The Consortium
Alberta Professional Learning Consortium

Think Like a Scientist

Adelee Penner

Facilitated by
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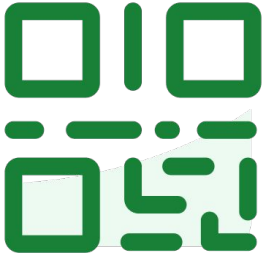
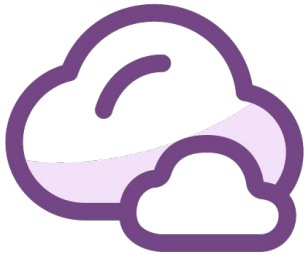
APLC Designer of Professional Learning

bit.ly/4mPYA98



Join at slido.com
#1453410

We are gathered here today from across Alberta and recording within Treaty 7 and the traditional Blackfoot territory which is home to the Siksika, Piikani, and Kainai Nations; the Iethka Stoney Nakoda Nation which includes the Chiniki, Bearspaw, and Good Stoney First Nations. This incredible area is also home to the Tsuut'ina Nation and the Otipemisiwak Métis Government of the Métis Nation within Alberta District 6.



What comes to mind when you think about 'thinking like a scientist'?

Why “thinking like a scientist?

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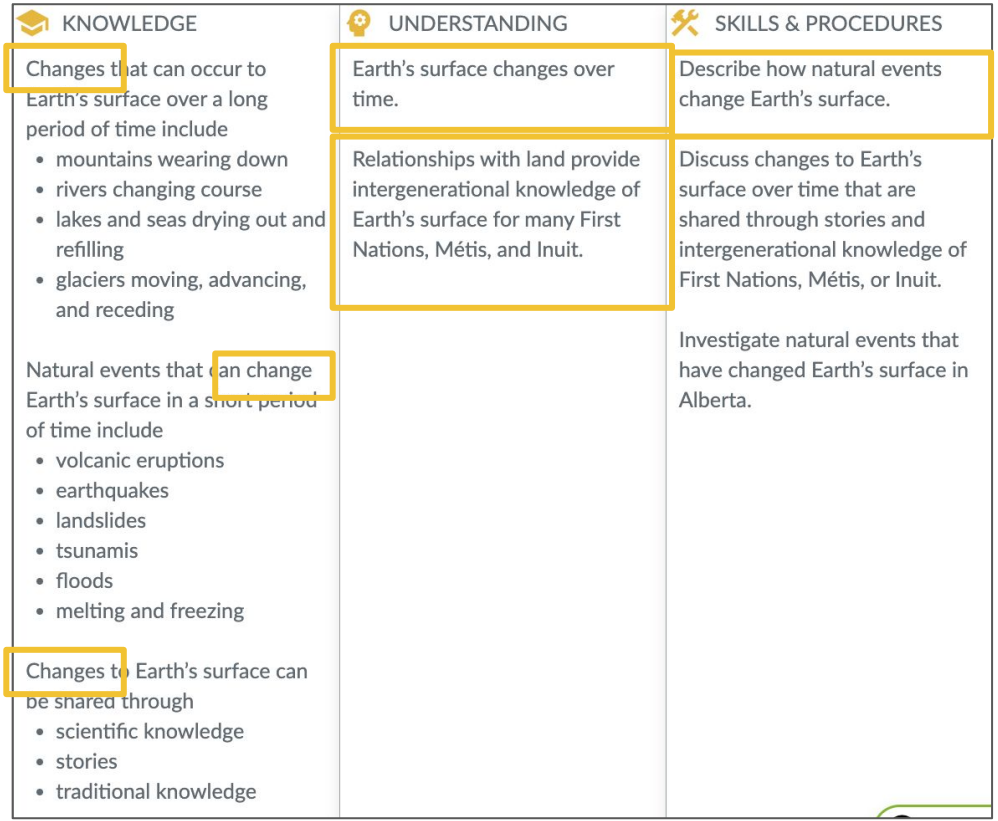
Organizing Idea **GRADE 2**	Earth Systems: Understandings of the living world, Earth and space are deepened through investigating natural **systems** and their **interactions** .
Guiding Question	How can Earth's components and **relationship** to the Sun be understood?
Learning Outcome	Students investigate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

Supporting every educator in every classroom

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.

Organizing Idea **GRADE 3**	Earth Systems: Understandings of the living world, Earth and space are deepened through investigating natural **systems** and their **interactions** .
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.



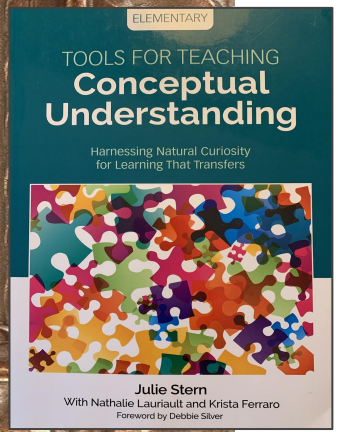
KNOWLEDGE	UNDERSTANDING	SKILLS & PROCEDURES
Changes that can occur to Earth's surface over a long period of time include • mountains wearing down • rivers changing course • lakes and seas drying out and refilling • glaciers moving, advancing, and receding Natural events that can change Earth's surface 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.

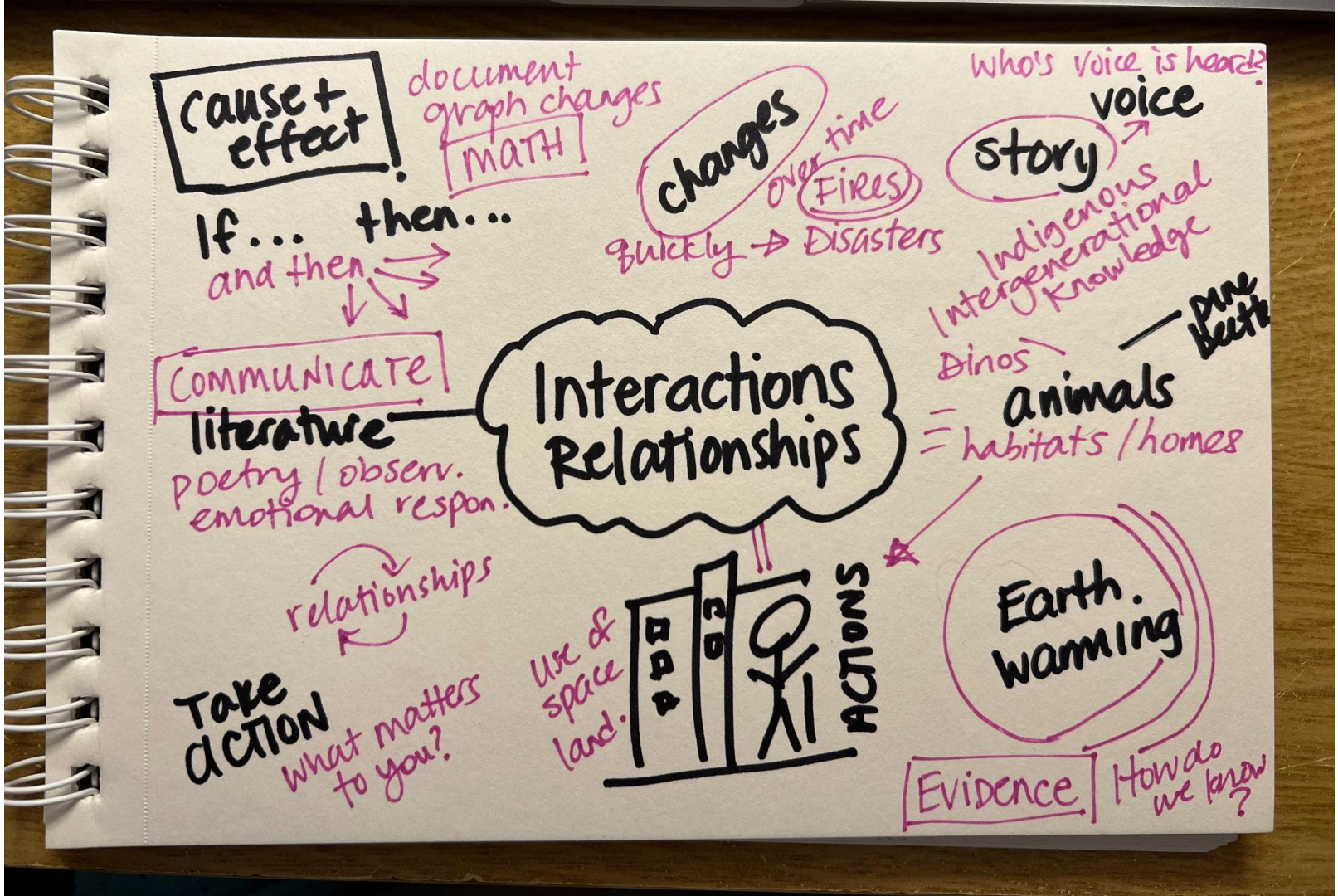
What is the relationship between _(concept)_ and _(concept)_?

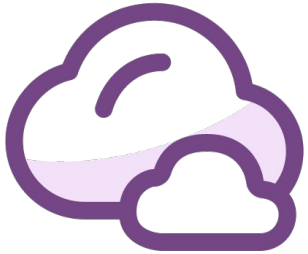
How does _____ impact _____?

What effect do _____ and _____ have on _____?

How do the forces of _____ and _____ interact?

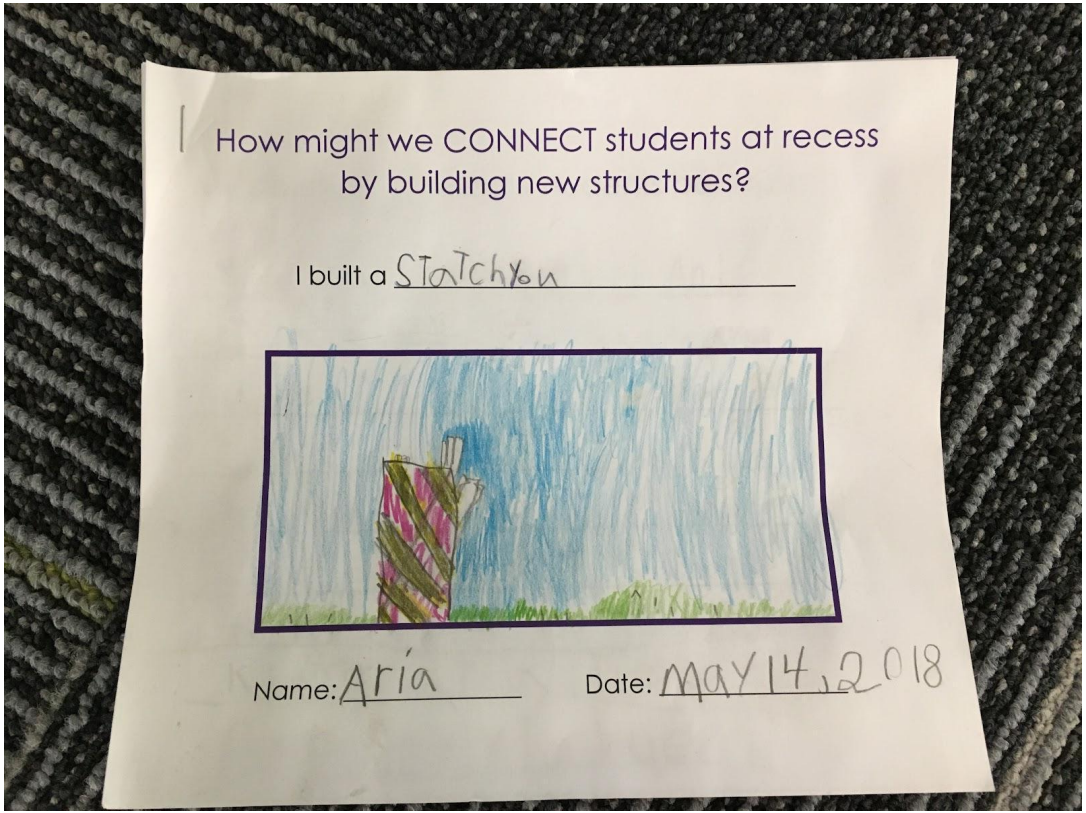


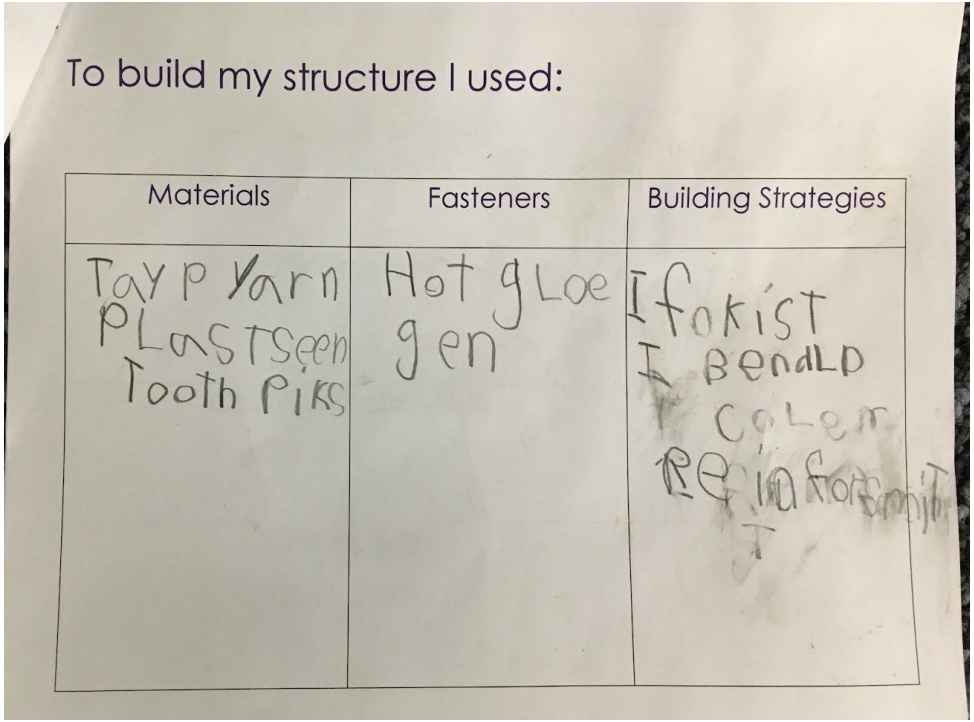

cause + effect
document graph changes
MATH
Who's voice is heard?
voice
story
changes
over time
Fires
quickly → Disasters
Indigenous intergenerational knowledge
If... then...
and then
COMMUNICATE
literature
poetry / observ.
emotional respon.
Interactions Relationships
Dinos
Pine Beetle
animals
= habitats / homes
relationships
Take action
What matters to you?
use of space land
ACTIONS
Earth warming
Evidence
How do we know?



What challenges do you face in implementing scientific inquiry in your classroom?

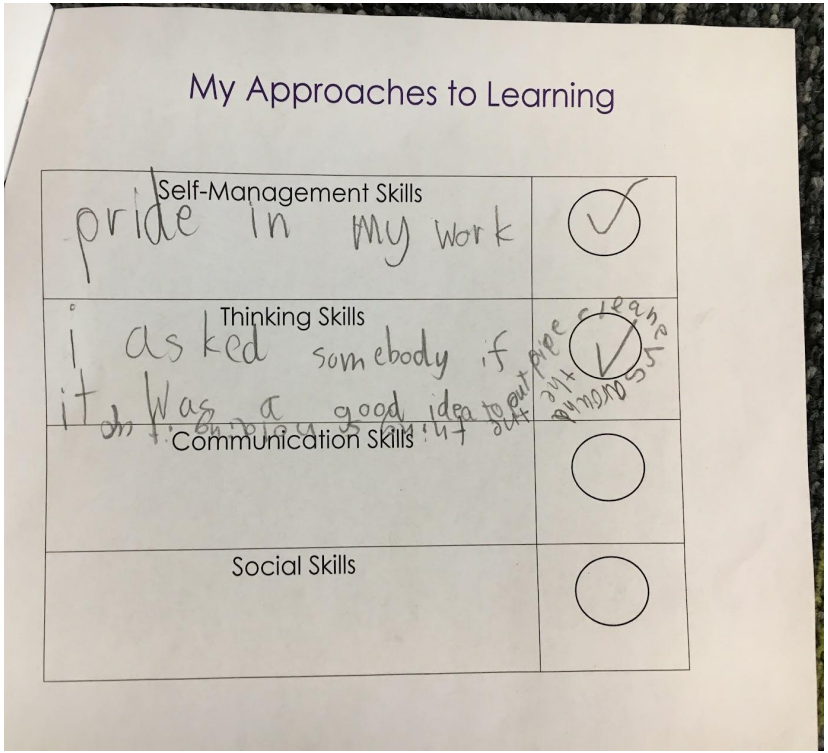
Structures are created to connect people and communities.





To build my structure I used:

Materials	Fasteners	Building Strategies
Tay p Yarn PLasTSeen Tooth PiKs	Hot gLoe gen	Ifokist I BendLD



My Approaches to Learning

Self-Management Skills pride in my work	✓
Thinking Skills i asked somebody if it was a good idea to put glue cleaner on paper	✓
Communication Skills	
Social Skills	

Investigations in Science

Descriptive Investigations

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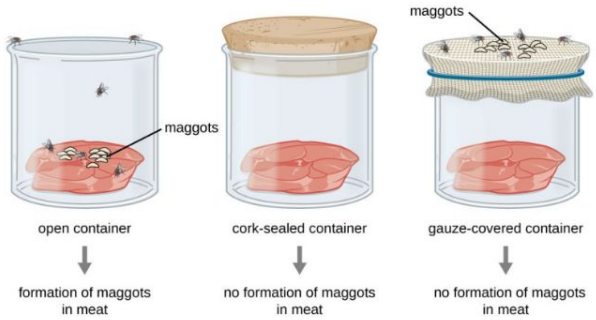
Comparative Investigations

- Purpose - a question is posed.
- Does not require complete scientific method
- Hypothesis not necessary

Experimental Investigations

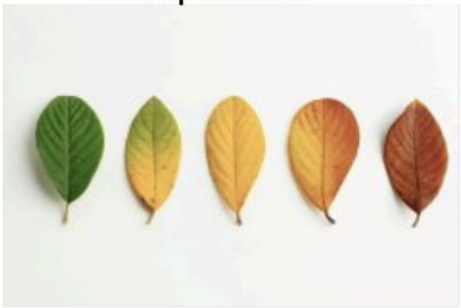


- Purpose - question is posed
- Involves testing dependent and Independent variables to confirm or refute a hypothesis
- Classic scientific method

Scientific Methods

Experimental

Comparative



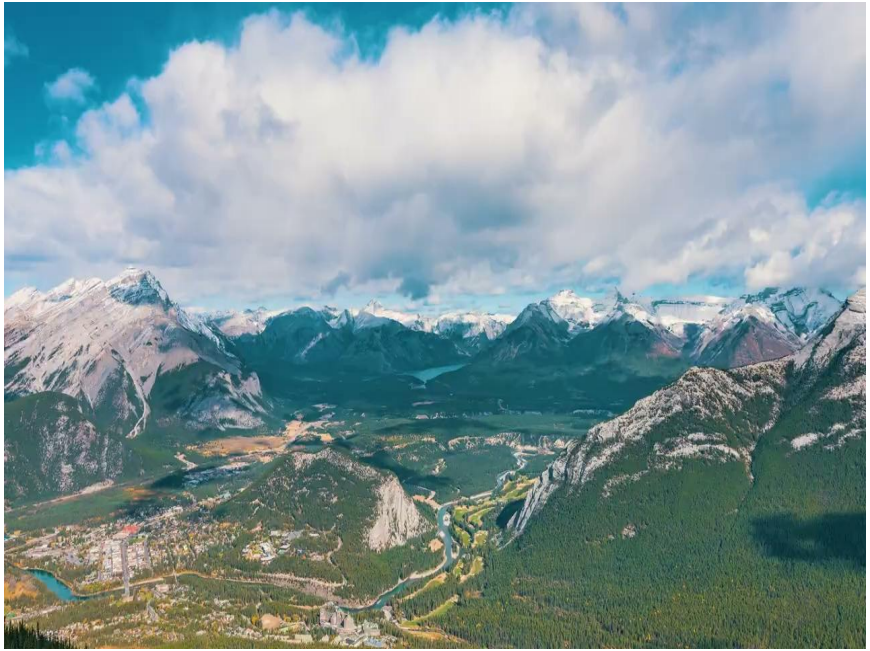
Descriptive/ Observation

Oral Stories and Traditional Teachings

Research

Relationships with the Land

Possible Assessment for a Descriptive or Comparative Investigation - *“If I was a bird…”*



Imagine you are a Canada goose traveling in your V formation across the landscape of Alberta. Use this “Flight Tracker” to show what you might see on your journey. Please use drawings, pictures and words.

Be sure to include:

- 3 different landforms
- 2 or more different seasons

Here is an example of a Flight Tracker you could use to show your learning.

Landscape 1: _____ Season: _____	Landscape 2: _____ Season: _____	Landscape 3: _____ Season: _____

Large paper for drawings, labels, names of features and landforms etc.
Color can be used to depict seasonal changes, snow, ice and foliage.

Engaging (and efficient) Task Design

Students in Grade 6 will design an informative display/performance or exhibit for the Mayor's Expo that will inform the people of Calgary about the impact of climate change on Earth, specifically in our Alberta context.

LEARNING OUTCOME

Students investigate climate, changes in climate, and the impact of climate change on Earth.

LEARNING OUTCOME

Students investigate the characteristics and components of ecosystems.

LEARNING OUTCOME

Students interpret and respond to texts through application of comprehension strategies.

LEARNING OUTCOME

Students evaluate how vocabulary enhances communication and provides clarity.

LEARNING OUTCOME

Students create texts that reflect personal voice and style through creative and critical thinking processes.

Engaging (and efficient) Task Design continued…

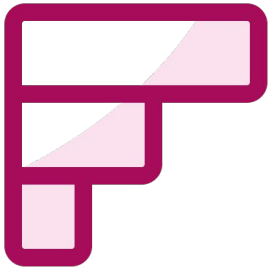
Students in Grade 6 will design an informative display/performance or exhibit at the Mayor's Expo that will inform the people of Calgary about the impact of climate change on Earth, specifically in our Alberta context.

LEARNING OUTCOME

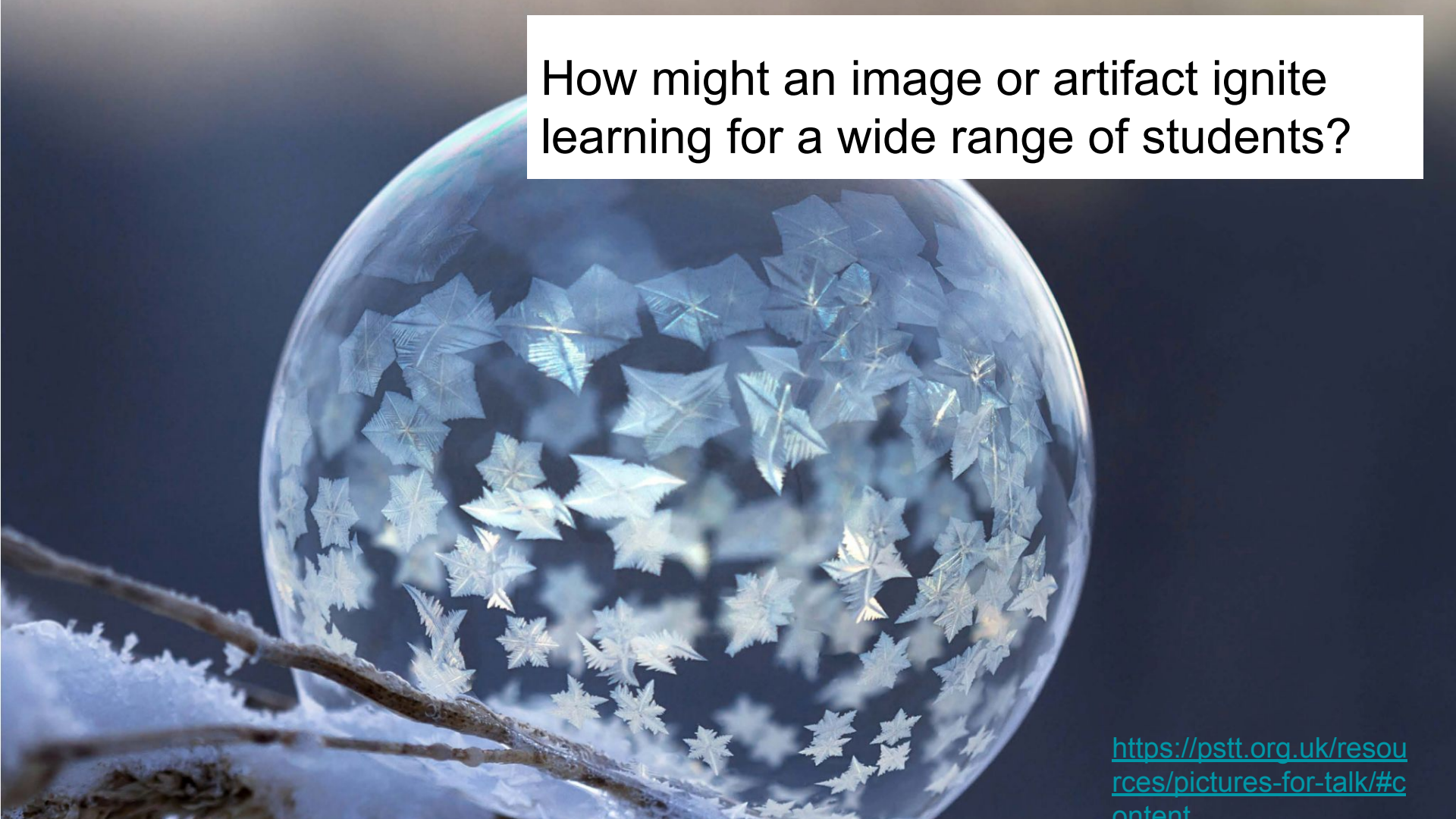
Students connect the quality and efficacy of oral communication to oral language skills.

LEARNING OUTCOME

Students investigate relative frequency using experimental data.



Rank these strategies in order of effectiveness for engaging students in scientific thinking.



How might an image or artifact ignite learning for a wide range of students?

https://pstt.org.uk/resources/pictures-for-talk/#content

Planning for the Edges Template

Range surrounds median of your group (may or may not be grade level)

Student friendly learning outcome:				
Approaching	Emerging	Developing	Confident	Extending
Begin with the most essential concept of the outcome, and then add complexity. →→→				

Starting point is on the margin at a point that includes ALL students...

Increase complexity as students require.

Based on the work of Dr. Shelley Moore.

1 First Choice: Hands-on, Real Life Experiences

2 Back-Up Plan (or online session): Excellent High-Quality Images

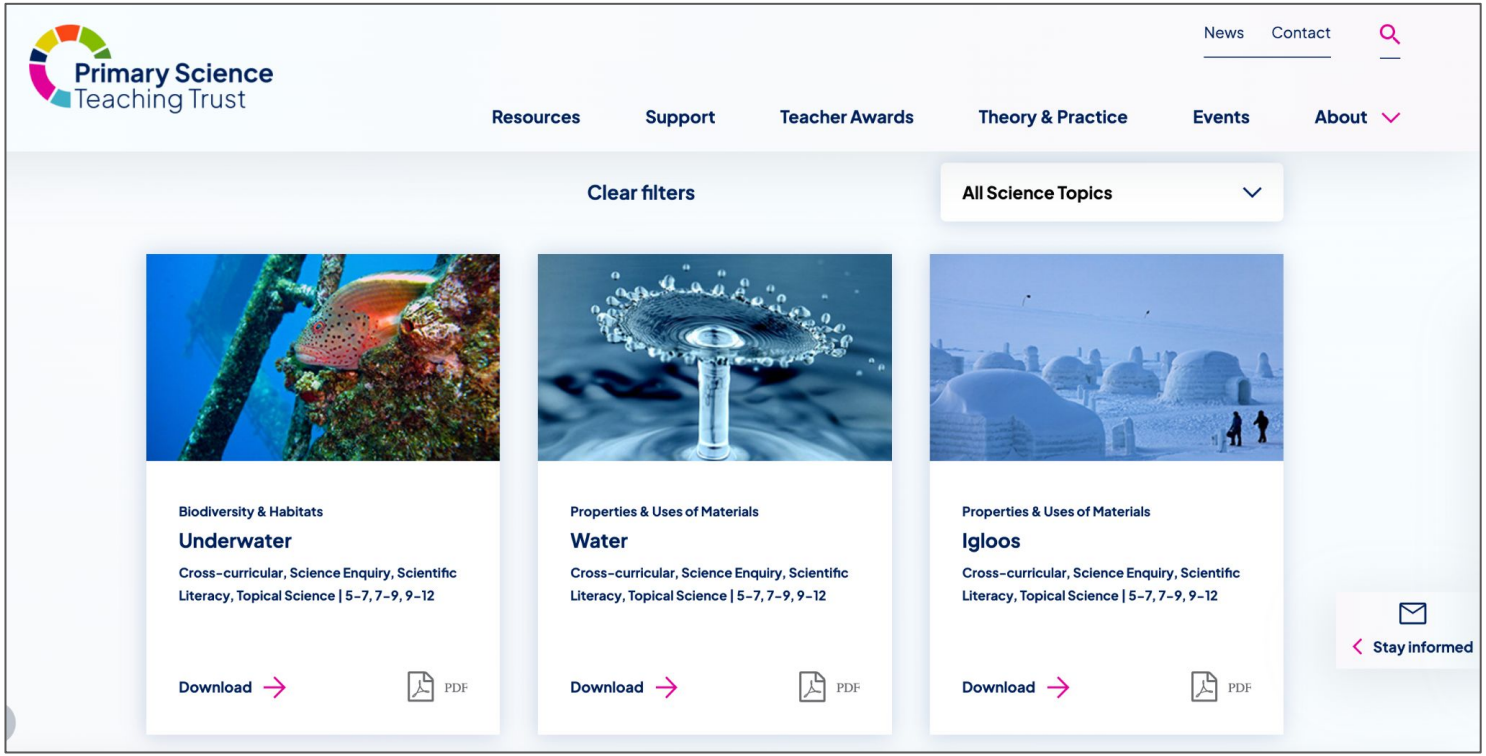
Pose carefully chosen questions about a picture to:

- construct explanations and link their ideas with evidence
- make confident challenges to the ideas of others
- explore scientific terminology and use it with genuine understanding

Pictures for Talk

IN PRIMARY SCIENCE

Supporting every educator
in every classroom



Which One Doesn’t Belong

Which One Doesn't Belong

How do we facilitate conversations that support access for **all** students?

Through activities that have them talking, thinking and showing what they know.

Which One Doesn't Belong

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in every classroom

Supporting Learning Outcomes in :

K-12 Science
K-12 Social Studies
K-9 Français langue première et littérature
K-12 Physical Education and Wellness
K-12 Math
K-12 ELAL

Which One Doesn't Belong

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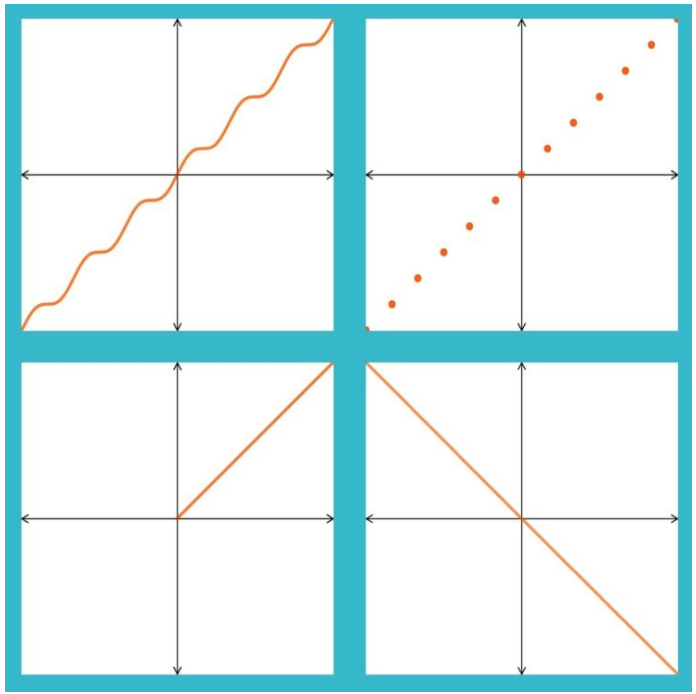
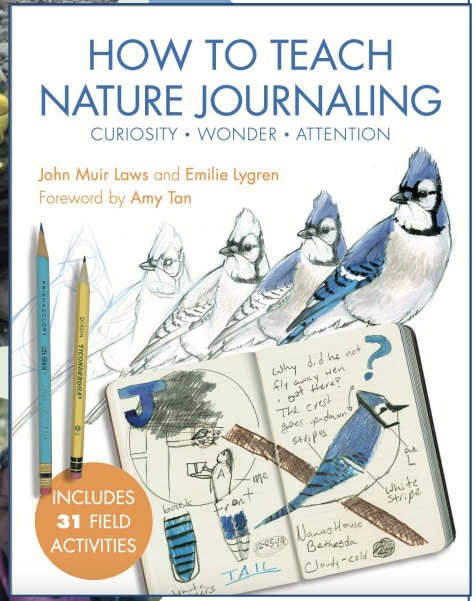
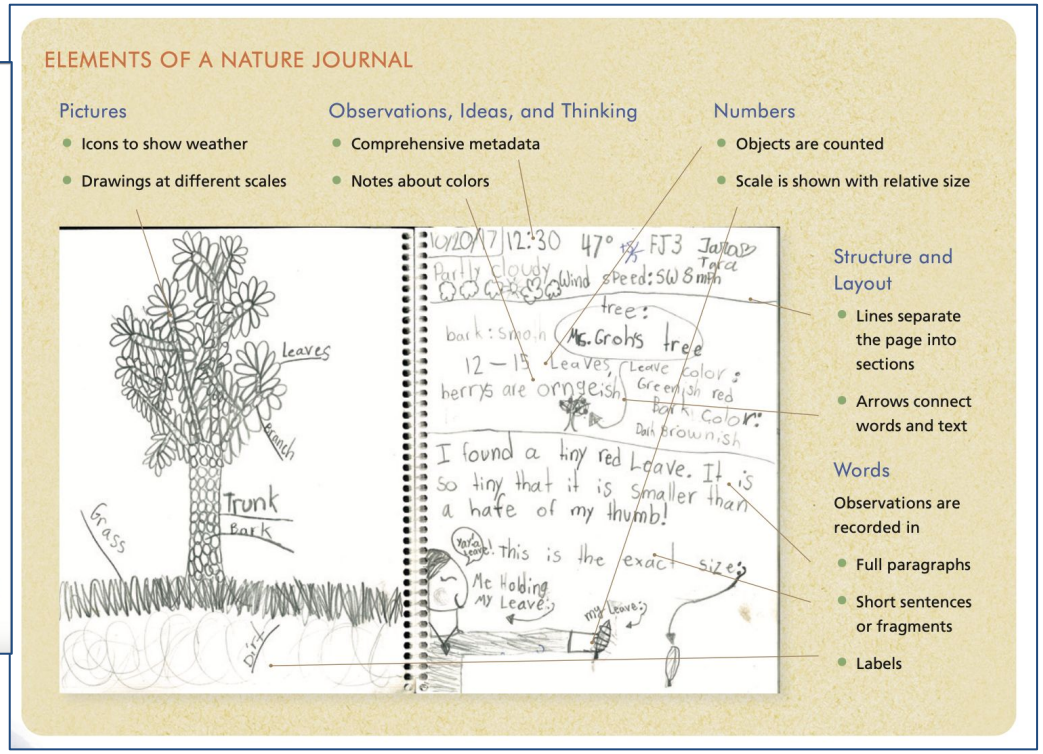
in every classroom



What do you think?

What ideas do you have for facilitating conversations about scientific concepts among your students?





Journals are windows into students' observations, questions and thinking. The criteria in this image can be your single-point rubric, or a general form of evidence you may include in your triangulation of data collected from students.

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APLC Post Session Survey

Thank you for attending this session. To help us enhance the delivery of future sessions, we ask that you please complete this short survey.

Your feedback is important and appreciated!

Note: Your survey will be submitted anonymously.

Survey:
https://aplc.ca/survey/?id=15077

Let’s talk more….

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