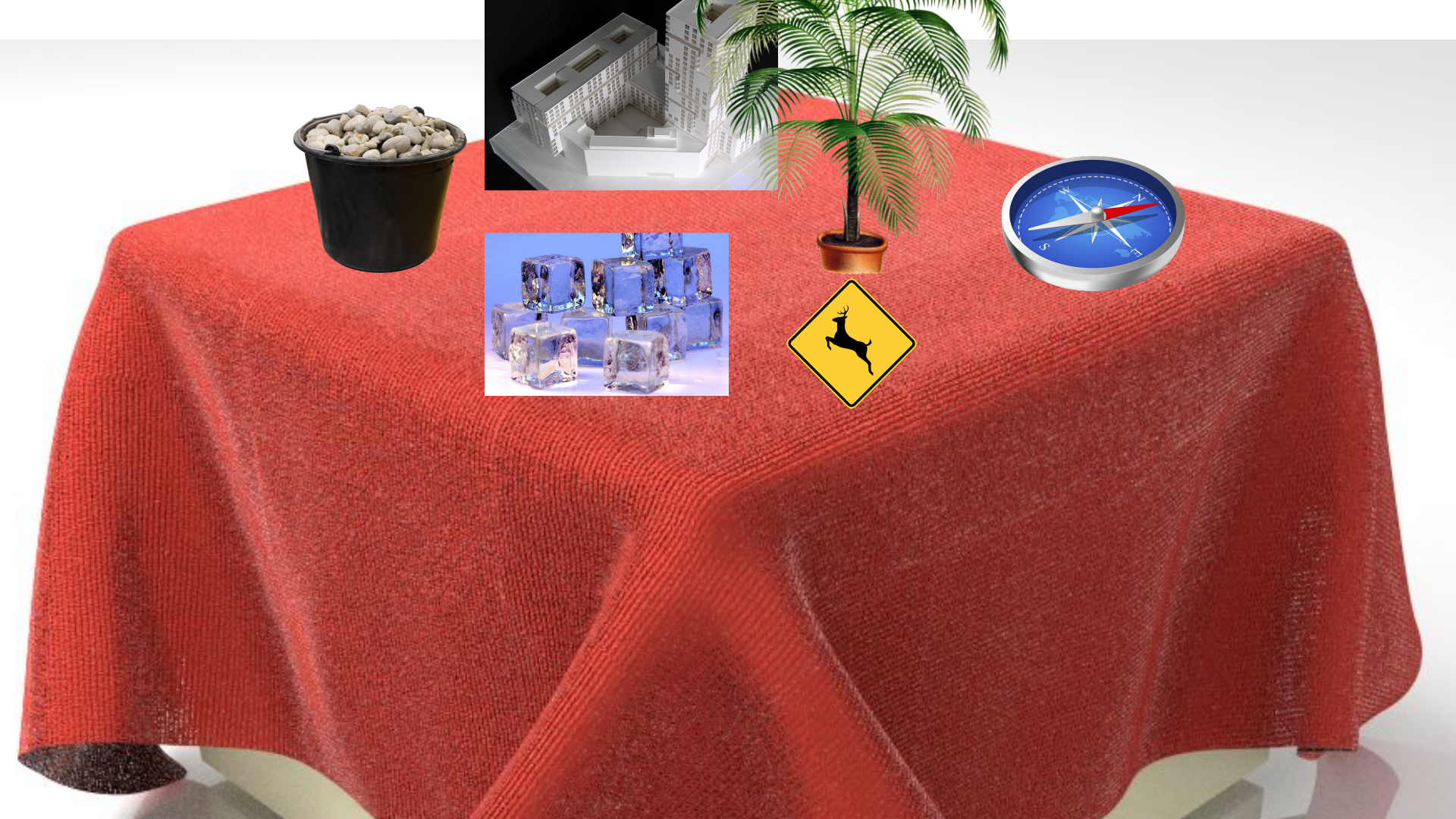
They are curious.

They are questioning.

So, you smile.
You pass them a magnifying glass.

You listen... to their thoughts, murmurs, connections and questions.

And then you pose your own questions in return.



The Art of Looking Closely

Looking at Objects or Artifacts

Describe the object's PHYSICAL FEATURES
What colour is it? What is it made of? Is it a natural or manufactured material? Is the object complete? Has it been mended or changed? Is it worn? Might it have a smell? Would it make a sound?

How was it made or CONSTRUCTED?
Was it handmade or machine made? Is it made from several pieces? If so, how was it fixed together?

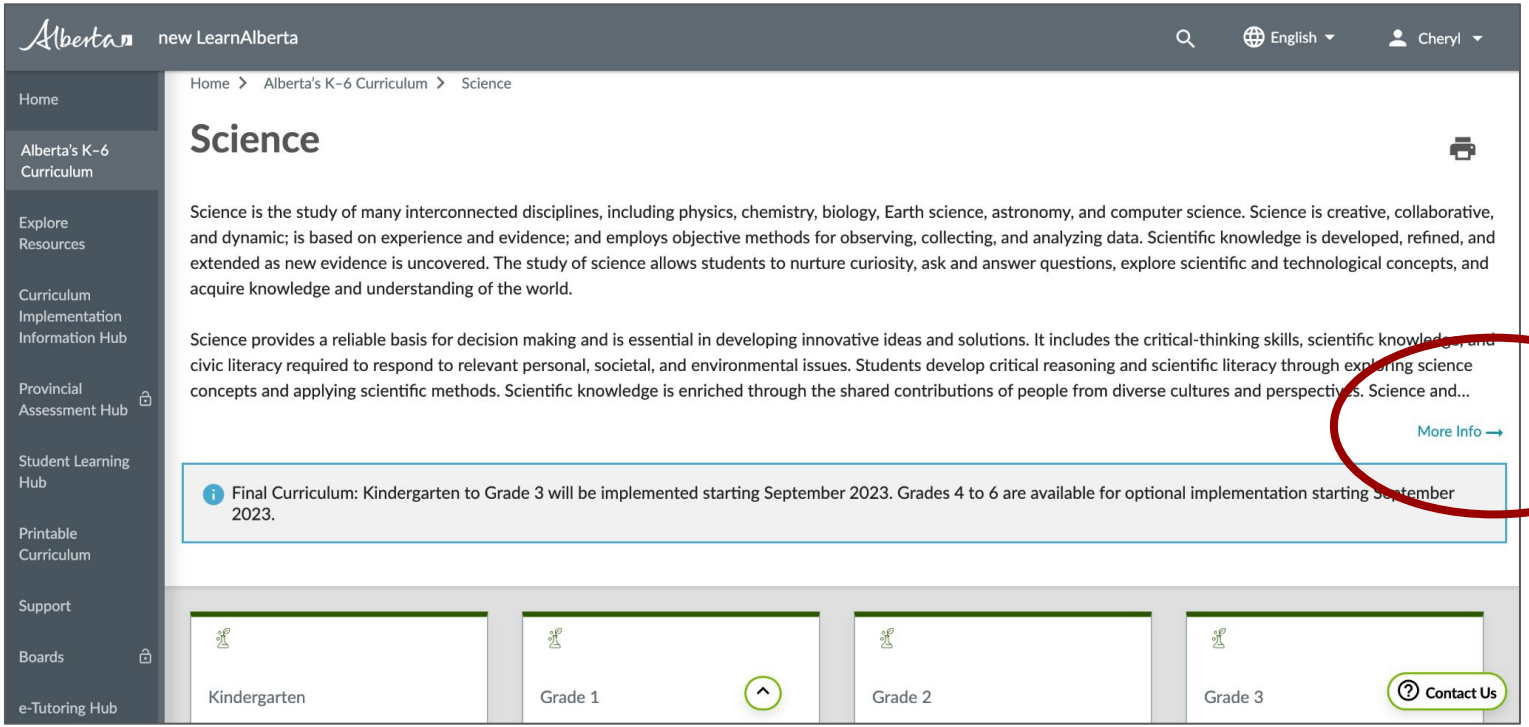
Think about the DESIGN
Does it do the job it was intended to do well? Were the best materials used? Is it decorated? If so, how was it decorated? Do you like the way it looks? Would other people like it?

What is it worth? What is its VALUE?
To the people who made it? To the people who used it?
To the people who keep it? To you? To a museum?

***Answer the question: Is this a valuable object? Explain and provide evidence.**

https://www.nsta.org/draw-scientist

Science is the study of many interconnected disciplines, including physics, chemistry, biology, Earth science, astronomy, and computer science. Science is creative, collaborative, and dynamic; is based on experience and evidence; and employs objective methods for observing, collecting, and analyzing data. Scientific knowledge is developed, refined, and extended as new evidence is uncovered. The study of science allows students to nurture curiosity, ask and answer questions, explore scientific and technological concepts, and acquire knowledge and understanding of the world. Science provides a reliable basis for decision making and is essential in developing innovative ideas and solutions. It includes the critical-thinking skills, scientific knowledge, and civic literacy required to respond to relevant personal, societal, and environmental issues. Students develop critical reasoning and scientific literacy through exploring science concepts and applying scientific methods. Scientific knowledge is enriched through the shared contributions of people from diverse cultures and perspectives. Science and technology are deeply interwoven in our daily lives. Together, they enable society to build and share knowledge, innovate, improve quality of life, and predict future events.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Science
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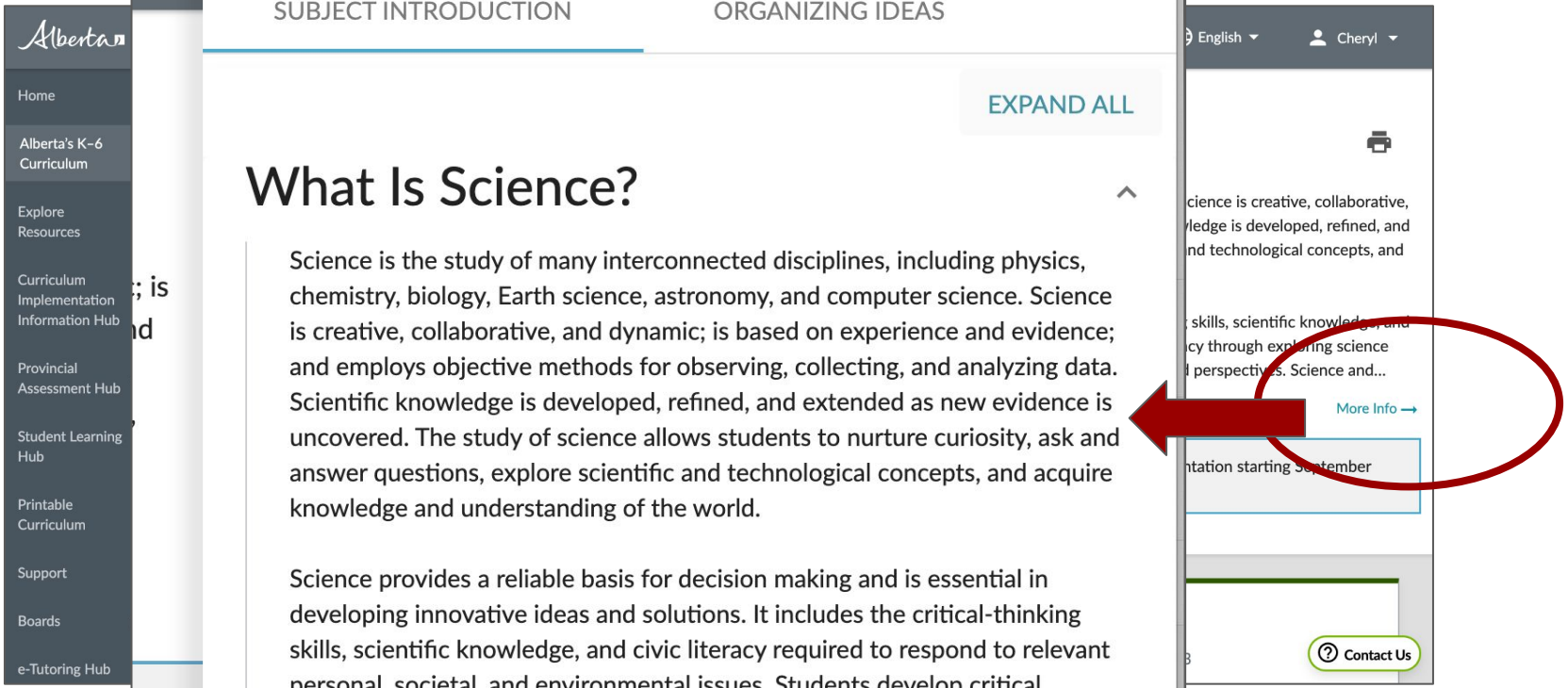
More Info
Final Curriculum: Kindergarten to Grade 3 will be implemented starting September 2023. Grades 4 to 6 are available for optional implementation starting September 2023.
Kindergarten
Grade 1
Grade 2
Grade 3
Contact Us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SUBJECT INTRODUCTION
ORGANIZING IDEAS
EXPAND ALL
What Is Science?
Science is the study of many interconnected disciplines, including physics, chemistry, biology, Earth science, astronomy, and computer science. Science is creative, collaborative, and dynamic; is based on experience and evidence; and employs objective methods for observing, collecting, and analyzing data. Scientific knowledge is developed, refined, and extended as new evidence is uncovered. The study of science allows students to nurture curiosity, ask and answer questions, explore scientific and technological concepts, and acquire knowledge and understanding of the world.
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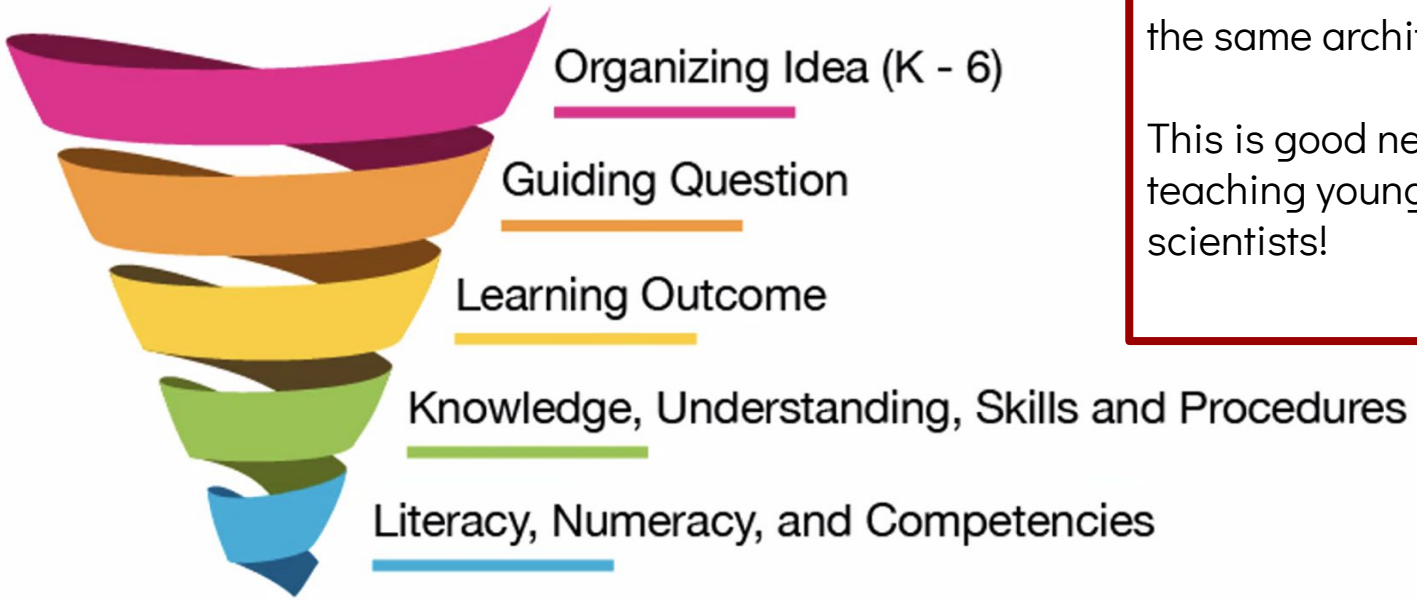
English
Cheryl
More Info
Contact Us

Grade	Topic	Emphasis
1	A. Creating Colour B. Seasonal Changes C. Building Things D. Senses E. Needs of Animals and Plants	Science Inquiry Science Inquiry Problem Solving through Technology Science Inquiry Science Inquiry
2	A. Exploring Liquids B. Buoyancy and Boats C. Magnetism D. Hot and Cold Temperature E. Small Crawling and Flying Animals	Science Inquiry Problem Solving through Technology Science Inquiry Science Inquiry Science Inquiry
3	A. Rocks and Minerals B. Building with a Variety of Materials C. Testing Materials and Designs D. Hearing and Sound E. Animal Life Cycles	Science Inquiry Problem Solving through Technology Science Inquiry Science Inquiry Science Inquiry
4	A. Waste and Our World B. Wheels and Levers C. Building Devices and Vehicles that Move D. Light and Shadows E. Plant Growth and Changes	Science Inquiry Science Inquiry Problem Solving through Technology Science Inquiry Science Inquiry
5	A. Electricity and Magnetism B. Mechanisms Using Electricity C. Classroom Chemistry D. Weather Watch E. Wetland Ecosystems	Science Inquiry Problem Solving through Technology Science Inquiry Science Inquiry Science Inquiry
6	A. Air and Aerodynamics B. Flight C. Sky Science D. Evidence and Investigation E. Trees and Forests	Science Inquiry Problem Solving through Technology Science Inquiry Science Inquiry Science Inquiry

Previous curriculum was organized by TOPICS within grades 1 through 6.

Architecture and Design of Provincial K–12 Curriculum



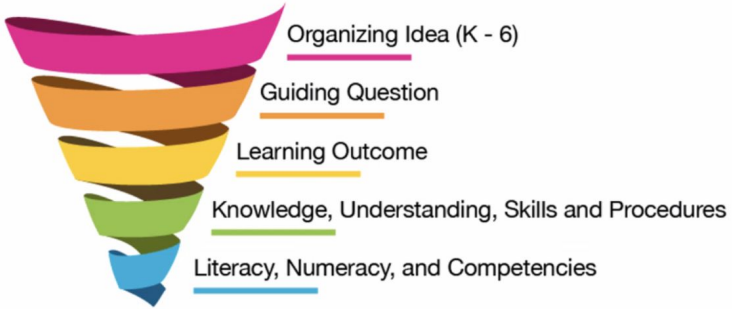
ALL new curriculum uses the same architecture.

This is good news for teaching young scientists!

Alberta

Source: Alberta Education, 2022

Organizing Ideas



Organizing Ideas

- ✓ are logical **categories** that communicate the **goals** of education within each **section** of a subject or discipline
- ✓ are statements of the learning within a given **section** of a subject
- ✓ span some or all grades
- ✓ begin with **end** in mind

Organizing Ideas Consider:

- the body of knowledge that includes the facts, symbols, rules, principles, and concepts that constitute the subject area
- the skills, strategies, processes, steps, and systematic approaches that students use to demonstrate their knowledge and understanding of the subject

Alberta

Source: Alberta Education, 2022

K	1	2	3	4	5	6
Matter: Understandings of the physical world are deepened by investigating matter and energy.						
Energy: Understandings of the physical world are deepened by investigating matter and energy.						
Earth Systems: understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.						
Living Systems: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.						
Space: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.						
Computer Science: Problem solving and scientific inquiry are developed through the knowledgeable application of creativity, design, and computational thinking.						
Scientific Methods: Investigation of the physical world is enhanced through the use of scientific methods that attempt to remove human biases and increase objectivity.						

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Now, each grade will uncover concepts, knowledge and skills that derive from the same organizing ideas.

Guiding Questions

Guiding Questions can …

- raise other **important** questions
- call for **higher-order thinking** such as analysis, inference, evaluation, and prediction
- include **debatable** questions to increase student interest and motivate thinking
- ask about the nature of the **relationship** between concepts or information
- be **open-ended** and **engaging**
- **guide** student learning

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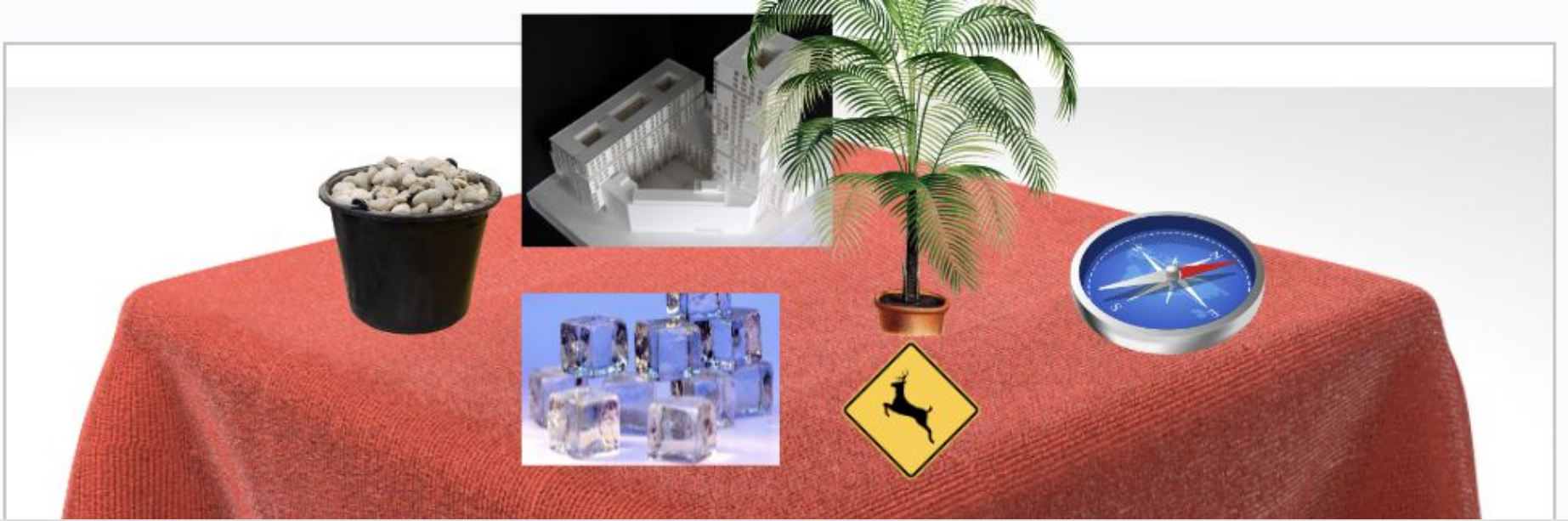
Source: Alberta Education, 2022



ORGANIZING IDEA

Earth Systems: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.

GUIDING QUESTION

How can Earth's components and relationship to the Sun be understood?

LEARNING OUTCOME

Students investigate Earth, its landforms, its bodies of water, and its relationship to the Sun.

GUIDING QUESTION

What visible changes can be identified by examining Earth's surface?

LEARNING OUTCOME

Students analyze changes in Earth's surface and explain how its layers hold stories of the past.

Learning Outcomes

Learning Outcomes

- ✓ describe what students are required to **know, understand, and be able to do** by the end of a grade
- ✓ must be **assessed** and **reported**
- ✓ are subject specific
- ✓ include **one or more concepts** that are the focus for learning and assessment

Would you like to access a copy of the curriculum where the outcomes are numbered?
Click here.

Alberta

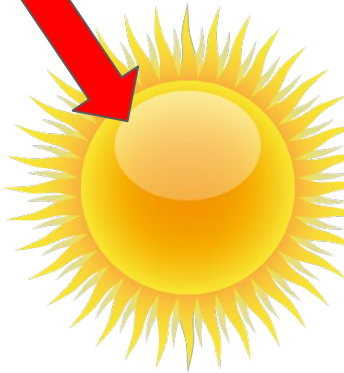
Source: Alberta Education, 2022

Organizing Idea **GRADE 2**	Earth Systems: Understandings of the living world, Earth and space are deepened through investigating natural **systems** and their **interactions**.
Guiding Question	How can Earth's components and **relationship** to the Sun be understood?
Learning Outcome	Students investigate Earth, its landforms, its bodies of water, and its relationship to the Sun.

KNOWLEDGE	UNDERSTANDING	SKILLS & PROCEDURES
A year is the length of time it takes Earth to revolve around the Sun. A day is the length of time it takes Earth to rotate fully (on its axis). Earth's surface experiences day when it faces the Sun, and night when it does not face the Sun.	Earth revolves around the Sun and rotates.	Describe the relationship between time and Earth revolving around the Sun. Represent ways that Earth's rotation connects to patterns of day and night.

Things or people that are connected to each other.

What makes a good relationship? What makes it not-so-good?



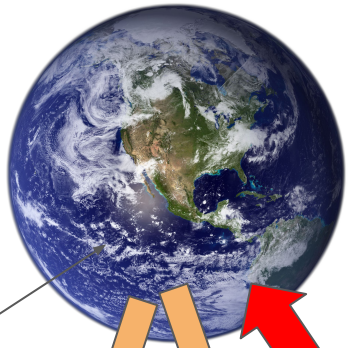
Things or people that **impact** each other. Impact is **affect (feelings)** or **effect (consequence)**, or **change**.

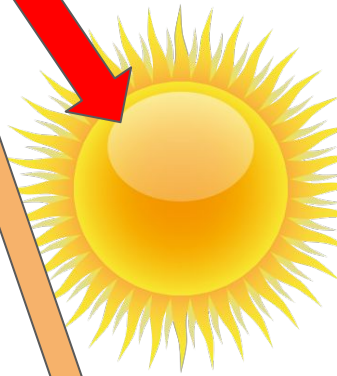
a set of things working together as parts of a mechanism or an interconnecting network.

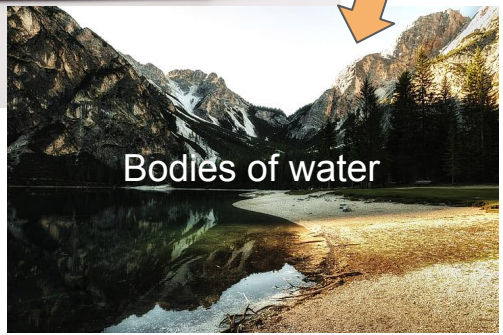
What makes a good relationship? What makes it not-so-good?

a **set of ways or procedures** that describe how something is done;
an **organized** framework or method.

A system is not “random”, chaotic, or “things are everywhere”







Science Curriculum through Concepts

This document takes a look at the learning outcomes and has identified many of the **topic specific concepts** that teachers need to help students unpack. Sometimes called micro-concepts, these concepts are KEY to demonstrating understanding of the learning outcomes.

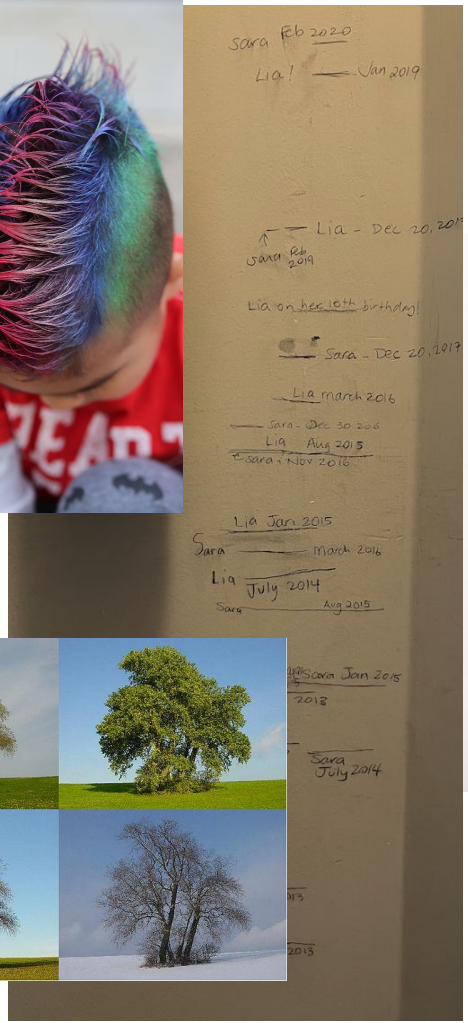
Teaching Science through Concepts: New AB Curriculum

Knowledge is essential to make sense of concepts.

Skills and procedures activate the knowledge.

Understanding of CONCEPTS helps to TRANSFER the learning to new and authentic situations.


change


Sara Feb 2020
Lia! Jan 2019
Lia - Dec 20, 2017
Sara Feb 2019
Lia on her 10th birthday!
Sara - Dec 20, 2019
Lia March 2016
Sara - Dec 30 2016
Lia Aug 2015
Sara + Nov 2016
Lia Jan 2015
Sara March 2016
Lia July 2014
Sara Aug 2015
Sara Jan 2015
2018
Sara July 2014
2013


change


Can you share a
story of change
with this material?

I see...
I think...
I wonder...

Grade 3 | Next >

GUIDING QUESTION

What visible changes can be identified by examining Earth's surface?

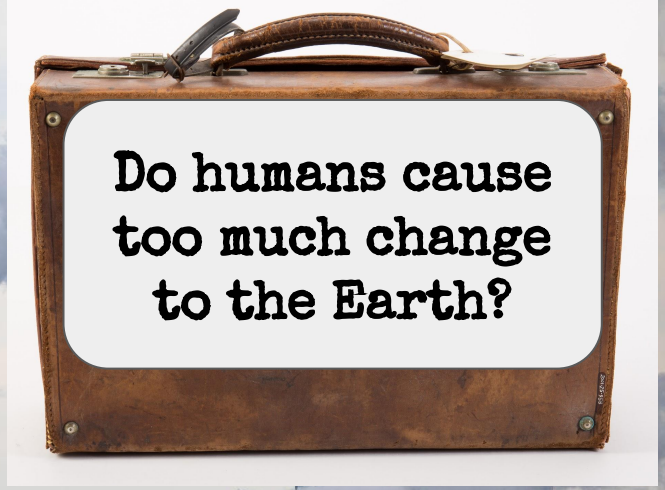
LEARNING OUTCOME

Students analyze changes in Earth's surface and explain how its layers hold stories of the past.

KNOWLEDGE	UNDERSTANDING	SKILLS & PROCEDURES
Changes that can occur to Earth's surface over a long period of time include • mountains wearing down • rivers changing course • lakes and seas drying out and refilling • glaciers moving, advancing, and receding Natural events that can change Earth's surface in a short period of time include • volcanic eruptions • earthquakes • landslides • tsunamis • floods • melting and freezing Changes to Earth's surface can be shared through • scientific knowledge • stories • traditional knowledge	Earth's surface changes over time. Relationships with land provide intergenerational knowledge of Earth's surface for many First Nations, Métis, and Inuit.	Describe how natural events change Earth's surface. Discuss changes to Earth's surface over time that are shared through stories and intergenerational knowledge of First Nations, Métis, or Inuit. Investigate natural events that have changed Earth's surface in Alberta.

Contact

KNOWLEDGE	UNDERSTANDING	SKILLS & PROCEDURES
Human activities that can change Earth's surface include • living on the land • building towns and cities • getting and using resources • growing crops and farming (agriculture) • polluting • stewardship Plant and animal activities can change Earth's surface, such as • overpopulation • using resources • parasite infestation; e.g., mountain pine beetle • animals burrowing	Plant, human, and other animal activities can cause changes to Earth's surface.	Relate human activities to changes in Earth's surface. Relate activities of plants and animals to changes in Earth's surface. Discuss the interconnectedness between human activities and responsibilities for maintaining Earth. Investigate how changing Earth's surface by farming and growing crops contributes to daily life in Alberta.

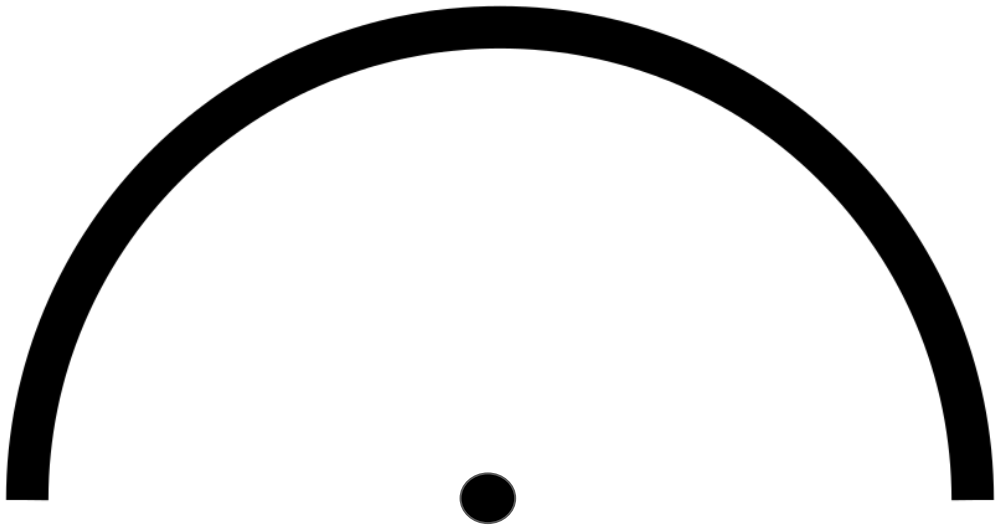


Observe.
Think.
Question.

Question: Do humans cause too much change to the Earth?

Draw an arrow to represent your thoughts.

Give evidence (sound reasoning) for your opinion.



No.

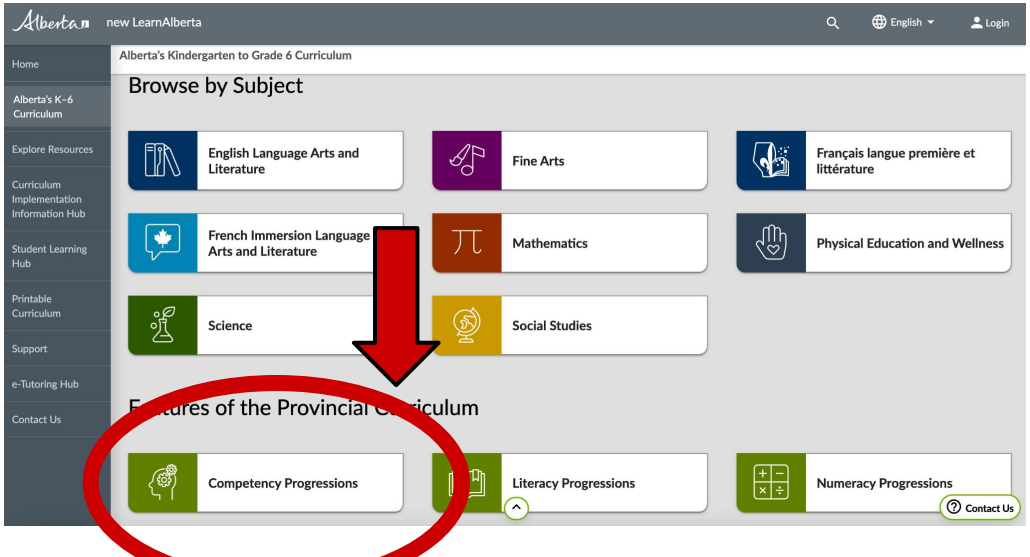
Yes.

YOU ARE AN EXPLORER.

YOUR MISSION IS TO DOCUMENT AND OBSERVE THE WORLD AROUND YOU AS IF YOU'VE NEVER SEEN IT BEFORE. TAKE NOTES. COLLECT THINGS YOU FIND ON YOUR TRAVELS. DOCUMENT YOUR FINDINGS. NOTICE PATTERNS. COPY. TRACE. FOCUS ON ONE THING AT A TIME. RECORD WHAT YOU ARE DRAWN TO.


PUSH YOURSELF

How might the competency progressions help lead the design of the learning?



Competency Progressions Change Feature

Collapse All

Prev | Kindergarten (ages 4–5) | Division 1 (ages 6–8) | Division 2 (ages 9–11) | Next

Critical Thinking involves reasoning logically to analyze and synthesize new knowledge with existing knowledge in a coherent way.

- I wonder about the world around me.
- I think about and share experiences or feelings.
- I make predictions based on prior knowledge.
- I make choices based on what I like or know.
- I recognize how my thoughts, words, or actions affect others and myself.

- I ask relevant questions to help me learn.
- I use simple criteria to form opinions or make decisions.
- I synthesize new understandings by comparing and contrasting information.
- I reflect on contexts or experiences that influence my thinking.
- I consider how my thoughts may be similar to or different from those of others.

- I pose questions to analyze information or evidence.
- I begin to analyze complex issues and ideas based on criteria I help to develop.
- I evaluate the effectiveness of my own thinking or that of others.
- I make inferences, predictions, or decisions based on information.
- I consider perspectives that do not fit with my understandings.

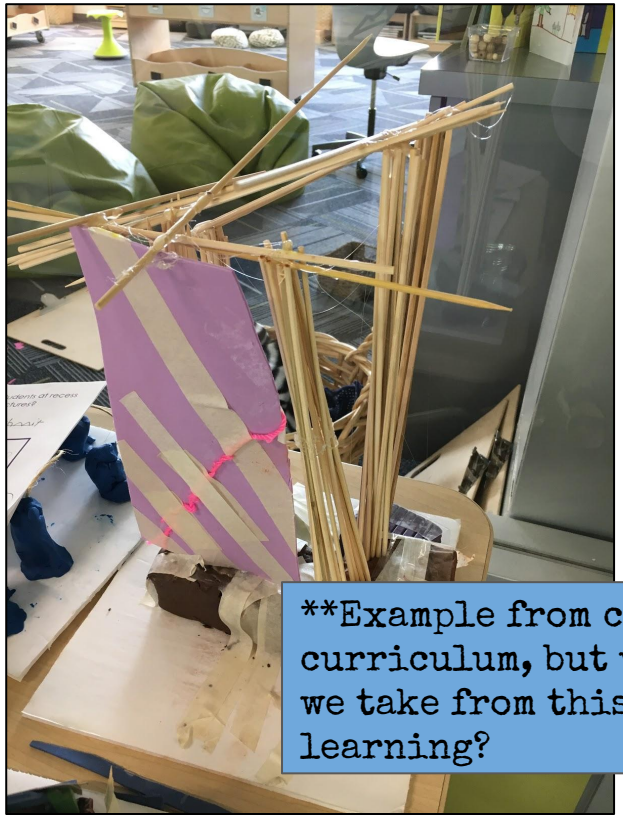
Research and Managing Information involves research skills as well as organizing and using information for specific purposes.

- I use my senses to learn about the world around me.
- I connect new information with things I already know.
- I use information to understand my world and myself.
- I share my ideas and information.

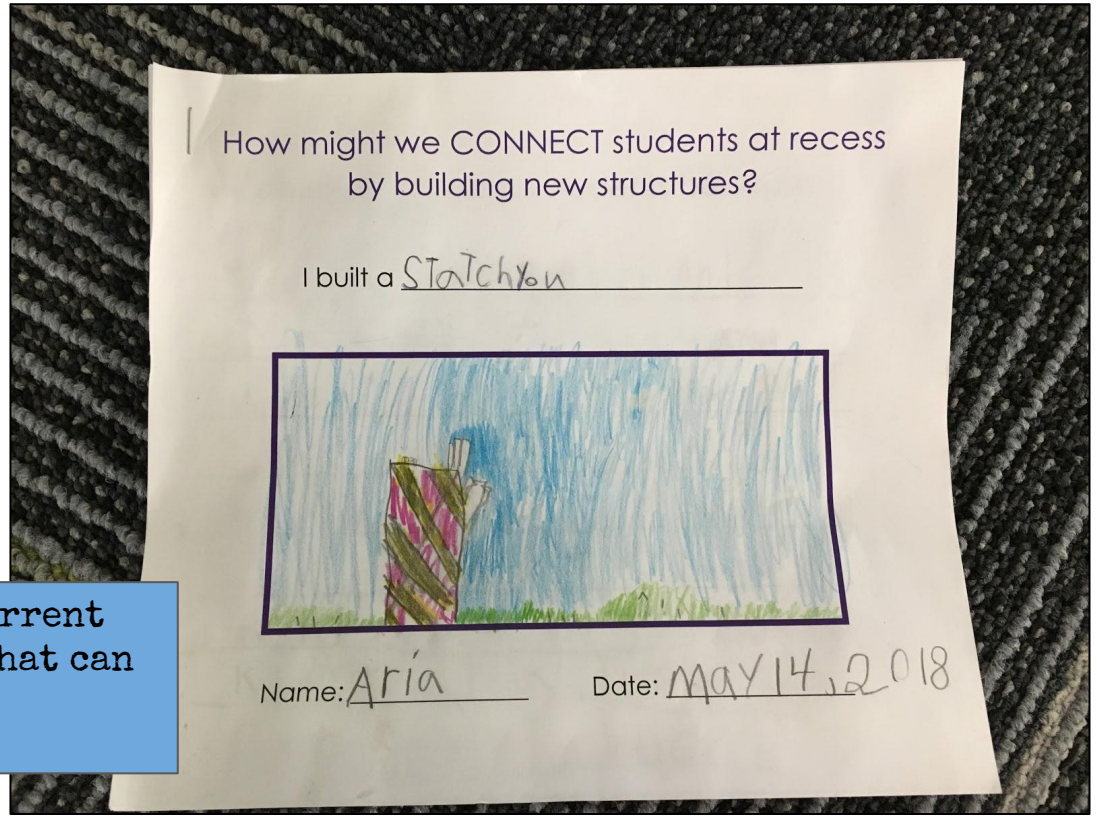
- I collect information for a specific audience or purpose.
- I organize and combine information from a number of sources.
- I consider the content of information to determine its use.
- I reference the source of information when using someone else's ideas.

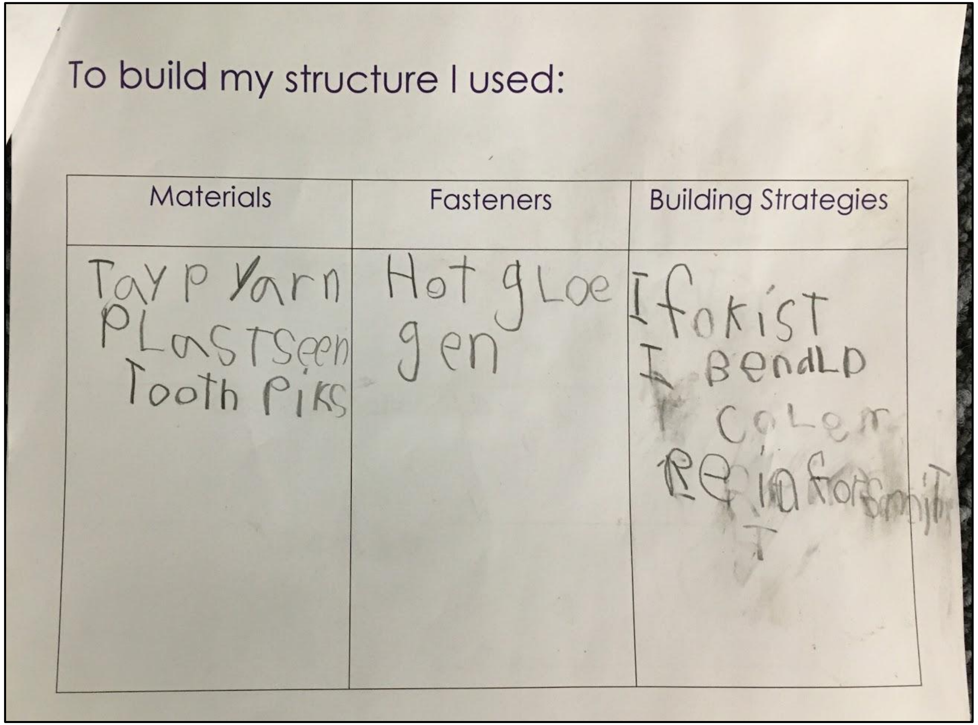
- I reflect on information gathering processes and revise if necessary.
- I gather and organize information from multiple sources to enhance or clarify understandings.
- I verify the accuracy of information collected from a variety of sources.
- I apply socially accepted protocols when using, sharing, and storing information.

Structures are created to connect people and communities.



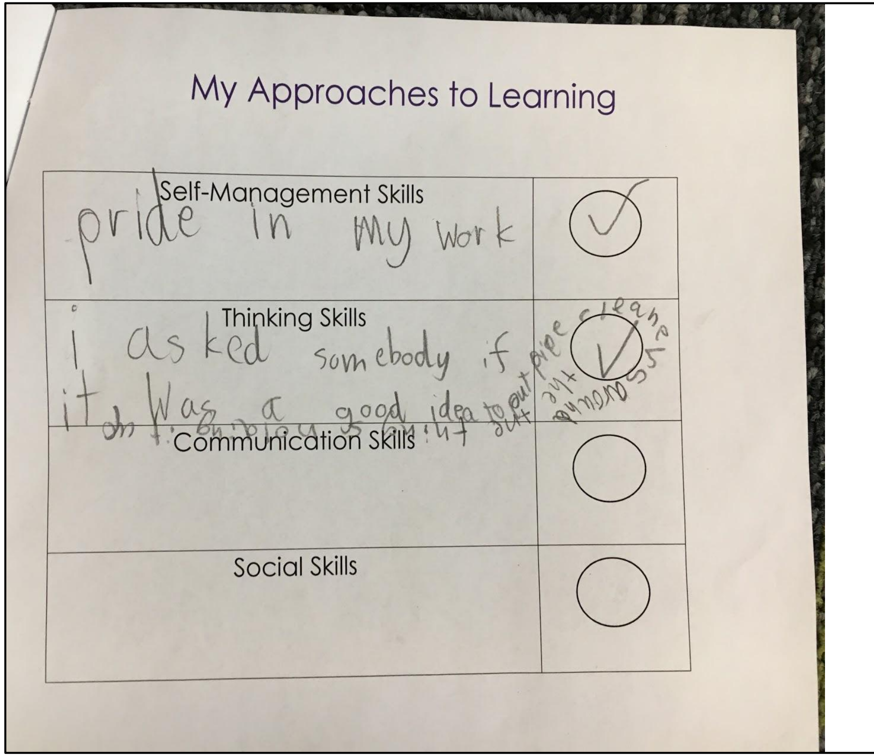
**Example from current curriculum, but what can we take from this learning?





To build my structure I used:

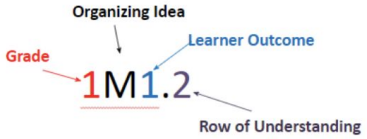
Materials	Fasteners	Building Strategies
Tayp Yarn Plastseen Tooth Piks	Hot gLoe gen	I fokist I BendLD I CoLer Reinforsmint



My Approaches to Learning

Self-Management Skills pride in my work	✓
Thinking Skills i asked somebody if it was a good idea to put pipe cleaners [illegible]	✓
Communication Skills	◯
Social Skills	◯

What's new with Science? [Click here for a link to Curriculum Comparison Documents]

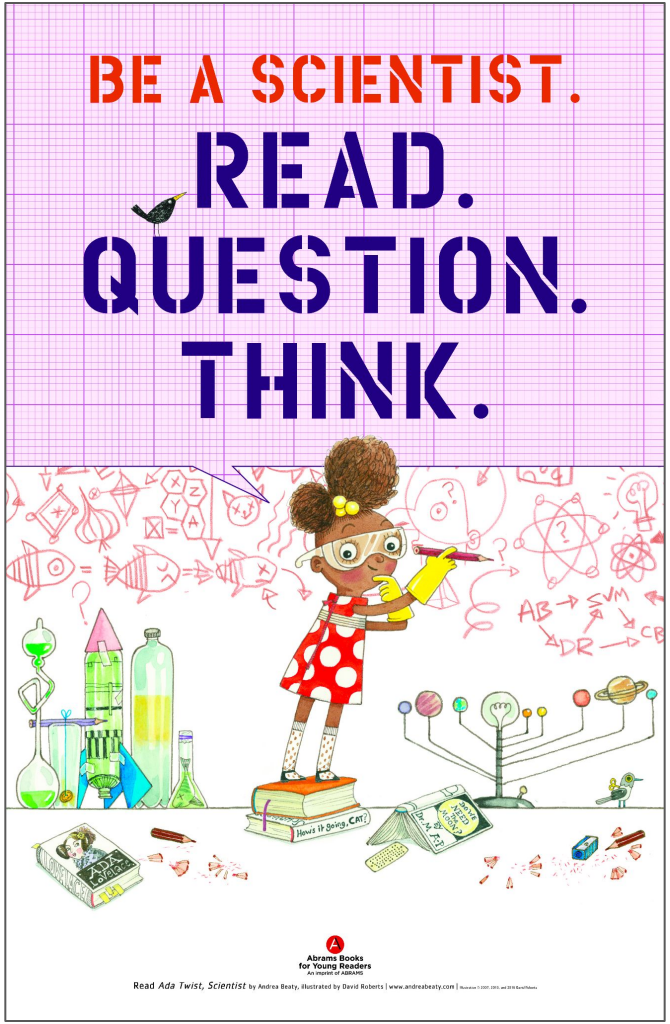


Grade 1 Curriculum Comparison to the New Alberta Science Curriculum

M = Matter E= Energy ES = Earth Systems S = Space LS = Living Systems CS = Computer Science SM = Scientific Method.

Cross Referenced Outcomes form the 1996 Curriculum	Learner Outcomes	Understandings from New Curriculum, Knowledge	Skills and Procedures
Possible Links to the 1996 Science Curriculum	**Matter(M) : Matter: Understandings of the physical world are deepened through investigating matter and energy.** **Guiding Question: How can properties of an object be altered?**		
Grade 1 **Skills: Science Inquiry** 1–2 Describe materials and objects that have been observed and manipulated, and identify what was done and found out.	**LEARNER OUTCOME** 1M 1.1 Students analyze properties of objects and investigate how they can be changed.	**UNDERSTANDING** Objects have measurable properties. **KNOWLEDGE** Measurable properties of objects include • length • how much flat space an object covers (area) • weight (mass) Weight is the heaviness of an object. Tools, such as balance scales and magnifying glasses, can be used to examine properties of objects and materials.	**SKILLS and PROCEDURES** Identify measurable properties of objects. Directly compare the length, area, and weight of various objects. Use various tools safely when examining the properties of objects.
	LEARNER OUTCOME 1M 1.2 Students analyze properties of objects and investigate how they can be changed. .	**UNDERSTANDING** Physical changes to objects do not change what the objects are made of. **KNOWLEDGE** Properties that can be changed include • length • area • weight (mass) • Shape • texture	**SKILLS and PROCEDURES** Predict how actions can physically change properties of various objects. Explore actions that physically change properties of various objects. Describe physical changes that result from various actions. Discuss why physical changes do not change what an object

This link brings you to the ARPDC website with new curriculum resources. You'll find K - 6 curriculum comparison documents here.



Download a copy!


Please use the chat to let me know what you need!
The resources we will uncover next week during our session.
All the beautiful ways you stretch yourself as a teacher.

CRC Designers of Professional Learning

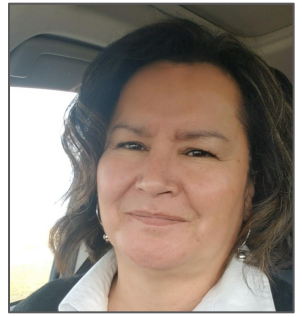
Please reach out to us to discuss professional development for your school!

Wanda Dechant
Math

Kim Tackaberry
Literacy and Inclusive Ed

Cheryl Babin
Curriculum, Pedagogy, Instructional Leadership

Jodi Taylor
Inclusive Education and Literacy



Donna Ross
Indigenous Education

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Alberta Regional Consortia

Alberta Regional Professional Development Consortia

Adult learning for students' sake

Central Alberta Regional Consortium

Consortium provincial francophone

Learning Network Educational Services

NRLC Regional Learning

Southern Alberta Professional Development Consortium