

# SHARED KNOWLEDGE SCIENCE CELEBRATION

## PLANNING GUIDE

### What is a Shared Knowledge Science Celebration?

- Combination of a science fair and a learning expo
- Focuses on nature and “science topics related to Indigenous Knowledge”
- Inquiry driven
- Knowledge is gained through observation, Elders, knowledge keepers, literature
- Students follow the 7E format (environment, engage, explore, Elders, explain, elaborate, evaluate)
- Students demonstrate ongoing learning through a science story journal (visual journal)
- Continual reflecting and questioning to support the inquiry development
- Embed First Peoples Principles of Learning

### Rationale

- Directly related to the Learning Standards in the science curriculum
- Increase awareness of, interest in, and attention to science for Aboriginal students
- Demonstrate the interconnectedness of science practices in our world around us using both traditional and western science practices
- Provide an opportunity for educators to build skills sets in inquiry planning, and authentic Aboriginal perspectives within the curriculum
- Cross curricular
- Embed First Peoples Principles of Learning

### Goals (Ministry of Education)

The BC Science curriculum contributes to students’ development as educated citizens through the achievement of the following goals. Students are expected to develop:

- an understanding and appreciation of the nature of science as an evidence-based way of knowing the natural world that yields descriptions and explanations that are continually being improved within the context of our cultural values and ethics

- place-based knowledge and experiences about the natural world in the area in which they live by accessing and building on existing understandings, including those of local First Peoples
- a solid foundation of conceptual and procedural knowledge in biology, chemistry, physics, and earth and space sciences that they can use to interpret the natural world and apply to new problems, issues, and events, to further learning, and to their lives
- the habits of mind associated with science – a sustained curiosity; a valuing of questions; an openness to new ideas and consideration of alternatives; an appreciation of evidence; an awareness of assumptions and a questioning of given information; a healthy, informed skepticism; a seeking of patterns, connections, and understanding; and a consideration of social, ethical, and environmental implications
- a lifelong interest in science and the attitudes that will make them scientifically literate citizens who bring a scientific perspective, as appropriate, to social, moral, and ethical decisions and actions in their own lives, culture, and the environment.

Shared Knowledge uses the 7E model rather than the stages of scientific inquiry in the BC curriculum, but to the same end. This demonstrates to the students that there is no one set of stages for scientific inquiry.

Environment - everything is connected to everything

Engage (Purpose) – get excited

Explore (Hypothesis) – learn about something

Elder - Sharing and teaching traditional knowledge, connecting the science

Explain (Procedure) – tell how it is done

Elaborate (Observations) – share your knowledge

Evaluate (Conclusion) – what did you learn

## Using the 7E Model

### *ENVIRONMENT*

Students take the opportunity to learn traditional ecological knowledge (TEK) through place based activities. The traditional understanding that “everything is connected to everything” (Haida translation) takes a deeper appreciation when students are learning about the land and the environment in which they are situated. Students learned various “science stories” that would help them to ground their knowledge.

Example Activity: nature walk, discuss what the land may have looked like 500 years ago – what animals, plants and structures.

### *ENGAGE (PURPOSE)*

A shared knowledge inquiry project embeds within the practice the First Peoples Principles of Learning. Each week incorporates, builds upon and weaves through the practice a sense of responsibility, historical importance and connectedness. Students become engaged through the week 1 activities and begin to question, build curiosity and thread together ideas to solve big ideas. Students focus on one area of curiosity (we used the four elements to help guide students: earth, air, water, fire).

Example Activity: Element Mystery Bags: in a bag place objects that represent the four elements (earth, air, water, fire). Have students explore each element and create a brainstorm in their journal showing how they are all connected.

### *Explore (Hypothesis)*

Students began to explore their area of learning by creating a list of questions and connecting those questions to big ideas. With text resources, internet and interviews, students began to learn how their questions were related and formulate a “story of understanding” around the science.

Example: What plants grow here now? Where did the other plants go? Why are there some plants that are poisonous and some that you can make medicine from? How do plants help people, animals, and the earth?

Complete Blackline Master: Engage and Explore, page 202.

### *ELDERS*

Students worked side by side with experts, elders and cultural facilitators to develop models and greater understanding around their topic big idea. Big ideas were narrowed down to specific interests and knowledge was shared through traditional storytelling and hands on experiences.

Complete Blackline Master: Daily Knowledge Check, page 208.

### *EXPLAIN (PROCEDURE)*

Students begin to develop their own plan for creating an understanding of their specific interest. They journal the learning, record the steps to creating the model

Complete Blackline Master: Explain and Elaborate, page 203.

### *ELABORATE (OBSERVATION)*

Students create their models with the on-going support of the Elders and cultural facilitators. Using traditional practices they are able to generate examples of

scientific models and explain how they are connected to their questions and big ideas. A celebration for parents, guests and peers occurs where students are able to showcase their learning, share ideas and represent their learning. “Achievement Acknowledgements” are presented to each student.

Example Activities: Shared Knowledge Celebration where the school, community, elders and families are invited to listen, learn and engage in the knowledge as presented by the students.

### *WEEK 12 - EVALUATE (CONCLUSION)*

Assessment is a facet of all school learning. In traditional practices that can be demonstrated through the sharing of knowledge and the creation of hands on examples. To address the formative assessment throughout the learning, students complete a daily work reflection. That reflection acts like a running record of ideas continually being generated, plan making and knowledge accumulated. At the end of the celebration, students will complete a summative assessment reflection/ rubric to show how their learning changed and how they connected the traditional knowledge to their own “science story.”

Complete Blackline Master: Evaluate and Reflect, page 204.

### **Suggested Assessment**

- Use a science journal to have students record their daily learning, drawings, and formative assessment practices.
- Use the BC Science Fair guidelines for project evaluation ([www.sciencefairs.ca](http://www.sciencefairs.ca))
- Create a student Bingo search for sharing projects (Bingo Card Generator App) – students go around and answer the question that are posed on the bingo sheet– go for a full card (example attached)
- Formative assessment probes – to be used throughout student learning as a means to begin weekly journal reflections

## Sample Ideas for Shared Knowledge Topics

- Plants: traditional medicines (pick one and learn how it is made)
- Plants: Cedar - why doesn't stripping the cedar bark harm the tree?
- Why is eagle important?
- How do you make moccasins?
- Traditional fishing practices in the ocean, rivers or lakes
- What are plant indicators?
- What kinds of tools are made for wood carving?
- What does the button blanket represent?
- Why does a canoe float?
- What is the moon?
- What is the sun?
- How are stars used to navigate?
- What is the importance of games? (for example slahal)
- How do you make a drum have different sounds?
- There were no fridges, how is food preserved?
- What are crests?
- Tanning hides
- How are cedar baskets made waterproof?
- How is a longhouse built without hammer and nails?
- What was paint made from?
- Coast Salish weaving (wool)
- Patterns and graphics - math
- Where do we catch fish
- Baskets - purpose
- Pine needle baskets
- Medicine pouches
- Eagle feathers
- Seasonal rounds/cycles
- Music – does the material change the sound?
- Salmon
- Sustainable gathering/harvesting – how much is too much?
- Water – what does it tell you?
- Pit house construction
- Harvest rotations
- Animal connections
- Land formations and place names
- Temperature control in traditional houses (pit house, long house, tipi, etc.)
- Uses of obsidian
- How dyes are made and used

## **Samples of Learning Standards (Curricular Competencies) addressed through a Shared Knowledge Science Celebration in Grades 5-9:**

### *QUESTIONING AND PREDICTING:*

- Demonstrate a sustained curiosity about a scientific topic or problem of personal interest
- Make observations in familiar and unfamiliar contexts
- Make observations aimed at identifying their own questions about the natural world
- Identify a questions to answer or a problem to solve through scientific inquiry

### *PLANNING & CONDUCTING:*

- Explore and pose questions that lead to investigations
- With support, plan appropriate investigations to answer their questions or solve problems they have identified
- Collaboratively plan a range of investigation types, including field work and experiments, to answer questions or solve problems they have identified

### *PROCESSING AND ANALYZING DATA AND INFORMATION:*

- Experience and interpret the local environment
- Demonstrate an openness to new ideas and considerations of alternatives

### *EVALUATING:*

- Identify some of the social, ethical, and environmental implications of the findings from their own and others' investigations

### *APPLYING AND INNOVATING:*

- Contribute to care for self, others, and community through personal or collaborative approaches
- Co-operatively design projects
- Transfer and apply learning to new situations

### *COMMUNICATING:*

- Communicate ideas, explanations, and process in a variety of ways
- Express and reflect on personal, shared, or others' experience of place

## Snapshot of Cross Curricular Connections

### *LANGUAGE ARTS*

- Identify how story in First Peoples' cultures connects people to the land
- Exchange ideas and perspectives to build shared understanding
- Think critically, creatively, and reflectively to explore ideas within, between, and beyond texts
- Construct meaningful personal connections between self, text, and world

### *MATHEMATICS*

- Engage in problem-solving experiences that are connected to place, story, and cultural practices relevant to the local community
- Explore, apply, and connect concepts to each other, to other disciplines, and to the real world
- Implement multiple strategies to solve problems in both abstract and real life situations using different cultural perspectives

### *SOCIAL STUDIES*

- Use Social Studies inquiry process and skills to: ask questions; gather, interpret, and analyze ideas; and communicate findings and decisions
- Explain different perspectives on past or present people, places, issues, and events, and compare the values, worldviews, and beliefs of human cultures and societies in different times and places

## Sample Learning Framework

Mary started with a very basic topic. She wanted to know how a real pair of moccasins were made.

This is her brainstorm to help guide her science story:

- What are moccasins made of?
- Where does the leather come from?
- How is the leather processed?
- What are the different styles of moccasin?
- How are moccasins held together?
- What are moccasins used for?
- Who wears moccasins?
- Are there different kinds of moccasins?

ENVIRONMENT: Mary's class went on nature walks, saw videos and pictures and heard stories about the land around the school.

ENGAGE: Mary picked something that interested her from one of the four elements. Her topic is moccasins (earth).

EXPLORE: Mary then decided to explore something more specific about moccasins. She wanted to explore how moccasins were made.

This is a broad question to begin with. Mary will explore and do research and eventually narrow down her question even more by asking more questions.

How are moccasins made? They are sewn and decorated by hand using a variety of objects found in nature or through trade – bone needles, beads, dyes, fur. They are sewn with animal hide and sinew.

This leads to the question, “How is animal hide prepared so that it can be used to make moccasins?” In order to get the hide to make moccasins, Mary will need to find out that an animal is hunted, killed, skinned, and then how the hide is prepared through a process called tanning. There are different ways of tanning hide to make leather.

By doing research, Mary now has more questions to answer. What type of tanning produces the best leather for making moccasins? Why do different types of tanning produce different types of leather? Why are some waterproof and some not? What chemical change takes place when tanning leather? This last question requires Mary to look into the science behind making leather. She would then need to explain how leather is prepared for making moccasins.

ELDER: By connecting with an Elder, Mary is able to learn the process for preparing a hide. The Elder is teaching her through experiential practice, story and guided instruction. Traditional knowledge is being shared and Mary is learning and retelling the Elder what she understands.

EXPLAIN: Mary is now able to connect her learning from the Elder and apply the knowledge to her science story. She can retell the steps, demonstrate and answer questions about what is happening during the preparation of the hide and the creation of the moccasin.

ELABORATE: Mary would then need to elaborate on her findings. She would use a model to show her learning. She can tan a hide on her own in order to see what traditionally would have been done for thousands of years. Mary can also use technology to create a movie, power point, or story that explains her learning.

EVALUATE: Lastly, Mary needs to evaluate what she has learned, and share her knowledge. Mary will reflect on her learning, completing a reflection in her science journal.

## **Suggested Assessment**

Formative assessment probes

- How are moccasins connected to the element “earth”?
- Will tanning a hide to make moccasins change the feel of the leather?

## **Resources Used**

White, Kelli. Knowledge Sharing Fair: An Inquiry Approach to Integrating Indigenous Knowledge into the Science Curriculum Grade 4-8, Greater Saskatoon Catholic Schools, 2010

Manitoba First Nations Education Resource Centre Inc; Manitoba First Nations Science Fair, 2015

## Engage and Explore

ENGAGE (Purpose)

Pick a topic from one of the four elements of a science story.

Earth

Air

Water

Fire

EXPLORE (Hypothesis)

Using your topic, what question do you want to explore?

## **Explain & Elaborate**

EXPLAIN (Procedure)

What do you need to know to answer your question? Brainstorm all the details that will help you gain your knowledge.

ELABORATE (Observation)

Make a model to show your learning. What materials are needed? What are the steps in creating your model?

## Evaluate and Reflect

EVALUATE (Conclusion)

What is your science story? Use the following to help you reflect.

- Did you read books?
- Did you meet with a knowledge expert?
- Did you ask questions?
- Did your question change as you learned more?
- How did you share your knowledge? Why did you share your knowledge this way?
- What would you do differently next time?
- What questions do you still have?

## Evaluate and Reflect Self-Assessment

Student Name: \_\_\_\_\_ Shared Knowledge: \_\_\_\_\_

Check all boxes that support your learning. Answer the questions in the space provided.

### Shared Knowledge in the Environment

I can make observations about the natural world.

I can identify the four elements:

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

I can experience and interpret the local environment using shared knowledge.

### Shared Knowledge Explorations

I can identify questions from each of the four elements:

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

I can explore and ask a specific question for my shared knowledge:

\_\_\_\_\_

## Shared Knowledge Explanations and Elaborations

- I can listen to an elder/knowledge keeper to gather ideas for my shared knowledge.
- I can apply my shared knowledge to teach someone else.
- I can design a project, find information and create a shared knowledge science story for others.
- I can reflect and communicate my ideas in different ways:
  - Science story journal
  - Video
  - Display board
  - Model
  - Other: \_\_\_\_\_

- I can share Aboriginal understanding and teachings in my shared knowledge science story.

Explain how you can share Aboriginal understandings:

## My new Shared Knowledge Science

What are a few important things you learned about your topic during your shared knowledge learning?

What do you still wish you knew about your topic?

What could you do differently in your learning next time you participate in shared knowledge?

What did you enjoy the most about your shared knowledge science celebration experience?

## Shared Knowledge Science Celebration Survey

Please answer the following questions.

I enjoyed learning from a knowledge keeper. YES or NO

Why or Why not?

I learned about some Aboriginal traditions and the importance of respecting the land.

YES or NO

I learned a little bit about my own identity and beliefs. YES or NO

I learned that shared knowledge is a part of stories and can be passed down from family. YES or NO

I learned that Aboriginal knowledge is important to science. YES or NO

I learned that shared knowledge takes time and my own learning depends on my actions. YES or NO

I think that shared knowledge is important to family, the land and the history of Canada. YES or NO

In the space below, please tell us something you have learned about Aboriginal knowledge in science.

# SHARED KNOWLEDGE SCIENCE CELEBRATION

## DAILY KNOWLEDGE CHECK

### **Topic - Engaged - Purpose**

What is my topic I am engaged in learning?

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### **Knowledge Finding - Explore - Hypothesis**

What did I learn today?

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What do I still need to learn?

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What do I still want to learn?

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### **Knowledge Creating Explain - Procedure**

How can I explain my learning?

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Is there a model I can make that shows my knowledge?

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## **Knowledge Sharing - Elaborate - Observations**

How will I share my knowledge?

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## **Knowledge Celebration - Evaluate - Conclusion**

Reflect on the learning you have done...

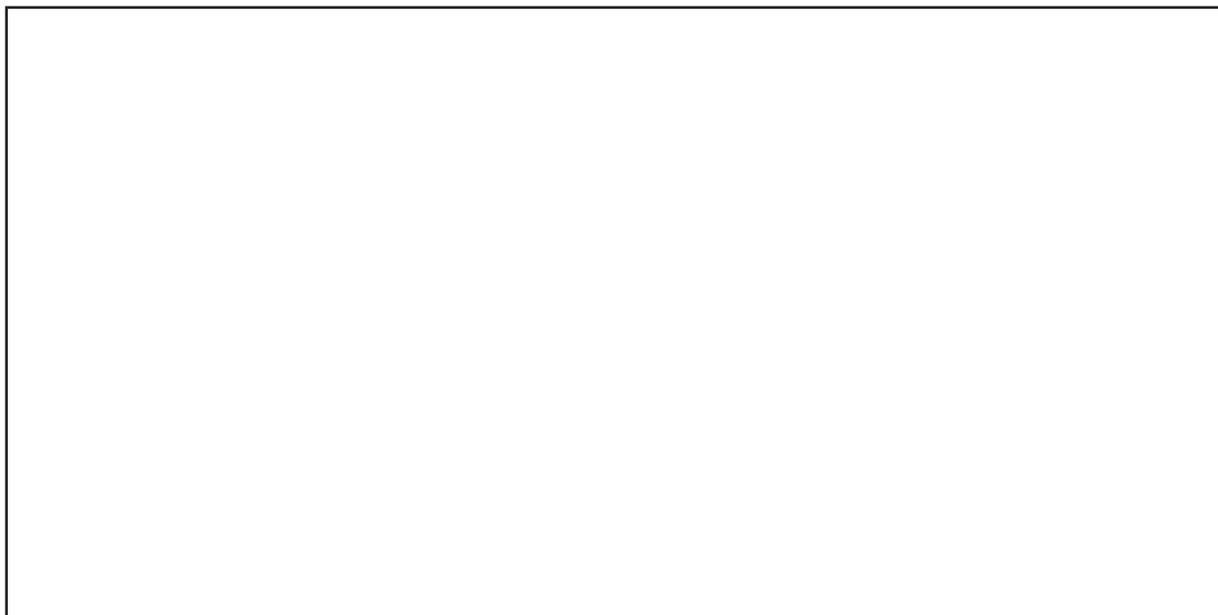
How will I use this knowledge and apply it to something new?

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Draw a picture of what you have learned

A large empty rectangular box with a black border, intended for drawing a picture of what the student has learned.

## Shared Knowledge Science Celebration Bingo

Medicine was made of...	A female fox is called...	I read a traditional story about....	Another name for a longhouse is a ...
I know three names of shapes used in art	I learned how a dreamcatcher is made	Find one presentation from each of the four elements	A traditional story about a volcano is
Shared knowledge for all science stories begins with the e_____	The traditional story about the frog girl is ....	Shared knowledge is ...	Fire was started using...
A traditional story about the seasons is...	Animals are used for ...	A musical instrument can be made of ...	The animals and activities found in spring are

# Shared Knowledge Science Celebration Bingo Call List

This is a Bingo call list for the example on the previous page

A traditional First Nations story about the seasons is...

Medicine was made of ...

A traditional story about a volcano is...

A musical instrument can be made of...

The animals and activities found in spring are...

Find one presentation from each of the four elements

A female fox is called a...

I learned how a dreamcatcher is made.

Fire was started using...

I know three names of shapes used in art.

Shared knowledge for all science stories begins with the e\_\_\_\_\_

Animals are used for...

I read a traditional First Nations story about...

Shared knowledge is ...

Another name for a longhouse is a ...