

**Ch'oondaii eenjit Gwanzḥḥḥ:
Medicinal Plants
Teachers Manual**



<https://culturalconnections.gi.alaska.edu/>

Mahsi' choo (thank you):

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Authors: Grace Angivran Moore-Anderson, Virginia Peter, Marilyn Savage, Mary Beth Solomon, Debra VanDyke, Susan Solomon, Charles Harriman

Language Consultants: Marilyn Savage, Paul Herbert, Sam Alexander, Virginia Peter

Design, Graphics, and Layout: Katherine Bendall

Science Editor: Lisa Strecker

English Editor: Kaz Storm, Ankana Chaudhuri

Education Researcher: Sean Asikluk Topkok



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Dear High School Teacher,

Thank you for using the Cultural Connections to Alaska Science Medicinal Plants activity kit in your classroom! This kit is designed to address the Athabascan values, as well as the Gwich'in learning framework, Kheegwadadhaak'a' "We just keep the fire going", Science Standards for Alaska, Alaska Cultural Standards, and Next Generation Science Standards. Teaching this kit in full will provide 9th- to 12th-grade students with an understanding of photosynthesis, cellular respiration, homeostasis, a variety of medicinal plants in the Yukon Flats, and the preparation/use of medicinal plants. *We recommended using this resource and implementing these activities during a time of year when plants are growing, and it is safe to explore outside.* **This guide is for educational purposes and contains information on medicinal plants and their uses; it is not intended to be a guide for self-medication or commercial use.** This Teacher's Manual includes key vocabulary related to medicinal plants in Dinjii Zhuh K'yàa, the language of the Gwich'in who have inhabited Interior Alaska for millennia. Activity-based assessments are provided for your convenience. We encourage you to work collaboratively with the bilingual educator in your school to teach these lessons, as all include Alaska Native language elements.

NOTE: *Within the Ch'oondaii eenjit Gwanzhìh: Medicinal Plants curriculum, the value of spruce is emphasized. Activity 3 materials require **ts'ìivii zhàl** (spruce tips). Since there is a small window of opportunity to harvest spruce tips, it would be advantageous to collect **ts'ìivii zhàl** during your region's gathering time. **ts'ìivii zhàl** can be kept fresh by vacuum-sealing or using self-sealing bags and storing in the freezer until use. Another alternative would be to ask Elders/community members whether they have **ts'ìivii zhàl** and whether they would be willing to share it with the class. You will need approximately one tablespoon of **ts'ìivii zhàl** for every one cup of water. Plan harvest according to how much you intend to prepare.*

Established goals:

- Students develop an understanding of the medicinal and non-medicinal uses of local plants in the Yukon flats area, including the types of plants and how to prepare them.
- Students are introduced to photosynthesis, cellular respiration, and homeostasis.
- Students become knowledgeable about the parts of a spruce tree and their uses.
- Students read, write, and speak Gwich'in terms relevant to medicinal plants and their uses.

Targeted Frameworks, Values and Standards:

Athabascan Values:

- Knowledge of Language
- Sharing
- Respect for Others
- Cooperation
- Respect for Elders
- Respect for Nature
- Responsibility to Tribe

Gwich'in Learning Framework- Kheegwadadhaak'a' "We just keep the fire going":

- Dinjii Zhuh K'yaa- Gwich'in Language
- t'aii- Personal power
- gwiizhi- Knowledge
- Dinjii Zhuh Gwitr'it Tr'igwiheel'ee/Tr'igwihil'ee- Gwich'in values
- duulee ginlii- Becoming proficient in skills or subject as a young man/woman

Science Standards for Alaska:

HS-LS1-3.

Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.] [Assessment Boundary: Assessment does not include the cellular processes involved in the feedback mechanism.]

HS-LS1-5.

Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. [Clarification Statement: Emphasis is on illustrating inputs and outputs of matter and the transfer and transformation of energy in photosynthesis by plants and other photosynthesizing organisms. Examples of models could include diagrams, chemical equations, and conceptual models.] [Assessment Boundary: Assessment does not include specific biochemical steps.]

HS-LS1-7.

Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed, resulting in a net transfer of energy. [Clarification Statement: Emphasis is on the conceptual understanding of the inputs and outputs of the process of cellular respiration.] [Assessment Boundary: Assessment should not include identification of the steps or specific processes involved in cellular respiration.]

Alaska Cultural Standards:

- A. Culturally-knowledgeable students are well-grounded in the cultural heritage and traditions of their community. Students who meet this cultural standard are able to:
- 3) acquire and pass on the traditions of their community through oral and written history
 - 4) practice their traditional responsibilities to the surrounding environment;
 - 5) reflect through their own actions the critical role that the local heritage language plays in fostering a sense of who they are and how they understand the world around them;
 - 6) live a life in accordance with the cultural values and traditions of the local community and integrate them into their everyday behavior.

- B. Culturally knowledgeable students are able to build on the knowledge and skills of the local cultural community as a foundation from which to achieve personal and academic success throughout life. Students who meet this cultural standard are able to:
- 1) acquire insights from other cultures without diminishing the integrity of their own;
 - 2) make effective use of the knowledge, skills and ways of knowing from their own cultural traditions to learn about the larger world in which they live;
 - 3) make appropriate choices regarding the long-term consequences of their actions.
- C. Culturally knowledgeable students are able to actively participate in various cultural environments. Students who meet this cultural standard are able to:
- 1) perform subsistence activities in ways that are appropriate to local cultural traditions.
- D. Culturally knowledgeable students are able to engage effectively in learning activities that are based on traditional ways of knowing and learning. Students who meet this cultural standard are able to:
- 1) acquire in-depth cultural knowledge through active participation and meaningful interaction with Elders;
 - 3) interact with Elders in a loving and respectful way that demonstrates an appreciation of their role as culture-bearers and educators in the community;
 - 4) gather oral and written history information from the local community and provide an appropriate interpretation of its cultural meaning and significance.
- E. Culturally knowledgeable students demonstrate an awareness and appreciation of the relationships and processes of interaction of all elements in the world around them. Students who meet this cultural standard are able to:
- 2) understand the ecology and geography of the bioregion they inhabit;
 - 3) demonstrate an understanding of the relationship between worldview and the way knowledge is formed and used;
 - 4) determine how ideas and concepts from one knowledge system relate to those derived from other knowledge systems;
 - 8) identify and appreciate who they are and their place in the world.

Next Generation Science Standards:

HS-LS1-3 From Molecules to Organisms: Structures and Processes

Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

HS-LS1-5 From Molecules to Organisms: Structures and Processes

Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.

HS-LS1-7 From Molecules to Organisms: Structures and Processes

Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

Activity 1: Ch'oondaii eenjit Gwanzhìh Vocabulary

Overview:

In this lesson, students will be introduced to vocabulary and play a vocabulary card game to learn Gwich'in language terms related to medicinal plants and their uses, with an emphasis on spruce.

Time:

45 minutes-1 hour (1 class period)

Materials:

- Vocabulary card template set (1 per group)
- Timers (optional)
- Gwich'in pronunciation guide (available at: <https://culturalconnections.gi.alaska.edu/vocab/> and scroll down to the "Ch'oondaii eenjit Gwanzhìh: Medicinal Plants" tab to access the online pronunciation guide.
- iPads or computers
- Markers or colored pencils
- Scissors
- Instruction Sheet: Word Games (1 per group)
- **Student Worksheet: Ch'oondaii eenjit Gwanzhìh Vocabulary**
- **Ch'oondaii eenjit Gwanzhìh Crossword Sheet**
- **Ch'oondaii eenjit Gwanzhìh Word Scramble**

Standards Addressed:

Athabascan Values: Knowledge of language, sharing, respect for others, cooperation
Gwich'in Learning Framework Kheegwadadhaak'a': Dinjii Zhuh K'yaa Gwich'in language, gwiizhì knowledge
Science Standards for Alaska: HS-LS1-5
Alaska Cultural Standards: A.5, B.2, E.2
Next Generation Science Standards: HS-LS1-5

Objectives:

The students will:

- recognize, read, and say Gwich'in vocabulary terms related to medicinal plants;
- use local Indigenous language words to describe the world around them;
- follow instructions to play vocabulary learning games;
- work cooperatively, responsibly and respectfully with peers when playing vocabulary games;
- identify what undergoes photosynthesis; and
- use a computer to achieve competency in pronouncing Gwich'in vocabulary terms.

Background Information:

Based on the Visual Iñupiaq Vocabulary Acquisition (VIVA) Program of the North Slope Borough School District, these vocabulary cards have both the Iñupiaq and English terms. The games suggested are meant to promote fluency through repeated practice. Other vocabulary cards can be easily integrated into the games. This will extend the potential length of the games and add a greater challenge. By working with the words through different games, students can develop greater fluency with the Gwich'in vocabulary. Gwich'in, or Dinjii Zhuh K'yàa, is the heritage language of the Gwich'in.

Assessments:

Vocabulary fluency game observations and the student worksheet responses provide a means of assessing student ability to:

- use local heritage language to help them understand plants and their medicinal and non-medicinal uses, as well as different phrases using the vocabulary words;
- make effective use of the knowledge, skills and ways of knowing embedded in the Gwich'in language to learn about the larger world in which they live by associating Gwich'in words with their English counterparts;
- identify traditional medicinal plants and their Gwich'in and English names;
- hear, read and speak Gwich'in language terms;
- cooperate and share with peers;
- follow instructions;
- identify what undergoes photosynthesis.

Student use of the online pronunciation guide provides a means of assessing student ability to:

- Use a computer to get information.

Activity Preparation:

1. Pronunciation and spelling of Alaska Native terms can vary depending on the dialect spoken within a community. Ask your local Alaska Native language teacher or a local speaker to check the vocabulary cards and multimedia to ensure they are accurate for your community. If possible, collaborate with the Alaska Native language teacher in your school to teach this activity.
2. Familiarize yourself with the Gwich'in vocabulary in the Medicinal Plants Student guide so you can support students' pronunciations. Visit <https://culturalconnections.gi.alaska.edu/> and scroll down to the "Ch'oondaii eenjit Gwanzhìh: Medicinal Plants" tab to access the online pronunciation guide.
 - Make enough copies of **Student Worksheet: Ch'oondaii eenjit Gwanzhìh Vocabulary**, **Ch'oondaii eenjit Gwanzhìh Crossword Sheet**, and **Ch'oondaii eenjit Gwanzhìh Word Scramble** for your students.
3. *If implementing this activity with younger students, consider spreading this activity over two days.*

Activity Instructions:

1. Read pages 1-6 of the Medicinal Plants Student Guide as a class. Ask students to share their own experiences or understanding of plants and different types they know about or use in their lives. Ask them specifically about spruce and if they use it.
2. On page 4, after reading about photosynthesis and looking at the formula, look at the photosynthesis graphic and identify the different parts of the photosynthesis formula. Ask students what is different or missing from the photosynthesis graphic that is found in the photosynthesis formula. **Answer: glucose.**
3. On page 6, after reading about photosynthesis and cellular respiration on pages 4 and 5, have students look at the graphic showing the side-by-side comparison of photosynthesis and cellular respiration. As a class, discuss why photosynthesis is shown only in the daytime. What words are familiar on the graphic, and what words are new on the graphic? Help explain some of the new terms to help students further understand photosynthesis and cellular respiration.
 - Stomata: More information on stomata on page 8. The stomata are openings on a plant's leaves or needles that allow for gas exchange. Plants can regulate the opening and closing of the stomata. It is an important structure that helps plants regulate their functions and maintain a balanced internal environment, despite external conditions.
 - Transpiration: The process of water releasing from plant parts in the form of a vapor into the environment.
 - Glycolysis: The process in which glucose is broken down to produce energy.
 - TCA Cycle: The tricarboxylic acid cycle (TCA) is a series of chemical reactions to generate energy that occurs in the mitochondria.
 - OXPPOS: Oxidative phosphorylation (OXPPOS) is another process that plants undergo to produce energy in the mitochondria.
 - Photoassimilates: Carbohydrates (sugars) that plants produce during photosynthesis.
 - Biosynthesis: the production of complex molecules within living organisms or cells.
4. Ask students to try the online Gwich'in Vocabulary Pronunciation Guide at: <https://culturalconnections.gi.alaska.edu/vocab/>, scroll down to the "Ch'oondaii eenjit Gwanzhijh: Medicinal Plants" tab to access the online pronunciation guide. Use this to learn how to pronounce Gwich'in words related to medicinal plants, or invite a local speaker to your classroom to help the students learn to pronounce the terms.
5. Show students the vocabulary card templates. Hold up each card. Say the Gwich'in word on the card. Ask students to repeat the word. Discuss what each card means and what it should depict.
6. Divide the class into groups of four.
7. Provide each group with a Vocabulary Card Template set, blank index cards and colored pencils. Using the template cards as an example for spelling and reference, ask students to use their blank index cards to practice writing the Gwich'in words on one side and the English words on the other. To help them make connections to the Gwich'in word, have them draw a picture depicting the word on the Gwich'in side. Encourage students to be creative and draw something that helps them remember the words.

8. After students have illustrated the cards, provide each group with a printout of the Word Games Instruction sheet, a stack of vocabulary cards, and a timer (optional).
9. Students can commit to one game for a period of time or mix and match.
10. Provide time for each group to play through the games.
11. Discuss as a class: Which games were hard to do with only a few Gwich'in words in your vocabulary? What games did you enjoy most? What words were difficult to learn, no matter what game you played?
12. Collect the vocabulary card templates handed to groups to be reused in the future or to have for a student if they lose their set.
13. Distribute the **Ch'oondaii eenjit Gwanzhijh Crossword Puzzle**, the **Ch'oondaii eenjit Gwanzhijh Word Scramble**, and the **Student Worksheet: Ch'oondaii eenjit Gwanzhijh Vocabulary**, and ask students to complete them. The top of the sheet reads "Shoozri' _____ oozhii" which translates to "my name is ____".
Please note: If the local dialect is different than that provided on the cards, please revise the cards and worksheet answer key accordingly. Provide review as needed, and if you need to revise the crossword, it was generated here: <https://worksheets.theteacherscorner.net/make-your-own/crossword/>, and the website to generate the word scramble is here: <https://www.education.com/worksheet-generator/reading/word-scramble/>
Note: In the crossword, the glottal (looks like an apostrophe) counts as a space; additionally, spaces in words get their own box.
14. Ask students to share the words they learned with their families/parents and find out if families have other words to share that are related to the topic of Medicinal Plants.
15. Consider asking students to practice the vocabulary words or play a vocabulary game for 10-15 minutes each day while teaching the Medicinal Plants unit.

Connections and Extensions:

- Take a forest walk with students to find spruce trees and practice the Gwich'in terms for parts of the tree. Have students bring their vocabulary card and list. iNaturalist is an app that can help with plant identification.
- Ask students to create their own word games to help each other learn new Alaska Native words.
- Lead a discussion about how language is important to a culture and how we study past and present civilizations and their languages to understand the world around us. Indigenous language revitalization is important for all generations. Watch this Alaska Native Language Center video about the importance of language revitalization and individuals' duty to learn and speak their Native language: <https://www.channelfilms.com/work-samples/v/m89csgecapkd3zn4fcyca4s8mpyera>. While this video is focused on UAF and upper-level content, it illustrates the importance of language and features Sam Alexander from Fort Yukon.
- Create a Focus Wall in your classroom by printing the vocabulary terms and posting them on the wall, along with spruce and plant images and other key concepts and ideas from the activity kit. If students learn different terms from their families and community, the wall can be expanded.
- Create a Kahoot or Blooket to help students learn and practice vocabulary words.

Vocabulary List:

Gwich'in	English
Ts'iivii	Spruce
Ts'iivii jil	Small spruce
Dzih tł'uu	Spruce gum/pitch
Dzih nahdrin	Clear spruce gum/pitch
Ts'iivii daadzàl	Spruce cones
Ts'iivii ah'	Spruce boughs
Khàii	Spruce root
Deek'ii	Dried spruce branch/twig
Ah gât	Spruce needles
Ts'iivii aatr'ii	Outer spruce bark
Ts'iivii zhàl	Spruce tips
Gwanzhìh	Plant
Lidii maskit	Muskeg tea/Labrador tea
K'aii	Willow
Ch'oo'eezhų'	Lichen
Gwanzhìh nidjìltsi' daagàjì	Yarrow
Nitsih	Rosehip
Tł'oo dàak'a'	Fireweed
Ch'iveedzèe	Mushrooms
K'ii	Birch bark
T'aa	Cottonwood
Ch'ùh	Charcoal
Ch'oondaii	Medicine
Dzih ch'oondaii	Spruce gum/pitch medicine
Lidii	Tea
Teedhahzhraa	Steam
Ch'oondaii diikak t'arah'in	Medicine put on skin/salve
Ch'oondaii chuu niljì tr'iinii	Medicine/fluid taken by mouth
Gwattat darahchaa	Bandage
Ch'oondaii vaa tr'iizhak	Medicine to breathe in
Traa daagàjì	Dried wood
Dachan daalii	Green wood
Daa'ol	Driftwood on shore
Teelyaa	Driftwood afloat in water
Ko'	Fire
Khài hèe	In/during winter
Shin	Summer
Drin	Day
Tq̄q̄	Night
Aih	Snowshoes
Khài tyah	Basket made from spruce roots
Ts'iivii chàn	Shelter made from spruce
Gwinzjì gwarandaii nan tsan.	We live good from the land.

Ch'oondaii eenjit Gwanzh̄h	Medicinal plant
Ts'iivii n̄l̄n.	I see a spruce tree.
Dzih keegwaal'in.	I am looking for spruce pitch.
Lidii maskit eenjit chuṭ aṭvir.	I am boiling water for Labrador tea.
Ts'iivii ch'oondaii al̄tsii.	I am making spruce medicine.
Lidii ts'iivii yin̄than.	I want spruce tea.
Shoozri' oozhii.	My name is ____.
Ch'oondaii eenjit Gwanzh̄h ts'à Nan.	Medicinal plants and you.
Gwanzh̄h Adagogwaandaii	Plants sustain themselves

Local Language Word or Phrase	English
	Spruce
	Small spruce
	Spruce gum/pitch
	Clear spruce gum/pitch
	Spruce cones
	Spruce boughs
	Spruce root
	Dried spruce branch/twig
	Spruce needles
	Outer spruce Bark
	Spruce tips
	Plant
	Muskeg tea/Labrador tea
	Willow
	Lichen
	Yarrow
	Rosehip
	Fireweed
	Mushrooms
	Birch bark
	Cottonwood
	Charcoal
	Medicine
	Spruce gum/pitch medicine
	Tea
	Steam
	Medicine put on skin/salve
	Medicine/fluid taken by mouth
	Bandage
	Medicine to breathe in
	Dried wood
	Green wood
	Driftwood on shore
	Driftwood afloat in water

	Fire
	In/during winter
	Summer
	Day
	Night
	Snowshoes
	Basket made from spruce roots
	Shelter made from spruce
	We live good from the land
	Medicinal plant
	I see a spruce tree
	I am looking for spruce pitch
	I am boiling water for Labrador tea
	I am making spruce medicine
	I want spruce tea
	My name is _____
	Medicinal plants and you
	Plants sustain themselves

Ts'iivii daadzàl Spruce cones	Ts'iivii zhàl Spruce tips
Khàii tyàh Basket made from spruce roots	Ts'iivii Spruce tree
Lidii maskit Labrador tea	Dzih tl'uu Spruce pitch/gum

Ts'iivii ah' Spruce bough	Gwattat darahchaa Bandage
Ch'oondaii Medicine	Lidii maskit eenjit chųų alvir. I am boiling water for Labrador tea.
Gwanzhıh Plants	Ts'iivii ch'oondaii altsii. I am making spruce medicine.

Instruction Sheet: Word Games

VOCABULARY SWAP

1. Distribute one card to each person.
2. Practice the word on your card, then find a classmate. Teach them the word on your card and learn the word on their card. Trade cards.
3. Find another classmate and repeat.

FIND THE CARD

1. Divide into small groups. Each group will need a set of vocabulary cards. Spread the cards in front of you so that everyone in your group can see the English word side.
2. Listen as your teacher says a Gwich'in word aloud from one of the cards.
3. Work with your group to find and hold up the correct card.
4. *Variation* Turn student cards English-side down and have the teacher hold up an English word and students hold up and say the corresponding Gwich'in word.

VOCABULARY SLAP

1. Select one student to serve as the "caller" for this game. That student should make a list of Gwich'in vocabulary words on a separate sheet of paper. The words can be found on the index cards students made or in the vocabulary card template.
2. Place the cards in a circle, English-side-up, in the middle of the playing area.
3. The caller should call out a word from their list. Everyone else should quickly and CAREFULLY place their hand on the translation that they believe represents that word.
4. Turn over the card or cards that students selected to see who chose correctly. Each student who placed his or her hand on the correct card earns a point.
5. Put the card(s) back in the circle and play again.
6. Play for a designated period of time. At the end of the time, the person with the most points wins.
7. Students should rotate who the "caller" is as they play.

TEAMWORK

1. Divide your group into two teams. Each team will need a pencil and paper.
2. Shuffle the vocabulary cards and place them English-side up in the middle of the table.
3. Work with your team to write down the Gwich'in word for the card.
4. After both teams have written answers, turn the card over to check. Teams get 1 point for the correct Gwich'in word.
5. Repeat until all cards are gone. The team with the most points wins.
6. Variation: Place the cards Gwich'in side-up and write down the matching English word.

ACT IT OUT

1. Shuffle the vocabulary cards and deal them out to each player. Keep your cards a secret!
2. Take turns acting out your cards using motions and sound effects, but no words.
3. Whoever guesses the Gwich'in word first takes the card as a point.
4. The game is over after all cards have been acted out.
5. Optional: Add a timer to the mix! See if you can get your classmates to guess the word in 30 or 60 seconds.

Answer Key:

1. Ts'iivii, Gwanzhìh $6 \text{ CO}_2 + 6 \text{ H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{ O}_2$
2. Drawing should depict boiling water for Labrador tea
3. I am making spruce medicine

Crossword Puzzle and Word Scramble Answer Key: below

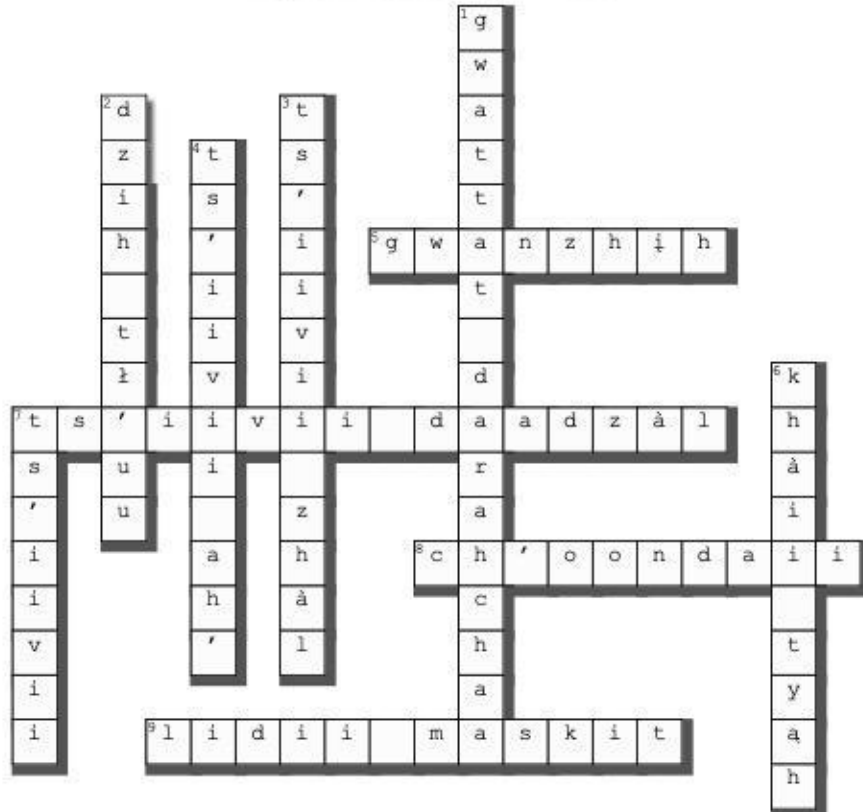
Ch'oondaii eenjit Gwanzhìh Word Scramble

ahhzwìng	<u>gwanzhìh</u>
iitsvii dlaaàdz	<u>ts'iivii daadzàl</u>
cohiodian	<u>ch'oondaii</u>
idiil iksmta	<u>lidiì maskit</u>
ttgaatw arhachada	<u>gwattat darahchaa</u>
dzhi uułt	<u>dzih tì'uu</u>
iivtsii zlàh	<u>ts'iivii zhàl</u>
tiiviis ah	<u>ts'iivii ah'</u>
kiiàh htay	<u>khàiì tyah</u>
vtsiìii	<u>ts'iivii</u>

Name: _____

Ch'oondaii eenjit Gwanzhijh: Medicinal Plants

Complete the crossword puzzle below



Across

5. Plants (gwanzhijh)
7. Spruce cones (ts'iivii daadzàl)
8. Medicine (ch'oondaii)
9. Labrador tea (lidii maskit)

Down

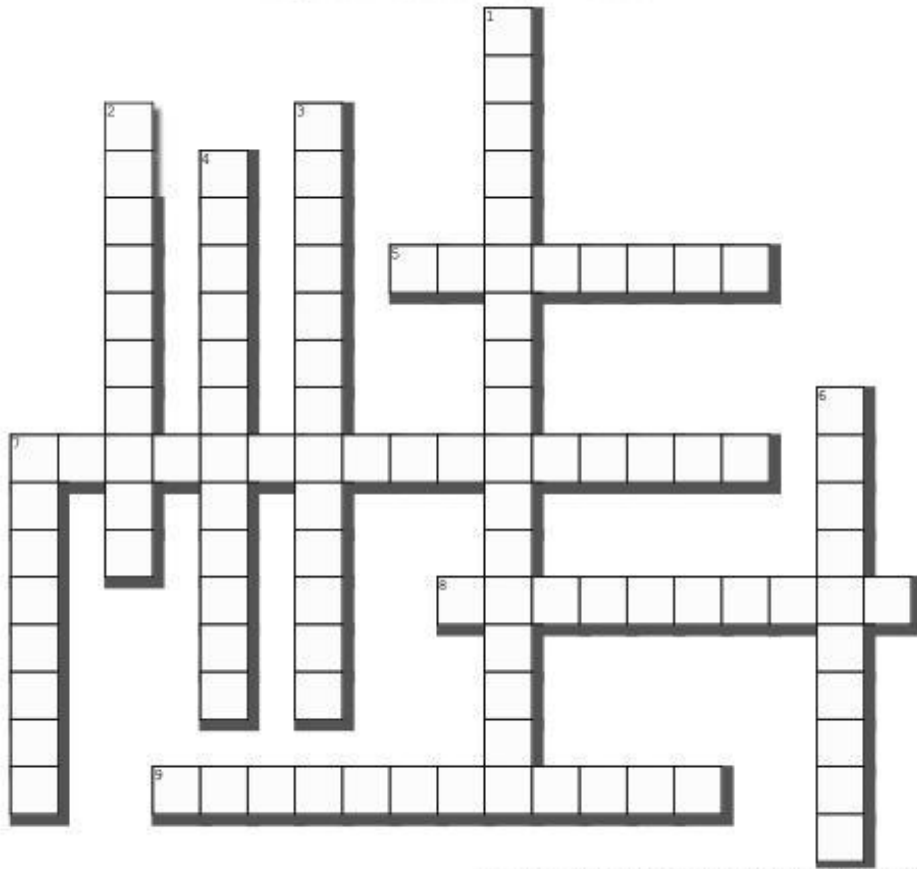
1. Bandage (gwattat darahchaa)
2. Spruce pitch/gum (dzih t'uu)
3. Spruce tips (ts'iivii zhàl)
4. Spruce bough (ts'iivii ah')
6. Basket made from spruce roots (khàii tyah)
7. Spruce tree (ts'iivii)

Created using the Crossword Maker on TheTeachersCorner.net

Name: _____

Ch'oondaii eenjit Gwanzhih: Medicinal Plants

Complete the crossword puzzle below



Created using the Crossword Maker on TheTeachersCorner.net

Across

- 5. Plants
- 7. Spruce cones
- 8. Medicine
- 9. Labrador tea

Down

- 1. Bandage
- 2. Spruce pitch/gum
- 3. Spruce tips
- 4. Spruce bough
- 6. Basket made from spruce roots
- 7. Spruce tree

Ch'oondaii eenjit Gwanzhjh Word Scramble

ahhzwjng

iitsvii dlaaàdz

cohiodian

idiil iksmta

ttgaatw arhachada

dzhi uułt

iivtsii zlàh

tiiviis ah

kiiàh htay

vtsiiii

Student Worksheet: Ch'oondaii eenjit Gwanzhìh Vocabulary

Shoozhri' _____ oo zhii (my name is _____)

1. Circle which of these words below undergo photosynthesis, then write the equation for photosynthesis below the list.

Ts'iivii

Aih

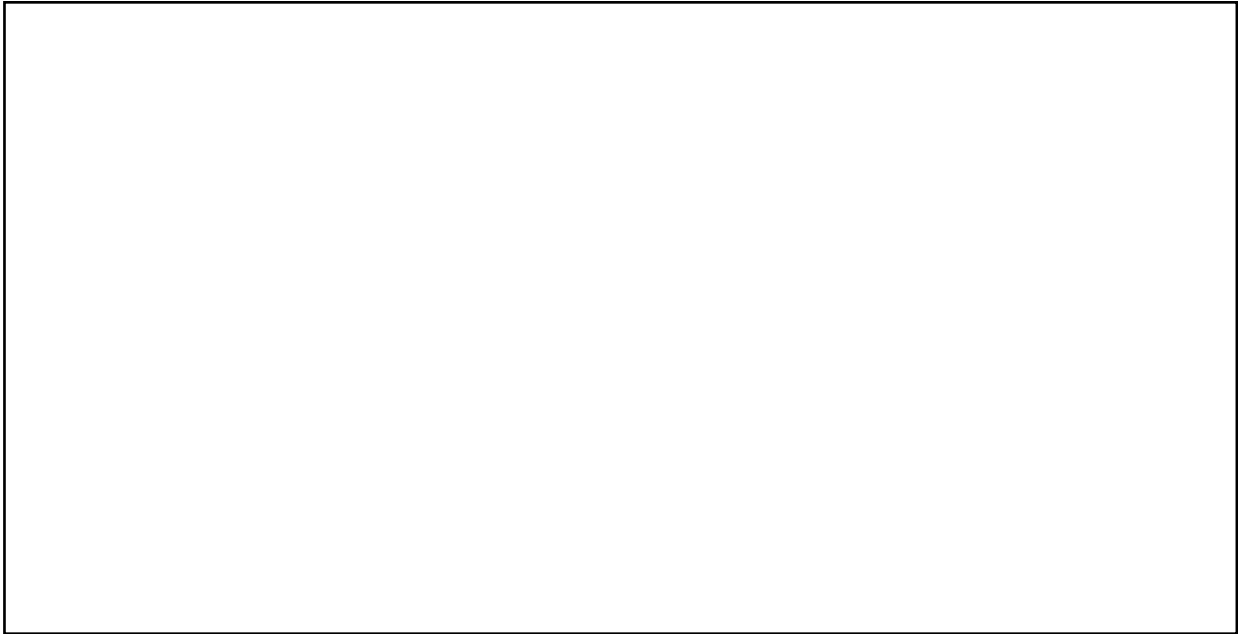
Khàii tyah

Dzih tl'uu

Gwanzhìh

Gwattat darahchaa

2. In the space below, illustrate this caption: **Lidii maskit eenjit chųų alvir.**



3. Translate **ts'iivii ch'oondaii altsii** into English:

Activity 2: Our Bodies and Homeostasis

Overview:

In this lesson, students will have an opportunity to further explore the concept of homeostasis through a partner activity in which they observe changes in their own bodies during different activities. By using a variety of motions and a stopwatch, students will see the ways in which their bodies react to changes to stay stable. With a partner, they will take turns timing and doing different activities. Students will collect data by calculating their heart rate per minute. Once data has been collected, students will graph and interpret their data. To close the activity, facilitate a group discussion about homeostasis and how it is relevant to both plants and people.

Time:

45 minutes-1 hour (1 class period)

Materials:

- Stopwatch
- Pencils
- Paper
- **Student Worksheet: Homeostasis and Me**

Standards Addressed:

Athabascan Values: Knowledge of language, sharing, respect for others, cooperation
Gwich'in Learning Framework Kheegwadadhaak'a': Dinjii Zhuh K'yaa Gwich'in language, gwiizhı knowledge

Science Standards for Alaska: HS-LS1-3

Alaska Cultural Standards: B.2, B.3, E.2

Next Generation Science Standards: HS-LS1-3

Objectives:

The students will:

- Demonstrate understanding of what homeostasis is in plants and how it works;
- Learn about how spruce trees survive in harsh environments;
- Work with a partner to learn about homeostasis in their own bodies;
- Work with a partner to measure and collect data;
- Practice recording data, graphing it, then interpreting the data;
- Identify similarities and differences between what plants need to regulate and what humans need to regulate.

Background Information:

Plants are important parts of ecosystems for a variety of reasons. They are the base of food chains for many ecosystems. They provide food, fuel, and shelter for animals and humans. Some plants even have medicinal properties which can help with anything from a small cut or burn, all the way to pneumonia and chest coughs.

Homeostasis in plants refers to the processes by which plants maintain stable internal conditions despite external environmental changes. This regulation is important for the plants' survival and growth, especially in extreme conditions like the Arctic, where temperatures can

drastically fluctuate season to season. Plants manage homeostasis through mechanisms such as water regulation, temperature control, and the balance of nutrients. For instance, stomata on leaves open and close to regulate water loss and gas exchange, while the roots absorb water and nutrients from the soil to support cellular functions. Additionally, plants can adjust their metabolic processes, such as photosynthesis, to adapt to varying light, temperature, and carbon dioxide levels.

Assessment:

Vocabulary flashcard review allows students to:

- use the Dinjii Zhuh K'yàa to help them understand plants and their medicinal and non-medicinal uses, as well as different phrases using the vocabulary words;
- make effective use of the knowledge, skills and ways of knowing embedded in the Gwich'in language to learn about the larger world in which they live by associating Gwich'in words with their English counterparts;
- hear, read and speak Gwich'in language terms.

Partner work throughout this turn-taking activity will allow for teacher observations of assessing student ability to:

- share supplies;
- collaboratively collect data during the activity
- respect their peers.

Student use of the student guide and the activity provides a means of assessing student ability to:

- understand the processes that plants undergo to maintain a stable internal environment in their region;
- identify the internal systems that plants have that allow them to survive and grow in extreme environments and maintain homeostasis;
- collect and graph data documenting their own homeostasis.

Activity Preparation:

1. Make enough classroom copies of the Homeostasis and You instruction sheet
2. [Optional] Review Gwich'in plant vocabulary flashcards and have students choose one game to play with the group.

Activity Instructions:

1. As a class, read through pages 8-9 of the student guide. Ask students to discuss in groups:
 - How would you describe homeostasis in your own words?
 - Why is homeostasis important?
 - What is an example of how spruce trees maintain homeostasis?
 - How do our bodies work to maintain homeostasis?
2. Once students brainstorm collectively, ask each group to share their understanding of homeostasis, why homeostasis is important, an example of how spruce maintain homeostasis, and ideas for ways their own bodies maintain homeostasis.
3. Explain that students will conduct an activity to explore how their own body maintains homeostasis and that they will be making a graph out of the data they collect. Model how

to draw a graph and how to label the x-axis and the y-axis. The x-axis should be labeled with the type of activity, and the y-axis should be labeled with the beats per minute.

4. Ask students to work in pairs or groups of three. Explain that students will take turns during the activity, and each partner will complete each activity once.
5. Demonstrate how to use the stopwatch, then distribute 1 stopwatch to each group, as well as graph paper and a Homeostasis and Me Worksheet to each student.
6. Read through worksheet instructions with students. Demonstrate how to find your pulse (on the inside of your wrist or on your upper neck below the jaw). Instruct students to use their index and middle fingers and begin to gently apply pressure until they can feel their pulse.
7. Ask students to work through the **Homeostasis and Me** worksheet. Circulate and help as needed.
8. Lastly, once students have completed the activity as a class, discuss:
 - How does an increasing heart rate help your body maintain homeostasis?
 - Are there similarities between what we learned about our bodies and homeostasis and plants and homeostasis?
 - What ways might your body be working to maintain homeostasis based on the current weather? In what ways might plants be working to maintain homeostasis in this weather?
 - What might a spruce tree do to maintain homeostasis when it is sunny out? What about when it is cool out?

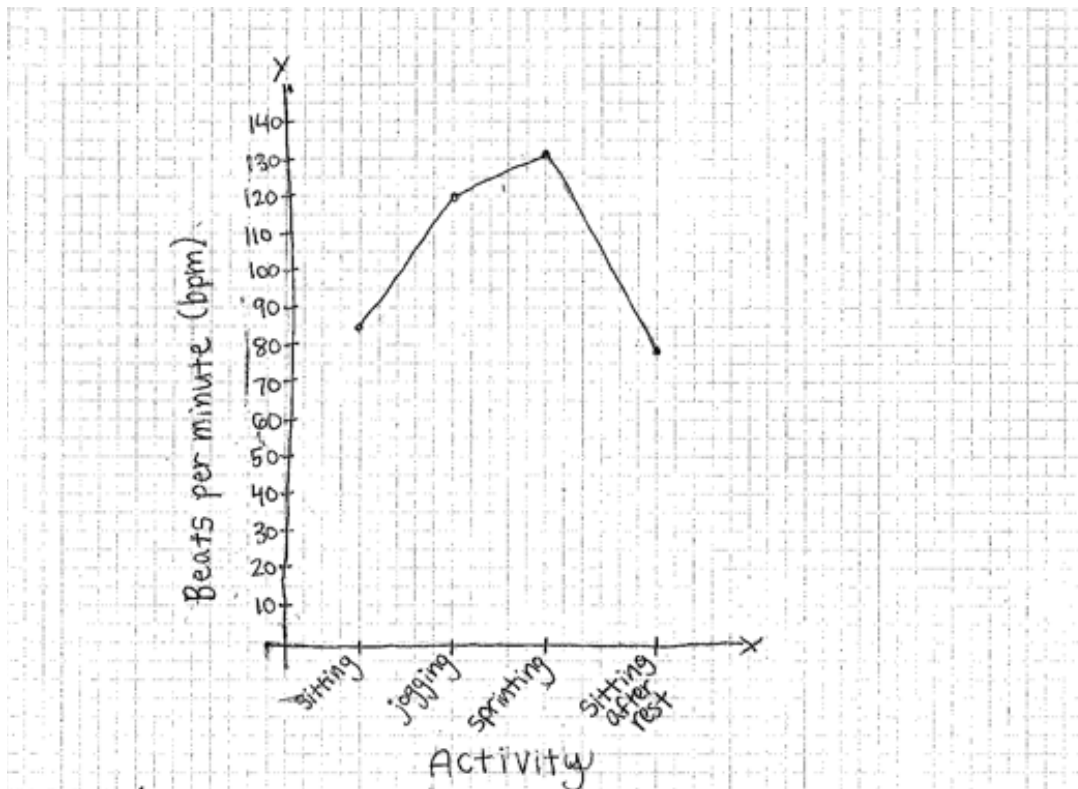
Connections and Extensions:

- If a student has limited mobility or is unable to do any of the activities for data collection, some potential alternatives are students holding their breath for as long as they can and then following the same steps and counting pulse for 10 seconds directly after the activity. Students can also put their face in cold water for 10-15 seconds, then follow the same steps above. These activities show how their bodies react when exposed to cold temperatures and how they react to atypical oxygen amounts.
- Have students brainstorm and think about ways they know they might be getting sick. What are some changes they feel in their bodies? What about if they are getting hungry or thirsty, what cues does their body send them?
- If students are having difficulty grasping the concept of homeostasis, this video further illustrates homeostasis amongst humans, animals, and plants. It is 15 minutes long.
<https://youtu.be/MrLqS3o9IO4?si=WIfifoNuuunv3NZC>
- A connected concept to homeostasis is phototropism. Phototropism is the growth of a plant, or other organisms, in response to a light source. An additional activity you can do with students is to grow a plant from seed (radish seeds grow quickly and would have observable sprouts). As plants grow and become stable, observe the way it grows when it has exposure to typical light. Then, after observing how the plant responds to typical light. Place the plant in a box with limited light. This 3-minute video (<https://youtu.be/HmHvWDeTt7Y?si=i2wCkanMHhdoNj-U>) shows how phototropism works if you are unable to carry out this extension activity in your classroom. The video also illustrates how to set up a box with limited light if you can do this activity in your class. Have students record observations and draw how the plant responded to differences in light. The focus of the video transitions from phototropism to Auxins (plant hormones)

after minute 2:20. **NOTE:** Please use caution when selecting the seed to grow, as you do not want to accidentally introduce an invasive species into the environment.

Answer Key:

1. Answers will vary
2. Answers will vary
3. Answers will vary
4. Answers will vary
5. Answers will vary
6. Graphs will vary; see the example below to help students set their graphs up



Student Worksheet: Homeostasis and Me

Shoozhri' _____ oozhii

Working with a partner, you will collect data to show changes in your heart rate during different activities. These changes reflect your body's efforts to maintain homeostasis when your internal environment is stable. **Before starting, locate your pulse.** You can feel it using your pointer and middle fingers, applying gentle pressure to the inside of your wrist or to your neck just below the jaw. Once you and your partner have both found it, you are ready to get started!

1. Sitting

- have one partner use the stopwatch and time for 10 seconds while the other sits and counts how many times you feel your pulse
- write down the number you counted during the 10 seconds _____
- Multiply that number by 6 (beats per 10 seconds*6=1 minute).

_____ *6= _____ beats per minute

- Swap with your partner and repeat the steps.

2. Jogging in place

- Have one partner use the stopwatch and time for 30 seconds while the other jogs in place. Immediately after, count how many times you feel your pulse in 10 seconds.
- Write down the number you counted during the 10 seconds. _____
- Multiply that number by 6 (beats per 10 seconds*6=1 minute).

_____ *6= _____ beats per minute

- Swap with your partner and repeat the steps.

3. Running in place

- Have one partner use the stopwatch and time for 30 seconds while the other runs in place as fast as possible. Immediately after, count how many times you feel your pulse in 10 seconds.
- Write down the number you counted during the 10 seconds. _____
- Multiply that number by 6 (beats per 10 seconds*6=1 minute).

_____ *6= _____ beats per minute

- Swap with your partner and repeat the steps.

4. Sitting after a 5-minute break

- a. Have one partner use the stopwatch and time for 5 minutes. During this time, you and your partner will be seated, with very low activity. Immediately after, count how many times you feel your pulse in 10 seconds.
- b. Write down the number you counted during the 10 seconds. _____
- c. Multiply that number by 6 (beats per 10 seconds*6=1 minute).

_____ *6= _____ **beats per minute**

- d. Swap with your partner; you do not need to do the 5-minute timer again, just the 10-second pulse count.

5. How did your pulse change during this activity?

- 6.** Below, write down what other changes you noticed in your body as you went through the different activities: did you get warm, did your cheeks turn red, were you out of breath? Share below.

- 7.** Lastly, using graph paper and the data you collected, graph your data. What do you notice about the graph? Is there any relation between the type of activity and your heart rate? Share with your partner.

Beats per Minute	150				
	140				
	130				
	120				
	110				
	100				
	90				
	80				
	70				
	60				
	50				
		Sitting	Jogging	Running	Resting
	Activity				

Activity 3: Ch’oondaii eenjit Gwanzhìh ts’à Nan (Medicinal Plants and You)

Overview:

In this lesson, students will have an opportunity to reflect on what they have learned previously about Gwich’in medicinal plants terms, photosynthesis, cellular respiration, homeostasis, and medicinal uses of plants found in the Yukon Flats. Students will watch the Medicinal Plants video and listen to an Elder or knowledge bearer share their knowledge of medicinal plants. Students will get a hands-on opportunity to make spruce tea to put into action some of what they have learned! Students will research a medicinal plant and its properties with a partner and write a reflective piece about their experiences and what they have learned.

Time:

4-5 hours (4-5 class periods)

Materials:

- **Ch’oondaii eenjit Gwanzhìh: Medicinal Plants** video. Visit <https://culturalconnections.gi.alaska.edu/> and open **Ch’oondaii eenjit Gwanzhìh: Medicinal Plants** to access the video
- Coffee or tea
- Cup to serve Elder(s)
- **Partner Student Planning Worksheet: Ch’oondaii eenjit Gwanzhìh ts’à Nan**
- **Ch’oondaii eenjit Gwanzhìh ts’à Nan Reflection Worksheet**
- Spruce tips (or another tea if spruce tips are unavailable due to the time of year)
- “The Boreal Herbal” by Beverly Gray
- “Gwich’in Ethnobotany” by Alestine Andre and Alan Fehr
- “Yukon Flats Medicinal Plants” compiled by Ginny Alexander

Standards Addressed:

Athabascan Values: Knowledge of language, respect for others, respect for Elders, respect for nature, responsibility to Tribe

Gwich’in Learning Framework Kheegwadadhaak’a’: Dinjii Zhuh K’yaa Gwich’in language, t’aii personal power, gwiizhì knowledge, Dinjii Zhuh Gwitr’it Tr’igwiheel’ee/Tr’igwihil’ee Gwich’in values, duulee ginlì becoming proficient in skills or subjects as a young man/woman

Science Standards for Alaska: HS-LS1-5, HS-LS1-7

Alaska Cultural Standards: A.3, A.4, A.6, B.1, B.2, C.1, D.1, D.3, D.4, E.2, E.4, E.8

Next Generation Science Standards: HS-LS1-5, HS-LS1-7

Objectives:

The student will:

- Respectfully interact and listen to an Elder
- Make spruce tea (or a tea if spruce tips are unavailable due to the season)
- Reflect on their experiences with the Elder, the video, and the scientific content.

- Show the differences between photosynthesis and cellular respiration
- Provide an example of homeostasis in spruce trees
- Describe different medicinal plants, how they are used, and what ailments they treat
- Present to a younger student or community member about medicinal plants
- Use Gwich'in terms for medicinal plants

Background Information:

Medicinal plants are a form of medication that have been around for thousands of years and have been used by people all over the world. In Alaska, medicinal plant knowledge is passed down from generation to generation through oral traditions and observations. Over thousands of years, the Gwich'in have become skilled at using the plants in their environment.

A commonly used medicinal plant due to its year-round accessibility and abundance is spruce. Spruce has many uses, including medicinal uses; other uses include fuel for heating, structural support, and parts for waterproofing boats. Some other plants and plant parts used medicinally include Labrador tea/muskeg tea, willow, yarrow, rosehips, fireweed, birch fungus, stinkweed/wormwood, cottonwood, and charcoal. A person should only harvest and use plants that they are confident they have correctly identified, and it is recommended by ethnobotanists that you have 3 reliable and independent sources (books, websites, people) to help identify plants while you are learning.

The knowledge of medicinal uses of plants is part of Cultural and Intellectual Property rights. The United States Declaration on the rights of Indigenous Peoples states, "Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and visual and performing arts. They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge, and traditional cultural expressions." (United Nations Declaration on the Rights of Indigenous Peoples, Article 31, 2007). This right has been historically ignored and exploited, so it is important to teach youth the importance of honoring, recognizing, and protecting plant knowledge.

Assessments:

Vocabulary flashcard review allows students to:

- use local heritage language to help them understand plants and their medicinal and non-medicinal uses, as well as different phrases using the vocabulary words;
- make effective use of the knowledge, skills and ways of knowing embedded in the Gwich'in language to learn about the larger world in which they live by associating Gwich'in words with their English counterparts;
- hear, read and speak Gwich'in language terms.

Class discussion and student analysis of the student guide text, video and quotes provides a means of assessing student ability to:

- evaluate claims, evidence and reasoning from Elders, local knowledge bearers and scientists about what different medicinal plants are, how to prepare the plants, and how to use them.

Student reflections provide a means of assessing students' ability to:

- reflect on the information learned from the Elder or knowledge bearer;
- describe why medicinal knowledge of plants is important;
- appropriately identify the Gwich'in name for a medicinal plant;
- connect the medicinal plant to how to prepare it and how it is used;
- give presentations in a variety of settings, such as in their classroom and to younger students;
- implement knowledge of medicinal plants.

Student interactions with Elders and notes regarding what they learned provide a means of assessing student ability to:

- listen, engage respectfully and learn from Elders;
- gather and interpret oral history from their community to help them understand their traditional responsibilities to the plants in their environment;
- appropriately use and expand their knowledge of Gwich'in language related to medicinal plants.

Activity Preparation:

1. Work with students to identify local Elders or other knowledge bearers familiar with medicinal plants, including types of medicinal plants, how they are prepared, and how they are used within the community. Invite the Elders to the classroom to speak with students about this topic, or ask students to visit the Elders in their lives and learn more about this topic. If students don't have a strong list of recommendations, ask the local school administrative assistant, bilingual teacher, the local Elders' council, or tribal administration to help you identify some Elders or knowledge bearers who may be willing to talk to the students.
2. If you invite the Elders/knowledge bearers to come to the classroom, an invitation written by the students, an in-person visit, or a phone call from one of the students with your assistance is a good way to issue the invitation. Explain that your class is studying medicinal plants and ask if they would be willing to share what they know about medicinal plants, how they are important to the local community, how medicinal plants are used, and how they have changed over time. Ask the Elders if they would be willing to stay and make spruce tip tea.
3. Arrange to have beverages such as coffee, tea, and water available to the Elders/knowledge bearers on the day of their visit. Snacks are nice, also, but not essential. Make sure you have comfortable chairs for the Elders to sit in and review respectful listening and hosting skills with students prior to the Elders' arrival. Plan to have students move close to the Elders for the discussion (either by gathering on the floor in front of the Elders, or by placing their chairs in a circle that includes the Elders' chairs). Always remain in the classroom with the students to support the Elders in their presentation as needed. After the Elders' visit, thank them and see them out. Follow up with a student-created, signed thank-you card for each Elder.
4. *If you are unable to have an Elder or knowledge bearer come in person to the classroom, consider contacting an Elder or knowledge bearer beforehand to see if they would feel comfortable scheduling a time to talk to students about the topic over the phone. If you are unable to have an Elder or knowledge bearer call during class, check the connections and extensions section for a plant talk sponsored by The Morris Thompson Cultural*

Center, Tanana Chiefs Conference, and Denakkanaaaga. where Kathleen Hildebrand Meckel of Nulato shares about harvesting, preparing, and using medicinal plants.

5. Make sure enough copies are made of the **Partner Student Planning Worksheet: Ch'oondaii eenjit Gwanzhìh ts'à Nan**, **Ch'oondaii eenjit Gwanzhìh ts'à Nan Reflection Worksheet**, and the **Student Information Sheet: Ch'oondaii eenjit Gwanzhìh References**
6. [Optional] Review Gwich'in plant vocabulary flashcards, and have students choose one game to play with the group.

Activity Instructions:

1. **Day 1:** Ask students to work with a partner to explore pages 12-16 of the Medicinal Plants student guide, then watch the **Ch'oondaii eenjit Gwanzhìh: video** as a class. Introduce the concept of cultural and intellectual property rights. Share with students the quote from the United Nations Declaration on the Rights of Indigenous Peoples, Article 31, 2007, found in the background section of this activity.
2. As a class, discuss how Indigenous plant knowledge has been exploited or taken advantage of before, so it is important that we be intentional about how we use and protect this knowledge.
3. After introducing the concept of cultural and intellectual property rights, as a class discuss:
 - What types of medicinal plants were talked about?
 - Can students locate any of the plants discussed in the video in the student guide?
 - How were these plants used?
 - In what ways were they prepared?
 - What were they used to treat?
 - In what ways can we honor and protect traditional plant knowledge?
4. **Day 2:** Place students in pairs (or groups of 3 as needed) to work on their Medicinal Plants Reflection project. Distribute the **Partner Student Planning Sheet: Ch'oondaii eenjit Gwanzhìh ts'à Nan** and explain that students will learn from Elders/knowledge bearers about medicinal plants in the region, how various parts of plants are used currently and how they have been used in the past.
5. Facilitate Elder interaction. (See Activity Preparation for more information on inviting Elders/knowledge bearers to your classroom). NOTE: If you were unable to locate an Elder for this activity, check the extensions section for a video.
6. Work with students to prepare a list of questions/topics to ask the invited Elder or knowledge bearer about. Questions or topics might include:
 - a. What are the medicinal plants around us?
 - b. What medicinal plants do you use?
 - c. How do you harvest medicinal plants?
 - d. How do you prepare them for use?
 - e. Are there certain rules to follow when harvesting plants?
 - f. Gwich'in terms for different medicinal plants.
7. Ask students to make notes or sketches on question 1 of their planning sheet to help them remember what they learned from an Elder or knowledge bearer.

8. With the Elder, make spruce tip tea with the class. Ask the Elder how they make spruce tip tea. There are also instructions in the connections and extensions section. Make sure to serve your Elder first!
9. To wrap up today's section of the activity, encourage students to ask people in their homes about the medicinal plants they use and how they use them.
10. **Day 3-4:** Distribute the **Student Information Sheet: Ch'oondaii eenjit Gwanzhih References and Resources** and any books about medicinal plants from your classroom or school library. The kit includes three books.
11. Ask students to work with a partner to choose a medicinal plant to focus on and research. Partners will create a slideshow about a medicinal plant of their choosing and include:
 - A graphic or equation showing the different processes plants undergo (photosynthesis and cellular respiration)
 - An example of a local medicinal plant
 - An example of how to harvest respectfully
 - Which part of the plant is used
 - What are some ways the medicinal plants can be prepared
 - What ailments can the medicinal plants help with
 - What is the Gwich'in name for the medicinal plant
 - A sketch of the plant (does not have to be in the slideshow, but can be present their drawing)
12. The student's individual reflection should include:
 - Reflection of time with Elder/knowledge bearer and what you learned
 - Why is knowledge of plants important
 - How will you integrate this knowledge into your life
 - How can you protect the intellectual property of plants
13. **Day 5:** Arrange for students to present the medicinal plant they focused on to the class and to an elementary classroom.

Connections and Extensions:

- Making spruce tip tea instruction as found in *The Healing Power of Alaska's Plants*, developed by Frances Bennett and Sandra Angaiak, which was adapted from *Plant Power* by Laurel Dewey
 (https://chugachheritageak.org/pdf/Healing_Power_of_Ak_Plants.pdf)
 - 1 Tablespoon spruce tips/leaves to every 1 cup of water. Boil water and pour over spruce tips. Let it seep for 3-5 minutes. Have students smell the vapor as it cooks and observe if there are changes to the water's color.
 - Once done boiling, strain the spruce tips and serve. If you are hosting an Elder in the classroom during this activity, be sure to serve the Elder first.
- If you are unable to have an Elder or knowledge bearer join the classroom, here is a URL to a plant talk sponsored by The Morris Thompson Cultural Center, Tanana Chiefs Conference, and Denakkanaaaga. where Kathleen Meckel of Nulato shares about harvesting, preparing, and using medicinal plants. Its run time is 1 hour and 4 minutes. The video covers how to prepare plants from 27:20-35:40 and covers specifically spruce from 35:48-38:07
<https://www.youtube.com/live/nacKnN7Vs1g?si=BbiqVLZwuKBn5KUc>

- This is a lesson about harvesting spruce boughs and how they are used as tent walls from a Yellowknives Dene perspective. This lesson takes about 3-4 hours.
<https://www.nccie.ca/lessonplan/consent-from-the-land-with-spruce-boughs/>
- This is a lesson about harvesting spruce gum and preparing spruce gum tea from a Yellowknives Dene perspective. This lesson takes about 4-6 hours.
<https://www.nccie.ca/lessonplan/making-spruce-gum-tea/>
- If the weather and time of year allow, go on a nature walk as a class to harvest spruce tips to make the tea.
- Consider having students research what the plants look like during their growing and dormant seasons.
 - *The Boreal Herbal* by Beverly Gray contains photos that show different stages of growth for the medicinal plants found in the student guide.
 - Lidii Maskit/Labrador tea pg. 107
 - Nitsih/Rosehips pg. 144
 - Gwanzhìh niḏìltsì' daagàì/Yarrow pg. 178
 - Chaga/Birch fungus pg. 245
 - T'aa/Cottonwood, also known as Balsam Poplar, pg. 256
 - Ts'iivii/Spruce pg. 259
 - K'aii/Willow pg. 269
 - The book also details information on how to prepare a tea on pg. 280
- Note: on page 19 of the student guide, Chaga/birch fungus isn't common around Fort Yukon, but can be found around Birch Creek.

**We invite
you to visit
our class!**

We are learning about medicinal plants in class. Will you please come share what you know about medicinal plants?

Where: _____

Date: _____

Time: _____

Partner Student Planning Worksheet: Ch'oondaii eenjit Gwanzhìh ts'à Nan

Shoozhri' _____ oo zhii

Shoozhri' _____ oo zhii

Shoozhri' _____ oo zhii

Directions:

Ch'oondaii eenjit gwanzhìh have been used by people for thousands of years to treat many different types of ailments. The way in which these **gwanzhìh** are harvested and prepared for use is part of important knowledge that has been passed down for generations. You and a partner will choose a **ch'oondaii eenjit gwanzhìh** in your area and research it. Ask an Elder or knowledge bearer to share what they know about the **gwanzhìh** and how they use it. You and your partner will write about **ch'oondaii eenjit gwanzhìh** to show what you learned. Share what you have learned with children and others in your community. Use this planning sheet to help you plan your slideshow presentation. In addition to writing about a **ch'oondaii eenjit gwanzhìh**, you will write a short reflection about your time spent with an Elder or knowledge bearer and what your takeaways were from the project.

Partner Work Slideshow Presentation:

1. Ask an Elder or knowledge bearer in your community what **gwanzhìh** they use for medicine and how they use them. Ask them how they prepare the **gwanzhìh**, which parts are best to use, and how to harvest the **gwanzhìh**. Be sure to take notes or sketches in the space below to help you remember what you learned.

2. Work with a partner. Choose one **ch'oondaii eenjit gwanzhìh**. Write the English and Gwich'in name.

Sketch the **gwanzhìh** below:

How do you harvest the **gwanzhìh**, or which part of the **gwanzhìh** is used? (Sketch or describe)

How do you prepare the **ch'oondaii eenjit gwanzhìh**?

What ailments can the **ch'oondaii eenjit gwanzhìh** help with?

3. With your partner, create a slideshow about the **ch'oondaii eenjit gwanzh̓ih** you chose. Use what you learned from the Elder or knowledge bearer, and through your own research, to include the following items in your slideshow. Check off each item as you add it to the slideshow.

_____ English and Gwich'in name for the **ch'oondaii eenjit gwanzh̓ih**

_____ A sketch of the **gwanzh̓ih**

_____ Information about how to harvest the **gwanzh̓ih** or which part of the **gwanzh̓ih** is used

_____ How do you prepare the **ch'oondaii eenjit gwanzh̓ih**

_____ What ailments does the **ch'oondaii eenjit gwanzh̓ih** help with

_____ The different processes **gwanzh̓ih** undergo to grow and survive (cellular respiration and photosynthesis)

4. Present your slideshow to your class, and share it with an elementary class and your community.

Who did you present to?

Ch'oordaii eenjit Gwanzhìh ts'à Nan Reflection Worksheet

Shoozhri' _____ oo zhii

1. Reflection of time with Elder/knowledge bearer and what you learned

2. Why is knowledge of **gwanzhìh** important?

3. How will you use this knowledge in your life?

4. How will you protect and honor this knowledge?

Student Information Sheet: Ch'oondaii eenjit Gwanzhijh References

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