

Section Two: Teacher Notes

Five habitat areas provide field collecting opportunities as students begin a Class Herbarium.

TEACHER NOTES: SECTION TWO

Summary:

Students continue to learn collecting etiquette as they begin a Class Herbarium. They examine 5 habitat areas to discover a particular area’s characteristics affecting plant growth, and they identify the area’s dominant plants. They look at literature with themes related to plants and/or the region.

If appropriate, you may wish to invite Elders and/or local experts into the class or on the outside field trips for these activities. Please see “ELDERS AND EXPERTS” in the Introduction for guidance and adjust your timeline, accordingly.

Please review the information in “NOTES on COLLECTING, PRESSING and the CLASS HERBARIUM” before beginning this section. Materials suppliers are listed in the Resources section of the Appendix.

Activities in this section involve collecting plant materials during the flowering season, although some seed activities are included. Select 5 outdoor locations for the class to visit. Suggestions are: beach, bog, meadow, sheltered valley, and exposed mountain.

Most of the activities in this section require time outdoors. If the weather does not permit these outdoor activities at this time, consider spreading the activities throughout other days. Alternately, you may wish to focus on the literature activity and reading time, and advance to Section Three, Activities 3, 5 and 6 before returning to this section.

Objectives:

Alaska Standards

To understand the varied growing conditions needed by different plants.

To learn indigenous plants’ names and characteristics

Science: A. 11, 12, 14, 15; B. 1, 5; C. 1, 5; D.1

World Languages: B. 1

Geography: B. 1; C. 2; 4

Skills for a Healthy Life: B. 1, 3

To understand local cultural heritage and stewardship for the environment.

English: B. 3; C; D; 2, 3; E.

Cultural: A. 3, 4, 5, 6; B. 2; C. 1, 3; D. 1. 3. 4. 5; E. 1, 2

History: B. 1

Arts: A. 3

TEACHER NOTES: SECTION TWO

To use technology to express ideas and create projects

English: A. 2, 4, 5, 6, 7; C. 5

Technology: A. 1, 2, 3; D. 1

To document the dominant species in a given growing area and to predict dominant species for similar areas.

Math: A. 3, 6

Geography: B. 1

Materials:

- *Legend of the Bluebonnet* or similar story
- Literature about plants (see Resources in Appendix)
- log book
- pen, pencil
- large sheets of paper for whole class activity

Habitat and collection activities:

- “NOTES on COLLECTING, PRESSING and the CLASS HERBARIUM” in the Introduction *
- habitat frames: one per color team to outline a study area 3 feet (approx. one meter) square.

Suggestions:

- hula hoops; or
- lengths of string 12-15 feet (4.5 meters) and pencils to hold the 4 corners
- camera, digital camera, video camera (optional)
- field guides (See Resources in Appendix for list)
- compass (directional)
- outdoor “weather” thermometer
- Habitat Record Sheet *
- hand lens
- masking tape for field labels
- waterproof marking pens
- plastic bags, in a variety of sizes to carry plant specimens: zip-loc or with twisties, 2-or 3 per student
- computers
- plant press (see “NOTES on COLLECTING, PRESSING . . .” in the Introduction)
- white herbarium paper or other sturdy white paper
- contact paper or laminating film and laminator
- Leaf and Flower Cards from the Appendix * copied, cut apart, and laminated
- Plant Illustration Cards from the Appendix * copied, cut apart, and laminated

Seed Activity:

- stuffed animal toy
- tweezers
- Seed Test Card * (see Appendix)

(*included with unit)

TEACHER NOTES: SECTION TWO

Activities:

WHAT DO STUDENTS KNOW ALREADY ABOUT PLANTS? (continued)

ACTIVITY ONE. Students read about plants in literature, beginning with *The Legend of the Bluebonnet* or similar plant story. They locate a story or book about plant use through research in the library, on the Internet, by interviews, or with teacher-provided list. (see “Readings About Plants” list in Resources section in the Appendix). Students read the story or book and retell it in oral reports or written reports.

Inside activity

Estimated duration: 20-30 minutes to begin, followed by reading sessions in class or as homework.

ACTIVITY TWO. Students review collecting strategy and etiquette

Inside activity

Estimated duration: 20-30 minutes

Include advice from Elders and local experts, if available. Look at “NOTES on COLLECTING, PRESSING . . .” in the Introduction for additional suggestions. Review values described in “The Right Way to Live as an *Unanga*” (see Appendix). Make a class record of collection guidelines on large paper that can remain displayed in the classroom for the duration of the unit.

HABITAT STUDY, SPECIMEN COLLECTING, AND CLASS HERBARIUM

ACTIVITY THREE A, B, and C. Students visit selected habitats and begin collections for a Class Herbarium. Students complete A, B, and C at each habitat location.

Outside activity

Estimated duration: one to 5, 80-90 minute sessions outside, plus travel time.

Begin a Class Herbarium. For detailed descriptions of collecting, pressing, and mounting specimens, please see “NOTES on COLLECTING, PRESSING and the Class Herbarium” in the Introduction. Materials suppliers are listed in the Resources section of the Appendix.

The Class Herbarium will be 2 collections of pressed plants with protective covers. One set will be identified and named. A second set will be without names so that it can be used in other activities including assessment.

Plan on taking an outdoor trip for the next one to 5 sessions to habitat areas that contain flowering plants. Suggestions for habitat areas include: beach, bog, meadow, sheltered valley, and exposed mountain. One or more of these habitats can be visited again during the seed activities in Section Three.

ACTIVITY THREE-A. Organize the class into teams by color: green, blue, yellow, red, and white. Student teams go to one of the pre-selected habitats with habitat frames —see materials above—and lay the frame on the ground. Within the frame, students record the characteristics of the habitat. They observe plants growing in the habitat and complete a Habitat Record Sheet.

ACTIVITY THREE-B. Students collect and observe seeds using Seed Test Cards. You may wish to limit this activity to one habitat location or repeat it at all habitats.

TEACHER NOTES: SECTION TWO

ACTIVITY THREE-C. Students collect specimens whose flowers match the color of their group name. Students may photograph the collection area and the plant before collection and may wish also to photograph the specimen later in the classroom. Students make preliminary field identifications using the Plant Illustration Cards.

ACTIVITY FOUR. Students identify plant specimens and prepare them for the Class Herbarium. They fill out identification tags and records on the computer using field guides and information from Elders or other experts. Arrange for one of the students or a helper to set up a template beforehand on the computer with the required Plant Information Card data.

Inside activity
Estimated duration: 20-30 minutes per plant collected

ACTIVITY FIVE. Students press their specimens. Based on your available materials, describe the appropriate pressing methods to your students. Review “NOTES on COLLECTING, PRESSING . . .” in the Introduction for guidelines.

Inside activity
Estimated duration: 10-15 minutes to set up per plant collected; 2 days to 2 weeks for drying time.

ACTIVITY SIX. Students mount and laminate their pressed plants to begin the herbarium collection. Students add final information about plants. (These may be as late as 2 days to 2 weeks later, depending on pressing technique.)

Inside activity
Estimated duration: 20-30 minutes per plant collected.

Assessment opportunity: Using completed Class Herbarium specimen pages that do not have labels, student identifies one or more plants and describes 4 facts about the plant.

Assessment rubric:
Students and teacher complete assessment rubrics.

Teacher Assessment Rubric, Section Two	Date: _____		
Name of student: _____			
	1 Always	2. Sometimes	3. Never
Student: Stays on task.			
Completes work.			
Asks questions.			
Contributes to group’s work.			
Is respectful of Elders and experts.			
Understands the information.			
Needs help with: _____			

Section Two

Five habitat areas provide field collecting opportunities as students begin a Class Herbarium.

Unangam Hitnisangin/Unangam Hitnisangis/Aleut Plants

Tanaġnangin iġayuusalix aġaġiimchin aġnaġtxichin. (E)

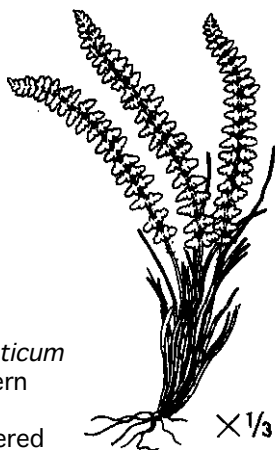
*Tanaġ, Alaġuġ ama slum imuunuu huzuu anaġim
anaġinġis sahnaġxtada.* (W)

Live with and respect the land, sea, and all nature.

SECTION TWO

Scientists guess that there are more than 250,000 plant species in the world. If all plants could live everywhere, you could collect thousands of plants near your home. What a crowd!

However, you will not find a bamboo plant where you live. Nor will you find big trees. You will not find the insect-eating Venus flytraps, but you might find a relative, the sundew. You will not find coconut palms where you live (they make the some of the biggest seeds in the world). However, you will find many ferns (they don't make seeds). Ferns are like the tropical plants that grow next to the coconut palm. Indeed, many orchids grow throughout Alaska. They are not found only in the tropics!



Polystichum aleuticum

Aleutian shield fern

This is the only officially endangered plant species in Alaska.

Originally found on Adak and Atka Islands, this plant has not been seen since 1932. There are other ferns in the region that look like *Polystichum aleuticum*.

Why do some plants live in one place and not another? Why do few big trees grow where you live? Scientists wonder about such questions. Perhaps you will gather some reasons before you complete this study.

Botanists guess that more than 500 species of plants live in the Aleutians/Pribilofs. Many of those plants are not found anywhere else in the world! You have already looked at some of them. Now you will look at some places where they grow and why they grow there. You will be looking at their **habitats**. However, don't expect to find all 500 of those *species of plants everywhere in the Aleutians/Pribilofs*.

Each plant is adapted to a set of conditions. That means that some of plant species will be in one kind of habitat, and some in another. Plants that you can find near St. Paul may not be found near Unalaska. Some Unalaska plants may not be found near King Cove. King Cove plants may be different from the plants found on Atka.



Gentiana algida

Gentian

This beautiful flower grows on St. Paul but is not easily found in other parts of the region.

You will be looking at little communities in the habitat that give you clues about growing conditions. You will need to ask yourself questions about where you find these plants, and why!

ACTIVITY ONE. You can read about plants.

Do you know any stories about plants? Do you remember hearing about plants being used for food or as medicine? You can find a story or book about plant use. Look in the library, or on the Internet. You can talk to Elders, parents or caregivers. When you find the book, plan to spend several days reading it.

Your teacher will ask you to retell the story when you are finished.

ACTIVITY TWO. You can collect wisely.

What are the important things to remember when you are collecting plants? These are some suggestions:

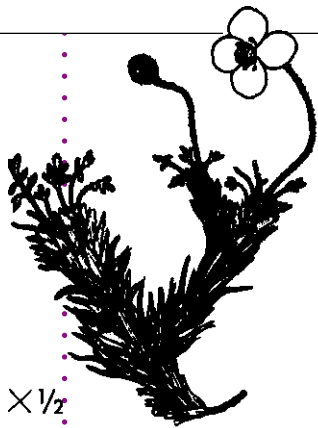
- A. Learn the place and conditions under which each plant grow best.
- B. Know where each plant can be abundantly found.
- C. Take only what can be used.
- D. Take time to appreciate the surroundings.

Can you think of other guidelines?

“Arctic poppy is the ‘rain flower’ on St. Paul Island. My mother said, ‘Don’t pick them, or walk on them, or it will rain. They don’t smell good, anyway.’ But it was a pretty flower. One time when we were picking berries, we picked the flower in spite of what mother had said, and then it sprinkled.”

Mary Bourdukofsky,
Unangan Elder from St. Paul

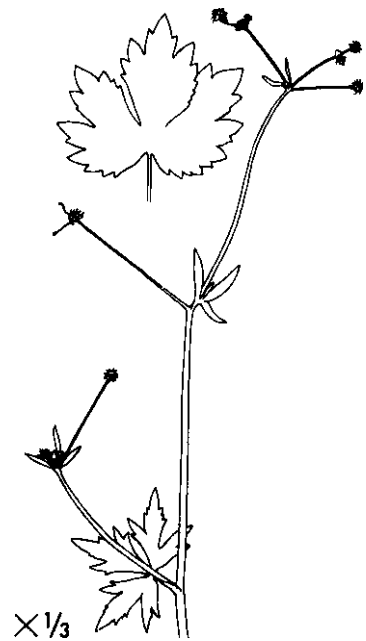
These are some of the plants known as “rain flower” in this region. Do you know any stories about how a flower got its name?



Papaver alaskanum
(rain flower in some places)
Alaska poppy



Claytonia sibirica
Chi̋xtam chi̋gududngii E (UT 138)
Chi̋xtam aahmaa̋gii W (UT 138)
(rain flower in some places)
Spring beauty



Ranunculus bongardi
Chi̋xtam chinguudgii E (UT 138)
Chi̋xtam aahmaa̋gii W (UT 138)
(rain flower in some places)
Bongard buttercup

VOCABULARY

In *Unangam tunuu* words [r] = Russian loan word.

chiġuudgni E (UT 139)

(chih GOOTHE ngeh): flower

aahmaa W (UT 63) (AAH hmaah):

flower

tuguma E (UT 402)

(toogh OOM ah): beach

agu W (UT 30) (AH ghoh): beach

chiimluuda E (UT 142)

(cheem LOO thah): field (meadow)

chaamluuda W (UT 142)

(chaahm LOO thah): field, meadow

tanaxa (UT 390) (ton USK ah): field

(meadow)

chaaska E (UT 132)

(CHAAHS kah): cup

chaaxi W (UT 132)

(CHAAHS kheh): cup

changana (UT 131)

(chung AHN uh): valley

chidġaayu(m) tuduu E (UT 401)

(chithe GUY yoo(m) • too THUU):

purple

uluudam qaxchikdaa W (Dirks, 2001)

(oo LOO thum • kagh CHIK thaah):

purple

chiġilġi E (UT138) (chih HIL gheh):

bog

chiġilġi W (UT 138)

(chig RIL gheh): bog

chuguulġun E (UT 152)

(choo GHOO L ghun): gravel

quganaalġi W (UT 332)

(kugan AHL ghis): gravel

chugu (UT 151) (CHEUGH oh): sand

chumnugi (UT 153)

(choom NUH gegh): yellow

kanuuya [r] (UT 230) (ka NOO yah):

orange

lista [r] (UT 256) (LEE stuh): petal

qiġuusi E (UT 238) (keoh GHOO segh):

mountain

kiiġuusi (UT 238) (kihg GHOO segh):

mountain

quma E (UT 335) (KOO mah): white

quhmax W (UT 335) (KOO hmah) white

siriivra W [r] (UT 360) (sir EEV rah):

silver

slu (UT 368 #3) (SLOOH): habitat

tana (UT 388) (TA nah): habitat

suulutu E [r] (UT 377) (SOO luh toh):

gold

zuulutu W [r] (UT 377) (ZOO luh toh):

gold

talġin E (UT 386) (TAHL ghin): branches

talġis W (UT 386) (TAHL ghis): branches

uluudam tudagii W (UT 401) (oo LOO

thum • too THAG ee): pink

uluuda (UT 436) (oo LOO thah): red

botanist

dominant

habitat

herbarium

nectar

petal

pistil

pollen

seed

sepals

specimen

stamens



Why are many flowers brightly colored?

Brightly colored flowers are nature's advertisements to insects that some good food is here. Insects, attracted by the flower's color and aroma, land to get a meal. As the insect looks for the sweet **nectar**, it also picks up the tiny **pollen** grains that are the flower's male reproductive cells. Then the insect flies on to another flower where some of these male grains stick to the female part of the flower, helping the plant make a new generation.

Many flowers need insects as much as insects need flowers.

You can learn to collect and identify plants.

ACTIVITY THREE.

You can make a collection of plant **specimens** that will help other people identify the plants in your area. This kind of collection is called a **herbarium**.

Before you visit the habitat area, make some guesses—predictions. Which plants do you think you will find in each of these habitats: a meadow (field), beach, bog, sheltered valley, and exposed mountain? Which plants will you find in the greatest quantity in any of these habitats? Which plants will be the fewest in quantity? Record these predictions with your class on large paper. After you visit each habitat, compare your predictions with what you actually found.

You will be organized into groups based on flower colors for these activities. What is the *Unangam Tunuu* word for your team's color?

ACTIVITY THREE-A. You can learn about plant communities called habitats.

You will need:

- something to make a frame on the ground such as a hula hoop, or a length of string and pencils to hold the corners
- Habitat Record Sheet
- outdoor weather thermometer
- directional compass
- log book
- pens, pencils
- camera (optional)

In the habitat area, organize into your color group teams. Working with your team, use a frame to outline an area approximately 3 feet (one meter) square. What plants are inside that area? With your team, complete a Habitat Record Sheet.

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HABITAT RECORD SHEET, Page 1

Record this information for the plants you observe inside your habitat frame.

a. Circle the type of habitat: meadow (field), beach, bog, sheltered valley, exposed mountain, other (describe) _____

b. The date is: _____

c. Identify the plants you know already.

Plant name	Number of plants found
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

(continue on additional page if necessary)

d. Give yourself identifying clues about the plants you do not know, and then include them also. Make notes about their characteristics so that you can research the plant name. Count how many of each plant you find inside your border.

Unknown plant description	Number of plants found
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

(continue on additional page if necessary)

e. How many different species total do you find inside the habitat frame? _____

Which species has the most plants in this frame? _____
(This species is the observed dominant plant.)

Which species has the second-most number of plants inside the frame? _____

HABITAT RECORD SHEET, Page 2

f. Many ingredients create a plant's habitat. What are some of the characteristics of the small place where your plants live?

Ask yourself these HABITAT QUESTIONS and record the observation answers.

LOCATION:

Is this place high in the mountains? yes _____ no _____

Is this place in the lowlands? yes _____ no _____

Is this place level? yes _____ no _____

Is this place steep? yes _____ no _____

WATER:

How much fresh water is in this place? None _____

Pools of water nearby _____ Lake or pond nearby _____

Stream or river nearby _____

Estimated annual rainfall is _____ inches. (You may need to call the weather service or look on the Web for this information)

Is there salt water in this place? yes _____ no _____

LIGHT and WEATHER:

Is there usually strong wind in this place? yes _____ no _____

Is this place protected from the wind? yes _____ no _____

Is it usually warm in this place? yes _____ no _____

Is it usually cold in this place? yes _____ no _____

The temperature today is _____ °F, _____ °C in this place

On this date, plants have an estimated _____ hours of sunlight in this location.

SOIL: What made the soils here? (you may need to select several of these)

Volcanoes? yes _____ no _____

Flooded waterways? yes _____ no _____

Ancient glaciers? yes _____ no _____

Old plants and creatures? yes _____ no _____

If I pick up a handful of this plant's soil will I find mostly rocks?

yes _____ no _____

Mostly dirt? yes _____ no _____

Mostly sand? yes _____ no _____

Other things? yes _____ no _____

Describe briefly: _____

VARIETY:

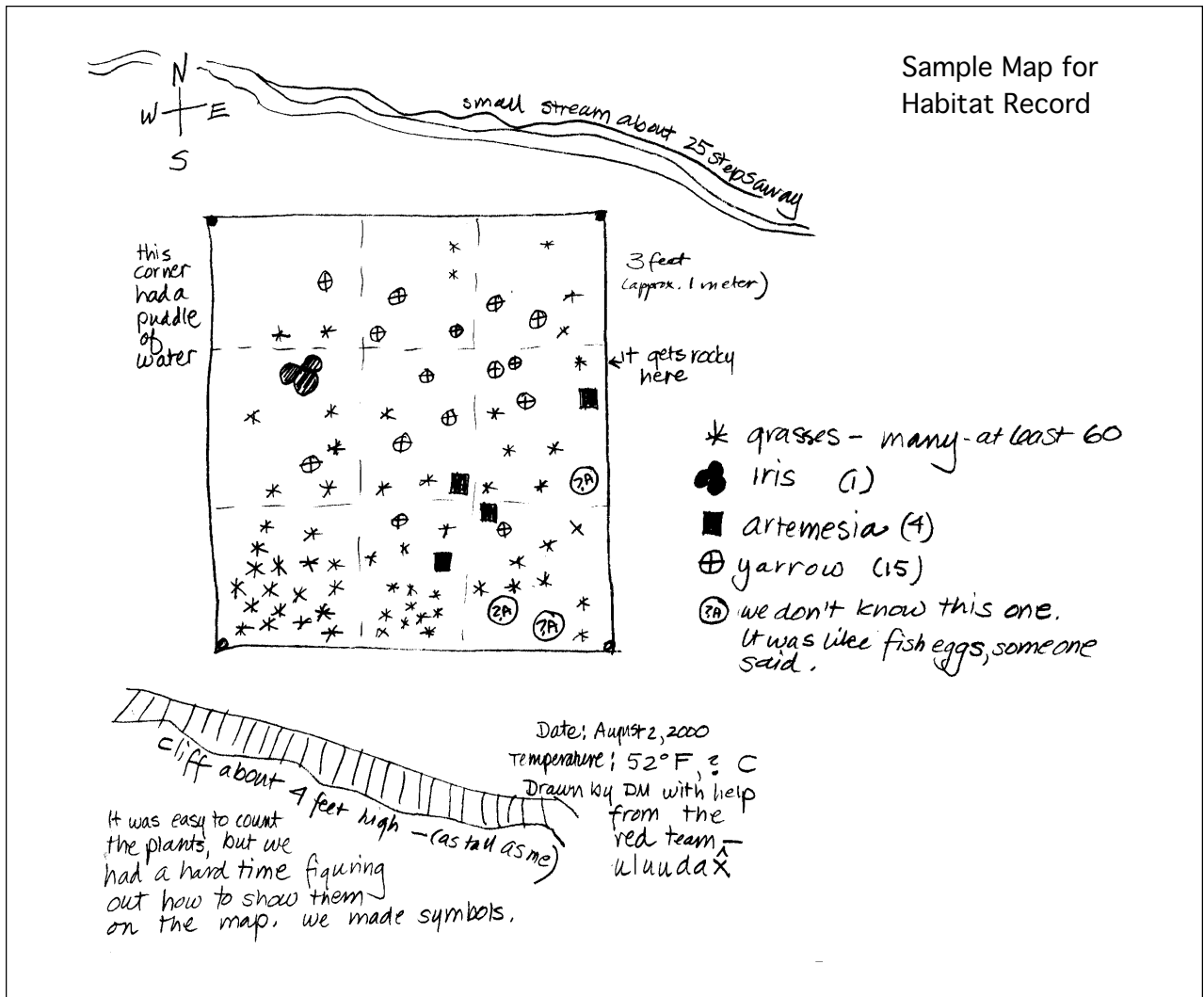
Is this place filled with many other plants? yes _____ no _____

Less than 10 other species? _____ 10 - 25 other species? _____

More than 25 other species? _____

g. Draw a "map" of the area inside your frame showing the location of your plants. (*see the sample map for ideas*) Note any nearby landforms such as streams or cliffs. Using a compass, find the directions for north, south, east and west. Mark these directions on your map. Attach your map to the Record.

h. Photograph the plants and the habitat for comparison later in the season or school year. Mount your photographs on pages with this Record.



ACTIVITY Three-B: You can look at seeds.

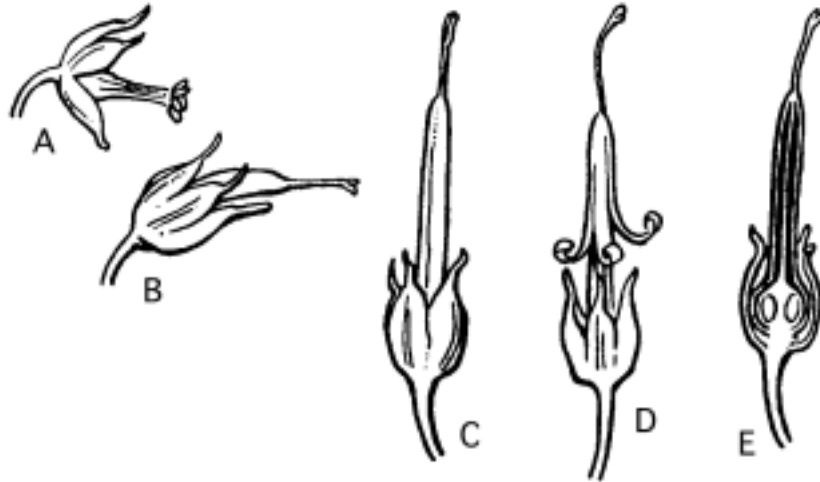
You will need:

- log book
- pens, pencils
- tweezers
- cup of water
- stuffed animal toy
- Seed Test Card
- hand lens

It's time to look for some seeds in the habitat. Find a seed and pick it up with your tweezers. How do you know it is a seed? What is your evidence? Observe the seed with a hand lens and describe

what you see. Hold the seed against a plain background if you need a better view. Sketch at least 3 different kinds of seeds in your log book. Using the Seed Test Card, look for the ways the seed travels. Describe these in your log book. Record any questions you have about the seeds.

Later, you will also collect seeds for an experiment and language/art project. Seeds are best collected in the fall. If you are collecting in the spring, don't be too disappointed if you find only a few samples.



Geranium erianthum
Chunusi E (UT 154)
Chuhnusi E & W (UT 154)
 Wild geranium, cranesbill

The wild geranium has a seed pod like a bird beak that splits, curls, and “throws” the seeds of the plant.
 A, B, C. The seed pod grows.
 D. The pod splits and curls.
 E. Cross-section of the seed pod at step C.

ACTIVITY THREE-C. You can collect specimens for the Class Herbarium.

You will need:

- plastic bags that close such as large zip-loc bags or bags with twisties.
- masking tape for field labels
- waterproof marking pen
- camera, video camera (optional)
- log book
- pens, pencils
- set of Plant Illustration Cards

What should your team remember while collecting specimens for the Class Herbarium?

- Limit your collection to 2 specimens each.
- Leave some plants behind to repopulate the species so that you and others may have the pleasure of seeing the plant again.
- Collect plants that match your color group.
- You may wish to photograph or video tape the plant in its habitat before you collect it. It will help you later if you make a key for your

pictures now.

- The Plant Illustration Cards may help you make a field identification of the plant.

1. Carefully put each specimen in a plastic bag.
2. When you collect each specimen, record the basic collection information on a piece of masking tape. Write the same information in your log book:
 - a. date
 - b. collection number. If this is the first plant collected today, write down the numeral 1. For the second plant collected, write down 2. Continue numbering your specimens in order every time you collect so you can keep accurate records.
 - c. team name
 - d. collector’s initials
 - e. location
 - f. plant name if known
3. Attach the masking tape label to the specimen bag.
4. Make the bag puffy with air to

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protect the specimen.

5. Close the specimen bag.
6. Carefully carry your collected specimens back to the classroom in the closed plastic bags.

You will need to open the bags when you return to the classroom so that the specimens do not mold. Set each specimen in the plant press before you leave school for the day.

ACTIVITY FOUR. You can identify your plant specimens.

You will need:

- plant field guides

- hand lens
- log book
- pen, pencil
- specimens
- Plant Information Cards
- computer

1. Using one or more plant field guides, identify your specimens.
2. Fill out an identification card for each specimen. Record the information on the computer. You may also have information from Elders and other experts to include. You may want to add more information later about plant uses

Plant Information Card

Technical/scientific name: _____

Unangam Tunuu name(s) (UT page):

Common name: _____

Family: _____

Where found: _____

Date found: _____

Collected by: _____

Identified by: _____

Collection number: _____

Field guide used for identification: _____

Height: _____

Leaves: _____

Flower colors and markings: _____

Number of petals, sepals: _____

Size of petals, sepals: _____

Grouping of flowers: _____

Number of stamens (seen with a hand lens) _____

Structure of the pistil (seen with a hand lens) _____

Qualities such as aroma, texture: _____

Uses for this plant: _____

as told by (name(s) of Elder(s) or expert(s)) _____

after you interview Elders and experts.
 3. Put the plant in the press if it still needs drying.

ACTIVITY FIVE. You can press your plants.

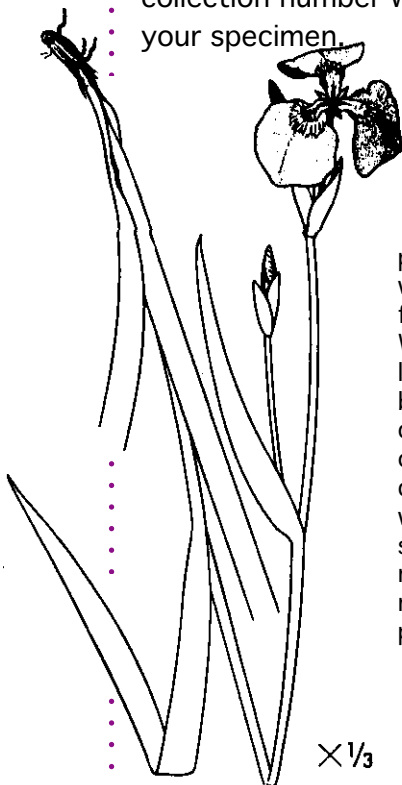
You will need:

- plant press
- specimens
- log book
- pen

Press your plant using the method your teacher describes.

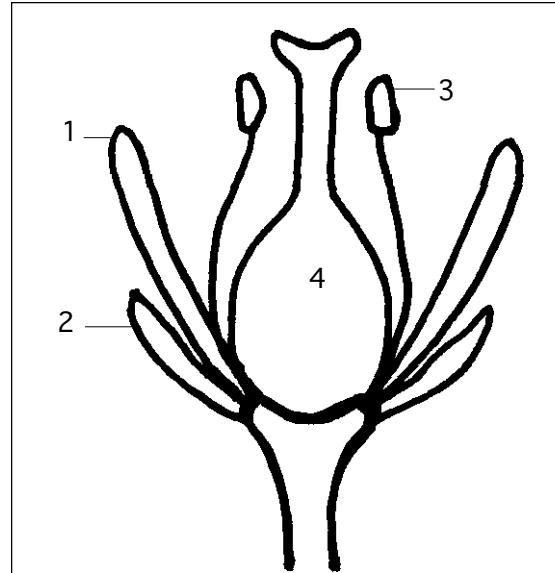
If a specimen is bigger than your press, don't let it hang out over the edges. Fold it into a W, N, Z, or V like the one shown for the *Iris Setosa*.

Write your initials and the collection number on a piece of paper by the drying plant. Sometimes plants change appearance as they dry. Your initials and collection number will help you know it's your specimen.



When this plant was pressed, its stem was bent into a V to fit into the press. When you press very long specimens, bend them in sharp corners like a V or W or N or Z. Gentle curves are not wanted for plant specimens. They make it hard to measure the dried plant.

Iris setosa s.
Nuusnuchuudan E (UT 285)
 (small scissors)
Umsutuuda W (UT 442)
 Iris



Parts of a typical flower

When you are identifying your specimen, these are some of the important flower parts to examine with your hand lens.

1. Petals - delicate colored parts.
2. Sepals - protect the flower.
3. Stamen - the male part of the flower that produces pollen.
4. Pistil - the female part of the flower that produces seeds.

ACTIVITY SIX. You can make a Class Herbarium.

When your pressed plants are completely dry, it is time to mount them on herbarium pages. Touch your plant gently with your finger. If your plant is ready, it should feel like dry paper. Depending on the pressing technique you used, this activity may begin several days or weeks after you began pressing.

1. Mount pressed plants on white paper.
2. Mount one specimen per page.
3. Include your computer-printed label information with the specimen.

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4. Laminate your specimen page to protect it while being handled in the future.

EXTENSIONS

ACTIVITY A.

With a partner, sort the Plant Illustration Cards into groups with similar flowers in each group. List the reasons why you have made these groups.

ACTIVITY B.

Using the Plant Illustration Cards, invent a game for your class.

ACTIVITY C.

The Plant Illustration Cards from *Flora of Alaska and Neighboring Territories*, by Eric Hultén, tell you how big the collected specimen was. For example, the drawing of this bluebell is X1/2. With a ruler, measure the drawing of the bluebell. It is about 2.5 inches (63.5 mm) To find the plant's actual size, multiply by 2. (That comes from the 2 in the 1/2). How big was the collected specimen? (Use a mirror to read the answer below.)

(2 inches or 51 mm)

You can learn how big all the collected plants were on the Plant Illustration Cards.

If you have an enlarging copier, you can also calculate how much bigger you would need to make a copy of the card to have a full-size drawing of the plant.

Illustrations from *Flora of Alaska and Neighboring Territories* by Eric Hultén (c) 1968 by the Board of Trustees of the Leland Stanford Junior University were reproduced with the permission of the publishers, Stanford University Press. Further reproduction of the material requires the publishers' permission. (<http://www.sup.org>)



Campanula chamissonis
Kulukalaḅ E (UT 248) [r]
Kulukuliḅ W (UT 248) [r]
(little bells)
Bluebell, harebell

Student Assessment, Section Two		Date:		
Name _____				
	1 Always	2. Sometimes	3. Never	
I stayed on task.				
I completed my work.				
I asked questions.				
I contributed to my group's work.				
I understand the information.				
I am respectful of Elders and experts.				
I still have questions about:				

NOTES: