Salicin (Willow Bark)

Learning Objectives:

- Students will understand the traditional Indigenous use of willow bark as medicine
- Students will learn scientific extraction methods and laboratory safety procedures
- Students will explore connections between traditional knowledge and modern medicine

Curriculum Expectations:

- *First Nations, Métis, and Inuit Governance in Canada Curriculum Expectations*
  - Page 281 Grade 12 D 4.4
- Overall Expectation D4
  - *D4. The International Context: demonstrate an understanding of the commonality of issues affecting Indigenous peoples both in Canada and around the world, with particular reference to self-determination, sovereignty, self-governance, human rights, and traditional Indigenous knowledge.*
- Specific Expectation D4.4 Page 281
  - *Analyse the impact of technological advances on Indigenous peoples in Canada and around the world (e.g., with reference to information and communications technology; technologies relating to resource exploration and extraction, surveillance, medical science, trade and finance, transportation) Sample questions: "How do advances in communications technology enable governments to monitor the activities of individuals and groups? What impact can such monitoring have on Indigenous peoples?" "In what ways can advances in information and communications technology support cooperation and*

- Grade 12 Chemistry Curriculum Expectations:
- Overall Expectation A1 (Page 106)
  - *A1. demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating);*
- Overall Expectation A2 (Page 107)
  - *A2. identify and describe careers related to the fields of science under study, and describe the contributions of scientists, including Canadians, to those fields.*
- Specific Expectations A1.2/A1.5 (Page 106)
  - *A1.2: select appropriate instruments (e.g., glassware, calorimeter, thermometer) and materials (e.g., chemical compounds and solutions), and identify appropriate methods, techniques, and procedures, for each inquiry*
  - *A1.5: conduct inquiries, controlling relevant variables, adapting or extending procedures as required, and using appropriate materials and equipment safely, accurately, and effectively, to collect observations and data*
  - *A2.2 describe the contributions of*

*knowledge sharing between Indigenous communities and advocacy groups on a global scale?" "What is the relationship between Indigenous knowledge systems and Western and/or Eastern approaches to medicine? **In what ways are developments in Western medical science compatible with traditional knowledge? In what ways are they incompatible**? What is the significance of this relationship for Indigenous peoples?" "How might technology enhance economic/financial progress in Indigenous communities in Canada and in other countries around the world? How might technology hinder economic progress in these communities or endanger traditional ways of life?"*	*scientists, including Canadians*
Extraction/Retrieval	
• Collection of the willow bark, ideally a knowledge keeper will come with us and demonstrate the procedure of harvestingincluding the smudge afterwards to provide the students with the importance of respecting the wildlife.	• This ideally would occur during early spring, this is the habitual harvesting time for willow bark.
Opening	
• If the collection is not completed through a outing then the teacher can collect the willow bark and have a knowledge keeper come in and perform the post-harvest ritual. • Begin with a land acknowledgement and a discussion of our local willow trees. • Introduction to Indigenous traditional medicine and the importance of willow bark • Safety briefing for laboratory work	• Willow Bark Introduction
Main Activity	

• Demonstration of proper willow bark harvesting techniques (with respect for the tree) • Laboratory extraction of salicin using scientific methods • Discussion of the connection between salicin and modern aspirin	• Traditional Indigenous Willow Bark Preparation • Aspirin Synthesis
Consolidation	
• Group reflection on the integration of traditional knowledge and scientific methods • Discussion of environmental stewardship and sustainable harvesting practices • Student reflective journals connecting Indigenous knowledge with scientific practice	• Reflection
Extra Information	

• Methods of harvesting willow bark:
  ○ https://windspeaker.com/buffalo-spirit/wonders-willow-bark
• General uses of willow bark:
  ○ https://www.mcgill.ca/oss/article/medical-history/sordid-medicine-shows-exploited-indigenous-cures	

Reflection:

During the presentation and feedback session, I had multiple suggestions to reflect upon. The first addition was the inclusion of Ojibwe/Anishinaabe terminology for the willow tree, acknowledging the importance of Indigenous languages and ideally deepening students' cultural understanding. This modification is a small step that helps to achieve the goal of respectfully integrating Indigenous knowledge systems into the curriculum.

some colleagues had concerns about potential student absences and the experience lost. Though this will always be an issue, I have developed a strategy that acknowledges the unique

structure of this two-part lesson. Since the traditional medicine making and laboratory components occur on separate days, students who miss either session can be accommodated through individual make-up sessions. The emphasis on reflection rather than content mastery makes this approach feasible, as the primary learning outcomes focus on understanding the cultural significance of willow bark and its transformation into modern medicine.

My largest point of reflection coming from the peer feedback was the opportunity to expand this lesson into a three-way cross-curricular collaboration. While many colleagues suggested integrating multiple subjects like art and chemistry with Indigenous studies within their own lessons, I identified a particularly promising connection with biology. By partnering with biology teachers, we are able to incorporate student-led presentations by biology students on aspirin's physiological effects, medical applications, and potential side effects. This addition would create a more comprehensive learning experience while providing biology students with presentation practice and chemistry students with valuable pharmaceutical context.

I believe having small group presentations (four presenters to four listeners) would provide intimate learning environments that encourage meaningful dialogue and peer feedback. This structure supports both complete reflection and the development of communication skills. This idea is something I will definitely try to utilize moving forward, and of course continue refining the balance between traditional knowledge and modern scientific understanding in my teaching practice.