Tep'aq – Driftwood

A Publication of Chugachmiut Heritage Preservation Department
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TEP'AQ – DRIFTWOOD

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Introduction:

The Alutiiq people used to gather wood daily for many different reasons. Wood was critically important in many facets of the traditional life of Sugpiaq/Alutiiq people, who lacked the technology to harvest large trees from the forests surrounding their communities. Driftwood, more readily available from the beaches, was the material most often used to provide for the necessities of daily life. Different kinds of driftwood can be found in the region, and some of it has traveled long distances. Currents and tides help transport driftwood to the beaches, for people to easily access and use.

This unit is for grade levels 3- 6, and will use the Red Cedar of Afognak Driftwood Curriculum. The Native Village of Afognak on Kodiak Island developed the curriculum together with UAF, and has given Chugachmiut permission to use it in the Driftwood Heritage Kit. For the 3-6 level Unit, please visit http://www.afognak.org/education/dw_summary.php .

Teacher Background Information:

Driftwood was used for tools, toys, heating, cooking, building, and what we know today as art through carvings.

For background on the Afognak 3-6 grades curriculum, please visit http://talm2009.pbworks.com/f/Red+Cedar+Making+Of.pdf.

Goal for this kit:

Students will learn to recognize the traditional importance of driftwood in the Chugach Region and how dependent people have been on driftwood as substance for survival, safety and shelter. Students will learn traditional uses of wood, properties of different woods and the way people worked with wood. Students will also learn to identify various types of driftwood, and how they can be used.

Students will understand that winds, currents, tides, tsunamis all play a part in how oceans affect our lives. Students will learn to predict the possible origin of different driftwoods based on the type of wood and the ocean current patterns and learn also to identify other resources available from the beach.

Activities for Grades K-2

DRIFTWOOD: GATHERING DRIFTWOOD (K-2)1

Grade: PK-2

Estimated time: 45 minutes

Objective: Though this activity, students will learn about driftwood and describe what the wood looks like. Students will work in groups and this activity may take a couple of days to complete.

Materials/Resources:

- Red Cedar Afognak

Teacher Preparation:

- This activity should take place from early spring to late summer into the fall season before the snow flies.

Activity Procedure:

1. The students will go to the beach and look for Driftwood. This may take a few weeks to complete if wood has not floated ashore. There should be enough driftwood for each student to work with in pairs.
2. Students should see if they can identify what types of wood it is. Then have a class discussion on how the texture of wood is and what the wood looked like and they can also talk about where they found the driftwood.
3. Donate wood to the community:
    a. The wood can be gathered as a class project for the local community.
    b. Students will gather wood and tie the wood of the same sizes together and donate them as a cord of wood to different community members. One cord of wood would be about roughly ten to 12 pieces of wood that is about the same size.

Language to be taught for different wood types:
List of Sugcestun words first and English below:
Red cedar (drift wood log -qar'usik
Cotton wood-ciquq
Drift wood- tep'aq
Wood- kenerkaq
Small pieces of driftwood- ketanguaq
Drift wood bark used for fire- ketaq
Get drift wood-pukillaq

Key words for this lesson in Sugcestun:
Red cedar (driftwood log -qar'usik)
Cottonwood-ciquq
Driftwood- tep'aq
Wood- kenerkaq

Small pieces of driftwood- ketanguaq
Driftwood bark used for fire- ketaq
Get driftwood-pukillaq

DRIFTWOOD: DRIFTWOOD FOR FIREWOOD (K-2)2

Grade: PK-2

Estimated Time: 45 minutes

Objective: Students will gather and stack wood in order to make a successful fire first before starting the fun stuff in this lesson. Stacking wood was one of the first chores a young person would learn before given harder chores.

Materials/Resources:

- One cord of fire wood/ drift wood from the beach
- Hotdogs
- Marshmallows
- Matches

Teacher Preparation:

- Teacher may need an ax or saw to cut wood to same sizes for stacking purposes.

Activity Procedure:

1. This task was one of the first chores a young child would learn before moving to harder chores around the house. The Students will begin to learn how to stack the wood in a pile and the teacher will explain that the goal for this lesson is for the wood not to fall over.
2. Students will go to the beach and explore their surrounding looking for drift wood pieces of various sizes (including plenty of small pieces)
3. Students will come back with their wood and start piling the wood into one pile remembering the goal the teacher told them about.
4. Students will create a circle of driftwood starting with the core of the driftwood then building out from there.
5. Teacher will get a picture of students around the wood circle then the students can help set the circle of wood on fire and roast marshmallows and hotdogs.
6. Students will close this lesson by adding these words to their vocabulary.

Language to be taught in this lesson:

Tep'aq- driftwood
Pukilaaq- logs and small driftwood
Katurlluteng- they gather
Qull'iqlluki- stack them up

Key words in this lesson:

Tep'aq- driftwood
Pukilaaq- logs and small driftwood
Katurlluteng- they gather
Qull'iqlluki- stack them up

DRIFTWOOD: WOOD FLOATS VS. FOAM FLOATS (K-2)3

Grade: KP-2

Time: Three 45-minute classes.

Objective: Students will learn to create a wooden float. Then test it to see what types of floats float better. **We are working with 4 to 7 year olds. I don't believe that they will be able to make a wooden float. A better activity would be to use the water table and a variety of floats set up with weights, then have students watch to see which ones float higher, longer, or hold most weight.**

Materials/Resources:

- Indian Fishing Early Methods on the Northwest Coast By Hilary Stewart
- Kachemak Oceanography, Student Guide by Jane Middleton, November 22,1994
- Water table
- Tarp
- Fan

Teacher Preparation:
Teacher will have to set up the water table with the tarp on the floor. Place the fan next to the water table and set it to high. Students will be watching how a float move though waves.

Background:

- The wooden floats were mainly used in the late 1950's and early 1960's. They were made of red cedar and now days they are hard to find. Years ago before there were polypropylene floats there were wooden floats then they went to corks and then to foam flats.

Activity Procedure:

1. Students will look at the examples of different types of floats.
2. Then as a class they will talk about the different types of floats and what happens to floats as they move though the water.
3. Students will compare how the different types of floats react to the water and then hold a class discussion on which one floated the best and was able to withstand the waves without sinking too much.
4. Students will close by talking about change over time and how the wooden floats were heavy and the foam floats are light.
5. Design a float by using traditional engineering methods and designs.

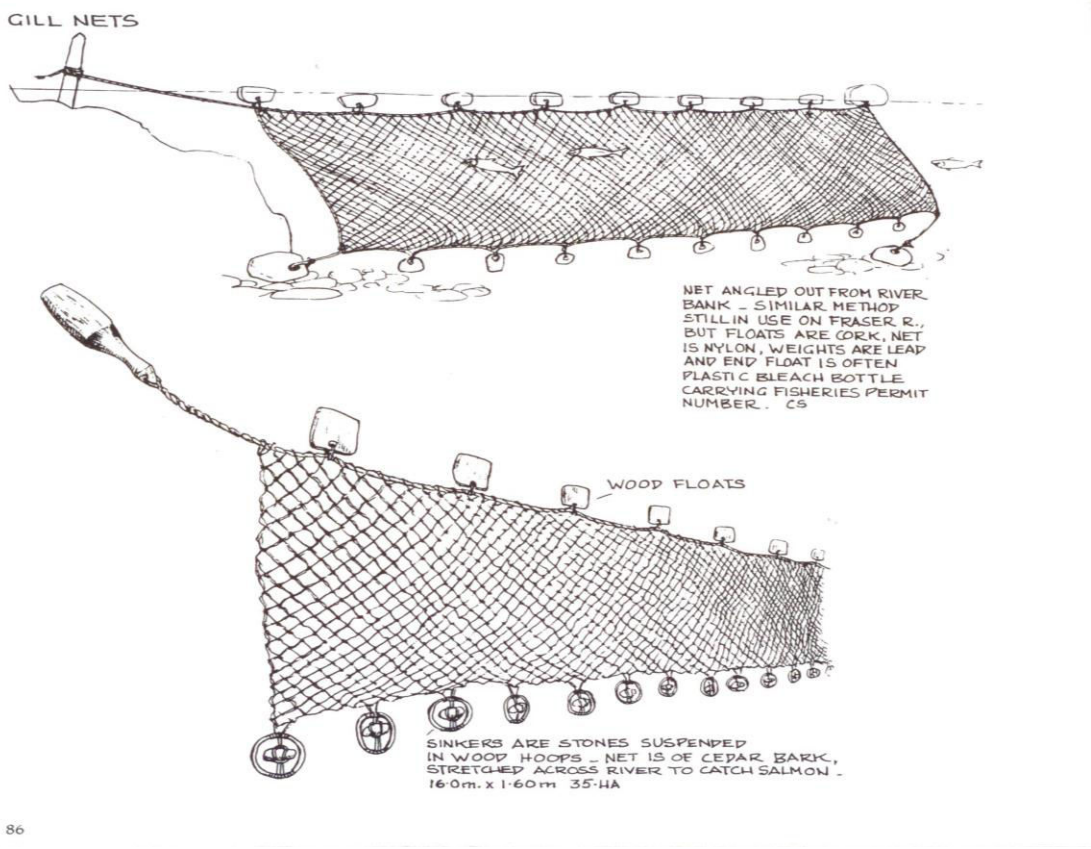
Language to learn in this lesson:
Float-pugtaluni
Sink-(in the water)- kill'uni

Key words in this lesson: floats-pugtaluni

Sink-(in the water)- kill'uni

This was taken directly from Indian Fishing page 86, we can't do that but we can recommend that teachers use the book and make bulletin boards that reflect the illustration.

Must be removed.



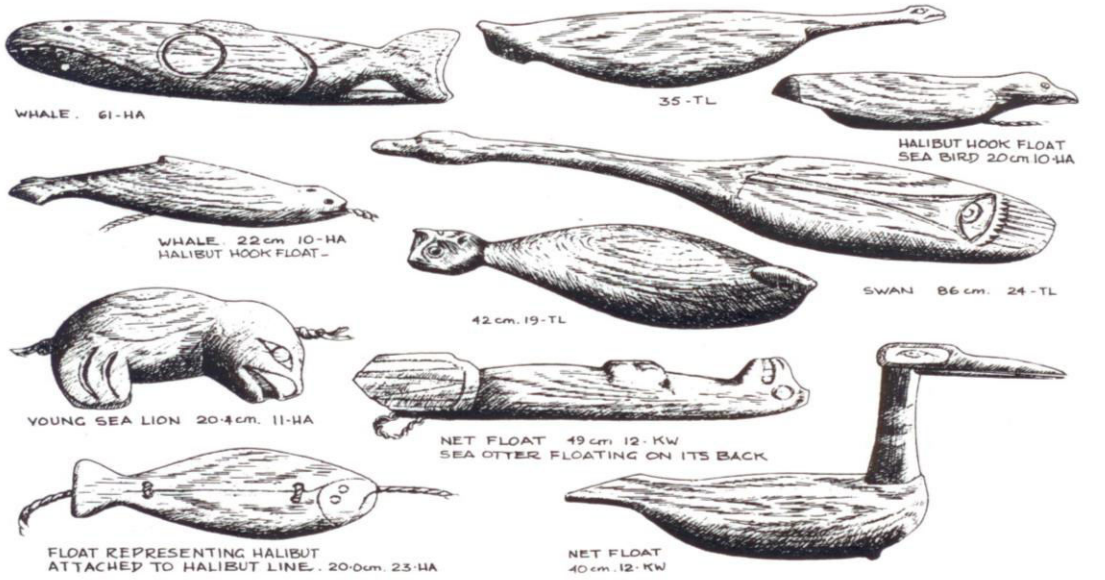
Floats

With characteristic aptitude for making a simple utilitarian object an item of beauty, the Indian fisherman frequently carved his wooden floats to represent a variety of creatures. Symbolism may have been part of the reason and perhaps it clarified ownership of the fishing gear, but the pleasure of seeing the gracefully carved sea bird, whale or swan riding the waves seems reason enough.

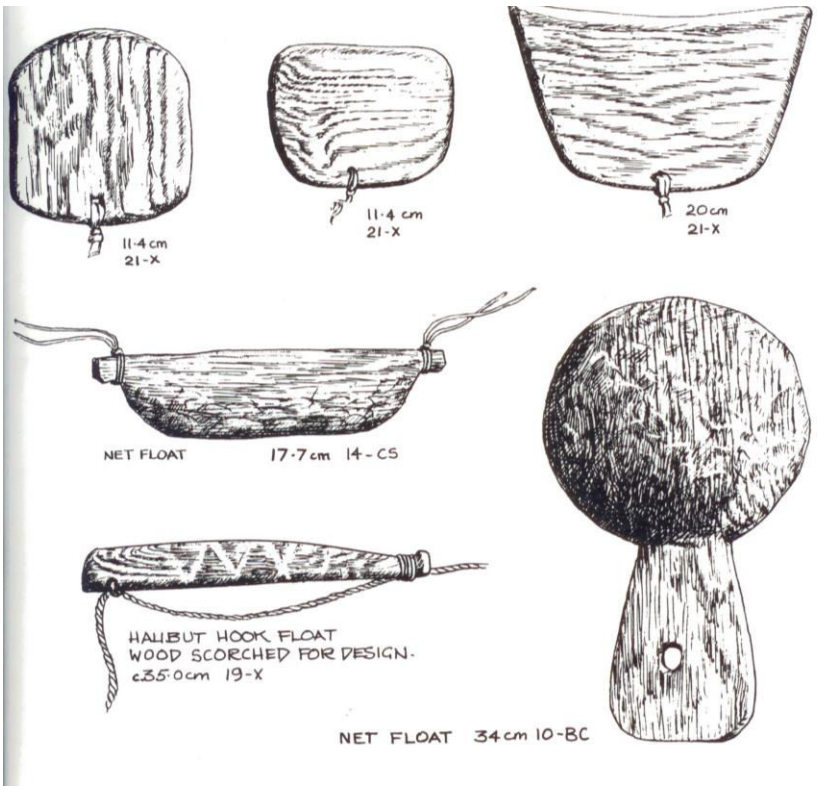
One of the most charming of these must surely have been the sea otter floating on its back, paws across its chest in the typical attitude of this animal.

Such floats mainly served to hold up and mark a halibut line, as did inflated seal skins or bladder floats. The small carved floats having a perforation from end to end were underwater floats used to maintain the correct position of some of the V-shaped hooks of the north.

Simpler, undecorated floats of wood supported the upper edge of fish nets; small ones along the length of the net, large ones at the ends.



Must be removed-see above



a cork is floating on the water.

energy wave #1 advances toward the cork from the left.

when energy wave #1 arrives at the site of the cork, the cork moves upward in a circular path.

when energy peak #1 passes by the cork, the cork falls into the trough between wave peak #1 and wave peak #2.

when wave peak #2 arrives at the site of the cork, the cork moves upward again.

I don't know where this is from. Put a credit in the teacher material section and suggest that they have students experiment with floats in the water table to see how they move with waves.

DRIFTWOOD: DRIFTWOOD FLOATS OR SINKS (K-2)4

Grade Level: K-2

Overview:

Standards:

AK Cultural:	*AK Content*:	*CRCC*:

Estimated Time: One 30-minute class

Lesson Goal: The scientific method of hypotheses/theory, test, observe, record results using a graphic organizer, and extrapolate will be used in determining if an object will sink or float.

Lesson Objectives: Students will:

- Examine how a float floats or sinks.

Vocabulary Words:

English:	PWS:	Lower Cook Inlet:
float	pagtaluni	
Sink (in the water)	kill'uni	

Materials/Resources Needed:

- Water table
- Floats-cork-wooden floats and foam floats
- Tarp
- A old pair of jeans

Websites:

Teacher Preparation:

- Cover floor with waterproof tarp
- Set up clear tote with enough water to allow objects to sink or float
- Arrange objects to be tested on the table
- Make copies of the graphic organizer for each student

Opening:

Activities:

1. Students will take dry wood and test if it floats or sinks
2. Students will take wet wood and see what happens to the wood will it float or sink?

3. Students will see which float floats better the cork, foam or wooden floats
4. Students will compare and contrast a pair of jeans vs. a piece of dry wood then compare the jeans to the wooden cork and then to the foam cork and try and figure out why the floats sink by using the example of the jeans that holds the water.
5. To close students will see which driftwood floats the best and state why it floats the best.

DRIFTWOOD: TREE RINGS TIMELINE (K-2)5

Grade: KP-2

Time: Three 45-minute classes.

Objective: Students will create a tree ring timeline. Students will also have the opportunity to create a tree ring puzzle in this lesson.

Materials/Resources:

- Little lamenting paper for picture
- Velcro to place on the tree rings and behind the pictures
- http://en.wikipedia.org/wiki/Dendrochronology

Teacher Preparation:

- Teacher will photo copy the pictures and lament them
- Teacher will help students identify things that happened on the tree rings by creating a timeline using his/her own expanse

Activity Procedure:

1. Students will examine the rings of a tree and talk about when the tree came into existence.
2. Teacher will help students identify things that happened on the tree rings by creating a timeline using his/her own expanse.
3. Students will deicide what will go on their timeline ring tree timeline.
4. Students will count the number of rings that are on the tree.
5. Students will gather pictures from home after they decide what will go on their tree.
6. Students will start a tree ring timeline that includes when they were born and any events that happed in their lifetime or when their parents were born and married.
7. Students will see the example that is on the next page.
8. After each student is done creating their own time line they will display them for an open house during the parent teacher meeting.
9. Students will also spend some time putting together the tree ring puzzle.

Language to learn in this lesson:

Trees- napat more then one or a single tree is napaq
Small tree- napanguaq
Driftwood – tep'aq
For a long time- since long ago- qanginek

DRIFTWOOD: WOOD IDENTIFICATION (K-2)6

Grade: KP-2

Time: 45 minutes

Objective: Students will be able to compare and contrast the different types of wood**.**

Materials/Resources:

- Box of wood types

Teacher Preparation:
Teacher may want to scope out areas to walk with the class before the class field trip to look for lots of different types of trees and include the beach as part of that trip as well.

Activity Procedure:

1. Students will take a field trip and walk around to find out what types of woods are in the area.
2. After students take that visual inventory they will come back to the classroom and look up the different types of trees they have in their area.
3. Then the students will identify what types of wood that would be used for firewood in a smokehouse, steam bath and a fire on the beach.
4. Students will compare and contrast the different types of wood.
5. The students will pick up the blocks of wood and study the grains then decide if the wood is hard or soft.
6. The students will state whether the wood has an order or sent to it or not.

Language to learn in this lesson:
Firewood-kenerkat
Wood pile-kenerrkat
Yellow cedar-teptuiliq
Wood-kenerkeq
Red cedar-qar'uskik
Tree stump-acillquq
Wood that is too hard to split- qugcialluni

Key words in this lesson:
Firewood-kenerkat
Wood pile-kenerrkat
Yellow cedar-teptuiliq
Wood-kenerkeq
Red cedar-qar'uskik
Tree stump-acillquq
Wood that is too hard to split- qugcialluni

DRIFTWOOD: WIND CHIMES (K-2)7

Grade: KP-2

Time: 45 minutes

Objective: Create sound when wind picks up and lets the people know the weather is changing.

Materials/Resources

- Driftwood for wind chimes
- Twine
- Glass or shells and other items from the beach
- Scissors
- Red Cedar of Afognak
- Driftwood Science
- Electric drill

Teacher Preparation:

- Teacher will have to get a permission statement out to the parents before the field trip
- Teacher must precut the string ahead of time for all class members
- Teacher may want to have students gather more items from the beach for other art projects.
- Teacher will have to pre drill holes in the drift wood and shells for the students

Activity Procedure:

1. Student will go to the beach and pick up driftwood and items for wind chimes.
2. Students will come back to the classroom and place all items on a table and share their found objects with the class. Each child will then pick items they want to make their chimes with.
3. Teacher will hold up an example of what the wind chime should look like.
4. Students will start the construction on their own wind chimes.
5. Teacher will explain that different objects will make different noises and the students should test object out before constructing the wind chime.
6. Each child will test the way items make sound first before there final choice of their selection.
7. The students will go to the teacher for their precut string.
8. If glue is needed the students will get the glue form the teacher.
9. Students will hang their chimes at the school or take them home to their parents to hang up.
10. Students will test their chime with a fan
11. Wrap up teacher will ask what sounds made the most noise and which one was

DRIFTWOOD: DRIFTWOOD TOYS – HOW TO MAKE A XYLOPHONE (K-2)8

Grade: KP-2

Time: 45 minutes

Objective: Create sound using wood driftwood found on the beach.

Materials/Resources:

- **http://vodpod.com/watch/3501231-how-to-make-a-driftwood-xylophone?u=tunipanea&c=tunipanea**
- 4 towels per group of students
- Drift wood of different sizes
- Computer to show the u tube video clip

Teacher Preparation:
It is recommended to do this activity on a good weather day.

Activity Procedure:

1. Students will first watch how to make a driftwood Xylophone clip
2. Then gather the towels
3. Students will divide up into groups and then head to the beach
4. Students will gather different types of driftwood and test them for sound like the video.
5. Students will then create the xylophone on the beach
6. Students will find the xylophone mallet to use
7. After driftwood is collected roll the towels up for cross bars and place the driftwood on the towels.
8. They will sound better if the wood over hangs over the towels.
9. Each student should be able to make their own xylophone in their groups.
10. After the activity students will come back to the classroom and talk about which pieces of driftwood sounded the best.

DRIFTWOOD: HOW WE USED TO LIVE (K-2)9

Grade: KP-2

Time: Two 45-minute classes

Objective: Students will create an old style house from building blocks that are glued together. This was a big part of the Alutiiq culture before the modern houses came along.

Materials/Resources:

- Building blocks
- Glue
- Moss
- Cardboard for the base of project

Teacher Preparation:
Teacher will have to find a sturdy cardboard for the building blocks lesson. This will be a class project. Invite an elder into the classroom to explain what a Barbara is and how they were constructed.

Activity Procedure:

1. Students will break up into groups and create a class project
2. Students will have to figure out how to shape the top of the roof so it does not fall down.
3. Students will then think about how people use to live in these houses
4. A class discussion can be about the structure of the Barbara and how the people use to live in them. How did they get in and out of them?
5. Students will create a Barbara from the building blocks and glue them together as a group.
6. After the sod house is complete students will place and glue on the moss and chunks of wood that goes around the Barbara.
7. This house can be displayed at the open house for the parent teacher meetings.
8. Invite an elder into the classroom to explain what a Barbara is and how they were constructed.

Language to learn in this lesson:
Barbara-ciqluaq
House- ena
Ancient- nutarrpiaq

Key words in this lesson:
Barbara-ciqluaq
House- ena
Ancient- nutarrpia

Activities for Grades 3-6

DRIFTWOOD: BEACH WALK (3-5)1

Grade: 3-5

Time: Two 45-minute classes

Objective: Students will learn the best time to gather wood and go on a field trip to the beach. Each child should receive a wooden necklace as they set foot on the beach.

Materials/Resources:

- Local elder
- Red Cedar Afognak

Teacher Preparation:

- Teacher will have to pass out the wooden necklaces to each child as they get to the beach.
- Native elders can assist you when the best time to go and gather driftwood is. Invite the elder to come along on your field trip. The students will use the dyes form the next lesson to complete this lesson.

Activity Procedure:

1. Students will track the tides to see when the best time will be to go to the beach and gather wood**.** Students will want to go during low tide for best results**.**
2. Field trips are an important part of our school program. A letter explaining the nature of the trip and requesting parent permission for the students to attend will be sent out prior to each field trip, only if it is required by the school to do this.
3. Field trips may be scheduled for educational purposes during the school year. Students are considered "in school" while participating in district sponsored activities. This means students are subject to the rules, district policy, and school rules.
4. Students will listen to a story told by a local elder about gathering driftwood and how he/she uses it.
5. Students will write a story About gathering driftwood
6. Students will receive a wooden disk necklace and for each lesson they complete they will draw a symbol on their wooden bocks. They will use the dye form the next lesson to complete this lesson.
7. After the stories are written each student will read aloud their story
8. Share stories in a story circle format with one another.

DRIFTWOOD: COLLECTING DRIFTWOOD (3-5)2

Grade: 3-5

Time: 45 minutes

Objective: Students will be assigned an activity card to complete. They will also try and identify what types of wood was found.

Materials/Resources:
- Pocket knife
- Matches
- Activity sheet
- Gram crackers
- Hersey bars
- Marshmallows
- Napkins

Teacher Preparation:
Teacher needs to bring something to make a fire with and have a pocketknife handy to make sharp pointed sticks for the s'mores. Teacher will have to show the kids how to make s'mores if they don't know how.

Activity Procedure:
1. Students will begin by looking for wood in one area and if there is not enough then they will move to another area to search for wood.
2. Students will locate the wood and try and guess what type of wood it is
3. Then they will think about where the wood would comes form.
4. Complete the activity list listed on the next page
5. Students will state out loud to the class what they know about building a fire and what it takes to make a fire.

Drift Wood Activity Card

Find drift wood Of any size or shape	See how many pieces of drift wood you can find	Collect drift wood for art project	Make wooden sticks for s'mores
Place one or more in a pile	Find a piece of drift wood that has at least three points on it	Find a dry piece of drift wood	Gather enough wood for a fire
Find two that look alike	Find two pieces of drift wood that look very different from each other	Find a old piece of drift wood that is very wet	Make a fire and make s'mores

DRIFTWOOD: THE BIG STORM (3-5)3

Grade: 3-5

Time: 45 minutes

Objective: Students will learn why gathering wood is best done after a big storm.

Materials/Resources:
Driftwood - Cottonwood
Red Cedar Afognak

Teacher Preparation:
This lesson would be best to do right after a big storm.

Activity Procedure:

1. Students will go to the beach and search for cottonwood after the big storm.
2. Gathering driftwood is always best after a big storm.
3. Students will identify why cottonwood was important to the Alutiiq people.
4. If cottonwood is found what was it used for and why was it so valued?
5. What type of wood would this be hard or soft?
6. Was this wood good for smoking fish and if so why?
7. Students can do an experiment of the different types of wood does burn hot or cold and what color is the smoke of the fires?
8. Students will interview local elders to find out more about the big storms and what types of thing were found after big storms.
9. Students will then create a story based on an interview with a local elder. Asking the elder how driftwood would arrive in their area as well.
10. Teacher may want to read a story about driftwood form the Red Cedar Afgonak book about driftwood.

Here is an example of one short story:
One old story that goes along with this lesson would be that driftwood is best gathered after a big storm. Also it would bring in things like halibut, octopus, and Lady Slippers (big red gumboots) and they were gathered before the birds arrived.

DRIFTWOOD: DYES AND STAINS (3-5)4

Grade: 3-5

Time: 45 minutes

Objective: Students will examine the different types of dyes and add them to their wooded disk when they go on the beach walk and after they complete the different lessons in this unit**.**

Materials/Resources:

- http://www.ehow.com/how_2125187_naturally-dye-wood.html
- Herbs, plants and berries
- Stainless steel pot
- White vinegar
- Alum
- Mixing spoons
- Paintbrush
- Sealant
- Wood blocks

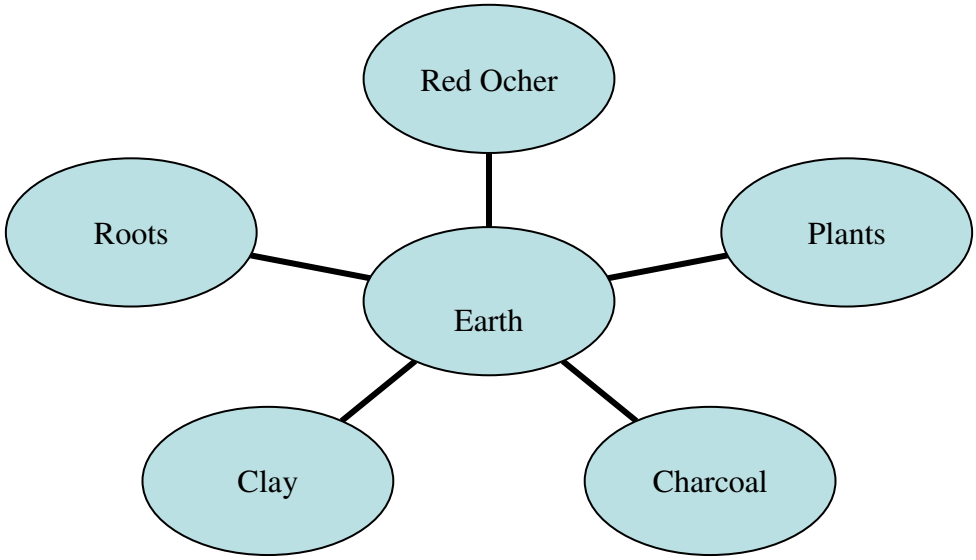
Teacher Preparation:
Teacher will prep ahead of time for the items and making sure that all the items are included to do this lesson.

Activity Procedure:

1. Students will examine how to make different types of dyes.
2. Students will choose one of the dyes and go and on a field trip to gather material to make their own dyes to learn how to create their own dyes.
3. students will follow the step by step process to make there own dye
4. Students will paint the wood and take home their art

Language to learn in this lesson:
Berry—alagnaq
Plant-nauq or naucestaaq
Root-nukek
Earth-nuna

Types of dyes:



Herbs, plants and berries have been used for generations to dye woods. Naturally dyeing wood is not only good for the environment but also good for the wood itself. Woods that are naturally dyed achieve a more natural look after the dyeing process.

Step 1

Gather the herbs, plants and berries needed for the color you desire. For a pink, rose or lavender color, use elderberries, blackberries, rose hips or sorrel. For yellow, use turmeric powder, saffron, apple tree bark or pear tree bark. For an orange dye, use onion skins, beet root, heather, marigolds or pear leaves. Red onion skins, shrub clippings, lily of valley or nettles create green. Deep brown dyes are created with gypsy wart, sassafras or walnut hulls. Blackberries, blueberries or indigo plants create blue dyes.

Step 2

Prepare the natural dyes. For berries, add 1 tsp. alum to the mix to help the color stay. When making pink, rose or lavender dyes, cook the herbs in a pot with a small amount of water while adding white vinegar 1 tbs. at a time until the desired color is achieved. Yellow dye is made by boiling the herbs until you reach the desired yellow. To make orange and green dyes, use 3 to 4 handfuls of the herb and boil it until it reaches the desired color. More may be added for a richer shade. When making deep brown or blue, soak the ingredients overnight and then boil the water in the morning.

Step 3

Paint the wood with the natural dye you created. Apply as many coats as necessary. Allow each coat to dry before applying the next coat.

Step 4

Apply a sealant generously on the wood so the colors stay for a longer amount of time. Allow the sealant to dry before using the wood

Key words in this lesson:
Berry—alagnaq
Plant-nauq or naucestaaq
Root-nukek
Earth-nuna

DRIFTWOOD: TREE RINGS (3-5)5

Grade: 3-5

Time: 45 minutes

Objective: The students will learn about the tree ring tale and create their own tree rings tale.

Materials/Resources:

- http://web.utk.edu/~grissino/images/ashland_hemlock2.jpg
- Red Cedar Afognak, A Driftwood Journey

Teacher Preparation:
Teacher will grade the stories and then have the students rewrite the story after the revisions are made and then have a class viewing on the stories along with the tree ring storyline.

Activity Procedure:

1. Teacher will read the Tree Rings Tell Tales from The Red Cedar of Afognak book.
2. The students will create a story of tales that goes along with the tree rings picture the student will create.
3. Each student will add in important dates in time and create there own tree rings timeline.
4. Students will hand in their stories to the teacher and after the stories are graded and returned the students will gather their tree ring poster they made and put them up for display for the class to view.
5. Students will view each others work and then have a class discussion on the interesting things that stood out to them and state why it was intrusting to them.
6. Students will use the picture of the tree ring provided on the next page.

DRIFTWOOD: HEALTHY TREES VS. ROTTEN TREES AND THE ENVIRONMENT (3-5)6

Grade: 3-5

Time: 2 45-minute classes

Objective: Students will go around the village/town to see what shape the trees are in. They will look at beetle-killed trees if they are in the area. If the area has had a forest fire what shape students will examine what shape the trees are after that fire?

Materials/Resources:
Resources books on green wood and the properties of wood is needed for this lesson.

Teacher Preparation:
A field trip is required for this lesson. There will need to be an experiment done to answer question number 6.

Activity Procedure:

1. Students will take a field trip and walk around their community to see if the trees are healthy or sick.
2. Students will examine what a green tree is (green trees are just freshly cut trees) so what does a green tree look like, does it have a sent, is the wood hard or soft and why do they call the fresh cut trees green trees?
3. Students will examine how can you tell if driftwood is rotten? Does it crumble is it wet and soft or is it hard and dry? Would rotten wood be good for carving? How did the people use the rotten wood in our area?
4. Students will look at sick trees by using a magnifying glass and see if they can find traces of why the tree had died. (Like beetle kill)
5. If there was a forest fire in the area students need to look at the environment and see what the forest fire has done and answer the question of did the forest fire help or hurt the environment?
6. Would rotten wood burn hot or cold? Which one burns more smoothly? An experiment might be needed for this to test this.

Language to learn in this lesson:
How wood was used:
Steam bath-maqiq
She is burning something-nagkuahiuq

Key words in this lesson:
Steam bath-maqiq
She is burning something-nagkuahiuq

DRIFTWOOD: HEATING THE HOUSE FOR WINTER (3-5)7

Grade: 3-5

Time: 45 minutes

Objective: Students will examine the characteristics of firewood.

Materials/Resources:

- http://www.donnan.com/firewood.htm
- Cores of wood or make your cords of wood

Teacher Preparation:
Teacher will help students gather and make cords of wood for later use.

Activity Procedure:

1. Students will begin to understand the importance of having wood set aside for winter.
2. Students will go out and gather wood
3. Students will bring wood home then split the wood into smaller sizes for the fireplace and steam baths.
4. Students will cut enough wood for later use to be used in the wintertime.
5. The wood should be stacked in an orderly fashion for later use.
6. The wood will need to be sheltered form the rain and snow
7. Last students will bring wood into the house as needed for the fireplace or steam bath.
8. Look at the list below and see if you can identify what types of wood would be used in your area. Students should examine and be able to explain what the cautions are about burning certain types of woods?

CHARACTERISTICS OF FIREWOOD

Some types of wood are user-friendlier since they're easier to start on fire and will burn much better. Ash is often called "the Firewood of Kings" since it burns well even when freshly cut.

Generally speaking, woods high in resin content (pine, spruce, fir) aren't used in the home fireplace, since resin build-up in a chimney can promote chimney fires.

Woods that 'pop' and spark are also considered less desirable for burning. No matter what type of wood is burned, it's important to practice good maintenance by having a chimney periodically inspected and swept.

Rating the overall quality of firewood is open to some debate, but the categories below should give the reader a rough idea of where the various woods stand.

Overall Rating	Type of Firewood
EXCELLENT	Ash, beech, hickory, sugar maple, oak
GOOD	Black cherry, black locust, red maple, black walnut
FAIR	Elm, sweet gum, poplar, white pine
POOR	Spruce

TEN WOODBURNING TIPS

Source: The Chimney Safety Institute of America

To aid in the prevention of chimney fires and carbon monoxide intrusion and to help keep wood burning fireplaces and wood stoves functioning properly, the Chimney Safety Institute of America (CSIA) offers the following safety tips for new and returning wood burners:

Get an annual chimney check. Have chimneys inspected annually, and cleaned as necessary, by a qualified professional chimney service technician. This reduces the risk of fires and carbon monoxide poisonings due to creosote buildup or obstructions in the chimneys.

Keep it clear. Keep tree branches and leaves at least 15 feet away from the top of the chimney.

Install a chimney cap to keep debris and animals out of the chimney.

Choose the right fuel. For burning firewood in wood stoves or fireplaces, choose well-seasoned wood that has been split for a minimum of six months to one year, and stored in a covered and elevated location. Never burn Christmas trees or treated wood in your fireplace or wood stove.

Build it right. Place firewood or fire logs at the rear of the fireplace on a supporting grate. To start the fire, use kindling or a commercial firelighter. Never use flammable liquids.

Keep the hearth area clear. Combustible material too close to the fireplace, or to a wood stove, could easily catch fire. Keep furniture at least 36" away from the hearth.

Use a fireplace screen. Use metal mesh or a screen in front of the fireplace to catch flying sparks that could ignite or burn holes in the carpet or flooring.

Be careful not to overload the fireplace. Add one manufactured fire log at a time or no more than a couple of pieces of firewood. A fireplace is not designed to function as an incinerator and should never be used to burn glossy paper or garbage.

Install smoke and carbon monoxide detectors. Place detectors throughout the house and check batteries in the spring and fall. When you change your clocks for Daylight Savings Time, remember to check your batteries.

Never leave a fire unattended. Before turning in for the evening, be sure that the fire is fully extinguished. Supervise children and pets closely around wood stoves and fireplaces.

Source: **http://www.donnan.com/firewood.htm**

DRIFTWOOD: SCULPTURES OF DRIFTWOOD (WOOD ADZ) (3-5)8

Grade: 3-5

Time: 45 minutes

Objective: Students will learn about the types of adz in their area and how they were used.

Materials/Resources:
Twine
Wood
Carving tools

Teacher Preparation:
Just know that each adz will be different for each student due to size of the arms.

Activity Procedure:
1. Students will create a handle for a wooden adz
2. The handle should be the length of your arm from the wrist to the elbow
3. Find wood that is curved like your arm
4. Students will make the wood adz handle and succor the adz head to the tool with twine.
5. Each adz will be different from others in the class
6. Students will research what types of adz were used in their area and see if they can replicate one that was found in their area.
7. Students will explain how an adz was used in their area and what the adz was used for.

DRIFTWOOD: ELEMENTS OF WOOD (3-5)9

Grade: 3-5

Time: Three 45-minute classes

Objective: Students should be able to explain what the elements of wood are and the different species of wood.

Materials/Resources:

- **http://www.madsci.org/posts/archives/nov98/911281031.Ch.r.html**
- **http://www.seafriends.org.nz/books/periodi.htm#where**

Teacher Preparation: this lesson should be done in stages beginning with a field trip to the woods. Have students bring papers to write on and have them measure trees around, how tall the tree is and landscape around them.

Activity Procedure:
1.Students will examine the elements that make up wood components.

Here is a quick list of possible elements. Without analysis, there is no way to be sure that all of these elements will be found in a particular wood sample and that other elements will not be present. * - an essential element for plant growth.

*Hydrogen, *Oxygen, *Carbon, *Nitrogen, *Potassium, *Calcium, *Phosphorus, *Magnesium, *Sulfur, Sodium, Silicon, *Iron, *Boron, Strontium, Aluminum

(The following are all trace elements)
*Manganese, *Copper, Titanium, Nickel, Vanadium, Chromium, Zirconium, *Molybdenum, Tin, *Zinc, *Chlorine, Cobalt, Barium, Silver, and Bismuth.

2. Now that the students have an idea of the elements that make up wood they will examine the periodic table and identify what species are found in their area.
3. Students will also take a field trip to the woods and measure the trees around and check if the tree is alive or has rot in it. Is the tree healthy or sick and document what the student find out.
4. Each student can grade the trees by using the elements chart and examining how the wood components are made up and the condition of the tree.
5. Students will create a map of the trees and the landscape around them. Include if possible how high the tree is and the circumference around the tree.

The table below lists which nutrients are thought to be essential to various living organisms

Essential inorganic nutrients for living organisms

Source: Encyclopedia Britannica and others

Elements essential to all species, marked blue

nt	Representative organisms exhibiting the requirement	Plants	Micro organisms	An
	Certain vascular plants and algae; no evidence of animal requirement	..	.	
Ca	Plants, animals, most microorganisms	+	+	
	All plants (CO_2), micro organisms and animals (tissue)	.	.	
Cl	Higher animals; no evidence for requirement in plants	.	.	
n Cr	Probably essential in higher animals	.	.	
	Essentially in ruminants; probably functions chiefly through microbial	.	.	
	incorporation into the vitamin called cyanocobalamin B12	.	.	
u	Plants,a nimals, most microorganisms	+	+	
	Highly beneficial to bone and tooth formation in animals, including humans	.	.	
	Higher animals; no evidence for requirement in plants or microorganisms	.	.	
	Animals, higher plants, most microorganisms	+	+	
m Mg	Animals, plants, microorganisms	+	+	
se Mn	Animals, plants, microorganisms	+	+	
um Mo	Animals, plants, nitogen-fixing bacteria	+	..	
N	Plants, microorganisms. Animals derive nitrogen mostly from organic sources	NO3	NO3	
	and utilise limited amounts of the ammonium ion, but not the nitrate ion.	.	.	
us P	Animals, plants, microorganisms	+	+	
n K	Animals, plants, microorganisms	+	+	
Se	Higher animals	.	.	
	Certain protozoa and sponges	.	.	
la	Animals, some plants, some marine bacteria	..	..	
	Plants, many bacteria. Animals derive sulfur mostly from organic sources	+	+	
n V	Various tunicates and holothurian echinoderms; some algae; (higher animals)	..	..	
	All animals, plants, most microorganisms	+	+	

Nutrients and nutrient deficiency in plants

Plants are the basis of all life. They are also the first creatures to have evolved on land, where water and nutrients are much harder to acquire. Plants depend on the macro nutrients N, P, K, S, Mg, Ca and a number of micro nutrients (trace elements). From these nutrients and carbon dioxide, plants manufacture a vast range of biochemical compounds necessary for themselves and for other organisms.

Nitrogen (N)

Nitrogen is taken up by plants as nitrate (NO_3^-) or ammonia (NH_4^+) ions. Bacteria in the soil, often living close to plant roots, are able to convert the abundantly available nitrogen gas (N_2) into nitrates or ammonia. Also nitrates and nitrogen compounds are manufactured in the atmosphere by ultraviolet radiation, raining down equally on land and sea. These critically important nutrients are absorbed on clay particles and humus.

The plant incorporates nitrogen in organic compounds, mainly proteins and nucleic acids, essential components of protoplasm and enzymes. The compounds are accumulated in the living parts of the plant: the shoots, leaves, buds and storage organs. Lack of nitrogen results in stunting or dwarfism, spindly appearance; yellowing of old leaves, sometimes reddening; more roots than shoots.

Phosphorus (P)

Phosphates are taken in as organically bound phosphates of Ca, Fe, Al, in the relatively insoluble PO_4^{--} or HPO_4^- ions. It is incorporated in esteric compounds, nucleotides, phosphatides, phytin, essential for basic metabolism and photosynthesis. It accumulates in reproductive organs (pollen) and in leaves. Lack of phosphorus disturbs the reproductive process (delayed flowering), stunting, dark green or bronze leaf discolouring and needle-tip drying in conifers.

Sulfur (S)
Sulfur comes from sulfur-containing minerals of Ca, Mg, Na. The SO4-- ion is readily absorbed and does not adsorb onto clay. Inside the plant it is used to produce esters, proteins, coenzymes and others, essential components of cell protoplasm. It accumulates in leaves and seeds. Lack of sulfur causes symptoms similar to nitrogen deficiency.

Potassium (K)
Potassium is found in the minerals feldspar, mica and clay. It is available as the K+ ion, which is strongly adsorbed to clay. In the cell sap, potassium promotes hydration, and acts in balance with other ions. It is necessary for enzyme activation in: photosynthesis, nitrate reductase, osmoregulation. It accumulates in young tissue, bark and sites of intense metabolism. Lack of it results ina disturbed water balance (dying tips), curling of edges of older leaves, root rot and in conifers, premature drop of needles.

Magnesium (Mg)
Magnesium is found in soil carbonates (dolomite), silicates (augite, hornblende, olivine), and as sulfate chloride. It is readily adsorbed to clay and thus deficient in acid soils. Absorbed as the Mg++ ion, it is bound in chlorophyll, pectates, components of enzymes and ribosomes. Accumulating in leaves, it is essential for the regulation of hydration and metabolism: photosynthesis and phosphate transfer. Lack of Magnesium results in stunted growth, interveinal chloroses of old leaves.

Calcium (Ca)
Calcium is found in soils as carbonates (gypsum), phosphates and silicates (feldspar, augite). It is strongly adsorbed to clay and deficient in acid soils. Absorbed by the plant as the Ca++ ion, it is organically bound in pectates which regulate hydrates. Calcium is an enzyme activator and regulator of length-wise growth. It accumulates in leaves and bark. Lack of calcium disturbs growth (small cells), tip drying, leaf deformation and impaired root growth.

Iron (Fe)
Iron is available in soil as sulfides, oxides, phosphates, silicates (augite, hornblende, biotite). It is adsorbed to clay and forms an important part of clay structure. It is deficient in acid soils. As the Fe++ ion or Fe+++chelate, it takes part in metal-organic compounds as components of enzymes (heme, cytochrome, ferredoxin). Iron plays an important role in basic metabolism (redox reactions), nitrogen metabolism and photosynthesis. It accumulates in leaves and lack of it shows as straw-yellow interveinal chloroses; in extreme cases white coloration of young leaves and suppressed formation of apical (top) buds.

(source: W Larcher, Physiological plant ecology, 1980, Springer Verlag)

Nutrient deficiency in humans

Nutrients, minerals or trace elements are needed by the human body. When deficient, disease symptoms appear. In order to better understand the importance of various elements, the most common deficiency symptoms follow below.

Iron deficiency anemia
Iron is a keystone element in the formation of hemoglobin, the red substance that conveys oxygen from the lungs to the places where it is needed. A lack of iron may develop during excessively fast growth, pregnancey, blood losses (particularly invisible stomach ulcers). Iron deficiency is quite common (20% of small children, 5-10% of women). symptoms include weakness, fatigue, pallor, coldness of extremities, sore tongue, loss of hair, brittle fingernails, or dry skin. After taking iron supplements, quick improvement is common.

Calcium deficiency
Calcium is the building element of bones and teeth, of which it forms 70%. 1% of the body's calcium circulates in the bloodstream where it helps to contract muscles, and to regulate the contractions of the heart. It also plays a role in the transmission of nerve impulses and in the clotting of blood. It is essential in various enzymes and hormones.
In case of deficiency, the body redirects it from the bones. In the long term this may result in osteoporosis and softening of bone tissue. Severe calcium deficiency causes sensation of numbness and tingling around mouth and fingertips and painful spasms and aches of the muscles. This disease is not common. Calcium exists plentiful in nature in foods like dairy products, leafy green vegetables and fish food. It is absorbed by the body in the presence of vitamin D and phosphorus for bone forming, since bones consist of calcium phosphate. Certain hormones also play a crucial role.

Chlorine deficiency
Chlorine is available in table salt, a common component of human blood (60%). Chlorides play an essential role in the neutrality and pressure of extracellular fluids and in the acid-base balance of the body. Hydrochloric acid is produced in the stomach for the digestion of food. it is also lost in sweat, urine and faeces (92%). The body's supply of chlorine can deplete rapidly through excessive perspiration or loss of acid in the body.
Chlorine is found in table salt but also in dairy food, fish and eggs. Vegetables may be low in salt.

Cobalt deficiency
Cobalt is a trace mineral bound to the vitamin B12. The pancreas contains a high concentration of the metal for the production of insulin and other enzymes for metabolising carbohydrates and fat. It is interesting to note that vitamin C counteracts cobalt.
Cobalt is absorbed from foods grown on soils with high concentrations of it. Vitamin B12 is found only in animal foods, so that vegetarians and vegans run a high risk of cobalt deficiency.

Copper deficiency
Copper is an element necessary for oxydation and absorption of iron and vitamin C. It also acts as a catalyst for making hemoglobin. The highest concentrations of it are found in the liver. Copper deficiency symptoms are similar to anemia.
Sources of supply: animal flesh, particularly liver, oysters, fish, whole grains, nuts and legumes.

Fluorine deficiency
Although fluorine is a poison in higher doses, it is necessary for retaining calcium in teeth and bones. Fluoride compounds are artificially added to municipal water supplies in order to reduce the incidence of caries (tooth rot).

Iodine deficiency
Iodine is important in the thyroid gland that controls heart action, nerve response to stimuli, rate of body growth and metabolism. A deficiency of it leads to goitre, an enlargement of the thyroid gland, a disease common in areas remote from salt water. Early symptoms are: dry skin, loss of hair, puffy face, flabbiness, weak muscles, weight increase, diminished vigour and mental sluggishness. A sufficient supply of iodine during pregnancy is important to prevent cretinism (retarded mental & physical development).This deficiency can be prevented by eating seafood regularly or by using iodised salt.

Magnesium deficiency
Magnesium is essential to enzyme reactions in the metabolism of ingested carbohydrates. About 75% of it is associated with skeleton and tooth formation. The remainder (25%) is found in soft tissues and body fluids. Although its role is not precisely known, it is important in the functioning of cell membranes and the stimulation of muscles and nerves.
Magnesium deficiency symptoms are: chronic kidney disease, excess acid, diabetic coma. Lighter symptoms could include: weakness, dizziness, distension of the abdomen and convulsive seisures.
The best food sources are: cereals, legumes, nuts, meat, fish, and dairy products.

Manganese deficiency
Manganese is known to be a catalyst in the action of calcium and phosphorus and it is essential for normal bone structure.
Principal food sources are: legumes, nuts, whole-grain cereal, tea and leafy vegetables.

Phosphorus deficiency
Phosphorus is a mineral vitally important to the normal metabolism of numerous compounds. About 70% combines with calcium in the bones and teeth, while nitrogen combines with most of the remaining 30% to metabolise fats and carbohydrates. Phosphorus is the main element in the structure of the nucleus and cytoplasm of all cells and functioning of enzymes.
Symptoms are rickets in children and osteoporosis in adults, severe muscle spasms in fingers and toes.
Phosphorus is found in dairy products, egg yolk, fresh food, legumes, nuts and whole grains.

Potassium deficiency
Potassium is an essential constituent of cellular fluids. It maintains the intracellular fluid balance. It is also important in the metabolism of nitrogen compounds (proteins) and its working depends on calcium and sodium. Potassium is important for normal muscle and nerve responsiveness, and heart rhythm. Only about 8% of potassium's daily intake is retained; the rest is excreted.
Potassium deficiency occurs particularly through food starvation. It is also excreted rapidly in severe diarrhea, diabetes, and prolonged administration of cortisone medications.
Almost all foods contain adequate amounts of this mineral.

Sodium deficiency
Sodium is an element that functions with chloride and bicarbonate to maintain the balance of positive and negative ions in body fluids and tissues. Sodium has the property of holding water in body tissues.
Excess sodium may result in edema or water retention. Too little of it disturbs the tissue-water and acid-base balance, necessary for good nutritional status. The hormone aldosterone controls the balance of sodium and water in the body.
Symptoms may include feelings of weakness, apathy, nausea, cramps. Sodium is found in all foods and table salt.

Activities for Grades 6-8

DRIFTWOOD: DRIFTWOOD NEEDS AND WANTS (6-8)1

Grade: 6-8
Time: Three 45-minute classes

Objective: Students will come up with ideas on uses for driftwood and create a paper that goes along with the uses of driftwood.

Materials/Resources:

- Red Cedar Afognak

Teacher Preparation: make a need and wants list on the chalkboard and ask the students to write a paper on these subjects.

Activity Procedure:

1. Read the chart below and explain how our people used driftwood.

Needs	Wants
spoons	masks
tools	Native Art
Containers	Wood for fires, smoking fish-steams, cooking, stoves and heating houses
spears	Games
bowls	Wood shapes for kayak making
Fire bows	Ornaments
shelters	combs
Bentwood hats	jigs
traps	jewelry
Net floats	furniture

2. Write a paper on how we used driftwood. Choose three from each category on the list above and include pictures of what they would look like. In the paper explain what other resources were needed to get the things the people wanted.
3. Do a summery paper on why it was important to have all these things made from driftwood and how our people used them daily using the whole list above.
4. In one paragraph choose one idea of what you would want to make and explain why you would want to make one thing form the list above and why it would be important to you to make it.
5. Students will identify what other skills would it take to complete some of these activities above. (Examples -Math skill, carving skills, local knowledge)
6. See if you can come up with other things to add to this list and what other uses will you come up with?
7. Explain the change over time on trading and the new modern ways we use driftwood today.

DRIFTWOOD: LANDMARKS ON THE BEACH (6-8)2

Grade: 6-8

Time: Two 45-minute classes

Objective: Students will use visual land makers to identity the area when out hunting or fishing. Then explain how our people used driftwood then and now the change over time.

Materials/Resources:
Need a resource here for this activity

Teacher Preparation:
Maps might be helpful for this lesson.

Activity Procedure:
1. Students will draw a map with visual landmarks of the area on local beaches
2. The other things that need to be including in the maps are burial makers, fishing sites and territorial markers.
3. Draw a settlement area that your family would have used or uses today. Try to include as many land markers as you can.
4. How would the people use driftwood in these areas?
5. How would it be important to recognize where you are if you were on the water and what land makers could you using to help you remember where you are?
6. Interview your parents and ask if your family have a traditional fishing campgrounds or hunting sites? If they did ask them how they used driftwood now and then.
7. Include parent's stories in the yearbook along with any pictures that were taken.

Language to learn in this lesson:
Cross-kelistaaq
This is our land-man'a nunagpet
Wood,firewood-kenerkaq
Bing up the piece of wood from down there-qupurraq unaken tagusggu

Key words in this lesson:
Cross-kelistaaq
This is our land-man'a nunagpet
Wood,firewood-kenerkaq
Bing up the piece of wood from down there-qupurraq unaken tagusggu

DRIFTWOOD: DRIFTWOOD ON THE BEACH (6-8)3

Grade: 6-8

Time: Three 45-minute classes

Objective: Students will learn the best time for gathering driftwood.

Materials/Resources:

- Gathering Driftwood, Jenny Opie
- Red Cedar Afgonak

Teacher Preparation:
The best time for gathering driftwood would be right after a storm. Wood usually comes ashore after big storms.

Activity Procedure:

1. Students will go to the beach after a storm and see if there are any new pieces of driftwood that has come ashore.
2. Students will look at the rivers and streams or oceans to see if they can see any signs of wood coming down the river, stream or oceans.
3. Students will then look at the direction of the wind because the wind drives the driftwood and tides.
4. If the opportunity arises have the students look at the tree floating down the river and they should notice that the root always travels first down the river.
5. Students will hypothesize why the roots float down river fist.
6. Students will draw a map and include a compass on their maps on the way the driftwood is traveling.

DRIFTWOOD: DRIFTWOOD WHALE DART GAME (6-8)4

Grade: 6-8

Time: Three 45-minute classes

Objective: Student will learn to make and play an old Alutiiq game that has been around for a long time.

Materials/Resources:
Small pieces of wood
Carving tools
Wooden dart
Small brads nails
Pen
Sinew string
Ask Helen about the full details on this game and the resource needed for this lesson

Teacher Preparation: Students will be creating their own whale and may need help at some point to complete the whale.

Teacher will help students create a whale and help them carve it out when needed.

Activity Procedure:

1. Students will carve out the shape of the wood and make their own wooden whale
2. Students will create a small wooden dart to go with the whale
3. Students will then write numbers on the whale 1-3 and draw in a blow hole on the top of the whale
4. Students will create the small dart that goes with the whale
5. Students will add the string on top of the whale
6. To play the game students will throw the dart to try and hit the whale somewhere on the whale
7. The person who hits the blow hole wins the game or the person with the most points

DRIFTWOOD: FIRE BUILDING AND FIRE BOWS (6-8)5

Grade: 6-8

Time: Three 45-minute classes

Objective: Students will learn to create a fire bow and how to make a fire as a survival skill.

Materials/Resources:

- http://www.ehow.com/how_12589_make-bow-drill.html
- 14-function Pocketknives
- Nylon cord

Teacher Preparation:
Teacher will photo copy the lessons on how to create a fire bow and how to build a fire and hand them out to the students and the students should be able to read and follow instructions according to the handouts.

Activity Procedures:

Survival skills:

- Students will learn how to use the survival skills will be needed to be taught for this lesson
- Students will have a basic understanding on the survival skills like making a fire can save a persons life if lost in the woods.
- Students will gather the materials that are used to make a simple fire.
- Students will learn and know what kind of wood to gather could make a difference of stay warm and dry or being cold and wet.
- Students will follow the step by step processes to make a fire drill and how to build a fire.
- Students will test out their creations and keep trying to make a successful bow until they can get a fire going

How to Make a Bow-Drill for Starting a Fire

Contributor
By an eHow Contributing Writer

Make a Bow-Drill for Starting a Fire

Make an apparatus for starting a primitive fire without the aid of a lighter or matches.

Difficulty: Moderate
Instructions

Things You'll Need:

- 14-function Pocketknives

Step 1

Understand that a bow-drill; consists of four parts: the bow, the hand-hold, the spindle or drill and the fireboard. The hand-hold and the fireboard are held on either side of the spindle, which is spun by the bow to generate friction, heat and, finally, fire. Rub your hand together back and forth to understand the concept of generating heat through friction.

Step 2

Make your bow from a light sturdy sapling, slightly longer than your arm from shoulder to fingertip.

Step 3

Tie a piece of nylon cord from one end of the bow to the other, like a bow for archery. If you don't have a nylon cord, you can use string, a shoelace, a strip of cloth or whatever is available.

Step 4

Use a dry, soft wood such as cottonwood, willow, larch, cedar, sassafras, alder, aspen, poplar, box alder or basswood to make the other parts of the drill.

Step 5

Make sure the hold piece fits into your hand snugly and firmly. Carve a small depression in one side of the hand-hold for the spindle to ride in.

Step 6

Cut your spindle from a branch 3/4-inch wide and 6 inches long. It should be round and straight. Carve both ends of the spindle to a dull point.

Step 7

Make you fireboard about a 1/2-inch thick and flat on both sides. Make a depression in it, like the hand-hold, for the other side of the spindle to ride in.

Step 8

"Burn in" (see eHow "How to Start a Fire Using a Bow-drill") your apparatus before using it to start a fire.

How to Use a Fire Bow

Step 1

Make the four pieces of your apparatus (see "How to Make a Bow-Drill," under Related eHows).

Step 2

Place your fire board on the dry ground and place your left foot across it to hold it stable, with your right knee on the ground. If you're left-handed, do the reverse.

Step 3

Wrap the string of your bow around the spindle once.

Step 4

Place the bottom end of the spindle in the notch on your fireboard. Hold it in place by putting the top end of the spindle into the handhold notch and pressing down on the handhold.

Step 5

Hold one end of the bow in your right hand, with the string side facing inward, toward your left knee.

Step 6

Lean down over your left knee and press down slightly on the handhold with your left hand. Move your right arm back and forth in a sawing motion, causing the spindle to spin back and forth.

Step 7

Increase the speed of the sawing motion and the intensity of your handhold pressure until the fire board begins to smoke.

Step 8

Do these for a while to grease your handhold notch and "burn in" your fire board to prepare your apparatus to start a fire?

Starting Your Fire

Step 1 Prepare a small tepee of twigs in your fire pit. Make sure you have enough fuel readily available.

Step 2 Gather a palm-sized ball of dry fibrous vegetation, such as dry grass or inner tree bark. Wad the material together to form a nest like tinder ball.

Step 3 Keep your tinder ball near your fire board.

Step 4 Place your spindle in its fire board notch.

Step 5 Operate your apparatus until your fire board begins to smoke.

Step 6 Give it about 10 more strokes.

Step 7 Lift your apparatus carefully away from the fire board. Notice that a small piece of coal has developed from the wood dust worn off by the action of the spindle.

Step 8 Use a small twig to nudge the coal from the fire board into the tinder ball, like an egg in a nest.

Step 9 Blow gently on the ball until flames develop.

Step 10 Place your burning tinder ball inside your twig tepee and carefully fuel your fire.

DRIFTWOOD: FISHING NEEDLES, SHUTTLES, AND GAUGES (6-8)6

Grade: 6-8

Time: Three 45-minute classes

Objective: Students will learn to create a net mending needle as one of the main tools that was used and is still used today by local fishermen.

Materials/Resources:

- Making a fishnet, setting a fishnet under the ? Need to check on title of book
- http://www.youtube.com/watch?v=Ts0dfN3t0nY,(how to make a net needle)
- Leatherman knife or pocket knives

Teacher Preparation:
Teacher will have to have bandages on hand just in case students cut themselves.

Activity Procedure:

1. Students will research what the difference between the fishing needles is compared to a shuttle and a gauge and find out what they all were used for.
2. Students will then create there own fish net needle
3. They will carve or whittle out the net needle
4. Students will watch the video on U-tube on how to make a net needle before starting
5. Students will begin to make the net needle
6. Students will sand down the needle after it is completed
7. The needle will be ready to use after it is sanded.
8. Students should practice making a net or learn to mend nets because fishing is one of our subsistence activities we do every year.

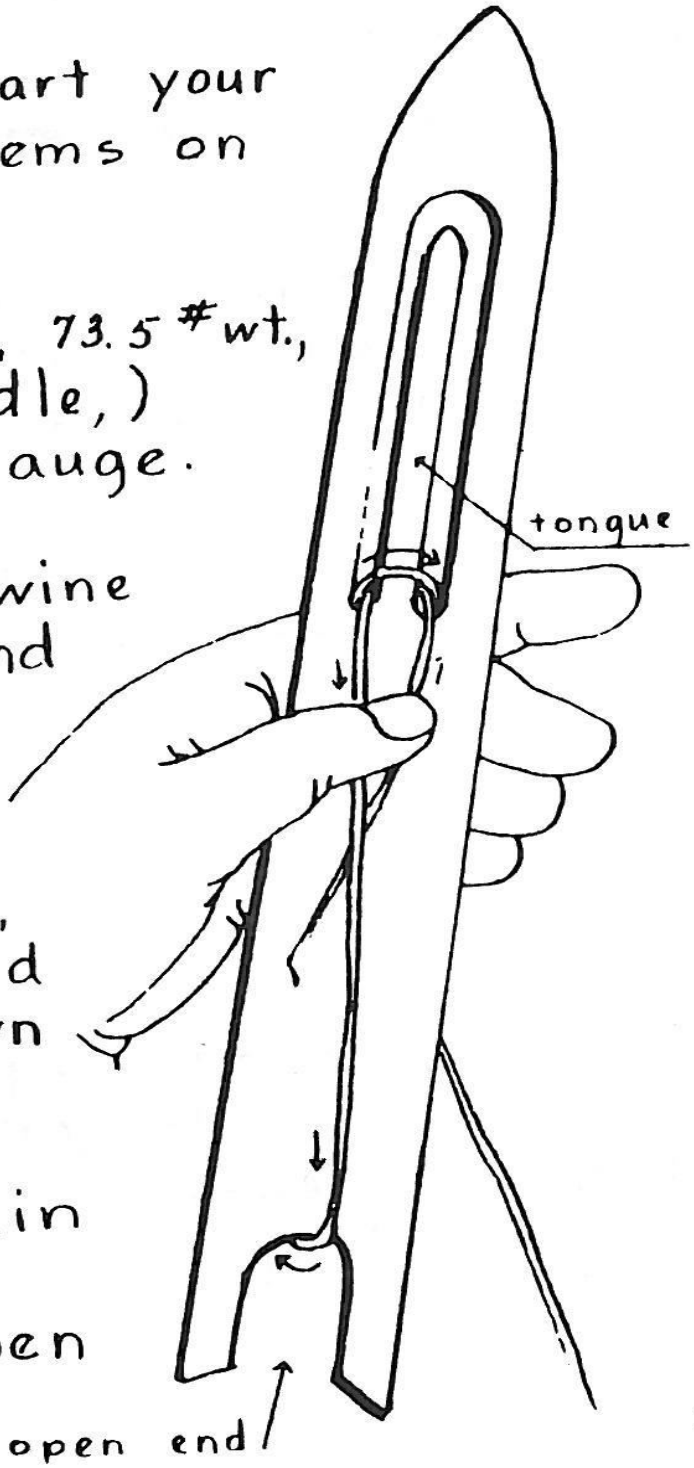
(See next page for instructions on how to complete the net needle)

How To Make A Net

Before you start your net, have these items on hand:

a. nylon fish-twine, 73.5 # wt.,
b. shuttle, (or needle,)
c. correct mesh gauge.

To wind fish-twine on shuttle, hold end of twine near center of shuttle with left thumb. Using right hand, wind twine up and around tongue, down and under open end, up behind shuttle and again around tongue, down, under open



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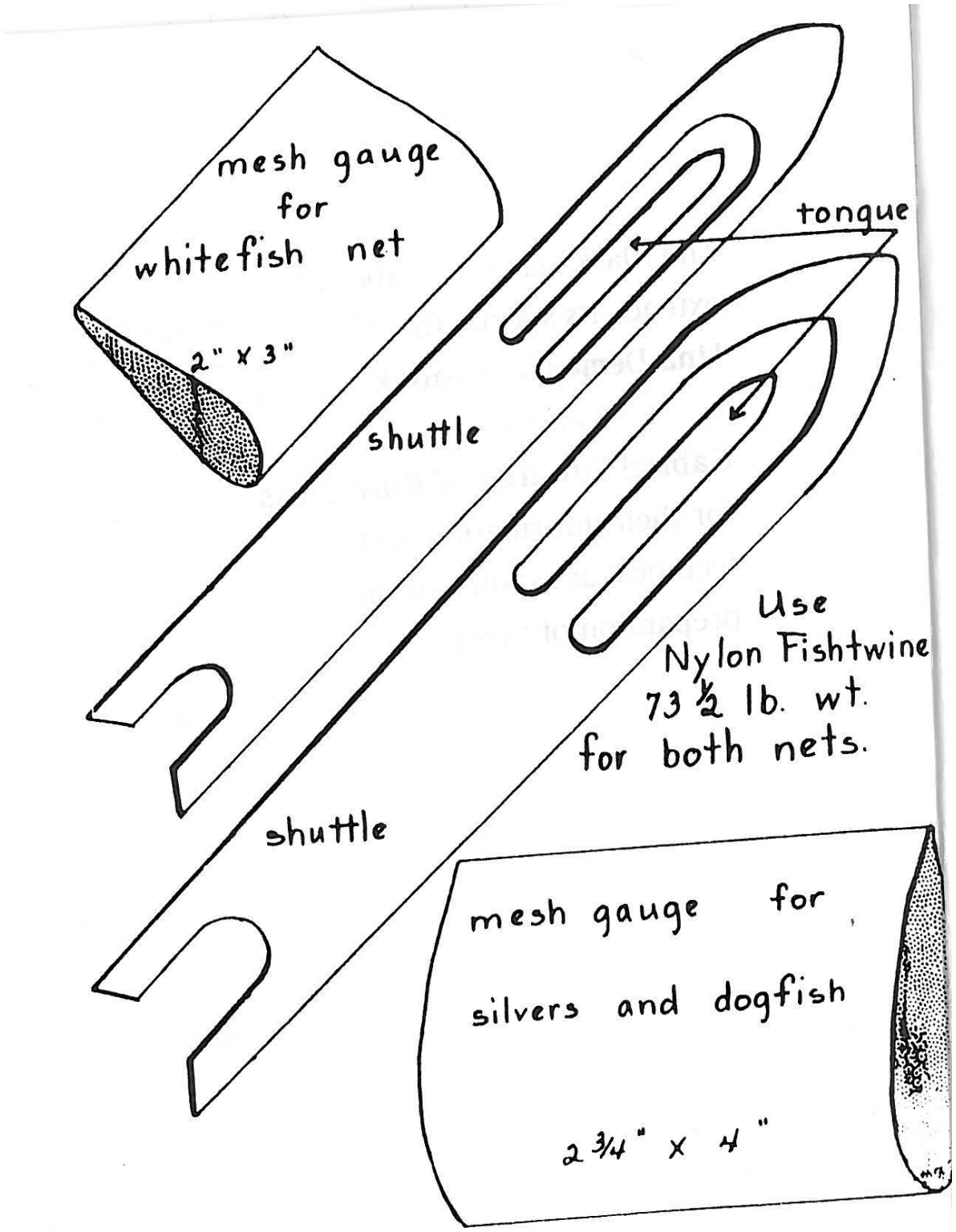

mesh gauge
for
whitefish net
2" x 3"
shuttle
tongue
Use
Nylon Fishtwine
73 ½ lb. wt.
for both nets.
shuttle
mesh gauge for
silvers and dogfish
2 3/4" x 4"

DRIFTWOOD: MASK MAKING AND DYES (6-8)7

Grade: 6-8

Time: 2 weeks (45-minute classes)

Objective: Students will examine the different types of dyes and add them to their wooded disk when they go on the beach walk and after they complete the different lessons in this unit**.** Then students will create a drift wood mask and use the dyes they just learned about in this lesson to dye their masks.

Materials/Resources:

- http://www.ehow.com/how_2125187_naturally-dye-wood.html
- Herbs, plants and berries
- Stainless steel pot
- White vinegar
- Alum
- Mixing spoons
- Paintbrush
- Sealant
- Wood blocks
- Carving tools

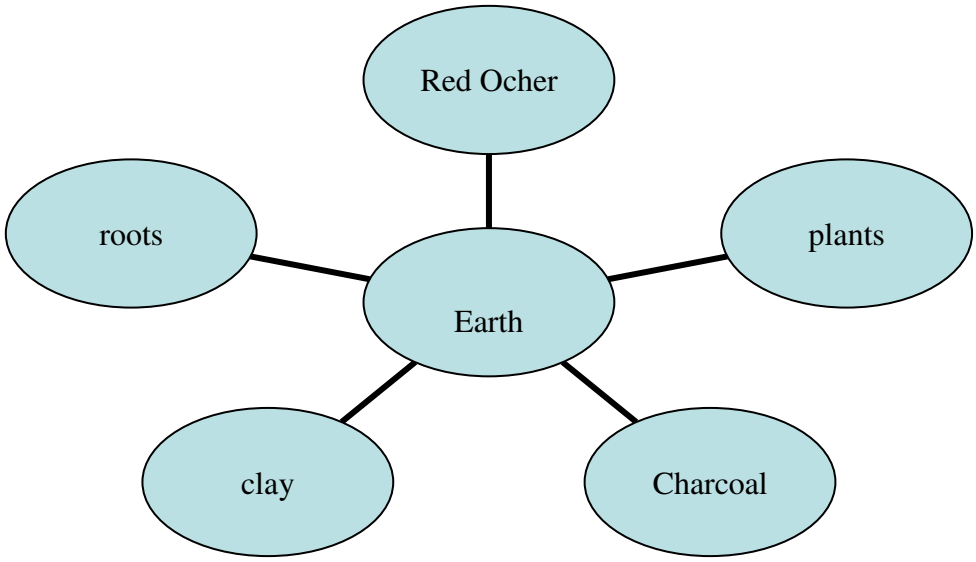
Teacher Preparation:
Teacher will prep ahead of time for the items and making sure that all the items are included to do this lesson.

Activity Procedure:

1. Students will examine how to make different types of dyes.
2. Students will choose one of the dyes and go and on a field trip to gather material to make their own dyes to learn how to create their own dyes.
3. Students will follow the step-by-step process to make there own dye.
4. Students will paint the wood and take home their art
5. Students will create a drift wood mask and choose one dye from the list below to paint the completed mask using a natural dye.

Language to learn in this lesson:
Berry—alagnaq
Plant-nauq or naucestaaq
Root-nukek
Earth-nuna
Mask-maskaq

Types of dyes:



Herbs, plants and berries have been used for generations to dye woods. Naturally dyeing wood is not only good for the environment but also good for the wood itself. Woods that are naturally dyed achieve a more natural look after the dyeing process.

Step 1

Gather the herbs, plants and berries needed for the color you desire. For a pink, rose or lavender color, use elderberries, blackberries, rose hips or sorrel. For yellow, use turmeric powder, saffron, apple tree bark or pear tree bark. For an orange dye, use onion skins, beet root, heather, marigolds or pear leaves. Red onion skins, shrub clippings, lily of valley or nettles create green. Deep brown dyes are created with gypsy wart, sassafras or walnut hulls. Blackberries, blueberries or indigo plants create blue dyes.

Step 2

Prepare the natural dyes. For berries, add 1 tsp. alum to the mix to help the color stay. When making pink, rose or lavender dyes, cook the herbs in a pot with a small amount of water while adding white vinegar 1 tbs. at a time until the desired color is achieved. Yellow dye is made by boiling the herbs until you reach the desired yellow. To make orange and green dyes, use 3 to 4 handfuls of the herb and boil it until it reaches the desired color. More may be added for a richer shade. When making deep brown or blue, soak the ingredients overnight and then boil the water in the morning.

Step 3

Paint the wood with the natural dye you created. Apply as many coats as necessary. Allow each coat to dry before applying the next coat.

Step 4

Apply a sealant generously on the wood so the colors stay for a longer amount of time. Allow the sealant to dry before using the wood

Key words in this lesson:
Berry—alagnaq
Plant-nauq or naucestaaq
Root-nukek
Earth-nuna
Mask-maskaq

DRIFTWOOD: COMPARE AND CONTRAST TYPES OF WOOD (6-8)8

Grade: 6-8

Time: Three 45-minute classes

Objective: Students will identify what types of wood are in their area and map out how driftwood travels to their area**.**

Materials/Resources:

- Gathering Drift wood, by Jenny Opie
- Log books with pencils
- Driftwood, Stories Picked Up Along the Shore, by Howard Sivertson
- Maps

Teacher Preparation:
Teacher will read stories out of the Driftwood book and the Gathering Driftwood book to the students for a clearer idea of what to write about.

Activity Procedure:

1. Students will touch and feel and smell the different types of wood and then see if they can identify what they are.
2. Students will describe whether the wood is hard or soft and if has an odor to it or not.
3. Students will then take a field trip around the village/ town to see if they can spot those kinds of trees around their area. If not this would be a good exercise to do a tree finding map.
4. Students will research the trees on the Internet and draw a map of where it is located.
5. They will create a river or body of water to which the log or driftwood arrived in their area.
6. If the mapping places are too large a bigger map may be needed then use string and tacks to track the location and the patterns on how the logs or drift wood arrived in the area.
7. Students can do a daily log on where the driftwood was gathered.
8. Students will track what time of the year it is to gather the drift wood and keep a log to see what months has the most logs to gather drift wood.
9. Student can create a poem about the drift wood to add to their log books
10. They might even what to draw pictures in their logbooks as well.
11. Have the teacher read some stories out of the Driftwood book and the Gathering drift wood book to give students a better idea on what to write.
12. Students will close the lesson by talking about the different types of wood that was found and where it was found by comparing and contrasting what they have found.

DRIFTWOOD: WOOD TYPES (6-8)9

Grade: 6-8

Time: Three 45-minute classes

Objective:

Materials/Resources:

- Tree-Ring Analysis, Biological, Methodological and Environmental Aspects, Edited By R.Wimmer and R.E Vetter
- Readers Digest, Crafts and Hobbies, A step-by-Step Guide to Creative Skills

Teacher Preparation:
Allow time for some research time in this lesson about 45 minutes

Activity Procedure:

1. Students will examine the different types of wood then touch and feel them along with smelling the wood to see if the wood carries an odor.
2. Students will describe what they find out and count the rings on the different types of woods to find out how old the tree was when it was cut.
3. Students will identify what types the woods are and try and find out where they came from.
4. Students will study about different types of wood and find out which ones burn the best and which ones are safer to use in the wood stove, fire places, steam baths and smoke houses.
5. Students will describe whether the wood is hard or soft and what would be the best chose for carving a mask?
6. Students will examine the wood and find out what zone the trees would have grown up in.

Woodworking

Materials: wood

For woodworking projects you will be dealing with three kinds of wood: hardwood from broad-leaved, deciduous trees; softwood from conifers, or cone-bearing trees; and plywood, which is made of thin sheets of wood, called veneers, glued together. Hardwoods–e.g., mahogany, oak, cherry–are the usual choices for fine furniture, but auxiliary parts, such as cabinet backs, drawer bottoms, and bracing, can be made of less expensive softwoods or plywood. Some softwoods –e.g., redwood–are harder than some hardwoods, such as basswood.

Wood characteristics. Color is a matter of personal choice. Grain, texture, and figure affect how you work with wood. Look at the edge of a board to determine the direction the grain runs. If it runs at a slight angle to the surface, plane it in the direction of the rising lines of grain; otherwise, you may roughen the surface. If grain changes direction in a board, change the direction of planing.

The closeness or openness of the cells, or pores, in the wood affects the way you finish the wood. Figure results from circumstances of the tree's growth: placement of the annual rings, knots, and deviations from normal growth. Figure should be considered when choosing and arranging boards.

The chart on this page lists some commonly used hardwoods and one softwood–pine. Do not be put off from using a wood termed difficult to work. Its relative hardness means that cutting tools must be sharp, but it will finish well and make a fine, durable piece. Other hardwoods to consider are those known as exotics. Rare and expensive, they are available in stores that specialize in supplying woodworkers. They include teak, satinwood, rosewood, zebrawood, padauk, purpleheart, and bubinga.

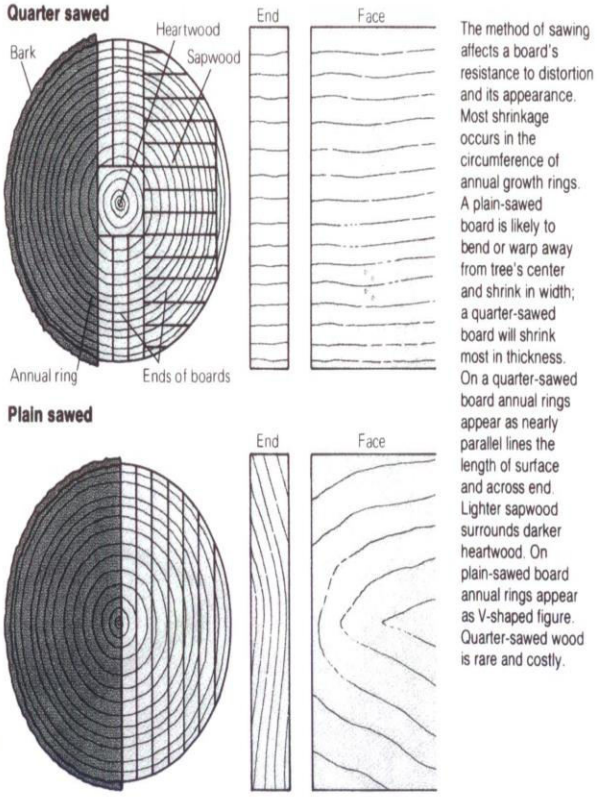
Drying. Make sure the wood you buy is dried to reduce its moisture content. Kiln drying, done under controlled conditions, is preferable to air drying for wood to be used immediately. All lumber, even after drying, is subject to distortions–shrinkage, swelling, warping, cupping, and bowing (see drawings, opposite)–caused by moisture changes in the air in which it is stored.

Buying hardwood. Hardwood is sold three ways: rough, dressed to specified thickness and width, or cut to exact dimensions–length as well as thickness and width. Unless you have access to a jointer and a thickness planer (a ma-

Common woods for furniture

WOOD	CHARACTERISTICS	FINISH
Ash, white	Off-white to dark brown; open grain; hard and tough; difficult to work; holds shape well after forming; often used for sports equipment	Paste filler; fairly difficult to stain; penetrating or surface finish (pp. 390-391)
Cherry, black	Light to dark reddish-brown, darkens with age; close grain; medium hard; moderately difficult to work; resists warping and shrinkage	Filler unnecessary; stains well but not often done; penetrating or surface finish
Mahogany, African, Honduran, Philippine	Pink to dark reddish-brown; open grain; medium density; tough and strong; easy to work; resists warping; Philippine not true mahogany, known as lauan, coarser in texture, less stable	Filler optional–paste if used; stained only to deepen natural color; penetrating or surface finish
Maple, hard and sugar	Light tan; close grain; hard and strong; dulls tools fast; excellent for turning; needs generous amounts of glue; interesting figures available	Filler unnecessary; does not stain well; penetrating or surface finish
Oak, red and white	Light tan (white oak) to light reddish-brown (red oak); open grain; hard and very tough; somewhat difficult to work; tends to warp; white oak has finer texture	Paste filler; stains well; sometimes fumed with ammonia to darken; penetrating or surface finish
Pine	Cream to light reddish-brown; close grain; soft; easy to work; often knotty; very little figure; sugar pine or yellow pine best	Filler unnecessary; stains surface finish; takes paint well
Poplar	Light yellow-brown, sometimes tinged with green or purple; close grain; soft; easy to work; excellent for turning; many prefer it to pine for inexpensive work	Filler optional; stains well; surface finish; takes paint well
Walnut, black	Gray-brown to dark brown; open grain; hard; easy to work; saws and planes well; little shrinkage and expansion	Filler optional–paste if used; stains well; penetrating or surface finish

Logs into boards



The method of sawing affects a board's resistance to distortion and its appearance. Most shrinkage occurs in the circumference of annual growth rings. A plain-sawed board is likely to bend or warp away from tree's center and shrink in width; a quarter-sawed board will shrink most in thickness. On a quarter-sawed board annual rings appear as nearly parallel lines the length of surface and across end. Lighter sapwood surrounds darker heartwood. On plain-sawed board annual rings appear as V-shaped figure. Quarter-sawed wood is rare and costly.

chine that mills boards to required thickness), the extra cost of dressed or cut-to-size lumber is worthwhile.

Specify "dressed two sides" for lumber surfaced on two faces or "dressed four sides" for lumber dressed on faces and edges. The edges are merely rip cut on a saw and may require planing. Dressed lumber may have some unusable portions, so order about 10 to 20 percent more length than you need. Lumber cut to exact size is the most expensive and requires only smooth planing.

Lumber dimensions are always expressed in this order: thickness by width by length. The cost of hardwood is calculated by board feet (see drawing) or by lineal, or running, feet.

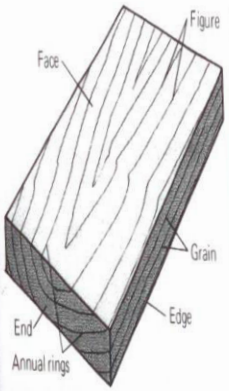
Hardwood grading is as follows: FAS, which stands for firsts and seconds, is the top grade, about 90 percent usable. No. 1 Common and Select contains some knots and defects. No. 2 Common has many defects and is suitable only for cutting into small pieces.

Softwood. Softwood is sold in boards by board feet and lineal feet and, in addition, in standard widths and thicknesses, called dimension lumber. The nominal sizes of dimension lumber are just that–sizes in name only; in reality the lumber is smaller. For example, a 2 by 4 is actually 1½ by 3½. There are several categories of grades of softwood; the only one suitable for fine work is Select. Within the Select category the grades are A, B, C, and D; grades A and B, sometimes called 1 and 2 Clear, are suitable for natural finishes, C and D for painting.

Plywood. Plywood is usually sold in 4- by 8-foot sheets ranging in thickness from 1/8 to 1⅛ inches. It is composed of an odd number of layers of veneer. Lumber-core plywood, with its solid-wood center, holds nails and screws better than veneer-core but is more expensive. The outside faces of either kind may be softwood or hardwood, each of which has its own grading system. For hardwood plywood the grades are, from best to worst, Premium, Good, Sound, Utility, and Reject. Specify the grade you want for both faces, e.g., G1S (one Good side) or G2S (two Good sides) and whether the plywood is for interior or exterior use.

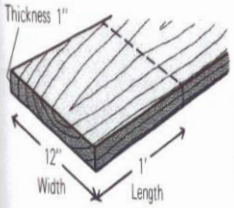
Fir plywood for cabinet backs and bottoms is labeled A through D in descending order of quality. Specify the grade for both faces, e.g., A-C for a piece of top quality on one side and lower quality on the reverse.

Anatomy of a board



A board's parts–faces, edges, and ends–are referred to in this section as labeled above. Always plane or sand in same direction as grain, as seen on board's edge. Annual rings show on plain-sawed board's surface as figure.

A board foot



A piece of lumber 1 ft long, 12 in. wide, and 1 in. thick equals 1 board foot. To calculate board feet, multiply length *in feet* by nominal thickness *in inches* (the board may actually be thinner) by width *in inches* and divide by 12.

Lumber distortions and defects

Cupping. This form of warping produces rounded edges. Slight cupping can be corrected by planing (pp. 372-373) or by sawing board lengthwise and reversing every other piece as in edge joint (p. 374).

In wind. When a board is twisted diagonally from corner to corner lengthwise, it is said to be in wind (rhymes with dined). Correct by planing diagonally from one high corner to the other.

Cross shakes. Splits across the grain or width of board are caused by compression from strain in the living tree or from the impact as felled tree hit the ground. Wood with cross shakes is usable for hidden parts.

Bowing. Ends of board curve up and board is bowed through its length. May also occur as a series of small bows. Use in short lengths; plane level. A thin board can be straightened by attaching it to a framework.

Splits and checks. Because ends dry faster, board may split through. End checks are similar but do not go through board. Checks may also occur in board's face; if not too deep, they can be planed or filled.

Wane edge. Where board's edge was cut too close to tree's outer circumference, sometimes bark and paler sapwood remain on edges. Board is usable if resawn to a narrower width.

Springing. Faces are flat and level, but edges curve. Correct by sawing or planing board so that edges are square with ends. The board will then have a narrower, usable width.

Shakes. These splits follow the curve of annual growth ring. A shake may girdle entire tree trunk or only part of it. They are unrelated to rough split lumber used for siding and roofs.

Knots. The base of branch embedded in heartwood forms knot. In hardwood, they weaken the structure of wood and detract from appearance. Often they are desired for decorative effect in pine.

Activities for Grades 9-12

DRIFTWOOD: CLAIMING THE DRIFTWOOD (9-12)1

Grade 9-12

Time: 45 minutes (can be extended time to complete this lesson would one summer season)

Objective: Students must know that there were different ways to claim ownership of driftwood.

Materials/Resources:
- Alutiiq Word of the Week, Lessons in Alutiiq Language and Culture Volume 1

Teacher Preparation:
A field trip to the beach at the end of this lesson will be necessary. If the students will not use the driftwood they can don another one of cultural values and honor our elders by giving them cut up driftwood that can be burned for a later use.

Activity Procedure:

Key ways the Alutiiq people would claim ownership of driftwood.
- People would use signals to show that someone had claimed the driftwood.
- People would place rocks on top of a log or stack driftwood and tie a line around the end of it.
- People would mark the driftwood and come back for it later.
- Wood was gathered by families who searched the coastlines to find suitable for smoking fish and smoke houses, bunyas, and heating their homes.

1. Students will come up with ways they too can claim their own driftwood. Students need to think about what kinds of makers or singles they will use to tell other people that the wood was already claimed.
2. Students will interview an elder and ask them how they use to claim their driftwood.
3. Have a journal entry of place and location that has been already clamed by someone else and how it was marked.
4. Students will go to the beach and physically mark logs or drift wood that they will come back for later. If the students will not use the driftwood they can don another one of cultural values and honor our elders by giving them cut up driftwood that can be burned for a later use.

Language to learn in this lesson:
Let's look for drift wood- pukilaarsurlita

Key words in this lesson:
Let's look for drift wood- pukilaarsurlita

DRIFTWOOD: ORIGINS OF DRIFTWOOD – MAPPING DRIFTWOOD (9-12)2

Grade: 9-12

Time: 45 minutes

Objective: Students will begin to learn where driftwood originates form and hypnosis where the wood came from and try and guess the age of the wood.

Materials/Resources:

- Red Cedar of Afognak, A Driftwood Journey
- Web site: http://en.wikipedia.org/wiki/Dendrochronology

Teacher Preparation:
There are many steps to this lesson read over the instructions and explain any questions on what is expected to be written in the paper and all the steps that are included in this paper to the students.

Activity Procedure:

1. Students will begin by writing a story about the driftwood
2. They will draw pictures of the driftwood or take pictures and use them in their papers
3. On the left side of the paper will be a map of the area on the right will be any Alutiiq woods that student can find that explains the story or wood
4. On the bottom left will be a hand drawn map where the students picked up the driftwood.
5. Explain in the paper how the driftwood travels in the currents and finally arrives at its destination on the beaches.
6. Students will hypnosis where the wood would have come from and guess the age of the tree
7. If the students think the driftwood comes from far away places use a big state map and map out with yarn the distance and way the wood would travel to reach their beaches.
8. Lastly the students will explain the change over time on ways people gather and collect wood now days.

DRIFTWOOD: GATHERING WOOD (9-12)3

Grade: 9-12

Time: 45 minutes

Objective: Students will learn about gathering driftwood and about the currents and tides and how it carries the driftwood to their area.

Materials/Resources:

- **http://oceanservice.noaa.gov/navigation/tidesandcurrents/**
- **Gathering Driftwood, Jenny Opie**

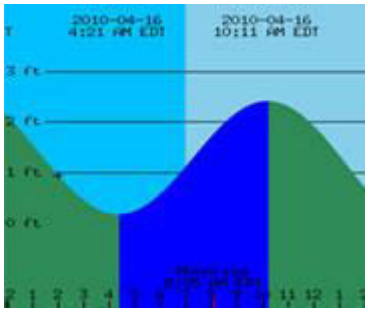
Teacher Preparation:

- This may take more then one class period to complete.
- A grading system that includes creativity and originality should be worth more then a student who puts little effort into the mini book process.

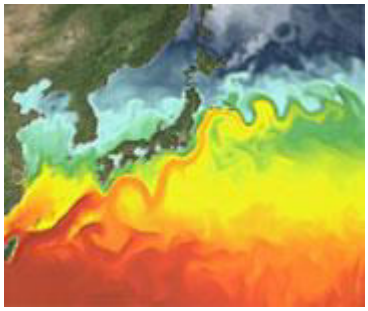
Activity Procedure:

1. Students will first take a camera to the beach and do a quick survey of the wood that is around the beach. This may take more then one class period to complete.
2. It is important for students to learn about how the driftwood would have gotten to their land.
3. Students will study how the drift wood would go though the currents and tides
4. Students will begin a mini book that includes stories about gathering driftwood, pictures and charts on how the tides flow for drift wood to arrive in the area.
5. Students can also read Gathering Driftwood for more idea
6. Students can also include poems and family stories that they may have about beachcombing and gathering driftwood.
7. See next page for a better explanation of how the tides and currents work.
8. Students can create a chart or graph that shows the tides and currents
9. Students can also create with water color paints how the currents flow
10. These drawings and graphs can be included in the mini book
11. After the book is complete each student will turn in the book for a grade.

What are tides and currents?



Tides. If you live near the coast or have ever visited the beach, you are probably aware of tides. But did you know that tides are really big waves that move through the ocean in response to the forces exerted by the Moon and the Sun? Tides start in the ocean and move towards the coast, where they appear as the regular rise and fall of the sea surface. How much the water level changes over the day varies depending on where you are and what day it is.



Currents. Currents put motion in the ocean! Tides involve water moving up and down; currents involve the movement of water back and forth. Currents are driven by several factors. Tides are one of these. Wind, the shape of the land, and even water temperature are other facts that drive currents.

DRIFTWOOD: TREES (9-12)4

Grade: 9-12

Time: Two days (and sufficient time for research)

Objective: Students will learn about trees that grow in their area and map out the vegetation around the trees. Then talk about the tree rings and the subfossil and historical value wood has.

Materials/Resources:

- Blending Indigenous Story and Science, ALISHA Susan "Englartaq Drabek, Native Village of Afognak Tribal Council & University of Alaska Faribanks
- Tree-Ring Analysis,Biological Methodological and Enviromental Aspects, Edited by: R. Wimmer & R.E. Vetter

Teacher Preparation:
Teacher will need to give at least two days of time to complete the following activities and allow sufficient time for research.

Activity Procedure:

1. Students will do a site selection to study various tree rings
2. Students will research the area and write a paper that include the climate t of which the tree grows in and describe what the ground is like. In the paper explain what species of trees grow in that area.
3. Student will reference were they found the resources in their paper
4. Students will then draw a map of the location that includes the vegetation that is around the tree.
5. Students will research and explain in their papers how leaves grow
6. Students will research what a subfossil and historical wood is.
7. Have the students end the tree rings study with a class dissection that summarizing what they have found out about the trees in the assigned area.
8. Students will write story that blends the science that they just learned about and include a local story into the story.

DRIFTWOOD: STUDYING DENDROCHRONOLOGY (9-12)5

Grade: 9-12

Time: Two days (and sufficient time for research)

Objective: Students will study about trees (Dendrochronology) and tree ring dating.

Materials:

- **Web site: http://en.wikipedia.org/wiki/Dendrochronology**
- Lori Martinez (1996). ""Useful Tree Species for Tree-Ring Dating"". http://www.ltrr.arizona.edu/lorim/good.html. Retrieved 2008-11-08.
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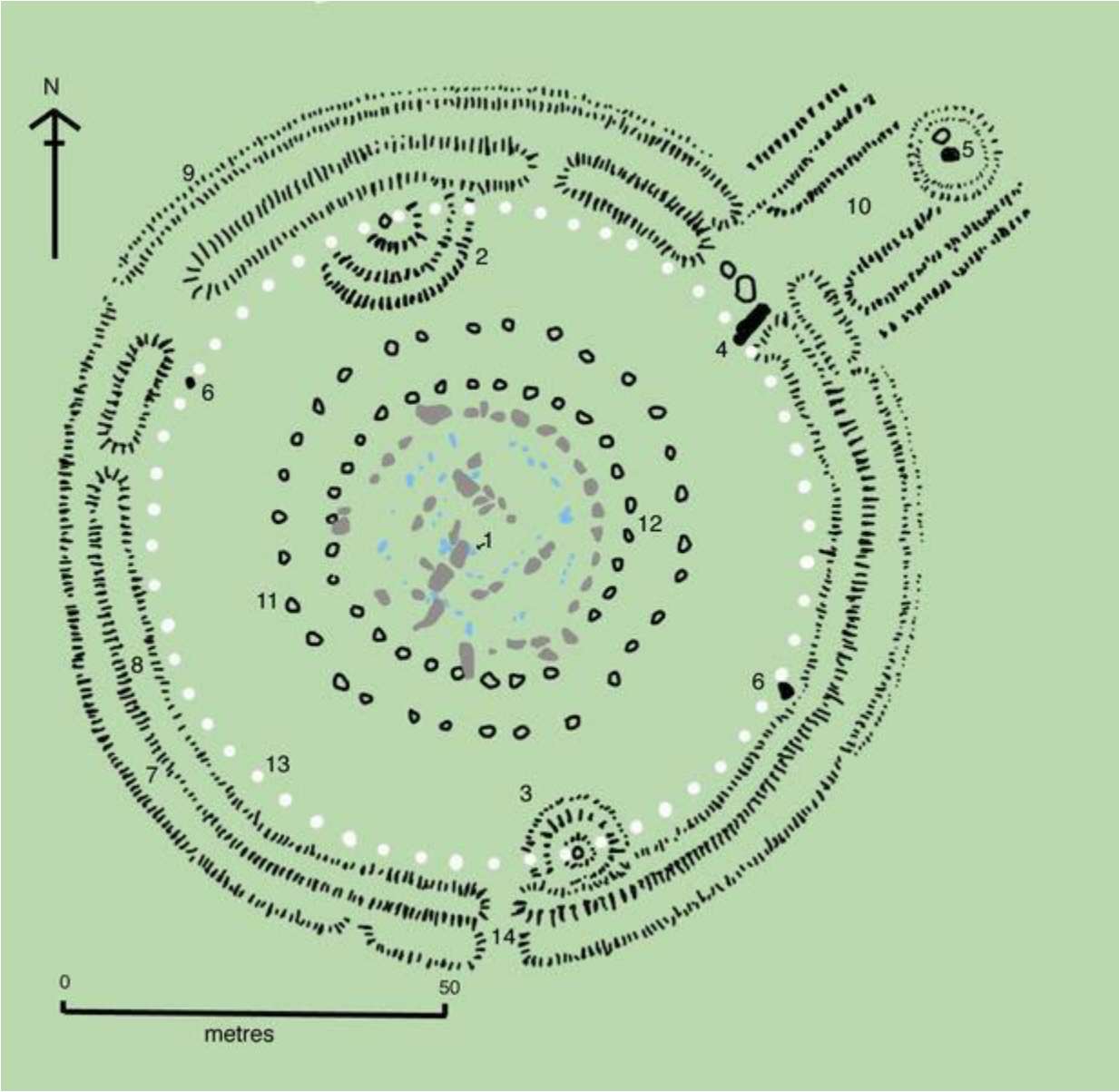
Teacher preparation/Background:
Teachers will allow students study time for this lesson and the students will be taking notes on this so a suggested visit to the website for information might be helpful.

Activity Producer:

1. Students will examine the Dendrochronology is by answering a few questions from the list below.
2. What is Dendrochronology and how does it work?
   Answer: Dendrochronology is the study of old buildings or artifacts using the techniques of Dendrochronology (tree-ring dating).
3. Hypnotize what you think this chart is about.
4. Follow this link and take notes and explain what Dendrochronology is and how people would have used Dendrochronology now and in the past.
5. Learning about Dendrochronology will help students have a clearer understanding and be able to study the history behind the wood.



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Drawn by en:User:Adamsan from sources:Cleal, Walker, & Montague, Stonehenge in its Landscape (London, English Heritage 1995)

- Pitts, M, Hengeworld (London, Arrow 2001)

Key to plan:

- 1 = The Altar Stone, a six ton monolith of green micaceous sandstone from Wales
- 2 = barrow without a burial
- 3 = "barrows" (without burials)
- 4 = the fallen Slaughter Stone, 4.9 metres long
- 5 = the Heel Stone
- 6 = two of originally four Station Stones
- 7 = ditch
- 8 = inner bank
- 9 = outer bank
- 10 = The Avenue, a parallel pair of ditches and banks leading 3 km to the River Avon
- 11 = ring of 30 pits called the Y Holes
- 12 = ring of 29 pits called the Z Holes
- 13 = circle of 56 pits, known as the Aubrey holes
- 14 = smaller southern entrance

DRIFTWOOD: PROPERTIES OF WOOD (9-12)6

Grade: 9-12

Time: Two days (and sufficient time for research)

Objective: Students will be taking a field trip and identifying the properties of wood types in their area.

Material/Resources:

- **http://www.woodbin.com/ref/wood/alaska-cedar.htm**
- **Trees and shrubs plant book need to find this**
- **World wide web**

Teacher Preparation:
Allow enough time for students to complete research and do a filed trip to see if they can identify the types of wood that is in the area.

Activity Procedure:

1. Students will research and describe the different types of wood in their area.
2. Students will look at the two examples of what the properties of wood should look like and create one with all the deterrent types of wood in their area.
3. Students will do a field trip of a local area to see if they can

Name	Alaska-Cedar (Chamaecyparis nootkatensis)
Type	Softwood.
Other Names	Also known as Alaska yellow-cedar, yellow-cedar, nootka false cypress, yellow cypress, Alaska cypress, sitka cypress, and white cedar.
Sources	Grows along northern Pacific coast of N. America.
Appearance	Generally straight grained with a fine, even texture. Bright, clear yellow heartwood and narrow, white to yellowish sapwood, barely distinguishable from heartwood.
Physical Props	Light and soft with moderate stiffness and strength, low shock resistance, and very high decay resistance and dimensional stability. Poor steam bending rating.
Working Props	Works easily with hand or machine tools - turns and carves quite well. Glues, screws and nails satisfactorily. Takes a fine finish and wears smooth with use.
Uses	Used for interior and exterior finish, furniture, cabinetry, turnery, carving, boat building (decks, rails, paneling), marine piling, posts, novelties, engineers' patterns, shingles, cladding, doors, and decorative veneer. Also used for battery containers due to high acid resistance.

Name	Red Alder (Alnus rubra)
Type	Hardwood.
Other Names	Also known as Oregon alder, western alder.
Sources	Grows along the Pacific coast of United States.
Appearance	Straight grained and even textured. Pale yellow to reddish brown with indistinct boundary between heartwood and softwood.
Physical Props	Soft, light, not particularly strong, with good elasticity, good steam bending, medium stiffness, low shock resistance, low decay resistance, and good stability in service.
Working Props	Works easily with hand or machine tools. Turns and carves extremely well. Marginal nail and screw holding properties. Glues, sands, stains and finishes easily.
Uses	Commonly used for panel core stock (one of the easiest commercial timbers to peel). Also used for interior furniture, sash, doors, millwork, and carving

DRIFTWOOD: FIRE BOWS AND FIRE MAKING (9-12)7

Grade: 9-12

Time: Two days (and sufficient time for research)

Objective: Students will learn how to create a fire bow and how to make a fire form raw materials.

Materials/Resources:

- http://www.wilderness-survival-skills.com/how-to-make-a-fire.html
- Twine
- Different sizes of wood for the fire bows
- Magnesium
- Lighter
- Fire wood
- Knife or ax of some sort

Teacher Preparation:
Teacher will photo copy the lessons on how to create a fire bow and how to build a fire and hand them out to the students and the students should be able to read and follow instructions according to the handouts.

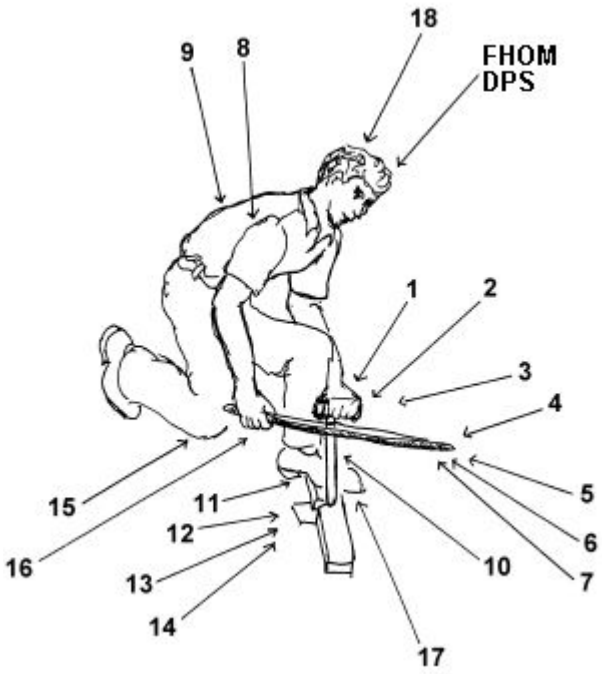
Activity Procedure:

1. Students will learn how to make a fire and what it will require to make one.
2. Students will then make a fire bow
3. Students will follow the instructions and make their own fire bows
4. Students will test out their fire bows and see if they can create a fire from their bows.
5. Students will hypnotize which size of bows will work the fastest and which one will work the best. Have the students make a variety of sizes to test their hypothesis.
6. Students will examine the handouts and see how closely they can follow instructions.
7. Students will produced a fire bow at the end of the lesson and demonstrate how it works to the class.
8. Some modifications may be needed on some bows
9. The way to tell if the student got the lesson will be if he/she could start a fire from their fire bow.
10. If the student is unsuccessful at making a fire bow they can try the other fire lesson included in this lesson.

by Lisa and G.T. Sanford
First published at Big Oak Wilderness School

NOTE: Although most of this information is basic for bow drill fire making, there is a good deal of advanced information as well. It is suggested that you spend a lot of time experimenting on your own before consulting this page.

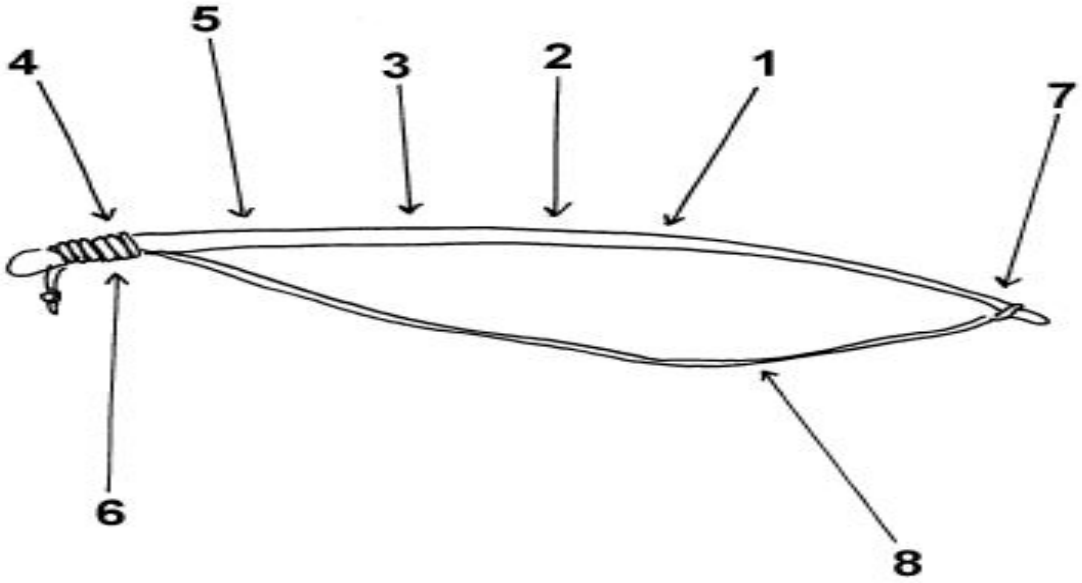
I. Body Positions and General Considerations for bow drill fire making



FHOM and DPS. Fuel, Heat, Oxygen, and Moisture: Duration, Pressure, and Speed. All are factors which will affect the
success or failure of making fire with a bow and drill.

1. Lock wrist against leg.
2. Keep hand hold perpendicular to drill.
3. Apply proper pressure.
4. Keep bow horizontal to the ground and 90 degrees to drill
5. Flexible vs. rigid bow.
6. Angle of bow in relation to body. Straight ahead; slight angle across body; cross body like cello player.
7. Bow length choices vary from long to short. Types of wood and sizes of drill will play a role in determining type of bow.
8. Bow should be moved from the shoulder not from elbow. Body position should be high enough to require swing from shoulder.
9. Body should lean over drill far enough to exert downward pressure on drill with body as well as the arm.

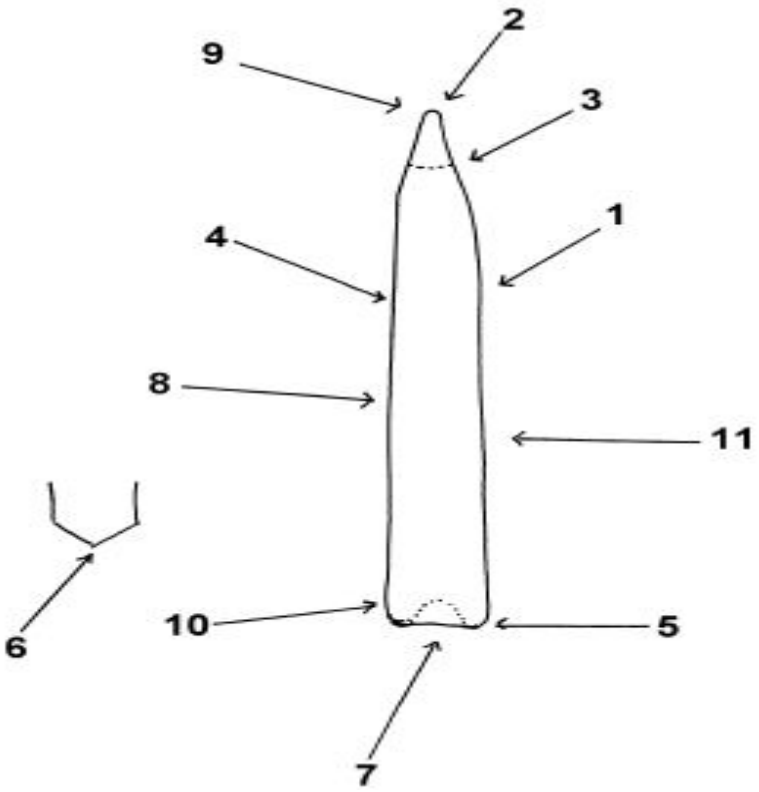
10. Keep drill vertical. Otherwise, binding and unwanted friction will occur along sides of fireboard hole as drill penetrates deeper.
11. Instep of foot should be on top of fireboard and side of foot almost touching drill.
12. Notch In fireboard should face to the inside.
13. Do not place tinder under the fireboard.
14. Place coal catcher under fireboard.
15. Kneeling leg should be almost in line with front leg and lower part of leg should angle across back of body for balance. If kneeling leg is to the outside of the front leg, it may restrict bow movement.
16. Apply tension to string with fingers.
17. Check shoelace and make certain it will not be caught in the rotating drill.
18. Use visual imagery for preparation. Do not begin to physically make fire before conducting proper mental rituals.



II. The Bow

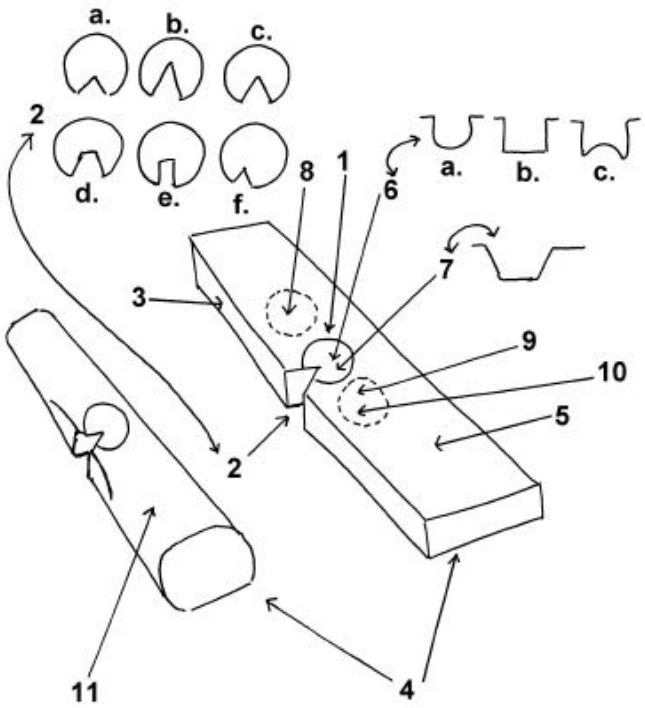
1. Length should allow for full swing of arm. However, there may be times when a short bow will do the job better. Rotation/ friction factor must be taken into account.
2. Curve needs to be only slight. Too much curve can throw the fire maker off balance and tire him or her more rapidly.
3. Choose flexible bow or rigid bow. Flexible bow is a must for natural cordage string. Rigid bow can be more powerful.
4. Keep extra string tied around the bow to quickly replace broken string.
5. Diameter and weight should be comfortable so as to not wear out the user. A heavier bow can supply more power.
6. Handle can be outside or inside where string is tied. Placing hand inside string area reduces bow length.

7. Rather than notching where string is to be attached, a hole through the bow may be better, especially when it comes to using natural cordage. A drilled hole requires less string length. Hole diameter should be about the size of a "pinky".
8. Apply pine resin to string to keep from slipping on drill.



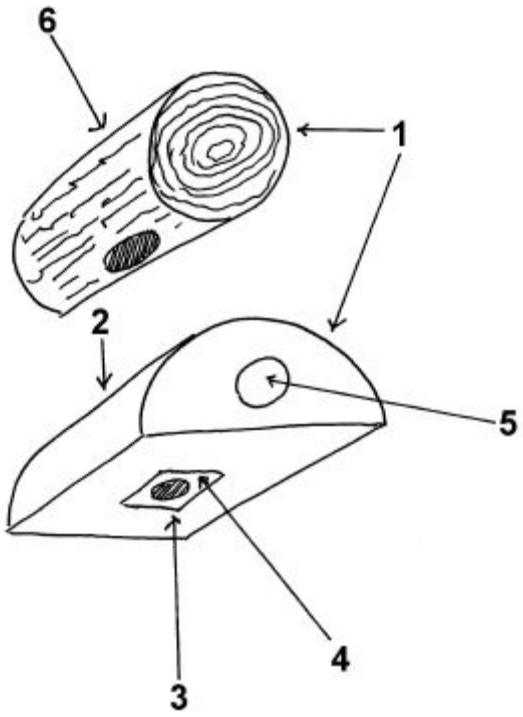
III. The Drill

1. Drill diameter. Too fat = slow rpm's; too thin = tendency to drill hole faster.
2. Upper end should be pointed to create the smallest friction surface.
3. Watch for formation of indented ring near top of drill. This is an indication that drill end is too big for hand hold opening.
4. Drill should be clean so as to not wear out string. Too smooth, however, will cause string to slip.
5. Tip should be fairly flat.
6. Tip for initial drilling into fireboard should be blunt pointed.
7. Hollowed center to eliminate dead zone.
8. Length. Too long = too much wobble; too short = loss of pressure, loss of control, and short life.
9. Keep tip lubricated. Green leaves most easily available lubricant.
10. Keep lower end trimmed along sides so as to not create side friction. May not be able to do this with thin walled, pithy centered drills.
11. Drill should be straight as possible, not bowed.



IV. The Fireboard

1. Hole should be burned in far enough from edge of board to keep drill from breaking out of fireboard wall.
2. Notch. a. too shallow; b. too deep; c. just about right; d. blunt point, better for dust flow; e. straight wall, used by some primitive cultures--sometimes even narrower; f. notch to one side, indicates drill being held on an angle. Will cause dust to collect in a circle around the drill on top of the fireboard.
3. Fireboard thickness. Too thick = dust cools and takes longer for ignition; too thin = may burn through before ignition.
4. Prepare board so it will not wobble when in use.
5. Width wide enough to accommodate two rows of holes.
6. Hole base. a. rounded, allows for too much oblique-angled friction--less heat; b. flat base, good friction and heat; c. hump formed from hollow center drill -- remove it.
7. Keep hole diameter large enough so as to not create side friction.
8. Have more than one hole prepared as back-up.
9. Use second hole to receive coal rather than cutting notch on side of board.
10. Warm up extra holes on either side of center hole for extra heating and drying before trying to make coal in the middle hole.
11. Branch will make a quick fireboard. Just flatten top and bottom; it is not necessary to carve and square everything up like a piece of lumber.



V. The Hand Hold

1. Type of material. Wood should be hard and polish easily (hickory, Osage orange, serviceberry, and oak are good). Soapstone makes an excellent, long lasting hand hold. Bone and antler also work well.
2. Should fit properly and comfortably in the hand. Finger and thumb grooves can be carved for a custom fit.
3. Hole should be deep enough to keep drill from popping out, and wide enough so drill edges will not touch hand hold except at the very tip.
4. A soapstone insert can prolong the use of a wooden hand hold.
5. Hole in side of hand hold to store lubricant for drill tip.
6. A branch with the bark left on can serve the purpose without a lot of extra work. Bark helps the hand grip better. Can work just as well as, or better than, a fancy hand hold.

We hope you enjoyed this great article on bow drill fire making

Lisa and GT Sanford run *Big Oak Wilderness School in located in Nolensville, TN. They teach lots of outdoor skills including bow drill fire making.*

HOW TO BUILD A FIRE

For the survival practical, the fire should burn for 10 minutes. This tells how to build a fire that will burn for longer than 10 minutes.

AIR, FUEL, and HEAT are needed to start a fire and to keep it going.

FUEL is anything that burns well such as logs, twigs, pitch from trees, plastic, or paper. Fuel includes tinder (small dry twigs, pitch, or grass), kindling (small branches or wood, no bigger around than your finger), and large fuel (driftwood or logs).

AIR or oxygen is necessary to ignite a fire and to keep it burning.

HEAT is supplied from the spark of a flint or by a match.

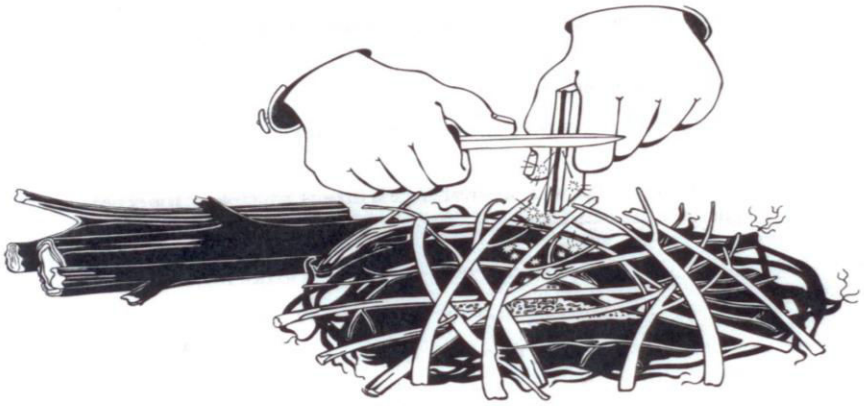
First locate a site sheltered from wind and rain. Collect enough tinder and kindling to supply a fire for at least 20 minutes and enough large fuel for the day.

Arrange tinder to allow room for oxygen. Kindling can be crosshatched on top of tinder or stacked in a teepee shape. If a magnesium fire starter or other flint material are being used, add kindling sparingly after starting a flame.

Kindling should burn for several minutes before adding larger fuel. Do not smother the fire by adding too much fuel at one time. Larger fuel should also be added sparingly. A small fire is adequate to boil water or cook food.

Grass, twigs, birch bark, and fire sticks can be used for tinder. Fire sticks are wood sticks with paraffin.

Using a knife, shave pieces of magnesium starter onto tinder.



Strike the sparking edge of the magnesium starter to make sparks and get flames going.

Fire material

To make a fire, you need to build it up gradually, beginning with small pieces of wood, then progressing to larger pieces as the fire gets going. You can grade your fire material into tinder, kindling, and fuel.

Tinder

You will need some material that ignites very easily to start a fire. Good tinder is dry material that takes only a spark to ignite. The tinder must be absolutely dry. There are a number of things you can use for tinder, paper, leaves, grass, bark and resin. You will find resin in spruce and pine trees. Resin will burn even if it is wet.

Use your knife to turn dry sticks and pieces of bark into powdery tinder. Tinder is the most important part of your fire, so prepare it well. If you have found resin, rub it on small twigs and sticks. Have plenty of tinder on hand so your fire will not go out. Collect tinder before you need it. Put tinder in your pocket or backpack, so you always have it handy.

Learn how to light a fire with matches, or to be more precise, light your tinder. Alternatively, why not learn how to make a fire with a flint striker.

Kindling
Kindling is readily combustible material that you add to the burning tinder. Small dry twigs and sticks are best. They should easily light when placed on a small flame. The dead branches on the undersides of trees provide excellent kindling, and they are usually dry, even if it has rained for weeks.

Fuel
Once your fire is established, you can add larger pieces of firewood. Make sure your firewood is as dry as possible. Look for dead trees, they are usually a good source of dry firewood.

Remember:
- Never leave a campfire unattended. Make sure your fire is completely out before leaving camp. Check it at least twice.

- The best time to start preparing your wilderness trip is now, before you head for the trails!

DRIFTWOOD: THINGS WE MAKE WITH DRIFTWOOD (9-12)8

Grade: 9-12

Time: Seven days

Objective: Students will be making a food bowl, spoon or a sling shot in this lesson. These were things that kept our people busy in the wintertime and these things were useful.

Materials/Resources:

- Wood
- Plains
- Carving tools
- Patterns
- Ban saw for teacher only
- Sand paper
- Bead
- Pictures of items to make
- **http://greenwood-carving.blogspot.com/2009/12/wooden-bowl-carving-ollies-first-bowl.html**
- **http://www.ehow.com/how_6388985_make-toy-sling-shot.html**

Teacher Preparation:
The teacher will rough cut the patterns out for the students. This project should take at least a week to complete. Teacher will photo copy a colored picture of different types of bowls then the students will choose one style and complete a replica of that bowl.

Activity Procedure:

1. Students will choose the design they want to create
2. Students will research why the item was used. For example was this item used for feast and ceremonies or what was it used for? Students will first research the types of toys that were made of driftwood
3. Students will begin the process of making toys for the younger students.
4. Students will begin by tracing out their pattern on to the wood
5. Students will the begin to carve out the replica of the item
6. Once the pattern is traced on the wood the student will have the teacher rough
7. Students will need a safety class on carving rules to help avoid injuries
8. Students will begin by sanding down with a plain the wood to begin to make their paddles.
9. After they sand down with the plain the wood they will need to sand the paddle or other carved items to complete the project.
10. Use creative designs to make their version of a food bowl, toy or paddle
11. Students will then choose to create one item then start to make it

12. After the item is made it can be given away or used an example of one object that was created in this unit.

Sunday, 27 December 2009

wooden bowl carving, Ollie's first bowl

This is my 12-year-old son Ollie's first bowl, made from willow. First he split the log in half.

Next he cut a piece to length. Note stylish pink crocks.

Axing the base of the bowl flat and removing all the pith.

And planing the base flat. This is not totally necessary but it helps when judging the thickness of the base later.

With the blank turned and wedged he starts hollowing with an adze.

A good adze is a remarkable tool and quite quickly it is possible to be remarkably accurate. The adze is followed by a gouge for smoothing and refining the form.

It is important to get a nice smooth line around the edge.

Once the inside is done it is time to start axing the outer profile to match. Ollie finds the weight of the gransfors wildlife hatchet just right and he is very good at carving with it.

It is good to get rid of as much weight as possible with the axe.

Then we move on to the push knife.

This was all done on a freezing cold day and we ran out of light, then the snow came. This morning we decided to bring the bowl horse inside and do some more. Starting with refining the inside and smoothing surfaces.

The fingers wrapped around the bowl and thumb inside the gouge give great control.

Then it is back to the push knife for a bit more off the outside.

The bowl is basically functional now but we normally leave them a few days to dry and then go over them particularly getting a sweet line along the outside and top edges with a knife. I'll try to post some pictures when it is finished. And just to show bowl carving is not just for boys, here is Jojo getting stuck in.

POSTED BY ROBIN WOOD AT 20:29

How to Make a Toy Sling Shot

This project shows kids that sometimes nature provides the best toys.

While some parents shy away from letting their kids own or play with a slingshot, using a slingshot could teach kids valuable lessons in self-control and responsibility. If you let your child play with a slingshot, have her promise to never point the slingshot at people or animals. Instead, she can use it to practice her aim, shooting at tin cans or trees. Making her own slingshot can provide a lesson on how natural materials often provide the best toys.

Difficulty: Moderately Easy
Instructions

Things You'll Need:

- Stiff, solid forked stick
- 6 rubber bands
- Leather strip, 4 inches by 1 inch
- Pocket knife or blade

1. Step 1

Search the forest for a sturdy, forked stick. Set it aside when you find it.

2. Step 2

   Loop three rubber bands together so that you have a chain of rubber bands. Repeat with your three remaining rubber bands. You should have two strips made up of three bands.

3. Step 3

   Slit a small incision 1/4-inch in on the right and the left end of the leather strip. Loop the last rubber band of each strip of rubber bands through one slit.

4. Step 4

   Loop the right end of your strip of rubber bands around the right prong of the fork. Loop the left end of the strip of rubber bands around the left prong of the fork. Your sling shot is ready for play.

DRIFTWOOD: STEAMING AND BENDING WOOD SNOWSHOES (9-12)9

Grade: 9-12

Time: Two days

Objective: Students will be learning to end wood and then creating a pair of snowshoes after they learn how to bend the wood.

Materials/Resources:

- Twine
- Wood for hoops bendable
- Fasteners
- http://www.inquiry.net/images/ich054.gif
- http://www.allwoodwork.com/article/woodwork/methods_of_bending_wood.htm
- Molds as needed
- Kettle
- PVC pipes
- Gloves and potholders
- Clamps
- Microwave
- MDF wood
- Band saw
- Wooden dowels 1"inch - ¾ inch - and ½ inch
- Hotplate or burner

Teacher Preparation:
Teacher should invite a knowable instructor into the classroom to help teach how to crate a snowshoe. Teacher will help the students choose a project to do that requires bending wood. Teacher will help students cut wood as needed.

History:
The trappers used snowshoes to make their own snowshoes. This was an important so each trapper could safety get across the snow. They would go on long travels and it was a needed survival skill each hunter should learn to make.

Activity Procedure:

1. Story time-have a knowable person speak about a story they had with snowshoes
2. Students will have to set up the equipment for the bending part of this lesson.
3. Students will begin to construct their snowshoes
4. Students will work closely to follow a pattern that will be provided along with the
5. Students will have to create a project that involves bending wood
6. Students will learn to bend wood and try a few different methods out

7. Students will test the bending process out by trying some of the vicarious methods listed below.
8. Students will state what methods are the easiest and which one they would choose for bending wood.

Methods of Bending Wood
By: Rob Smith

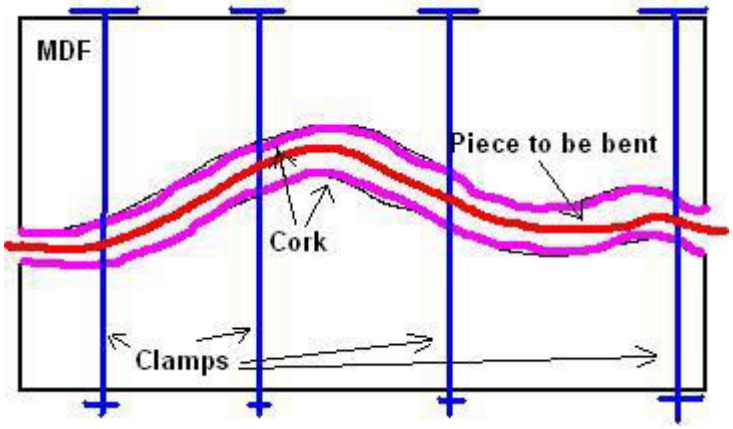
After building a few simple projects in your shop, you may have the desire get more creative and build something that requires more advanced techniques in woodworking. One of these advanced techniques is wood bending.

There are a few different methods used to bend wood. I will try to give you enough information on most of these wood bending techniques to allow you to get started on your way to more creative furniture. These methods will include Steam Bending, Kerf-cut Bending, Laminated Wood Bending, and for small pieces of wood, Microwave Steaming. You will also need to know how to prepare forms and molds before you can bend the wood.

Forms and Molds for Bending Wood

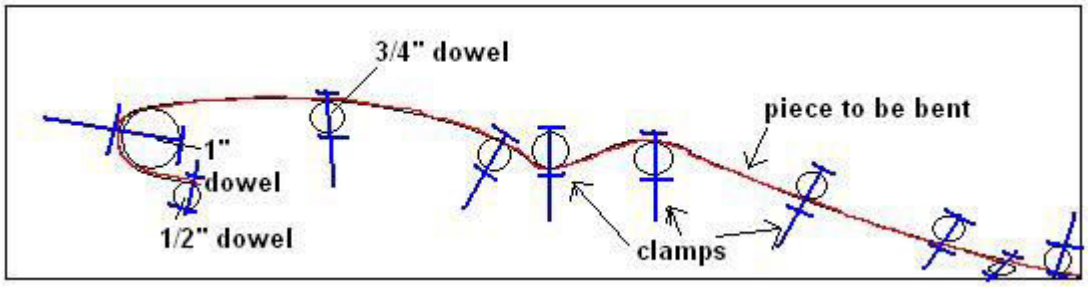
Before attempting to bend wood you will need to have a mold or form set up. Steam bent wood needs to be placed in the form and clamped in place as quickly as possible after being removed from the steam box. Laminated wood also needs to be placed in the form and clamped before the glue begins to set.

Most forms and molds are easily made from MDF. You will have to glue multiple sheets of MDF together to get the thickness that is about the same as the height of the piece of wood you are forming. After you glue up the MDF and it is dry, you have to square up the ends, for easier clamping later on. Then trace your shape on the form, and cut it with the bandsaw, take care to save both sides of the form. They need to match like a puzzle piece. Then smooth out the cut with a pattern makers file and/or sandpaper, to refine your form's shape to perfection. Finally, glue a strip of cork to each part of the form. This will help to provide equal clamping pressure to the piece and a slight cushion help prevent marks on your piece of wood.



Another alternative for a form is a theory I have been thinking about. I have not tested this and cannot say for sure it will work. If you would like to experiment with it, please email me and let me know if it worked. I will provide the details below. Think about it and use your own judgment in whether to try it or not.

My thought is that a pegboard form would work for sweeping curves. You would start by drawing out your shape on a piece of 8/4 or 2" hardwood stock. Then you would drill and place hardwood dowels at the apex of the curves. When the dowels are in place, you are ready to place your work piece into the jig and clamp it to the dowels as the blue marks indicate in the diagram below.



Steam Bending Wood

Steam bending wood is probably the most widely used and accepted method of wood bending. It has been used for ages

To construct a steam box you will need.

- A heat source to make to steam
- A container to hold the water to be heated
- A hose to connect the container to the steam box
- A box to hold the wood to be steamed. Can be either a PVC pipe or a wood box.
- Various fittings, clamps, and screws to put the steam box together.

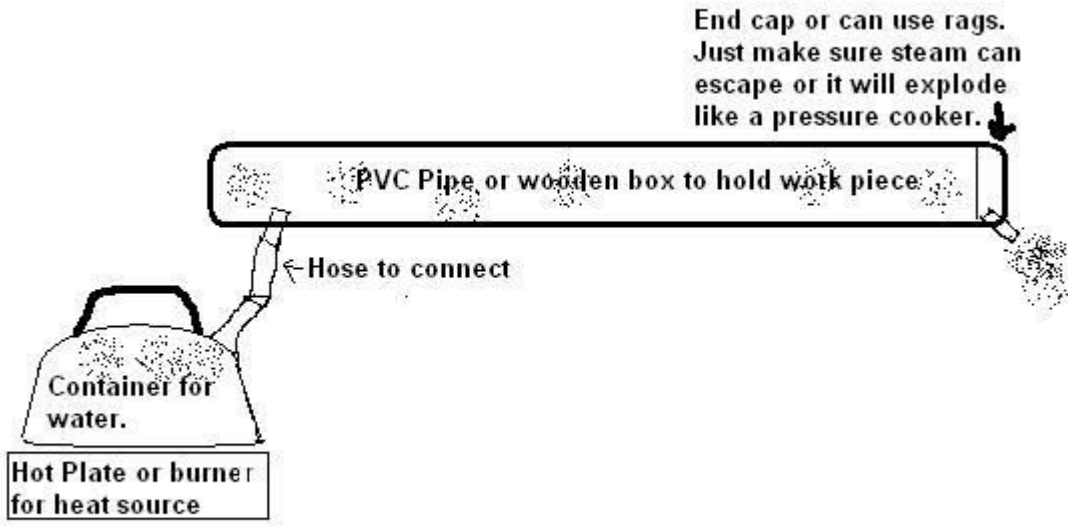
The heat source can be a camp stove, or just a hot plate. Open flames in a wood shop can be dangerous, so I would prefer a hot plate.

The container to hold the water can be anything you want. A teakettle works well, but some people use NEW and UNUSED metal gas cans, pressure cookers, etc. You have to be able to attach a hose to it somehow, with fittings and such.

The steam box itself can be made from PVC pipe, metal pipe, or a simple wooden box you make from scraps in the shop. It don't really matter that much. Steam has to be able to escape, or else the pressure will build and cause it to explode. But you want it to hold the steam enough to heat the wood and force water vapors into the wood. Roy Underhill from the Woodwright's Shop uses a wad of rags to plug the end of the box, and you can see the water dripping out of the end. If you use a PVC end cap, drill a hole or two in the end to allow the

steam to release to pressure as it builds.

Now just assemble everything and try it out. Be careful the steam will heat everything up, so use gloves. The general rule of time is about 1 hour for every inch of thickness being steamed. Use this as a starting point, and adjust your time as needed.



Laminated Wood Bending

Laminating wood to bend it is a fairly simple process. You will still need a form or mold but you won't need to build a steam box or risk burns with steam. Thin pieces of wood bend easier than thicker ones, but aren't as strong. So by laminating thin strips of wood together in a mold or form adds strength and when the glue dries it will hold the shape also.

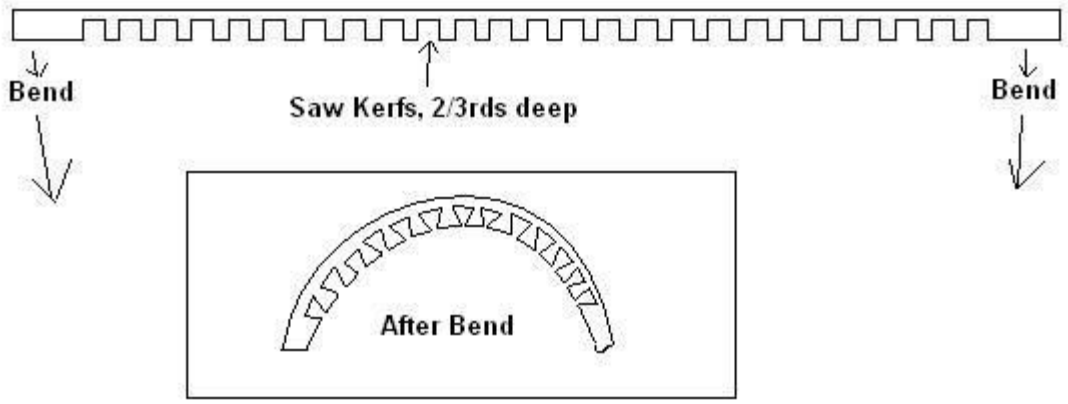
To bend wood with lamination you need to use thin pieces of stock, longer than your final length needed, you will trim to length after the bending is complete. To get the thin stock you can either buy it, or make your own by resawing thicker stock with your bandsaw. Pieces 1/8"or thinner will be easier to bend, but depending on how thick you want the piece in the end, you may need use a lot of pieces and glue.

After you have your form or mold ready and all your thin stock ready, all you do is spread glue on the pieces and stack them together in the form and clamp. When the glue is dry you can dress the edges and trim to length.

Kerf-cut Bending

Kerf-cut bending is done by using your saw to cut slots across the stock. This will allow the

stock to be bent because the kerfs can compress together. The kerfs are usually only used on the inside of the bend. If you want to make a more complex curve, perhaps an S- shaped curve, you would cut the kerfs on the inside of each bend, then you would use a veneer you cover the entire piece.



Microwaving Wood to Bend it

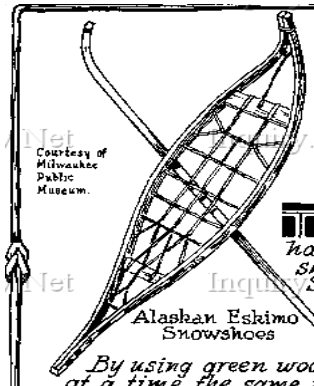
Basically this is just steaming, and is used for small pieces of stock. You wrap the stock with a wet paper towel and microwave for a few seconds. The microwave heats the wood and water just like a steam box. The time will vary depending on your microwave, the species of wood, the wood's moisture, the dimensions of the wood, etc. You will have to experiment to find the proper amount of time, start out with 15-20 seconds and work you way up from there.

Finally

There are a few more methods of bending wood out there, but they aren't widely used and there isn't much information available on them. These methods described above should be all you need to get started in the shop making more creative pieces of furniture. You might have to experiment a little but that is part of the fun of working in the shop, trying new things. So have fun but be careful

ALASKAN ESKIMO SNOWSHOES

DESIGNED AND DRAWN BY W. BEN. HUNT, HALES CORNERS, WIS.



Courtesy of Milwaukee Public Museum.

Alaskan Eskimo Snowshoes

Two methods of wrapping front ends.

To facilitate the bending of snowshoe frames the author has chosen this type of snowshoe for boys and novices. Snowshoes with this type of frame were used by Alaskan Eskimos and also by Chipewyan Indians.

By using green wood and bending it a little at a time, the same result is obtained as by steaming. By using green saplings one is also usually sure of straight grained wood. Allowing the bent frames to dry out for a week in a dry place (near a stove or furnace) is sufficient.

1. First get the form or forms ready. Use a 2"x10" plank 4' long and round off one end as shown in Fig. 1.

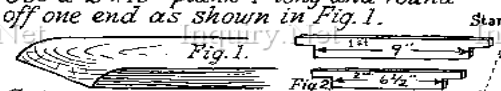


Fig. 1. Fig 2.

Cut 2 pieces of hardwood for the spreaders (Fig 2.) and fasten them to the plank. Fig. 3.

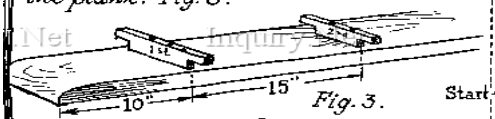
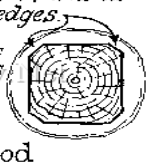


Fig. 3.

2. Now select 4 live elm or ash saplings measuring about 1½" to 1¾" at the butt ends and about 4' or 4½' long. While still fresh, trim them square with a drawknife and a spokeshave, to ¾"x¾" in the midsection and tapering to ¾"x½" at the ends. Chamfer the edges.

3. There are several ways in which the front curves may be bent, two of which are shown here.



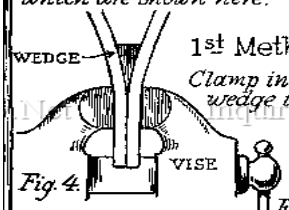


Fig. 4.

1st Method

Clamp in vise & drive wedge to spread Fig 4. Then tie plank to vise as shown in Fig. 5, place a prop under the other end and slowly bend both strips until they can be hooked under the first spreader. Then pull the tail ends together and clamp 6" from the end. Figs. 5 & 6.

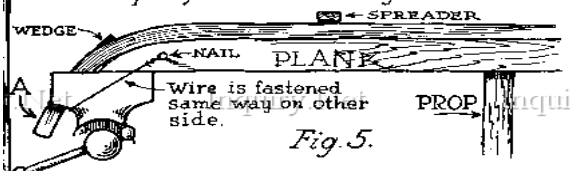


Fig. 5.

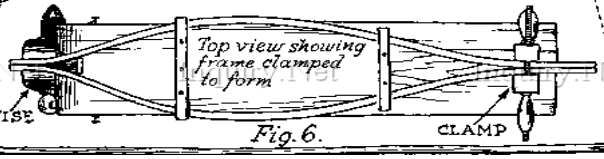
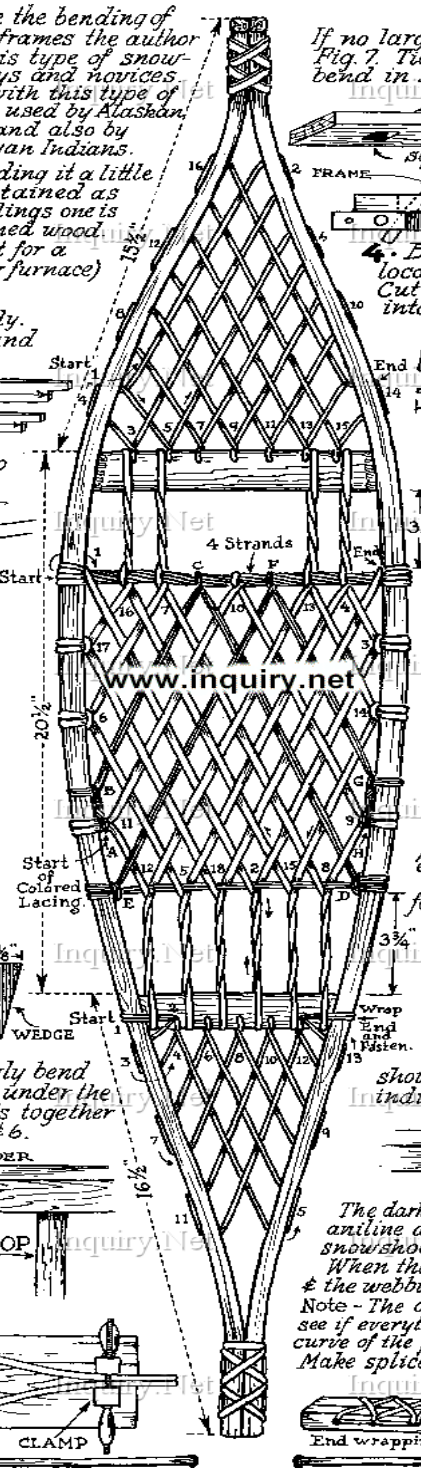


Fig. 6.



2nd Method

If no large vise is handy, make a jig as shown in Fig. 7. Tie or clamp the front ends together and bend in same manner as in 1st Method. Allow a week to dry.

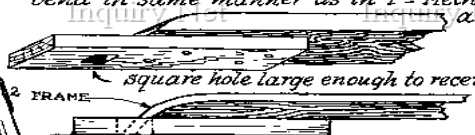
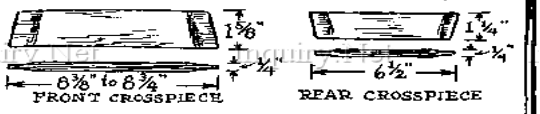


Fig. 7.

4. Before taking frames from forms, mark the locations for the crosspieces (see large drawing). Cut the crosspieces of hardwood and fit them into mortises in frame, cut ¼" to ⅜" deep.



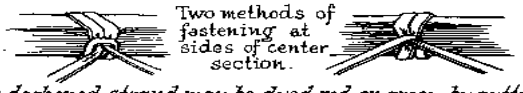
5. Wrap front end tightly with wet rawhide, set crosspieces into mortises, pull tail ends together and wrap.

WEBBING

Eskimos use walrus hide and Indians use rawhide for webbing. The snowshoes shown in the upper left hand corner are webbed for crusted snow. If no rawhide is obtainable, use so-called rawhide belt lacing, cut ⅛" wide for the ends and ¼" wide for the middle section. Either type of webbing should be thoroughly soaked before using and put on while wet. The detailed drawing shows the method of webbing. Lace the front & rear sections first. It is advisable to make a tracing of the frame on paper & then lay out the webbing on the paper first. Do not pull rawhide too tight as it may pull the frame out of line when dry. Just pull it moderately tight. About 12 feet of ⅛" lacing is used for the front end and about 6 feet for the tail end. About 28 feet of ¼" is used for the middle.

Be careful to weave over and under uniformly as shown. Webbing at ends is drawn thru ⅜" or ¼" holes in frame & crosspieces. Numbers show order of procedure.

For the middle webbing, start where indicated & go across & back twice, making 4 strands, then go under & over, & proceed in numerical order, twisting and fastening as shown at left. The darkened strand is then woven in, fastening where shown, and following the alphabetic order as indicated, finally fastening end at H.



Two methods of fastening at sides of center section.

The darkened strand may be dyed red or green, by putting aniline dye in the soaking water, and will give the snowshoes an added bit of decoration.

When the rawhide has dried thoroughly give the frame & the webbing 2 or 3 coats of good spar varnish.

Note - The author suggests lacing with heavy cord first to see if everything will work out right. A change in the curve of the frame may mean a change in the webbing also. Make splices as shown.

DRIFTWOOD: BEACH WALK (9-12)10

Grade: 9-12

Time: Two days (and sufficient time for research)

Objective: Students will be creating a graph or chart. Students will be also be taking a walk on the beach to find driftwood. At the beach the students will gather driftwood to make a fire and learn about the tides and when the best time to gather dirt wood would be.

Materials/Resources:

- **http://www.coos-bay.net/understanding-tides.html**
- Marshmallows

Teacher Preparation:
Students will be creating a graph and may need help creating it. Teacher may want to invite a local elder to come along with the students on the walk to help tell stories after the driftwood is gathered.

Activity Procedure:

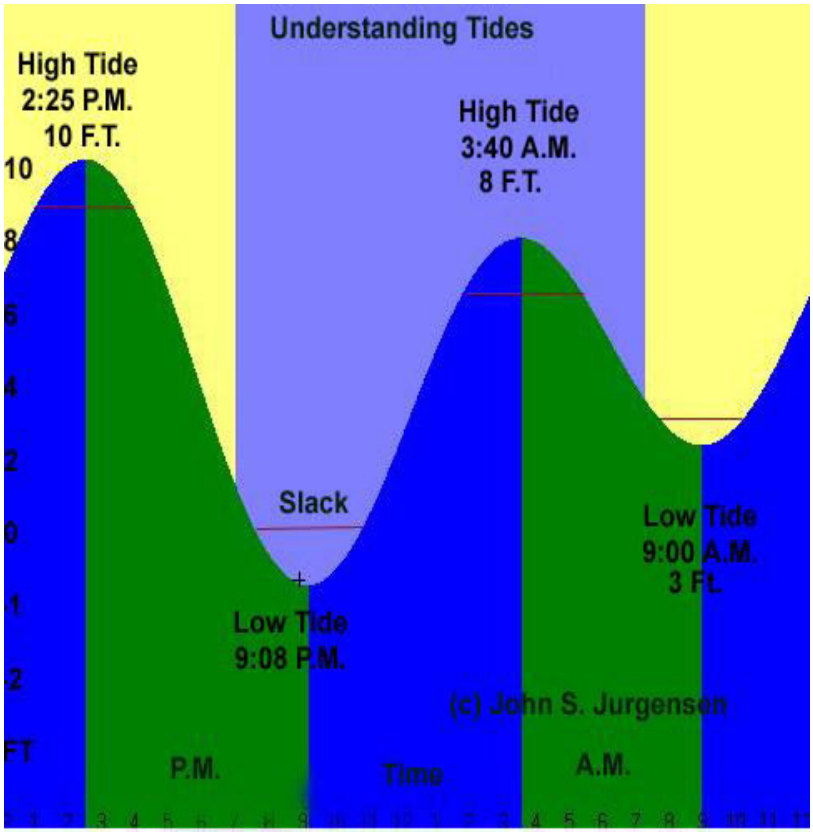
1. Students will track the tides to see when the best time will be to go to the beach and gather wood**.** Students will want to go during low tide for best results**.**
2. Students will examine the tide book and see if they can produce when the tide will be low for gathering and picking up driftwood.
3. Field trips are an important part of our school program. A letter explaining the nature of the trip and requesting parent permission for the students to attend will be sent out prior to each field trip.
4. Field trips may be scheduled for educational purposes during the school year. Students are considered "in school" while participating in district sponsored activities. This means students are subject to the rules, district policy, and school rules.
5. Students will create a chart of the tides in their area.
6. Students will then go to the beach and gather driftwood to make a fire.
7. Stories can be shared around a campfire

Reading a Tide Book

The Tide Chart

Understanding tide tables and charts is quite easy once you understand a few key topics. The chart below will help you see how the currents move and just what to expect during the changes. The Oregon coast has its' share of rip currents and the unexpected "sneaker waves" so the rule of thumb "never turn your back to the ocean" can save many lives each year.

Using the example above there are a few key points that I hope to explain in more detail. This should aid you in both your Dungeness crabbing and clamming adventures as well as how the ships move through the harbors and what you might expect and certain times. The chart I've made above is merely a learning tool and not an exact replica of a day's tidal movements. The above chart is most normally found as a table in a tide book and would appear as follows:



Saturday 2004-10-02
Sunrise 7:16 AM PDT, Sunset 6:55 PM PDT
Moonset 11:50 AM PDT, Moonrise 8:58 PM PDT
High Tide: 2.25 P.M. PDT 10.00
Low Tide: 9.08 P.M PDT -0.07
High Tide: 3.40 A.M. PDT 8.00
Low Tide: 9.00 A.M. PDT 3.00

A very common misconception is the thought that since there are four tides daily they must be on a six hour schedule. This, however, is not true if you look closely at the times. The tides are *not* on an exact 6 hour schedule as many might think . The period between tide cycles is very "roughly" about 13 hour from high to high or low to low. Factors such as moon phase, time of year, and your position on the globe are just a few on nature's way which determine how the tide's flow. My goal here is not to explain these external components but to simply help you understand how to read a store bought tide book and my weekly tide tables.

What does it All Mean

The first thing I'd like you to notice is the area above and below the red lines. These periods are called slack tides and are perhaps the most important time of the tide periods whether it be high or low. A "slack tide" is the very short period (from 1 to 3 hours "generally") when the ocean is close to a balance in tidal movement. These are the times when crabbing on the "high slack" side will be the best and when clamming on the "low slack" side will be at it's peak. The main reason crabbing is at it's peak during these times is the fact that the currents are not moving nearly as strongly as they are further down the tide timeline. The crabs can move easily without fighting the tide and therefore are much more active. Once the tides really start to move fast the crabs will often dig themselves under the sea bottom. This is when they'll tend not to feed nearly as much as they will when the tide is rather calm. You may also do very well crabbing on the low slack tide provided the water you are fishing is deep enough.

One very interesting thing to notice if you happen to be along a port is how the tides will affect ship movement. For example, one would expect the ships to move in and out of the ports during the high slack tides, while during the low slack tides you may see ships off in the horizon or in the port waiting for the tides to change in order to enter or leave the harbor. You'll also notice more of an abundance of shore birds during the low tides. This is when they come in and feed off the tiny exposed creatures.

I hope this better explains some of your questions about the tides. I strongly believe that if you use the information that I've provided on this site that you'll learn to know the best times for activities such as crabbing, clamming, ship watching, and tide pooling.