

# WHAT PLANTS ARE IN YOUR AREA AND HOW CAN YOU USE THEM?

## UNIT 4: Changing Landscapes Lesson 9 — Grades 4-5 INSTRUCTIONS



### Overview

In this lesson, students will collect and identify leaves from three different local plants. Students will work with local cultural knowledge bearers, elders, teachers, parents, and others to learn how people in the area use these plants.

### Objectives

On successful completion of this lesson, students will be able to:

- identify a minimum of three plant leaves from their area; and
- tell how the identified plants are used.

### Alaska Standards

#### Alaska Science Standards / Grade Level Expectations

- [4, 5] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring and communicating
- [4] SA1.2 The student demonstrates an understanding of the processes of science by observing, measuring and collecting data from explorations and using this information to classify, predict, and communicate
- [5] SA2.1 The student demonstrates an understanding of the attitudes and approaches to scientific inquiry by supporting the student's own statements with facts from a variety of resources and by identifying their sources
- [4] SC2.1 The student demonstrates an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms by choosing appropriate tools (i.e., hand lens, microscopes, ruler, balance) to examine the basic structural components (e.g., stems, leaves, fish scales, wings) of living things
- [5] SC2.1 The student demonstrates an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms by identifying and sorting plants and animals into groups using basic external and internal features

### 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:
- [A.4] practice their traditional responsibilities to the surrounding environment.
  - [A.6] live a life in accordance with the cultural values and traditions of the local community and integrate them into their everyday behavior.
- [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:



# WHAT PLANTS ARE IN YOUR AREA AND HOW CAN YOU USE THEM?

## UNIT 4: Changing Landscapes Lesson 9 — Grades 4-5 INSTRUCTIONS



[D.5] identify and utilize appropriate sources of cultural knowledge to find solutions to everyday problems.

[E] Culturally-knowledgeable students demonstrate an awareness and appreciation of the relationship and processes of interaction of all elements in the world around them. Students who meet this cultural standard are able to:

[E.2] understand the ecology and geography of the bioregion they inhabit.

### Bering Strait School District Scope & Sequence

4<sup>th</sup> Grade Sequence #5: Living Things

5<sup>th</sup> Grade Sequence #6: Living Things

### Materials

- A local plant field guide
- Student Worksheet: Leaf Type Notes
- Student Worksheet: Local Leaf Types
- Access to a computer with internet
- Projector
- Clipboards (one per student)
- Hand lenses

### Additional Resources

HSP IV: Ch. 2, Lesson 2

HSP V: Ch. 3, Lessons 1, 2

### Activity Preparation

1. Pre-identify a location where you can take students to collect local plant leaves. Be sure not to select an area that is traditionally harvested by others in your village.
2. If possible, invite an elder or culture bearer to your classroom (or someone you know to have a deep knowledge of local plants) on the day you do this activity with students. The culture bearer can help students identify plants and learn what they are used for.

### Whole Picture

Through millennia of living off the land, Alaska Native people have developed an intimate understanding of their surroundings. From generation to generation, people learned to read details about the environment from their elders, aunties and uncles, and other community members. People innately knew when particular animals would arrive on the landscape and when certain plants would be right for harvesting. This deep knowledge of the landscape was



# WHAT PLANTS ARE IN YOUR AREA AND HOW CAN YOU USE THEM?

## UNIT 4: Changing Landscapes Lesson 9 — Grades 4-5 INSTRUCTIONS



vastly important for survival, and in many communities was woven into the language. Activities that happened at certain times of the year were reflected in the meaning of month names. We see this still in Native communities like Golovin where the Native words for April, May, June, and July have meanings that reflect subsistence activities: “the month when people go out with the umiaq” (April), “the month when caribou lay their fawns” (May), “the month of small fish” (June), and “the month when birds molt” (July) (Wood and Bautnuq, part 1).

Understanding seasonal timing is an important scientific skill that enables people to understand the life cycles of the “rich array of vegetation, including numerous edible greens and berries” upon which they depend (Fienup-Riordan and Rearden, 2012, p. 13). Plant identification — both their names and how they are used — is a crucial aspect of learning this skill. Plants provide people with much needed nutrients to balance out their diets, medicinal properties to heal the ailing, and resources to use in tool and craft making.

Traditionally, plant identification skills and uses were passed from generation to generation through long hours of observation and hands-on learning. Young people would go out on the land with their elders and family members to pick berries, harvest plants, observe the world around them, and then spend many hours learning to prepare the food for immediate eating or for storage to be eaten at a later time (Fienup-Riordan and Rearden, 2012; Kawagley, 2006; Krupnik and Jolly, 2002; Matthews, 1968). Today, harvesting plants and putting food up for winter is no less important, but young people spend less time out on the land with the people who can teach them proper identification and harvesting techniques. Nevertheless, elders and culture bearers identify these skills as essential for young people to learn.

Still, “the world is faster now” (Krupnik and Jolly, 2002) — scientists and culture bearers alike have noted alarming changes happening to plants as the result of climate change — changes that are making it difficult to know the land. Shaktoolik resident Teresa (no last name provided) recalled that when she was young, the salmonberry harvest happened during August (around the time of her birthday), but now, berries ripen much faster, and they are usually done harvesting salmonberries by mid-July (Teresa, 2011). Similarly, Kenneth Kingeekuk, from Savoonga, has spoken about the unpredictability of plants. Some plants have started to disappear altogether, while others are coming either too early or much later than normal (Kingeekuk, 2011). One such example of this is sourdock. Even in the past five years, people depended on sourdock as an important and widely available green. Now, however, it seems to be far less plentiful and sunburns almost before it is ready for harvest (Asicksik, 2010).

Jeanette L. Aya, from Savoonga, has noticed that plants are growing faster than normal now. In the past, she says it was “as though time stood still” — people had time to gather and prepare food for winter storage. Now, the plants are nearly useless by the time they are first noticed (Aya, 2011), and people are finding it more and more difficult to get everything done. In the past, berry season followed the fishing season. Now, though, people often find themselves trying to gather berries at the same time as they need to be cutting and drying fish — this makes for challenging work and some are finding it difficult to put up enough food for winter.

As climate continues to change, people will witness more and more change, making traditional practices more and more difficult. It is therefore ever more important for young people to



# WHAT PLANTS ARE IN YOUR AREA AND HOW CAN YOU USE THEM?

## UNIT 4: Changing Landscapes Lesson 9 — Grades 4-5 INSTRUCTIONS



spend more time getting to know the plants and animals, not only so that the changes can be understood, but so that people can learn how to adapt to the changes and continue to survive.

### Vocabulary

**leaf margin**                the edge of a leaf

**leaf organization**      the manner in which the leaves are arranged on the plant stem

### Activity Procedure

1. Together with students brainstorm how people use plants from your area; if possible, have students specify plant names that they know. (If students say “subsistence” or “for medicine” ask them to provide more detail). Write student ideas on the board.
2. Direct student attention to the names of plants listed from the above brainstorm. Ask students to speculate how people know which plants are which. Include student ideas in the overall brainstorm on the board.
3. Explain that though plants sometimes catch our eye when they are blooming, the flower season is very short in the Arctic and subarctic, so people must learn to identify plants by their leaves.
4. Pass out the Student Worksheet: Leaf Type Notes
  - a. Discuss each kind of leaf and help students fill in the names of each leaf type.
5. Tell students that you will now go outside and collect 3-5 leaves to use in the next activity. Pass out the Student Worksheet: Local Leaf Types and clipboards.
  - a. Remind students of Native values as they go to gather leaves. Students should only pick one leaf from any individual plant (“Respect nature and all living things”). When possible, take leaves that have already fallen off the plants. (“Take care of the land and the waters.”)
  - b. Students should collect as much of the leaf stem along with the leaf as possible.
  - c. Instruct students to choose leaves that look healthy. Select leaves that are still green or that have not dried out.
6. As they collect the leaves, students should carefully observe each plant, draw a sketch of it, and note the way each leaf is attached to its plant on their Student Worksheet: Local Leaf Types.
  - i. Are there many leaves on the stem?
  - ii. What pattern do the leaves make: opposite, whorled, alternate?
  - iii. Are the leaves collected all at the bottom of the stem (basal)?
7. Back in the classroom, examine the leaves. Ask the following questions as you examine the leaves:
  - a. What do the leaves have in common? Are they the same in any way? How are they different? (look at leaf margins, texture, veins, etc.)



# WHAT PLANTS ARE IN YOUR AREA AND HOW CAN YOU USE THEM?

## UNIT 4: Changing Landscapes Lesson 9 — Grades 4-5 INSTRUCTIONS



- b. What do the leaves feel like? (Sticky? Hairy? Prickly? Smooth? Thick? Waxy?)
  - c. Do the leaves have a scent?
  - d. How are the margins (the edges) shaped?
  - e. Which leaf is biggest? Smallest?
  - f. Are there any patterns on the leaves? Can you see the veins? (If the veins cannot be easily seen, have students hold the leaf up to the light to see the veins.)
  - g. Have insects eaten any of the leaves? How do you know?
8. Group students into teams of 3-4 (depending on class size, you may wish to do this as a whole class).
    - a. Give each group a hand lens and instruct them to use it to observe their leaves.
  9. Instruct each group to observe all of their leaves and group them based on similarities.
  10. Once they have been grouped, students list the qualities of each leaf group on Part 2 of the Student Worksheet: Local Leaf Types.
  11. Finally, go to the “Plants of my People” website (<http://ankn.uaf.edu/ANCR/Inupiaq/plantsofmypeople/index.html>.) or use a field guide to help students identify the plant leaves they have collected. Students can add these names next to the drawings on their worksheet.
  12. **Homework:** Instruct students to take their worksheet and leaves home and ask their family members or neighbors to help them identify the plants / leaves. Ask them to list out any known uses of the plant. Back in class, allow students to share what they have learned.

### Extension Activity

- Invite an elder, culture bearer, or community member who is known for their ability to identify plants to visit your classroom. With your students and the culture bearer, take a walk around the school and allow the culture bearer to identify local plants and their uses.

### Answers

#### Student Worksheet: Leaf Type Notes

1. Basal Leaves
2. Opposite Leaves
3. Alternating Leaves
4. Whorled Leaves
5. Parallel Veins
6. Toothed Leaves



# WHAT PLANTS ARE IN YOUR AREA AND HOW CAN YOU USE THEM?

## UNIT 4: Changing Landscapes Lesson 9 — Grades 4-5 INSTRUCTIONS



### Student Worksheet: Local Leaf Types

#### Part 1: Collecting Notes

Student sketches and answers will vary depending on the plants they collect. It is important to observe the area closely before you take your students so that you will know what types of plants to expect.

#### Part 2: Grouping and Classifying

Student answers will vary depending on the leaves in each group. In each case, students should identify the leaf type for each leaf group.

### REFERENCES

- Asicksik, Eugene. (2010). Stories About Adaptation and Subsistence: Native Voices from the Frontlines of Climate Change. Aksik. Accessed from: <http://aksik.org/village/shaktoolik>.
- Aya, Jeanette L. (2011). Stories About Adaptation and Subsistence: Native Voices from the Frontlines of Climate Change. Aksik. Accessed from: <http://aksik.org/village/savoonga>.
- Fienup-Riordan, Ann, and Alice Rearden. (2012). *Ellavut: Our Yup'ik World and Weather. Continuity and change on the Bearing Sea Coast*. Seattle and London: University of Washington Press.
- Kawagley, Angayuqaq Oscar. (2006). *A Yupiaq Worldview: A Pathway to Ecology and Spirit*. Long Grove: Waveland Press.
- Kingeekuk, Kenneth. (2011). Stories About Adaptation and Subsistence: Native Voices from the Frontlines of Climate Change. Aksik. Accessed from: <http://aksik.org/village/savoonga>.
- Krupnik, Igor, and Daynna Jolly. (2002). *The Earth is Faster Now: Indigenous Observations of Arctic Environmental Change*. Arctic Research Consortium of the United States and Smithsonian Institution Presses.
- Matthews, Donna. (1968). *Aleut Plants*. Association of Unangan/Unangas Educators and the Unangam Elders' Academy. Alaska Native Knowledge Network. <http://ankn.uaf.edu/ANCR/Aleut/Unangam/UnangamHitnisangin/toc.html>.
- Teresa (no last name) (2011). Stories About Adaptation and Subsistence: Native Voices from the Frontlines of Climate Change. Aksik. Accessed from: <http://aksik.org/village/shaktoolik>.
- Wood, Cheryl Ann, and Bautnuq Punguk, Kylee. (n.d.). *Plants of My People: The Iñupiaq of Golovin Bay, Norton Sound, Alaska*. Alaska Native Knowledge Network. Accessed from: <http://ankn.uaf.edu/ANCR/Inupiaq/plantsofmypeople/index.html>.



# WHAT PLANTS ARE IN YOUR AREA AND HOW CAN YOU USE THEM?



## STUDENT WORKSHEET: LEAF TYPE NOTES

Name: \_\_\_\_\_

**Directions:** Look at the following pictures. With your teacher, learn which type of leaf is represented by each picture. On the blank below the picture, write the word that describes the leaf type.

Word Bank		
Toothed Leaf	Parallel Veins	Opposite Leaves
Whorled Leaves	Basal Leaves	Alternating Leaves




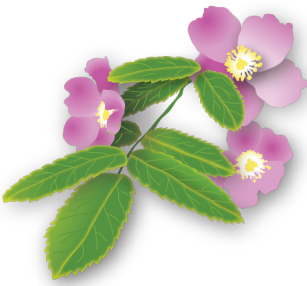
Image	Description	Leaf Type
	This type of leaf comes from a point at the base of a plant and fans out.	1.
	This leaf type shows leaves that are arranged on opposite sides of the stem.	2.

# WHAT PLANTS ARE IN YOUR AREA AND HOW CAN YOU USE THEM?



## STUDENT WORKSHEET: LEAF TYPE NOTES

Name: \_\_\_\_\_

	<p>This leaf type has leaves that alternate as they go up the stem.</p>	<p>3.</p>
	<p>The leaves of this type radiate around the stem from a single node in groups of three or more.</p>	<p>4.</p>
	<p>The leaf margin on this type of leaf is smooth, and the veins are easily visible.</p>	<p>5.</p>
	<p>The indentations on this leaf type are deeply cut, and the veins are branched.</p>	<p>6.</p>



# WHAT PLANTS ARE IN YOUR AREA AND HOW CAN YOU USE THEM?

UNIT 4: Changing Landscapes  
Lesson 9 — Grades 4-5  
STUDENT WORK



## STUDENT WORKSHEET: LOCAL LEAF TYPES

Name: \_\_\_\_\_

### PART 1: COLLECTING NOTES

**Directions:** As you collect your 3-5 leaves, make a sketch of the plant and take notes about the leaf organization. Refer to your Leaf Type Notes worksheet if needed. If you know the name of the plant, write it in the last column. You can also write what the plant is used for.

Quick Sketch of Plant	Leaf Type	Name of this Plant? Known Uses?



# WHAT PLANTS ARE IN YOUR AREA AND HOW CAN YOU USE THEM?



## STUDENT WORKSHEET: LOCAL LEAF TYPES

Name: \_\_\_\_\_

### PART 2: GROUPING AND CLASSIFYING

**Directions:** Combine your leaves with your group members' leaves. Observe all the leaves, looking for similarities. Organize the leaves into groups based on their common characteristics.

1. Into how many groups did your team divide the leaves? \_\_\_\_\_
2. Use the space below to describe the similarities within each group. Be sure to list the leaf types you identified. Use an additional sheet of paper if necessary.

**Leaf Group #1 description:** \_\_\_\_\_

---

---

---

---

---

**Leaf Group #2 description:** \_\_\_\_\_

---

---

---

---

---

**Leaf Group #3 description:** \_\_\_\_\_

---

---

---

---

---