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.

Resources HERE! Just Click & Collect.

https://bit.ly/projectbasedscience
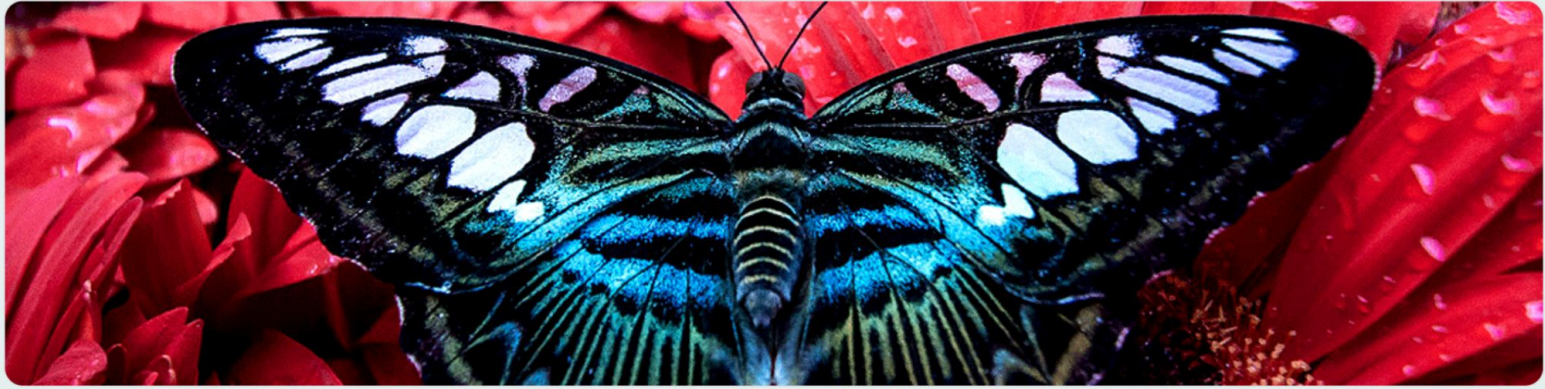
Project-Based Science People

Would you like to be connected with other teachers who are working to implement project based learning into their science classrooms? Add your name to the form below and you will be introduced to others in your grade level who just might become your co-planner BFF.

CLICK HERE!

[Join the LIST of Project-Based Science People](#)

When you see this icon, it's time for ACTION.

So grab a pencil, or open a new doc.

With a simple suggestion for a thinking organizer, YOUR TURN opportunities will give you a moment to think, write, and plan.

If you are watching the recording, you may want to pause on these spots for an amount of time that works for you.

Consider a Thoughtbook?

According to *the Critical Thinking Consortium…*

"Thoughtbooks are different from notebooks, which are used to record what students have learned, and from journals, which are used to record students' reactions to what they have learned. They have three defining features."

➢ **They are a response to genuine inquiries**. Students build on their own ideas.

➢ **They are ongoing and iterative.** "How has what I have just learned informed, altered, or challenged my thinking?"

➢ **They involve reflective and investigative thinking.** *Think back* to review, critique and test, and *think forward* by imagining, hypothesizing and extending ideas and plans.

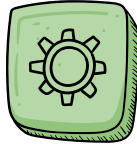[source](#)
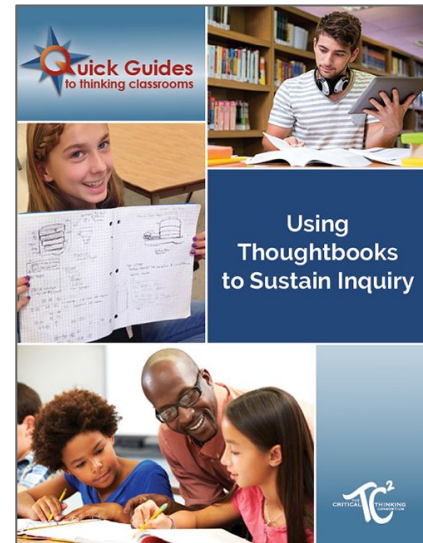
Designing the Learning

Step 1

Work from the Learning Outcomes. At its core, the project is focused on important KUSPs to understand the concepts.

Step 2

Driving Question for Critical Inquiry. Make students think critically by "problematizing" the issue. They need to make a judgment at the end.

Step 3

Design the Project or Critical Challenge. What product or performance will students communicate their response to the issue?

Step 4

Make a Project Map, focussed on *assessment for learning* opportunities. Be open-minded to pit-stops along the way.

Step 5

Plan for embedded ROUTINES and competency building.

Language Matters: *What do we mean when we say… ?*

1 **Project-Based**

Project Based Learning is a process that engages students in learning important knowledge and skills through a critical inquiry that is designed and structured around authentic questions and carefully designed products and learning tasks.

2 **Critical Inquiry**

Critical inquiry means responding to a provocative question that requires a reasoned judgment. Critical inquiry questions and tasks call for careful reasoning about relevant information in light of set of criteria.

3 **Assessment**

Assessment can be an opportunity to motivate, build confidence and point learners in the direction of their targets and goals. In this session, assessment is meant AS and FOR learning so that students can be engaged in their process and the power of their role as learners.

How do we come up with project ideas?

Developing an Idea for a Project

Consider your Scope

- Start small to begin
- How much time?
- How many subjects?
- Where will students have voice?

Foundations

We all have foundations or non-negotiables in our classrooms. What school/district expectations do you need to work within?

Community

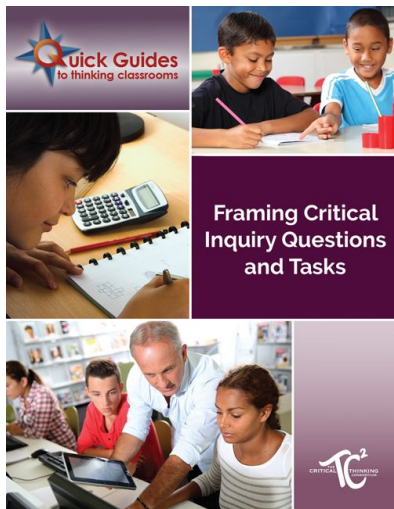Is there a way you can include a field trip or guest speaker within your project?

Inspiring Action

What's relevant and interesting to your students? This is often an avenue into a motivating experience that can be connected with curriculum.

The Critical Thinking Consortium TC2

[Frames for Innovation & Critical Thinking](#)

PBL Works Project Site:
[Filtered for Science-based projects grades 3 - 8](#)

Ready for Anything

How can we keep our communities safe and prepared for natural hazards?

Grade
3-5

Subjects
Science, ELA

Estimated Duration
19-23 instructional hours

Key Content
earth systems, natural hazards, regional climates, informational writing, communication

Interdisciplinary Projects that Live Beyond the Classroom
[Filtered for Science based projects for grades 3 - 8](#)

[Learning how to see](#)

Step 1

Work from the Learning Outcomes. At its core, the project is focused on important KUSPs to understand the concepts.

As you read through curriculum, ask yourself:

"Which are the **more complex** outcomes - the ones where students need to show **in-depth understanding** or **apply** what they're learning?"

These are the best candidates for projects.

"Is there an **issue in your community** that merits investigation and might inspire students to do something about it?"

"What problems or **challenges are faced by people** in the business and industry, the arts, agriculture, services, professions, or government?

	MATTER	ENERGY	EARTH SYSTEMS	LIVING SYSTEMS	SPACE	COMPUTER SCIENCE	SCIENTIFIC METHODS
Grade 4	Managing waste materials	Forces affect objects without contact from a distance	Interconnection of systems to sustain life	External structures of organisms support survival	Objects in space and their connection to Earth	Design to resolve a problem	Evidence collection to expand and advance knowledge
Grade 5	Solids, Liquids and Gases	Forces affect living things in air and water	Climate and its effects on weather and agriculture	Internal systems of organisms support biological processes and systems	Observing and interpreting astronomical phenomena	Design to achieve desired outcome or purpose	Gathering evidence and the importance of ethics
		Energy resources					
Grade 6	Heating and cooling solids, liquids and gases	Forces and interactions lead to physical changes	Factors affect climate change, impact on Earth	Characteristics and components of and within ecosystems	Represent celestial bodies of solar system	Design abstraction, impact of computers, coding and technology	Role of explanation in Science
		Use of energy resources		**"Topic Board"**			

Join the Chat to Brainstorm

I will start with an idea or two that comes from curriculum in a few organizing ideas.

Please use the chat to jump in with your ideas as well.

Let's go!
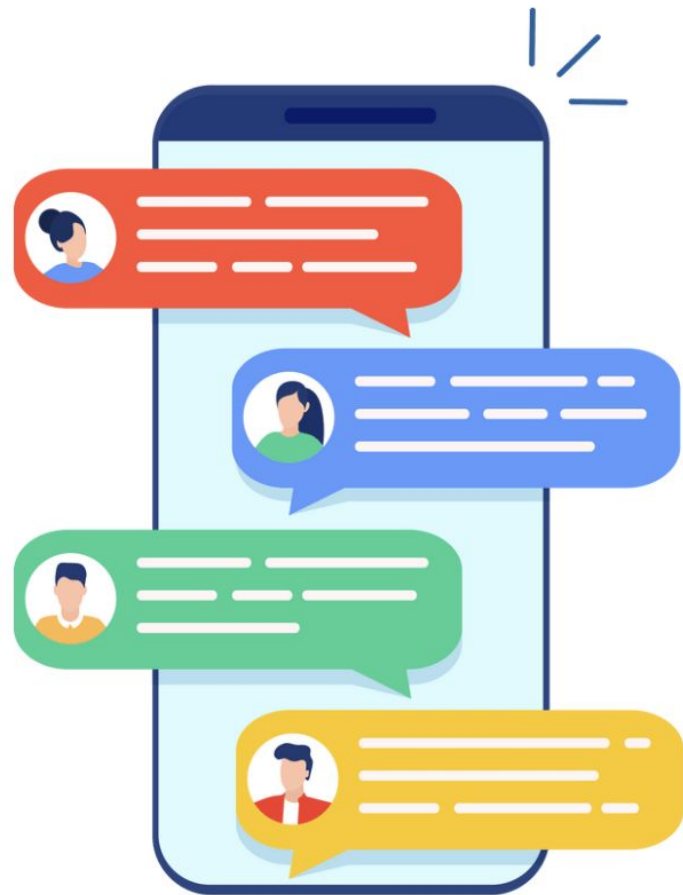
Project ideas we generated today!

Ideas from our chat:
- Go visit the Epcor Water Treatment Plant
- Have an elder come in to talk about indigenous ways of respecting the earth and using/giving back to Mother Earth
- Alberta Environment speaker -
- Research the landslide in BC... would incorporate Fist Nations knowledge (area was named "blocks water"), as well as fish biologists, and animals biologists,
- Jasper Wildfire - how it influences surrounding water quality, and glaciers
- ... and how firewalls can prevent devastation of the forests, community
- Then and now comparisons of an ecosystem, or a here and there comparison.
- Climate, agriculture, food security
- jasper Fire how can we help recovery?
- Divide your class into teams-have a bucket of water at the start line and one at the end. Label each student as trees, animals, grass etc. Blindfold your students and then they each have a cup and they have to pass the water from the front bucket to the last one. Then say forests are taken away (pull that student) out and the students have to adjust passing the water without trees, keep pulling elements so they can see how everything is connected.
- Cycling crops, nutrient deficiencies and how to adjust/improve naturally
- A positive spin for pipelines that currently exist in AB. What are the regulations that Alberta already has in place to protect our natural environment.
- How a growing city changes the environment for wildlife... find photos of before and after... when I was a kid... Edmonton ended at Northgate... when I moved to Clareview... there was no development of Walmart and the housing

EARTH SYSTEMS	
Interconnection of systems to sustain life	
Climate and its effects on weather and agriculture	
Factors affect climate change, impact on Earth	

Science > Grade 4

💡 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.

Earth's systems interact with one another, resulting in environments that sustain life.

Earth's surface is warmed by the Sun, allowing for life.

Caring for water and water sources is a shared responsibility.

Earth's systems are interconnected and can be impacted by small changes.

Conservation can impact land, natural resources, and organisms.

Many First Nations, Métis, and Inuit practise traditional methods of conservation, including taking only what is needed.
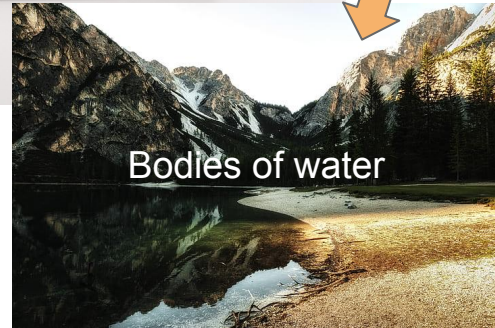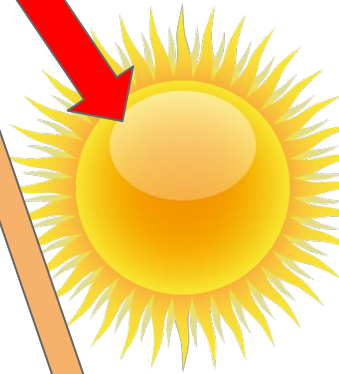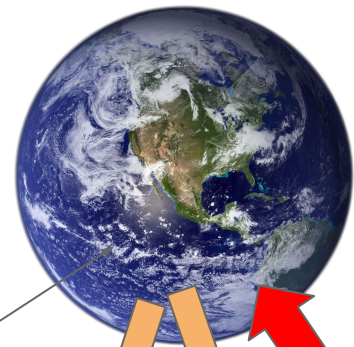
a set of things working **together as parts** of a mechanism or an interconnecting network.

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"

systems

Bodies of water

landforms

https://modelsofexcellence.eleducation.org/projects/advocating-water

Teaching a PBL Unit on Water Transformed Our Students' Learning

Create your own wetland project

https://wce-education.ducks.ca/index.php/en/projects

Select Curriculum That Could Inspire a Project
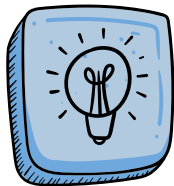
YOUR TURN

Idea 1	Idea 2

Driving Question for Critical Inquiry. Make students think critically by "problematizing" the issue. They need to make a judgment at the end.

"A project without a Driving Question is like an essay without a thesis."

PBL in the elementary grades

Criteria for a Great Question:
★ Students understand it and find it interesting
★ It requires in-depth inquiry and higher level thinking
★ In order to answer it, students need to learn important content

```
What adaptations do
animal species make in
order to survive in
various habitats?
OR
Could a dog live in
the desert? Which is
the best place?
```

What is required to sustain life?

How are the Earth's spheres connected?

What happens when change occurs in a system?

Wind, water, glaciers, Badlands

What is the relationship between the land and the sun?

What is our relationship with the systems of water on Earth?

What about other places?

Senses, observations, data collections

Cause and effect

Key Concepts: SYSTEMS INTERCONNECTIONS

Growth and change over time... when I was young...

Interconnections happen because the world is **connected**.

We are all connected. Our actions, our responsibilities

The Critical Thinking Consortium TC2

[Frames for Innovation & Critical Thinking](#)

Decode the Puzzle

Students suggest and justify a proposed solution, explanation or interpretation to a confusing or enigmatic situation.

Critique the piece

Students assess the merits/shortcomings of a person, product or performance (which may be teacher-generated or student produced).

Judge the better or best

Students judge from among two or more options (teacher provided or student generated) which meets the identified criteria.

Rework the Piece

Students transform a product or performance in light of additional information or an assigned focus, perspective genre etc.

Perform to Specs

Students perform or undertake a course of action that meets a given set of criteria/conditions.

Design to Specs

Students develop a product that meets a given set of criteria/conditions.

Slide source: Garfield Gini-Newman, TC2

FRAMES
FOR INNOVATION & CRITICAL THINKING

1. DECODE THE PUZZLE
Students suggest and justify a proposed solution, explanation or interpretation to a confusing or enigmatic situation.

2. JUDGE BETTER OR BEST
Students judge from among two or more options (teacher provided or student generated) which meets the identified criteria.

3. PERFORM OR DESIGN TO SPECS
Students perform or undertake a course of action that meets a given set of criteria/conditions, to educate, entertain, or persuade.

4. REWORK THE PIECE
Students transform a product or performance in light of additional information or an assigned focus, perspective, genre, etc.

5. CREATE
Design something original and useful within a subject area (art, song, poem, tool, or solution to a problem).

6. RE-CREATE
Re-work something for a new purpose or context beginning from an original design.

7. CURATE
Gather together selections of works (poems, paintings, artifacts) for an exhibit, anthology or digital collection.

8. IMAGINE DIFFERENTLY
Develop an imaginative response to a new or old problem by approaching the issue in a new way or by putting a twist on an old way.

Developed by the Critical Thinking Consortium TC2 - https://tc2.ca/
Check out the Quick Guides to Thinking Classrooms:
Framing Critical Inquiry Questions and Tasks

Decode the Puzzle

Students suggest and justify a proposed solution, explanation or interpretation to a confusing or enigmatic situation.

Look at the curriculum on LearnAlberta. What puzzles can be created to help students tackle outcomes?

★ Design an object that can fly, or move independently through water. (G5 energy)

★ What is the most dangerous natural climate event? (G5 or 6 Earth systems)

★ How do we explore and understand what's in outer space? (G4 - 6 space)

Judge the better or best

Students judge from among two or more options (teacher provided or student generated) which meets the identified criteria.

Look at the curriculum on LearnAlberta. What judgments can be created to help students tackle outcomes?

★ What combination of materials creates the strongest barrier against water?

★ Which organism is most likely to live the longest? (without becoming extinct)

★ Which agricultural practice is the most sustainable?

Design to Specs

Students develop a product that meets a given set of criteria/conditions.

Look at the curriculum on LearnAlberta.
What products can be created to help students tackle outcomes?

★ Design and build a terrarium that can grow local plants.

★ Design a museum model to help the community understand how the spheres work and are connected.

★ Create an interactive model to represent a human biological system (digestive, respiratory, circulatory, musculoskeletal)

Perform to Specs

Students perform or undertake a course of action that meets a given set of criteria/conditions.

Look at the curriculum on LearnAlberta. What performance can be created to help students tackle outcomes?

★ Create a 3 minute speech that persuades us to care more about waste management.

★ Build a mousetrap racer to identify the forces and respond to questions during its interactions.

★ Construct a device that can float, and carry a load.

Critique the piece

Students assess the merits/shortcomings of a person, product or performance (which may be teacher-generated or student produced).

Look at the curriculum on LearnAlberta. What critique can be created to help students tackle outcomes?

★ Look at the local government parties and their platforms. Provide an assessment of each party's merits and shortcomings according to our criteria for natural resource management.

★ Discuss advantages and disadvantages of using renewable and non-renewable energy resources.

★ Provide a report card on your city's response to climate change.

Rework the Piece

Students transform a product or performance in light of additional information or an assigned focus, perspective genre etc.

Look at the curriculum on LearnAlberta. What transformation of a product can be created to help students tackle outcomes?

★ Visit the local museum and recreate an exhibit to demonstrate your learning about Indigenous ways of connecting with the land.

★ Design a low, cost housing project for people in the community using only locally available natural resources. Adjust with new information and insight from users.

★ Redesign your ride to school to make it faster, more comfortable and energy efficient.

Draft Project Ideas That Connect to Curriculum

Idea 1

Idea 2
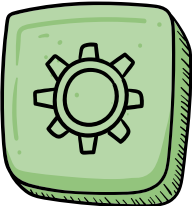
Step 3

Design the Project or Critical Challenge. What product or performance will students communicate their response to the issue?

Make a copy to use!

Designing an Engaging Critical Challenge			
Guiding Question:			
Learning Outcome(s):			
Knowledge, Understanding, Skills & Procedures			
Focus on the concepts identified	**Competencies practiced through this learning:**	**Design an engaging *Critical Challenge* that invites students to apply and demonstrate their learning with consideration for authentic purpose and/or audience.**	**Criteria for Success:**
❏ ❏ ❏ ❏ **Demonstrate a *reasoned response* to the inquiry by taking action:** Choose: ❏ Create ❏ Solve ❏ Perform ❏ Write ❏ Explain ❏ Curate ❏ Imagine & plan ❏ Critique ❏ Judge ❏ ----------	Choose: ❏ Critical thinking ❏ Problem solving ❏ Managing information ❏ Creativity and innovation ❏ Communication ❏ Collaboration ❏ Cultural and global citizenship ❏ Personal growth & well-being		❏ ❏ ❏

Be sure to consider criteria for success.
Better yet - Let the Students Help You!

Criteria for Success for the Critical Challenge/Project:
Students will:
❏ Reflect understanding of concepts
❏ transfer conceptual understanding to new context
❏ Demonstrate competency
*use these criteria to build your more specific rubric

Remember… we hope the project will:
➔ provide meaningful purpose for the learning
➔ engage students
➔ encourage development of important competences
➔ invite innovation and risk taking
➔ provide useful evidence for assessing curricular outcomes

The Project is *NOT THE DESSERT* that happens after the learning has occurred.

The Project becomes a Critical Challenge when it is the invitation to the journey!
You share out the invitation at the BEGINNING of the learning cycle, so students USE WHAT THEY LEARN to engage ALONG THE WAY.

The dessert at the end model.

Lesson   Lesson   Lesson   Lesson   Lesson

The engaging Critical Challenge THROUGH the learning model.

Inquiry   Inquiry   ...

Use what you learn as you go to add, change, adjust, build, refine, revise...

Project Path

What Students Think About:	Project Phase:	How Teachers Support Inquiry:
• What is the project asking me to do? • What do I need to know? • Why is this important? • Who will I be sharing my work with?	**Launch Project: Entry Event & Driving Question**	• Conduct entry event and present/co-construct driving question • Facilitate process for generating student questions
• What resources can and should I use? • Can I trust the information I am finding? • What is my role in the process? • How can I apply what I have learned to the project?	**Build Knowledge, Understanding & Skills to Answer Driving Question**	• Facilitate use and evaluation of resources • Provide lessons, scaffolds, and guidance in response to student needs
• What new questions do I have? • Do I need more information? • Is my work on the right track?	**Develop & Critique Products & Answers to the Driving Question**	• Help students apply learning to project tasks • Provide additional experiences to generate new knowledge and questions • Facilitate processes for feedback
• What should I explain about my work? • How can I best share this with others? • What have I learned and what should I do in the next project?	**Present Products & Answers to the Driving Question**	• Help students evaluate their work • Facilitate student reflection on process and learning

Revision

Link to template (sign in to a free account to view)

How might students use a thoughtbook to BUILD on ideas over time to be successful with their project/critical challenge?

How big of a change to your practice would it be to introduce the project at the beginning of the learning?

Step 4

Make a Project Map, focussed on *assessment for learning* opportunities. Be open-minded to pit-stops along the way.

Fishbone Diagram Template

"Where can I be **efficient and integrate**/combine to meaningfully connect other subject outcomes?"

Experience

Content

Content

Launch project with experience

Engaging, hands-on wherever possible

Dig deeper

Project

01 02 03 04 05

Project

Students Build on project ideas

Iterations, return to thoughtbook

Content

Questions

Like a fishbone template? Click here.
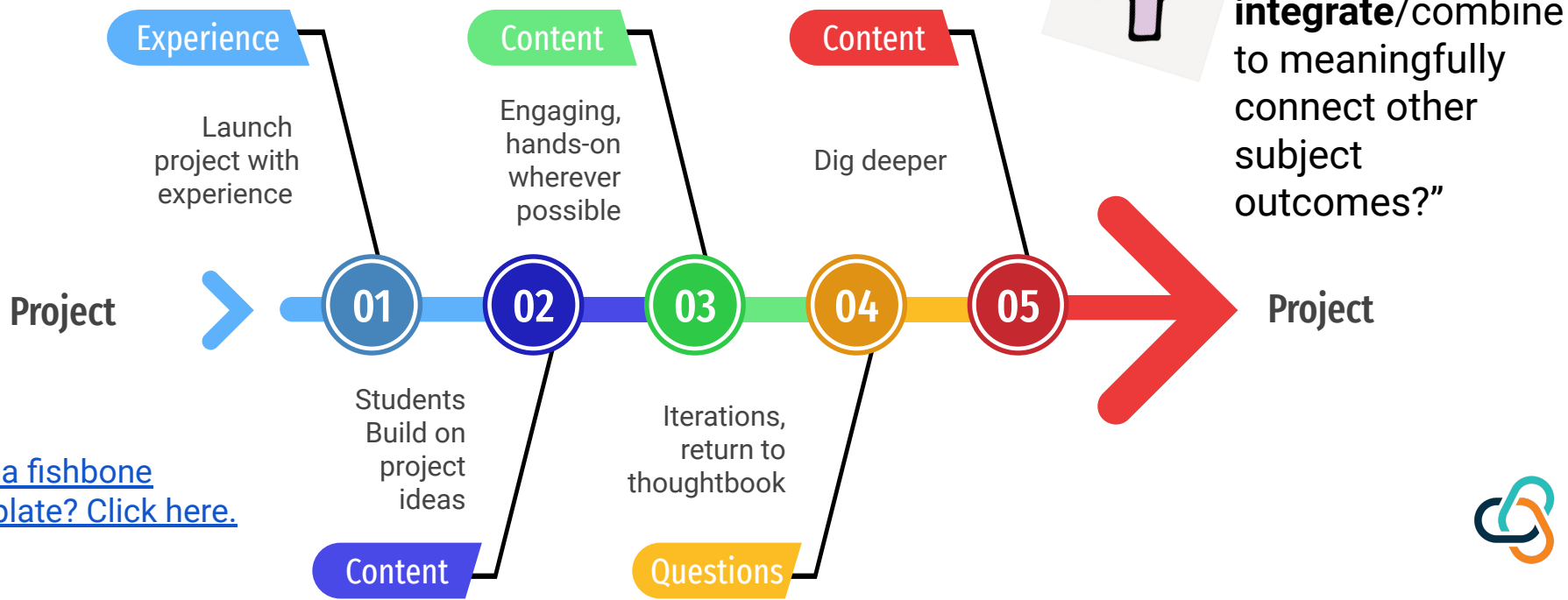
How might you plan to **gather enough evidence** of learning to **inform** your instruction along the way AND **ensure** the **evaluation** and reporting of learning outcomes are **fair and accurate** ?

Diagnostic pre-assessments identify strengths and needs in each essential skill and concept

Ongoing monitoring and documenting of students' products, experiences and performances to identify learning and learning gaps

End of learning assessment tasks using differentiated strategies and tools

Oral performance

Interview with teacher

Written product

Source: Adapted from Helen Hills 2016 as shared in Rebooting Assessment 2022, Figure 2.17

Assessment Sequence Map	Overarching Question:

Prior Experience & Knowledge

Ongoing Monitoring, Documenting & Feedback (Assessment As and FOR Learning)

Triangulated Assessment OF Learning (Evaluation)

Do (performance tasks) **Observations**

Write (tests, essays, projects, and so on) **Products**

Say (oral defense, conferencing, conversations, and so on) **Conversations**

[Click here for template](#)

PROJECT ASSESSMENT MAP

Click here for link to template
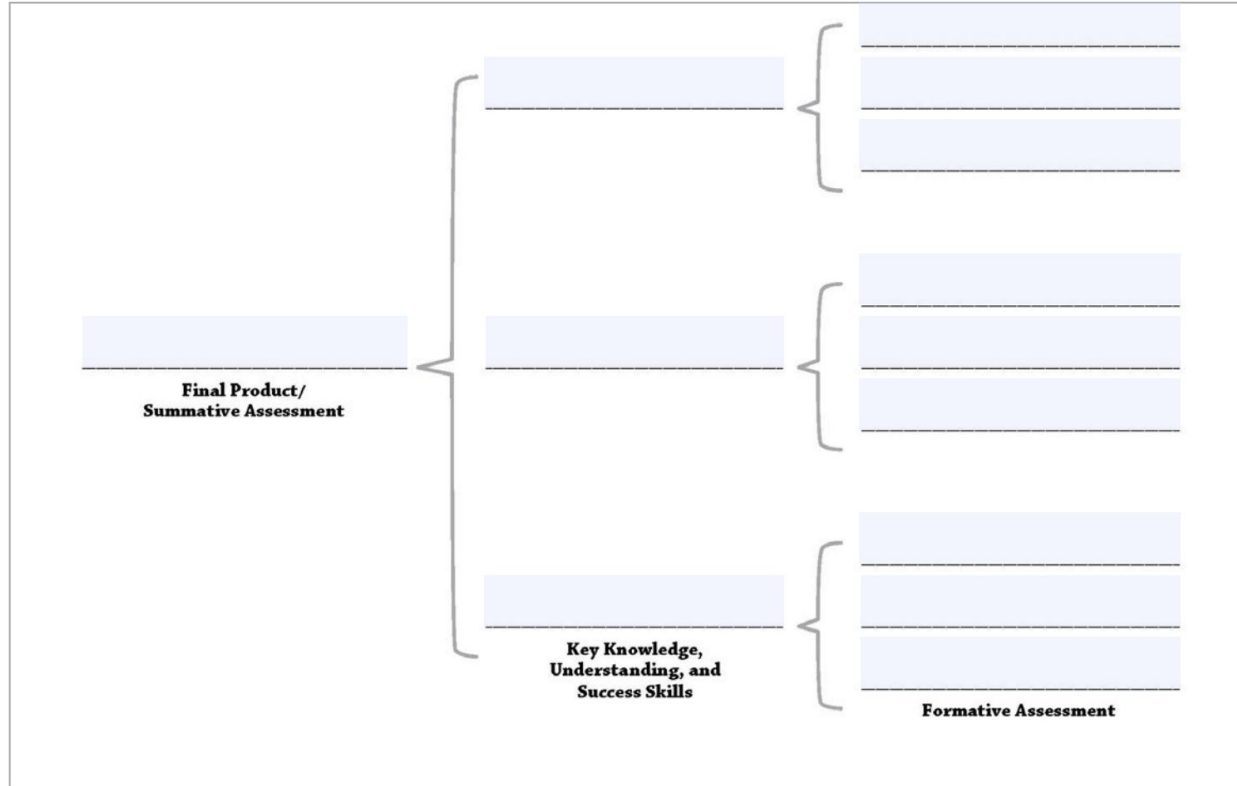
PROJECT PATH	THINKING ROUTINE	BRIEF ROUTINE OVERVIEW	EXAMPLE OF HOW TEACHERS HAVE USED ROUTINE IN PBL
LAUNCH	See Think Wonder	*Introducing / Exploring Ideas* Ideal for inquiry-based, close observations of photos, text, artwork, or other stimuli	*Entry event & need to know list.* A kindergarten teacher used artwork by a children's illustrator connecting to the driving question.
	Zoom In	*Introducing / Exploring Ideas* Close examination of a portion of an image to build a deeper understanding	*Entry event & need to know list.* A 6th-grade teacher used a historic photograph of the Holocaust to generate questions.
	Think Puzzle Explore	*Introducing / Exploring Ideas* Identifies current understanding, promotes curiosity, and allows for exploration of unknown questions	*Generating questions for NTK list and developing a plan* Middle school students initially did "Think" and "Puzzle" part to reflect and ask questions about citizenship and immigration. Then after teams and projects were introduced, began the "Explore" part of the routine.
	Generate Sort Connect Elaborate	*Synthesizing/ Organizing Ideas* Highlights one's understanding of a topic in a nonlinear way	*Generating questions for need to know list* After the entry event, a 3rd-grade teacher introduced the concept of "economics" in the Depression Era, making connections to a read-aloud.

Background table (partially visible):

PROJECT PATH	THINKING ROUTINE	BRIEF ROUTINE OVERVIEW	EXAMPLE OF HOW TEACHERS HAVE
LAUNCH	See T... Won...		
	Zoom...		
	Think... Expl...		
	Gene... Sort C... Elabo...		
BUILD KNOWLEDGE	+1 Ro...		
	Sente... Phrase-...		
	Micro... Proto...		
	The...		
DEVELOP AND CRITIQUE	What... You... Tho...		
	Chalk Talk	*Introducing / Exploring Ideas* Silent discussion on paper that invites all students to be active members of the learning process	critique and wrote a question at the center of the chalk talk. Other teams had a "silent" discussion about the question, giving suggestions and asking more probing questions.
PRESENT	I used to think.... Now I think	*Synthesizing / Organizing Ideas* A self-reflection tool to examine how one's thinking has changed or shifted over time	*Reflection and metacognition* Teachers used this routine after presentation day as a final reflection. Some teachers also include "What changed my thinking" to the routine in order to encourage students to provide evidence of their learning. Many teachers use this routine throughout the project as exit tickets and formative assessments.

[Click here for link to template](#)

Project Planner

☆ Add to my favorites

Start planning your next PBL project with confidence, using this step-by-step form as your guide.

Why is a project planner important?

When you're ready to design a project for your classroom, it's helpful to have a framework to capture your ideas and organize your plans.

A Gold Standard PBL unit has a lot of pieces to plan: your goals for student learning, entry event and driving question, major product(s) students will create, daily lessons, and more.

It's also a good idea for a school to use a common framework for PBL unit planning, so teachers can collaborate using the same language, and share projects more easily with colleagues.

PLANNING TOOL   BUCK INSTITUTE FOR EDUCATION
PBLworks

Project Planner

How to use the document: This planner offers guidance on how you might plan your daily lessons in the project calendar. Pick and choose what feels necessary to achieve the learning outcome and advance product development for all students.

1. Project Overview

Project Title	
Driving Question	
Grade Level/ Subject	
Time Frame	
Project Summary	
Public Product(s) Individual and Team	Note which products are individual or team and the product/performance's intended audience.

This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. It is designed by PBLWorks to be adapted by teachers and shared with students in the classroom.   www.pblworks.org   1

[Link to 2023 templates](#)

Learning Experience & Assessment Map

An **incomplete** planning map...

What is the relationship between humans and the changes happening on Earth?
Big idea: Interactions happen between things that are connected.

Summative Assessment Triangle (products/performances, observations, conversations)
- Students will create a museum artifact that demonstrates a significant Earth change
- Students will respond to questions about the relationship between humans and Earth changes.
- Students will be observed while engaged in experiences that reveal relationships between "parts"

Earth's surface, changes over time, observation skills, communication skills

Adopt a Tree or Sit Spot
Students will revisit their spot each month, drawing, noticing and writing/talking about changes they see. "What can we notice when we revisit the same spot?" How can we feel connected to Earth?

Unpack concept: Relationships
Help students make meaning. Examples and non-examples. Build it on a bulletin board that can grow and change in your space.

How do our senses help us understand our environment?
Capture video evidence of students using senses to describe various enviros. Now.. how about animals? Same? Different?

Get out into Nature
Plan a scientific journey to capture and document observations of changes on Earth. What will the evidence be? How do we know?

Data Tracking/math
Guide students to track and capture data (temps, wind, rainfall, floods, fires, etc.). Graph and display, expand vocabulary through guided talk. Ask about the data? Evidence?

Voice Through Art
Help students communicate their thoughts and feelings about the Earth, changes and their relationship. How can art communicate messages?

If.. Then…
Explore the concept of causation by learning about the landforms, layers (fossils), flow of water
Impact of sudden changes: earthquakes, floods, fires,

Literature Circles
Use questions to help students explore various genres and ideas presented through literature.

Always caring, never change.
Interview: Are there examples of things that should not change? What about how we care for the Earth and each other?

Music tells a story
Use your senses to draw, or paint, the story that is shared through various musical selections. Notice how music changes show up differently in your art.

What are the most powerful ways students can show what they know and understand through a variety of curricula?

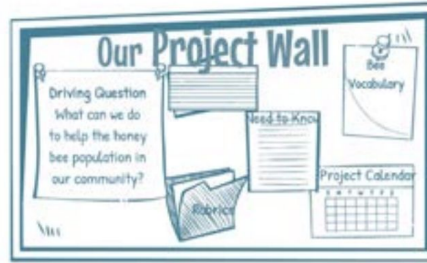**Take a few minutes to grab a template or two that appeals to your planning senses.**

Competencies

Our Project Wall

- ★ [Project Walls can help!](#)
- ★ Routine check-ins with Thoughtbooks. How has my thinking changed or grown? Look back - think forward.
- ★ Class and group agreements
- ★ Scaffold, chunk and make connections visible
- ★ Start small
- ★ Explicitly teach scientific methods and skills.

| 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. |

Scientific Methods: Investigation of the physical world is enhanced through the use of scientific methods that attempt to remove human biases and increase objectivity.

4

KUSPs

Ongoing collection of evidence provides a way to expand and adjust previous knowledge.

Represent evidence from an investigation in a variety of ways.

Conclusions drawn during investigation must be based on reliable and valid evidence.

Collect valid data by accurately using tools or technology during investigations.

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.

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KUSPs

KNOWLEDGE

Design process can be influenced by various factors, including
- safety
- functionality
- usability
- reliability
- efficiency
- aesthetics

Functionality is the quality of being useful to do the job for which something was designed.

Usability is the degree of ease with which something can be used to achieve an outcome.

Design processes that support the development of multiple iterations include
- enhancing
- refining

Design can be improved through collaboration.

UNDERSTANDING

Design can better meet needs through the development of multiple iterations.

SKILLS & PROCEDURES

Discuss examples of designs that have been enhanced or refined to better meet needs.

Evaluate an artifact based on various factors.

Design an artifact to meet a need.

Propose enhancements and refinements to an artifact in collaboration with others.

Develop multiple iterations of an artifact.

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.

🎓 KNOWLEDGE

The use of computers, coding, and technology can have impacts that are
- personal
- social
- environmental
- economic

Impacts of computers, coding, or technology may be intentional or unintentional.

⚙ UNDERSTANDING

Computers, coding, and technology can be used in ways that have positive or negative impacts.

🔧 SKILLS & PROCEDURES

Discuss how computers, coding, or technology have had impacts.

Predict possible impacts of computers, coding, or technology.

6 KUSPs

YOUR TURN

What questions do you have? Please feel free to raise your hand icon, use the chat, or pop on your mic.

https://arpdcresources.ca/consortia/project-based-learning-guide/

Resources are all HERE in this slide deck!
Just Click & Collect.

https://bit.ly/projectbasedscience

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