

COTTONWOOD

Cottonwoods stand like guardians over river banks and wetlands. Each tree's broad canopy, tall trunk, and miles of roots create a rich ecosystem, benefitting many species. Leaves make shade for understory plants. Insects, birds, and mammals make homes in the trunk and branches. Leaves fall and decompose into rich soil. People receive gifts of wood, food, and medicine from cottonwood.



Other Names: *Populus balsamifera ssp. trichocarpa*, black cottonwood, balm of Gilead, xW31?3?p3li (Twana), qʷədi?qʷ (Lushootseed)

Identifying Cottonwood: Cottonwood is a fast-growing tree that can reach 150–200 feet tall with a typical lifespan of 130 years. Its grey bark becomes deeply furrowed with age. Winter buds are large and full of fragrant yellow, orange, or red-colored resin. Leaves are shiny and dark green above and silvery underneath with rounded to heart-shaped bases and finely toothed edges. They turn yellow in the fall and form a thick layer of mulch on the forest floor. Male and female flowers grow on separate trees. Male flowers are dropping reddish catkins. Female flowers form four-inch-long catkins with light green capsules. When ripe, they split into three valves and release seeds with fluffy down that is carried great distances by the wind. Cottonwood fluff can be so thick it looks like snow in the early summer. Cottonwood is in the Salicaceae (willow) family.



Where it Grows: Cottonwood forms dense stands along streams, rivers, and floodplains where it towers above alder, willow, and bigleaf maple. It also occasionally grows in drier sites from sea level to mid-elevations. Black cottonwood grows from Southern Alaska to Northern California, mainly west of the Rocky Mountains. Other species of cottonwood, including Balsam poplar (*P. balsamifera ssp. balsamifera*), plains cottonwood (*P. deltoids* var. *occidentalis*), and narrow-leaf cottonwood (*P. angustifolia*), are found throughout the U.S. and Canada. All can be used for medicine.

Season: Cottonwood buds are ready to harvest in late winter to early spring (January through March). Leaves are harvested in spring through summer when they are fully developed and look vibrant. The bark can be harvested in any season, but is most potent in spring and fall.

How to Harvest: You can smell the fragrance of cottonwood buds in the air on the first warm days of spring. Just before they open, the leaf buds exude a drop of resin. This is the perfect time to harvest. If you are lucky, a

late winter or early spring windstorm will knock down a few tall cottonwood branches so you can access the largest buds. You will notice that some of the buds have catkins (flowers) inside. These do not have as much resin and are less preferred for medicine than the leaf buds. Snap the buds off the branches and place them in a plastic bag. Sticky resin will adhere to your fingertips and anything else it touches. To remove it, rub your hands with oil, rubbing alcohol, or hand sanitizer, then wipe with paper towels. Some harvesters find that rubbing their hands with oil or salve *before* harvesting helps prevent the resin from adhering to their skin.



Cottonwood leaves can be easily pulled off low branches or large branches that have recently fallen. They dry well in baskets or paper bags and keep for about a year. To harvest cottonwood bark, choose branches that have recently fallen or lower branches. Strip the bark with a knife, leaving behind the hard inner wood. Dry in a basket or a paper bag in a warm dry area with good ventilation.

Eating Cottonwood: Spring male catkins are rich in Vitamin C and can be eaten raw or added to soups. Later in the spring, the sweet cambium can also be scraped from the trees and eaten raw.

Medicine: Cottonwood's Latin name *Populus* means "the people's tree." *Populus* species are beloved trees throughout the world and have been valued since antiquity for many uses including wood, fuel, food, and medicine. Native Americans throughout the U.S. and Canada use cottonwood for treating a wide variety of ailments including baldness, sore throats, fevers, respiratory infections, and rheumatism.

Many parts of the cottonwood tree are medicinal. A compound called salicin, which is found in the leaves, buds, and bark lowers fevers and reduces inflammation and pain. The bark tea is most commonly used for internal medicine and has a bitter yet aromatic flavor.



Many people enjoy the fragrance of cottonwood resin in the buds and on the new leaves, and those who live near rivers often recognize it as a first smell of spring. The buds are infused or gently heated in oil, and then are used topically to ease swollen arthritic joints and sore muscles. Cottonwood's high antioxidant content makes it useful for healing skin afflictions including sunburns, chapped lips, wounds, and eczema. Cottonwood bud oil is a common addition to salves and creams. The buds are also antiseptic and can be added to herbal oils to prevent rancidity and molding.

CAUTION: People who are allergic to bees or aspirin should avoid using cottonwood topically or internally.

Traditional Technologies: Native Americans have used cottonwood resin to waterproof boxes and baskets, and the bark has been used to make buckets for storing and carrying food. The fruit capsules and buds are used to make dye. The wood is soft and lightweight when dry, and is excellent for smoking salmon. On the east side of the Cascade Mountains, cottonwood trunks were often hollowed into small dugout canoes and the bark was used for constructing sweat lodges and temporary cabins. Resin in the buds was used as glue to affix arrowheads and feathers to shafts.

At the Tell Abu Hureyra archaeological site on the Euphrates River in modern day Syria, archeologists found that around 11,500 years ago people used *Poplar* and willow species in many capacities. The wood provided fuel, forage for their goats, and the straight yet light trunks were used for house construction. They were also used for baskets and for anchoring reed nets. Clipped lower branches grow back quickly, making cottonwood a renewable resource.

Cottonwood is currently grown as a large-scale crop to make pulp in the Northwest. It grows twice as fast as Douglas fir, reaching up to 80 feet in just eight years, and can be harvested after just 10–15 years with a breast height diameter of about 15 inches.

Ecological Relationships: Cottonwood is a resilient plant along rivers and wetlands—dynamic landscapes where changing water levels and disturbance are the norm. Fluffy seeds fly in the wind, land on open soil, and then germinate within a day. Rapid deep rooting secures a water supply as warmer weather creates drier conditions. If soil levels build up during flooding, cottonwood trunk tissue can sprout roots. If soil levels are stripped away, cottonwood root tissue can sprout new branches.



Black cottonwood can grow in soil with a lack of nitrogen because it partners with a nitrogen-fixing bacteria called *Rhizobium tropici*, which lives in the stems. The bacteria fixes nitrogen from the air and converts it to a form that cottonwood can use as fertilizer in the soil.

Cottonwood adapts to changes in water availability. It can shed leaves or cause lower branches to die back if conditions are dry, and can expand roots and branches if conditions are flush. The whole tree is like a water tower that holds a massive amount of water. If you drive an axe into the trunk, it may squirt water!



Cottonwood is a whole ecosystem within itself. Miles of roots pump water from deep in the ground and carry it up to the massive canopy of leaves, providing shade that keeps the water cool for salmon and other species. The filtered light and rich leaf mulch created by the canopy also support a vibrant habitat for shorter deciduous trees, shrubs, and herbaceous plants. Insects make homes in soft cottonwood trunks and woodpeckers hammer holes to find them. These cavities become nests for birds, squirrels, and raccoons. Eagles, osprey, and great blue herons make platform nests in the upper branches of cottonwood. Beavers eat cottonwood and also use them to build dams. Cottonwood resin is sometimes called “bee glue” because bees gather it to make propolis, a sticky brown substance they use to seal their hives against invading insects, microbes, and harsh winds.

Fun Fact!

If you cut the small branches of cottonwood with sharp clippers and let it sit for a few minutes, you will often see a perfect 5-pointed star inside! Dakota elder Mary Louise Defender Wilson tells a story about how a star got to be inside the cottonwood trees.

https://files.dnr.state.mn.us/education_safety/education/plt/activity_sheets/star-cottonwood-tree-story.pdf (audio)

https://www.youtube.com/watch?v=WPVvIKEi_d8 (video)



Additional Resources

Cottonwood breathing video with Chenoa Egawa: <https://vimeo.com/614101167>

Cottonwood and the River of Time by R. Settler

Northwest Trees and Arno and Hammerly

References

Arno, S. and Hammerly, R. (2007). *Northwest Trees*. The Mountaineers Books.

Grey, B. (2011). *The Boreal Herbal*. Aroma Borealis Press.

Krohn, E. (2005). *Wild Rose and Western Red Cedar*. Chatwin Books.

Pojar, J. and MacKinnon, A. (1994). *Plants of the Pacific Northwest Coast*. Lone Pine.

Randall, Keniston, Bever and Sensen. (1998). *Manual of Oregon Trees and Shrubs*. Oregon State University.

Stettler, R. (2009). *Cottonwood and the River of Time*. University of Washington Press.

Photos: Elise Krohn

COTTONWOOD: WATER KEEPER

Time: 50 minutes to 1 hour
Season: Any season
Age: Grades K-12
Setting: Indoor or Outdoor



Overview: Students learn how to identify cottonwood, its lifecycle, and how it contributes to wetland and riparian ecosystems.

Student Wondering: *How do I recognize a cottonwood tree? How do cottonwoods survive in wetlands and along river edges? What gifts do they bring to these areas?*

| Learning Objectives | |
|---|--|
| <p style="text-align: center;">Understandings <i>Student will understand that...</i></p> <ul style="list-style-type: none"> wetlands and riparian zones are dynamic landscapes. cottonwood has many adaptations that help it to thrive in wetland habitats. cottonwood creates an environment that supports many species. | <p style="text-align: center;">Knowledge and Skills <i>Student will be able to...</i></p> <ul style="list-style-type: none"> identify an adult cottonwood tree. name the stages in the lifecycle of cottonwood from seed to adult tree. |

| NGS Standards: Performance Expectations | | |
|---|--|--|
| <ul style="list-style-type: none"> 3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. | | |
| Scientific and Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
| <ul style="list-style-type: none"> Developing and Using Models | <ul style="list-style-type: none"> LS1.B: Growth and Development of Organisms | <ul style="list-style-type: none"> Patterns |

Vocabulary: germination, pollination, sprinter, marathon runner

Background: Cottonwood is a common tree along rivers and wetlands - places where change is the norm as water levels fluctuate and rivers erode banks and build floodplains. These landscapes also often have poor quality soil and fluctuate between wet and dry conditions. Cottonwood has adapted to these conditions, and contributes to the diversity and abundance of plants and animals that thrive in these places.

Materials

Inside:

- Samples of cottonwood if available including leaves, branches, buds, flowers, and seeds
- Cottonwood Lifecycle Page to project, or printed to share with students (see end of document)

Outside: Gather around a large cottonwood tree. Have samples listed above readily available.

- Hand lenses or magnifying glasses
- Drawing materials including paper or journals, pens, pencils, or crayons
- Printed Cottonwood Field Exploration pages for each group for grades 6–12

Preparation: Read the *Cottonwood Overview*. Gather cottonwood samples if you will be inside, or find a large cottonwood tree or grove if you will be outside.

LESSON: COTTONWOOD - WATER KEEPER

INTRODUCTION

10 MINUTES

Gather around the tree if you are outside, or show students pictures and samples of the tree if you are inside.

Story Connection: Tell the story of a cottonwood tree or a cottonwood grove from seed to fully-grown tree.

Modify the story to fit a local landscape that students are familiar with. For example:

100 years ago, the Chehalis River flooded across this valley and deposited a thick layer of mud and rock. It looked like a wasteland. But the next summer, cottonwood seeds blew into the valley like snow in summer. The seeds landed in the soft mud and along the gravelly banks of the river. Some sprouted and took root. Roots dove down fast so they could draw up water in the hot dry months. These cottonwood saplings grew about five feet each year. In 20 years, the trees were already 100 feet tall. In summer the leaves provided shade, shelter, and food for many animals. In winter they fell to the ground and decomposed into rich soil. Many other plants including salmonberries and willows grew in their rich understory. Pileated woodpeckers hammered holes in the trees to find insects. Birds, squirrels, and raccoons made homes in the larger cavities. Beavers ate cottonwood shoots. They also used branches and small trees to build dams. Bees swarmed around the resinous buds in early spring and gathered the resin to make propolis, a sticky glue that helps keep their hives free of invading insects and diseases. Great Blue Herons, Osprey, and Eagles built platform nests in their treetops. These birds eat fish, and their leftovers and scat drop down and feed the soil. The cottonwoods are so tall now that they create shade over the river, helping to keep the water cool, and sheltering salmon and other water creatures. Some of the massive old cottonwoods are now dying, but other trees like Douglas fir, hemlock, and cedar are able to live here. Cottonwood has healed the soil and built ecosystems where many species of plants and animals thrive.

The Art of Noticing Cottonwood: Invite students to take a few minutes to explore. If you are inside, pass out plant samples for them to look at. If you are outside, they can feel the bark, look closely at the stems and leaves, smell the buds or bruised leaves, and gaze up into the canopy.

Ask: *Have you seen cottonwood before? If so, does it remind you of a place or a season? What do you notice?*

Share: Build on what students share about cottonwood. Choose information from the *Cottonwood Overview* that is appropriate for your student's knowledge level. For example:

- Habitat: Wet environments. For older students, this is an opportunity to introduce riparian zones as dynamic and diverse landscapes.
- Characteristics: Loses its leaves in late fall (deciduous).
 - Grows to 150–200 feet tall
 - Bark: Gray and becomes furrowed over time
 - Twigs: Older twigs are gnarled like arthritic fingers
 - Buds: Larger flower buds stick out on spur branches and smaller leaf buds are flattened against the twigs. Both are very resinous.
 - Leaves: Shiny dark green on top and silvery beneath
 - Seeds: Develop white downy fluff in summer that looks like snow falling
 - Flowers: Male and female flowers grow on separate trees. Male flowers are reddish and inchworm-shaped. Female flowers are green capsules that become woody and split open.
- Cottonwood Stars: If you cut the small branches of cottonwood with sharp clippers and let it sit for a few minutes, you will often see a perfect 5-pointed star inside! See if you can find this with students. You might want to share the Dakota cottonwood story by Mary Louise Defender Wilson <https://www.youtube.com/watch?v=P35cxB3gF7M>

COTTONWOOD LIFECYCLE

10 MINUTES

Share: Let's explore the lifecycle of cottonwood (show students as many samples as possible).

- Seeds have a long feathery attachment that is easily carried on the wind. Cottonwood makes LOTS of seeds. Even though only one in a million **germinate**, it is enough to create many cottonwood trees!
- Seedlings grow fast! Roots grow deep down into the soil for water, can be as thick as a human hair, and get a foot long in just a month, with only five little leaves to gather sunlight. Within a year, a cottonwood tree can grow five feet. Imagine if you grew five feet in a year!
- In 20 years a cottonwood can be 100 feet tall. It now has a big canopy of leaves and it about as tall as a 10-story building.
- Male trees make reddish golden flowers with a lot of pollen.
- Female trees make greenish flowers that look like young grape stems.
- Pollen from the male flowers is carried in the wind to the female flowers. This is called **pollination**. The female flowers swell and make seeds inside little green capsules.
- Female capsules mature and they break open and release the cottony seeds.
- Each seed has a feather-like attachment that helps it fly on the wind. They look like snow in summer. If they land on wet open ground, they can germinate and the cycle starts over again!

Cottonwood lives an average of 80–130 years, which is short for a tree. Cottonwood is called a **sprinter** because it grows fast and quickly builds an ecosystem. Other trees like cedar and hemlock are like **marathon runners**—they grow slow and live as long as 1,000 years!

Share: Start by reading this quote by R. Stettler, author of the book *Cottonwood and the River of Time*:

What draws people to cottonwoods? Is it the promise of a cool stream, some shade, and shelter? Indeed, water, the mainspring of life, is at the heart of it. And if there is a tree whose life cycle is hooked to water, it is cottonwood. From the germination of its seedlings to the dispersal of the next generation, all stages of its life are attuned to the seasonal dynamics of the water cycle.

Cottonwoods thrive along rivers and wetlands – places where change is the norm as water levels fluctuate and rivers erode banks and build floodplains. Cottonwood adapts to living in such dynamic landscapes in many ways including:

- Seeds Built for Travel and Speed: Cottony seeds fall like snow in summer. Each seed has a downy tuft that catches the wind. When they land on moist open soil, they can germinate within a day!
- Roots Grow Fast and Deep: Young roots can grow a centimeter a day! By the end of the first month, roots may grow a foot long and be as thick as a human hair, supporting a two-inch shoot with five leaves. Deep and fast-growing roots secure a water supply as warmer weather creates drier conditions.
- Nitrogen-fixing Bacteria: Black cottonwood can grow in soil with a lack of nitrogen because of its partnership with a nitrogen-fixing bacteria housed in its stems called *Rhizobium tropici*. The bacteria fixes nitrogen from the air and converts it into a form of nitrogen that cottonwood can use as fertilizer.
- Rooting Hormone: Cottonwood trees produce a rooting hormone that helps broken branches to root in mud and grow into a new tree! Cottonwood can actively shed short shoots by a process called **Cladogenesis**. A single tree may only live about 100 years, but its **genotype** can live many hundreds of years.
- Shoots from Roots & Roots from Shoots: As rivers flood and water levels drop, soil along the river is built up and are stripped away. Cottonwood adapts to these changes by sprouting shoots from root tissue and roots from trunk tissue - a unique quality among plants.
- Regulate Water Demands: Cottonwoods can hold a massive amount of water - almost like a water tower in dry hot months. Water may squirt from the trunk when an axe is driven into it! If conditions are dry, cottonwoods can shed leaves or cause lower branches to die. If conditions are wet, cottonwood can expand roots and branches to hold more water.



If you are outside, break the class into small groups and have them look for evidence of these water adaptations. You can print out the adaptations page at the end of this document for each group. After five minutes, call the groups back together and have each group share what they noticed.

HANDS-ON ACTIVITY (K-12)

10-15 MINUTES

Inside Drawing Activity: Have students draw a silhouette of a whole cottonwood and different parts of the cottonwood including the whole form of the tree, bark, twigs, leaves, flowers, and seeds. If seeds are in season, have students look at them with a hand lens or magnifying glass. Young children can do leaf rubbings.

Encourage students to follow the ABCDE's of scientific drawing including:

A - Accurate

B - Big - use the whole page

C - Colorful or gives context

D - Detailed - use writing and drawing together. What do you notice about color, texture, shape, size?

E - Explained - "I notice... I wonder... this reminds me of..."

Outdoor Journaling Activity: Have students find a quiet place to sit and observe cottonwood. What sounds do they hear? What animals are present? Are there signs of animals like insects or woodpecker holes? Are there signs of river flooding or drought? In addition to drawing cottonwood, students can write down their observations.

TYING IT TOGETHER (K-12)

5-10 MINUTES

Think, Pair, Share: Have students work with a partner or a small group. **Ask**: *Why is cottonwood called the water keeper? What does it contribute to wetlands and riparian zones? Name one thing you will remember about cottonwood?* Finish with an all-group discussion.

DIGGING DEEPER

Make Friends with a Cottonwood Grove: Have students find a local place that has cottonwood. Ask them to walk around and observe the area. How old do they think the oldest cottonwoods are? Do they recognize any other plants that grow around the cottonwoods? What animals live there? Have them take pictures of the area, and recommend that they observe the area in different seasons.

Explore the Ethnobotany of Cottonwood: Discuss ways that people value cottonwood for fuel, building materials, and medicine. See the *Cottonwood Overview* for notes and additional resources.

Listen to a Dakota Story on cottonwood by Mary Louise Defender Wilson

<https://www.youtube.com/watch?v=P35cxB3gF7M>

Make Cottonwood Water for Plant Propagation: Use the *Tend Gather and Grow Willow Water Plant Propagation Lesson* to make cottonwood water. Test to see if it helps other plants to grow faster.

COTTONWOOD FIELD EXPLORATION

| Cottonwood Adaption | What do you notice? |
|---|---------------------|
| <p>Seeds Built for Travel and Speed Cottony seeds fall like snow in summer. Each seed has a downy tuft that catches the wind. When they land on moist open soil, they can germinate within a day!</p> | |
| <p>Rooting Hormone Cottonwood trees produce a rooting hormone that helps broken branches to root in mud and grow into a new tree! They actively shed shoots by a process called cladogenesis. A single tree may only live about 100 years, but its genotype can live many hundreds of years.</p> | |
| <p>Regulate Water Demands Cottonwoods can hold a massive amount of water—almost like a water tower. Water may squirt from the trunk when an axe is driven into it! If conditions are dry, trees can shed leaves or cause lower branches to die. If conditions are wet, trees can expand roots and branches to hold more water.</p> | |
| <p>Shoots from Roots & Roots from Shoots As rivers flood and water levels drop, soil along the river is built up and are stripped away. Cottonwood adapts to these changes by sprouting shoots from root tissue and roots from trunk tissue - a unique quality among plants.</p> | |
| <p>Nitrogen-fixing Bacteria Black cottonwood can grow in soil with a lack of nitrogen because it partners with nitrogen-fixing bacteria housed in its stems called <i>Rhizobium tropici</i>. This bacteria fixes nitrogen from the air and converts it into a form of nitrogen that cottonwood can use as fertilizer.</p> | |
| <p>Roots Grow Fast and Deep Young roots can grow a centimeter a day! By the end of the first month, roots may grow a foot long and be as thick as a human hair, supporting a two-inch shoot with five leaves. Deep and fast-growing roots secure a water supply as warmer weather creates drier conditions.</p> | |

COTTONWOOD: THE PEOPLE'S TREE

Time: 1 hour
Season: Late Winter or early Spring
Age: Grades 6–12
Setting: Indoor or Outdoor



Overview: In this activity students learn to identify, harvest, and prepare cottonwood as a medicine. They make healing oil from the buds, which can later be turned into a lip balm or healing salve.

Student Wondering: *Why is cottonwood called the “People’s tree?” How do I use cottonwood buds for medicine?*

| Learning Objectives | |
|--|---|
| <p>Understandings <i>Student will understand that...</i></p> <ul style="list-style-type: none"> cottonwood grows in wet areas and contributes to soil health and plant and animal habitat. cottonwood has healing properties and can be used for medicine. | <p>Knowledge and Skills <i>Student will be able to...</i></p> <ul style="list-style-type: none"> identify an adult cottonwood tree. explain two reasons why cottonwood is called “the people’s tree”. harvest and make oil from cottonwood buds. |

| NGS Standards: Performance Expectations | | |
|---|--|--|
| <ul style="list-style-type: none"> 1-LS1-1 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. | | |
| Scientific and Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
| <ul style="list-style-type: none"> Constructing Explanations and Designing Solutions | <ul style="list-style-type: none"> LS1.A: Structure and Function LS1.D: Information Processing | <ul style="list-style-type: none"> Structure and Function |

Vocabulary: Internal, topical, arthritic, antioxidant, antiseptic

Background: Cottonwood is a beloved tree wherever it grows around the world. It is valued for wood, food, fuel, and medicine. Cottonwood is a favorite remedy among herbalists for reducing fevers, healing skin, and easing sore muscles and arthritis. The buds are most popular for topical remedies and are harvested in late winter through early spring just before they open up.

Materials

- Samples of cottonwood for student identification including twigs, buds, leaves, flowers and seeds

- Pictures of cottonwood trees in their habitat during different seasons
- At least 1 cup of cottonwood buds to make oil
- Extra virgin olive oil to cover your buds
- A blender (only if you are making a large amount)
- A double boiler (you can create your own by placing a small pot in a larger pot with a couple inches of water in it) or a crock pot
- A pressing cloth like muslin and a Pyrex measuring jar
- A glass mason jar with a lid for long-term storage plus a label

Preparation: Read the *Cottonwood Overview*. Gather samples of cottonwood including buds ahead of time. If it is a wet season or if you harvest during a rainy time, you should either heat the buds in oil or allow the buds to dry for three to four days to help remove the water. If you are not able to find cottonwood buds for this activity, or if you have missed the harvest time, you can purchase dried buds from Mountain Rose Herbs.

LESSON: COTTONWOOD – THE PEOPLE’S TREE

INTRODUCTION

10 MINUTES

Introduce Cottonwood: Choose information from the *Cottonwood Overview* that is appropriate for your student learning level. If you have already taught the lesson *Cottonwood: Water Keeper*, this is an opportunity for review including habitat, plant characteristics, and ecological relationships.

Share: Cottonwood’s Latin name, *Populus* means “the people’s tree”. *Populus* species are beloved trees throughout the world. They have been valued for many things including wood, fuel, food, and medicine.

Traditional Technologies: People use cottonwood to build structures that make their lives easier. For example:

- At the Tell Abu Hureyra archaeological site on the Euphrates River in modern day Syria, archeologists found that around 11,500 years ago, people used poplar and willow for many things. The wood provided fuel, forage for their goats, and the straight yet light trunks were used for house construction. The trees were also used for baskets and anchoring reed nets.
- Native Americans used cottonwood resin to waterproof boxes and baskets, and as a glue to fix arrowheads and feathers to shafts. The bark has been used to make buckets for storing and carrying food. The wood is soft and lightweight when dry, and is excellent for smoking salmon. On the east side of the Cascade Mountains, cottonwood trunks were often converted into small dugout canoes and the bark was used for constructing sweat lodges and temporary cabins. The fruit capsules and buds are used to make dye.

Medicine: Many parts of the cottonwood tree are medicinal. A compound called Salicin, which is found in the leaves, buds, and bark of cottonwood, lowers fevers and reduces inflammation and pain. The bark tea is most commonly used for **internal** medicine and has a bitter, yet aromatic flavor. The leaves make a nice bath tea for easing sore muscles and healing skin. The bud infused oil is used **topically** as massage oil and in salves to

ease swollen **arthritic** joints and sore muscles. Cottonwood's high **antioxidant** content makes it useful for healing skin including sunburns, chapped lips, wounds, and eczema. The buds are also **antiseptic** (kill infection) and can be added to other herbal oils to prevent them from spoiling and molding.

Native American people traditionally use cottonwood medicine for a great diversity of things including treating baldness, sore throats, sore joints, and respiratory infections.

Harvesting Tips: Every part of cottonwood is useful.

- Cottonwood buds have a strong fragrance on the first warm days of spring. Just before they open, the leaf buds exude a drop of red, orange, or yellow-colored resin. This is the perfect time for harvest. If you are lucky, a late winter windstorm will knock down a few tall cottonwood branches or a whole tree so you can access the largest buds. You can dry cottonwood buds and use them later to make oil.
- Cottonwood leaves can be easily pulled off low branches or large branches that have recently fallen. They dry well in baskets or paper bags and keep for about a year.
- Cottonwood bark is harvested from recently fallen branches. Strip bark with a knife, leaving behind the hard inner wood. Dry in a basket or a paper bag in a warm dry area with good ventilation.

Bees gather the resin to make their own medicine called propolis. Propolis is like "bee glue" that seals the hive and helps ward off bacteria, mold, and insects.

CAUTION: People who are allergic to bees or aspirin should avoid using cottonwood as medicine.

HANDS-ON ACTIVITY

10-15 MINUTES

Share: We are going to use cottonwood buds to make fragrant healing oil. We will turn this oil into (a lip balm or a healing salve). Leaf buds are dense, green inside, and full of resin. Flower buds feel harder on the outside and have a little blackish or greenish yellow catkin inside. They may look like immature pussy willows. The flower buds are not as resinous and medicinal, and can be composted. Teach students how to tell the difference by opening them up.

You can make cottonwood oil several ways including:

- Steeping leaf buds in oil in a glass jar for 2-3 months. Keep the jar in a warm place to help extraction. Cover with a piece of muslin cloth or several thick paper towels and a rubber band so that water can evaporate from the oil. This method is fine if you are not in a rush. If it has been a wet winter, you should dry the cottonwood buds in a paper bag for several days to help remove water.
- Covering leaf buds with oil and heating them gently in a double boiler, crock-pot, or dehydrator on a low setting. This method only takes a couple of days. Heat helps increase extraction and remove water.
- Covering the buds with oil and then placing them in a blender or food processor to break them up. Then they can be gently heated for a couple of days, or can sit in a jar for several months.



Several types of oil can be used including extra virgin olive oil, grape seed oil, jojoba oil, castor oil, or coconut oil. Olive oil is inexpensive, is high in natural vitamin E, and has a long shelf life.

Step 1 – Process the Buds: Have students work in groups. Make sure they wash their hands first. Place cottonwood buds on a paper plate or place butcher paper in the middle of each group. Show students how to tell leaf buds and flower buds by pinching them. Have them place pinched leaf buds in a paper bowl and discard or compost the flower buds. Once finished, place the leaf buds directly in a double boiler and cover completely with olive oil.

For larger amounts, you can use a blender. First, place your sorted leaf buds in a double boiler and cover them with olive oil so they are fully covered ½ to 1 inch above the buds. (If you put the buds in the blender directly without oil they will stick to the sides and your clean-up will be challenging). Pour oil and buds into the blender. Turn on and blend just until the buds are mostly broken open. Place back in the double boiler.

Step 2 – Gently Heat: Heat on a very low setting. Do not allow the olive oil to get hot enough that it boils! You can turn the burner on and off to keep the temperature low. Heat for several days. The oil will turn a deep golden color and become very fragrant. You can also use a crock-pot or a food dehydrator on a low setting.

Part 2: (Several days later once the oil has been heated)

Step 3 – Press Out the Oil: Lay a piece of muslin cloth over a strainer that is sitting on a container. Pour about a cup of buds and oil into the muslin, bundle it up, twist the cloth, and squeeze with all your might. Once oil stops dripping, empty the buds into a compost container, and continue pressing until done. Let the pressed oil rest for about an hour so that any remaining water and solids can fall to the bottom.



Step 4 – Store: Pour your oil (minus any water or solids at the bottom) into a glass storage container. You can use any glass jar with a tight fitting lid. Amber jars protect the oil from sunlight, but you can keep clear glass containers in a cupboard in a cool place and the oil will preserve just as well. Remember to label with the name of the oil, where you got the buds, and the date. Give each student a sample.

A STICKY MESS! To get resin off students' hands, have them rub hand sanitizer on their hands, then wipe with paper towels. To clean containers, wipe oil off with a paper towel, and then clean with soapy water. It is easier to get resin out of a double boiler when the oil is warm. If resin remains, wipe with a paper towel soaked in rubbing alcohol (the higher the alcohol content the better). For extreme cases you can soak with a little alcohol overnight.

TYING IT TOGETHER

5 MINUTES

Group Discussion: Have students work with partners, or do a whole-class discussion.

Ask: *How do we identify cottonwood? If you had to pick one medicinal use for this plant, what would it be?*

DIGGING DEEPER

Cottonwood Research Project: Have students investigate what species of cottonwood grow in your area. How do local people use cottonwood? Interview an elder or an herbalist.