Into the Outdoors

Educational Partners:

MIDDLE SCHOOL LESSON – PEOPLE NEED WOOD PRODUCTS

Companion to Video Managing Forests for Multi-Use
Forest Products in our Daily Lives

FOREST PRODUCTS IN OUR DAILY LIVES

Managing Forests for Multi-Use

Developed By Gina Smith, LEAF – Wisconsin's K-12 Forestry Education Program

Target Grade Level: 6-8

Appropriate for 9-12
Appropriate for 4-5 if educators provide reading support/modifications
Suggested resources for K-4 included

Science Categories

Forestry, Properties of Wood, Wood Products, Sustainability

Time Frame ~2 hours

- Introduction & Activity 1: 45-60 minutes
- Activity 2: 30-45 minutes
- Conclusion: 30-45 minutes

Materials

- Managing Forests for Multi-Use video
  - At a minimum1:48 Jim Bokern, Forest History Association of Wisconsin through 5:06 Douglas Cox, Menominee Nation
- Activity 1 Student Sheet: Wood Products - Jigsaw Reading
  - All students need a copy of pg 1
  - Each student needs a copy of EITHER Before 1800: Wisconsin's First Nations (pg 2-3) OR

1800-1940: Settling and Growth of Wisconsin – Logging Era (pg 4-6)

- Activity 2 Student Sheet: Properties of Wood Historically Used as Building Materials
- Online access to Wood Handbook – Wood as an Engineering Material, Chapter 2 Characteristics and Availability of Commercially Important Woods from the Forest Products Lab. https://www.fpl.fs.usda.gov/documnts/fplgtr/fplgtr282/chapter_02_fpl_gtr282.pdf
- (optional) LEAF Wood ID Blocks https://www.uwsp.edu/wcee/wcee/kits/wood-identification-blocks-kit/
- Written Assessment of Learning Student Sheet

Key Words

- Ciiporokes, saplings, wigwams, log homes, timber framed homes, wood framed homes, heartwood, sapwood, texture, grain, coarse grain, fine grain, warping

Learning Objectives

Students will be able to:

- Identify important woods used as building materials in Wisconsin's early history
- Examine the properties and purpose of different types of wood used in building materials
- Examine the impact using wood as a building material had on Wisconsin's forests and how it led to sustainable forest management
- Explore current and future uses of wood as a building material

Activity Summary

This lesson will start out by having students participate in a jigsaw reading activity to explore how wood was used by Wisconsin's First Nations and earliest settlers to construct dwellings and boats. In activity 2, students examine the properties of wood historically used as building materials to gain an understanding of why specific woods were selected for various purposes. The lesson concludes with an opportunity for students to demonstrate what they learned in an evidence-based writing activity.

Vocabulary

- Ciiporokes – Dwelling built by the Ho-Chunk who lived in the Teejop (Madison) area
- Saplings – Young trees that are flexible
- Wigwams – Dome-shaped dwellings built by the Menominee
- Log homes – Simple homes built from resources found on the land surrounding them
- Timber framed homes – Home that had a frame built from flat-edged logs that were covered with flat boards of wood
- Wood framed homes – Home built on stone foundations using standard-sized lumber for a frame which was covered with wood siding
- Heartwood: dense inner part of a tree trunk; hardest timber comes from heartwood
- Sapwood: soft, outer layers between the heartwood and the bark of the tree
- Texture/Grain: The arrangements of wood fibers

- Coarse grain: Wood with open growth rings with uneven texture – a more irregular look
- Fine grain: wood with tighter growth rings with even texture – a more even look
- Warping: when wood is bent out of shape; usually due to wetness or heat

Background Information

The reading materials included in this lesson provide sufficient background information. Please be sure to review all reading materials prior to completing this lesson with your students.

Learning Procedure

Introduction: Segment from *People Need Wood Products*

- If you have ample time, show the full video, People Need Wood Products.
  - Ask student to share what they learned from the video
- If you are pressed for time, watch the historical segments from People Need Wood Products
  - 1:48; Jim Bokern, Forest History Association of Wisconsin
  - 3:00; Douglas Cox, Menominee Nation)
  - Ask students to share what they learned from these segments

Activity 1: Wood Products - Jigsaw Reading

You may choose to have students begin this activity reading independently or with a partner.

- Assign each student/pair one of the texts to read (Before 1800: Wisconsin's First Nations OR 1800-1940: Settling and Growth of Wisconsin – Logging Era)
- Students should read their assigned section of text and take notes on the Jigsaw Reading Activity for People Need Wood Products student page. They should note the different types of wood used, how the wood was used, and why the wood was selected.
- Once all students/partner groups have completed reading and taking notes on their section, have the students pair up with another student/partner group and take turns sharing what they learned. They should record this information on their student page also.
- Have students complete the Reflection Writing Prompt for this activity independently. Compare and contrast how the types of dwellings or boats made by members from Wisconsin's First Nations were similar to and different from those made by settlers arriving in Wisconsin in the 1800s-1900s. Require students to use and cite at least three pieces of evidence from the Jigsaw Readings in their answers. Review how to use and cite evidence with students if necessary.

Activity 2: Properties of Wood Historically Used as Building Materials

You may choose to have students complete this activity independently, with a partner or in a small group.

- Use the following link to help all students access an online copy of the Forest Products

Lab's Wood Handbook – Wood as an Engineering Material, chapter two, Characteristics and Availability of Commercially Important Woods. It can also be found by doing an online search of the following "Forest Products Laboratory Wood Handbook Chapter 2". https://www.fpl.fs.usda.gov/documnts/fplgtr/fplgtr282/chapter_02_fpl_gtr282.pdf

- Instruct students to use pages 2-3 through 2-18 to complete the table of properties for wood that was used to build homes/boats by Wisconsin's First Nations and earliest settlers.
- Use basswood as an example to introduce students to the different properties and their definitions
- Consider checking out the Wood ID Kit from LEAF – Wisconsin's K-12 Forestry Education Program to use with this activity. The Wood ID Kit contains blocks of the following woods that are identical or very similar to those from the activity: basswood, birch, redcedar, elm, hickory, pine, spruce, hemlock and white oak. Samples can be used to help students understand the difference between the types of wood and their properties. The kit also contains several other wood samples that are not from the lab. The kit is free for educators throughout Wisconsin to use and can be reserved (for up to 4 weeks) from the LEAF website: https://www.uwsp.edu/wcee/wcee/kits/wood-identification-blocks-kit/
- Have students complete the Reflection Writing Prompt for this activity independently. Select three different types of wood from the table above. Use information from the table and evidence from the text (Jigsaw Reading Activity) to explain why Wisconsin's First Nations and settlers arriving to Wisconsin in the 1800s-1900s used those specific woods for shelters or transportation. Require students to use and cite at least three pieces of evidence from the table or texts from Activity 1 in their answers. Review how to use and cite evidence with students if necessary.

Conclusion: Assessment

Have students complete the Reflection Writing Prompt for this activity independently. *Select three different types of wood from the table in Activity 2 – Properties of Wood Historically Used as Building Materials and explain why Wisconsin's First Nations and settlers arriving to Wisconsin in the 1800s-1900s used those specific types of wood to build shelters or canoes/boats for transportation.* Require students to use and cite at least three pieces of evidence from the table (Activity 2)or texts (Activity 1) in their answers. Review how to use and cite evidence with students if necessary.

Extending the Lesson (Optional)

Elementary School Recommendations

While this lesson can be completed by upper elementary students, with either support from educators or minor modifications regarding the reading texts, the following LEAF lessons may be more appropriate for lower-middle elementary students.

LEAF 4th Grade Forestry Lesson Guide, Lesson 1: American Indians and the Forests

- Students learn what Wisconsin's forests were like before European settlement and discover how American Indians living in what is now Wisconsin relied on forests and altered them to meet

their basic needs. To accomplish this, students read about an Indian Nation who was living in the forests of what is now Wisconsin before it became a state. Students will share what they learn with their peers and compare and contrast the history of Wisconsin's First Nations. https://www.uwsp.edu/wp-content/uploads/2024/03/leaf-4-lesson-1-american-indians-and-the-forest.pdf

LEAF 4th Grade Forestry Lesson Guide, Lesson 2: Forests Built Wisconsin

- Students explore the importance of forests to early settlers and the Indigenous people living in Wisconsin at the time of settlement. Students participate in a mapping exercise to discover the role forests played in the settling of Wisconsin and how it changed the lands of Wisconsin's First Nations. Students use evidence to write a paragraph about how settlement changed Wisconsin forests. https://www.uwsp.edu/wp-content/uploads/2023/11/leaf-4-lesson-2-forests-built-our-state.pdf

LEAF 2nd-3rd Grade Forestry Lesson Guide, Lesson 4: Forests Are Important to Me!

- Students explore and graph their personal forest values. Using a checklist, they discover how many of the forest products they use are made right her in Wisconsin and map them. As a conclusion, students create a collage and write about why they value forests. https://www.uwsp.edu/wp-content/uploads/2023/11/leaf-2-3-lesson-4-forests-are-important-to-me.pdf

LEAF K-1st Grade Forestry Lesson Guide, Lesson 4: Forest Products Time Machine

- Students learn about historical uses of forest resources. Students begin by sharing ways we use the forest while playing a game of Hot Pine Cone. Next, the class explores forest resources used to create products of the past, while relating them to present-day goods. To conclude, students examine forest products and draw a picture of one they use every day. https://www.uwsp.edu/wp-content/uploads/2023/11/leaf-k-1-lesson-4-forest-product-time-machine.pdf

Middle/High School Recommendations:

Wisconsin's Flying Trees: The Plywood Industry's Contributions to World War II

- Have students read and discuss the article from Wisconsin Magazine of History: Volume 92, number 3, spring 2009 https://content.wisconsinhistory.org/digital/collection/wmh/id/49881

Legacy Lumber from WWI Research Helps Repair the U.S. Capitol Building

- Have students read and discuss the article from the United States Forest Service website about how legacy wood stored at the USFS Forest Products Lab in Madison, WI, was used to repair wood items damaged in the January 6 attack on the U.S. Capitol. https://research.fs.usda.gov/fpl/news/featured/legacy-lumber-wwi-research-helps-repair-u.s.-capitol-building

Related Links

- DNR forestry home page: https://dnr.wisconsin.gov/topic/forestry
- USFS Wood Handbook: Wood as an Engineering Material https://research.fs.usda.gov/treesearch/62200

Student Pages

See additional documents that will need to be included:

- Activity 1_Jigsaw_Wood Products
- Activity 2_Properties of Wood Used as Building Materials
- Wood Products Assessment

Standards

WISCONSIN STANDARDS FOR SCIENCE (Middle School)

- SCI.CC6.m Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials and how materials can be shaped and used.
- SCI.PS1.A.m The fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter, phase changes, and conservation of matter.
- SCI.ETS2.B.m All human activity draws on natural resources and has both short- and long-term consequences, positive as well as negative, for the health of people and the natural environment.

WISCONSIN STANDARDS FOR SOCIAL STUDIES (Middle School)

- SS.Hist2.a.m Explain patterns of continuity over time in the community, the state, the United States, and the world.
- SS.Hist2.b.m Explain patterns of change over time in the community, the state, the United States, and the world.

WISCONSIN STANDARDS FOR ENVIRONMENTAL LITERACY AND SUSTAINABILITY

- ELS.EX3.B.m Examine the relationships among resource use, environmental quality, and human health and well-being.
- ELS.EX5.C.m Examine how historical and contemporary factors shape a sustainability issue.

WISCONSIN STANDARDS FOR ENGLISH LANGUAGE ARTS (Middle School 6-8)

- ELA.R.6-8.1 Cite textual evidence to support an analysis of what the text says explicitly/implicitly and make logical inferences.
- ELA.R.6-8.2 Summarize texts, from a variety of genres, to determine a theme or central idea and how it is developed by key supporting details over the course of a text.
- ELA.W.6-8.2 Write arguments to support claims with clear reasons, relevant evidence and literary theory.
- ELA.W.6-8.3 Create writing that utilizes organization: introduce a topic; organize ideas, concepts and information; provide a concluding statement appropriate to the mode of writing.
- ELA.W.6-8.4 Produce clear and coherent writing in which the development, organization

and style are culturally sustaining and rhetorically authentic to task, purpose and audience.
- ELA.SL.6-8.1a-d Engage effectively in a range of collaborative discussions with diverse partners on topics, texts, and issues, building on others' ideas and expressing one's thinking clearly.
- ELA.SL.6-8.2 Analyze the main ideas and supporting details presented in diverse media and formats and explains how it contributes to a topic, text, or issue under study.

Resources

- Bloedorn, Kerry. (Spring 2002) Rhinelander's Floating Trees: History of the Rhinelander Boat Company. The New North Complimentary Community Magazine. https://www.thenewnorthonline.com/forms/magazinepdf/newnorthmagazine2[6029].pdf
- Cosier, Susan. (2023, October 2). Searching for Wisconsin's Dugout Canoes. Undark. https://undark.org/2023/10/02/wisconsin-dugout-canoes/
- Kuse, Hildegard and Kuse, Loretta. Native American Uses of Basswood. People – Past and Present at Kuse Nature Preserve. Retrieved June 25, 2024, from https://www.kusemuseum-naturepreserve.org/Media/docs/Plants/TreesVinesShrubs/LindenFamily/NativeAmericanBasswood.pdf
- Loew, Patty. Native People of Wisconsin. Madison, WI: Wisconsin Historical Society Press, 2015.
- Lopez, Suzette and Tanzilo, Bobby. (2022, April 5). April 5, 1890, Fred Pabst, lake's largest wooden steamer, was launched. On Milwaukee, llc. https://onmilwaukee.com/articles/fred-pabst-launched
- Pauliot, Molli. (2022, October 26). Ciiporoke of Teejop. University of Wisconsin-Madison Our Shared Future. https://oursharedfuture.wisc.edu/2022/10/26/ciiporoke-of-teejop/.
- Thornton, Denise. (2022, December 21). Wisconsin Forestry Products. My Wisconsin Woods. Retrieved June 21, 2024, from https://mywisconsinwoods.org/2022/12/21/wisconsin-forestry-products/.
- Waaswaaganing Indian Bowl Living Arts and Culture Center (2024). Wigwam Our Ojibwe Home. https://www.indianbowlproject.org/ojibwe-culture/
- Wiemann, Michael. (2021). Characteristics and availability of commercially important woods. Forest Products Laboratory, chapter 2 in FBL-GTR-282. https://research.fs.usda.gov/treesearch/62246 .
- Wisconsin State Historical Society, n.d. Historic Building Materials and Methods. https://www.wisconsinhistory.org/Records/Article/CS4199#:~:text=Early%20Wisconsin%20pioneers%20built%20log,clay%20and%20straw%20called%20daubing.
- Wisconsin State Historical Society, n.d. Maintaining the Original Exterior Wood Features on Your Historic Building. https://www.wisconsinhistory.org/Records/Article/CS4285.
- Wisconsin State Historical Society, n.d. Shipbuilding in Wisconsin. https://www.wisconsinhistory.org/Records/Article/CS1822
- The Wooden Canoe Museum, n.d. Discovering the History of Wood Canoes. https://woodencanoemuseum.org/index.php/builders

Into the Outdoors

Educational Partners:

WOOD YOU BELIEVE? – FOREST PRODUCTS OUR DAILY LIVES

Activity 1 - People Need Wood Products - Jigsaw Reading

Read your assigned section of text. Take notes in the table below about the different types of wood that was used, how it was used and why it is was used.

Partner up with student/s who read a different text than you. Take turns sharing what each of you learned. Record information for each time period in the table below.

Time Period / People	Type of Wood, How it was Used, Why it was Used
Before 1800 **Wisconsin First Nations**	

1800 - 1940 **Settling and Growth of Wisconsin / Logging Era**	

REFLECTION WRITING PROMPT: Use and cite at least three pieces of evidence from the Jigsaw Readings to answer the prompt below:
Compare and contrast how the types of dwellings or boats made by members from Wisconsin's First Nations were similar to and different from those made by settlers arriving in Wisconsin in the 1800s-1900s.

People Need Wood Products

Gina Smith, LEAF- Wisconsin's K-12 Forestry Education Program - June 2024

Before 1800: Wisconsin's First Nations

Wood has been important to people who have made their homes in what is now Wisconsin for thousands of years. The Ho-Chunk, who have always lived here and whose story dates back to the last ice age, used wood from many different trees to build structures, canoes, tools, baskets and other items that were needed daily.

Ho-Chunk

For many generations, the Ho-Chunk used wood from the trees that surrounded them to build lodges that were covered with mats made from *birch* bark or reeds woven together. In the **Teejop** area, now more commonly known as Madison, Wisconsin, the Ho-Chunk built homes called **ciiporokes**. Frames for the ciiporokes were made from tree **saplings** (young trees that are flexible). *Tamarack* saplings were often used because they were easy to bend. Poles made from the saplings were stuck into the ground and tied together at the top by rope made from long fibers found in the inner bark of *basswood* trees. Ciiporokes were then covered with large sheets of *birch* bark or mats made from cattails. The Ho-Chunk still build ciiporokes today.

Like the Ho-Chunk, the Menominee are also from what is now Wisconsin and have a story that goes back thousands of years. The Menominee also relied on forest trees to build their shelters and meet their needs.

Menominee

The Menominee lived in different homes during the winter months than they did during the summer months. From late fall until spring, the Menominee lived in dome-shaped **wigwams**. The frames of the wigwams were often made from small *cedar* trees tied together with strips of *basswood* bark or grasses. The frames were covered with mats that were made by stitching together pieces of *birch* bark or weaving together grass and reeds. During the summer months, the Menominee lived in larger rectangular dwellings made from wood poles. The main poles for these dwelling were often made from *ironwood* or other sturdy trees. These rectangular structures had peaked roofs and were also covered in bark, usually from *elm* or *cedar* trees.

Ojibwe

Although the Ojibwe are not originally from what is now Wisconsin, they lived here for centuries before the arrival of European settlers. And, like the Ho-Chunk and the Menominee, the Ojibwe turned to the forests for what they needed to survive.

The Ojibwe used bark, saplings and tree limbs to make wigwams and winter lodges. They built both round and rectangular structures. Poles from saplings were stuck into the ground, bent, and tied together at the top. *Ironwood* saplings about 1 inch in diameter were often used for the main poles. Other saplings were placed around these (perpendicular) to make a frame. The frame was covered with mats woven from bulrush, which is like a long grass, and sheets of *birch* bark. Sheets of birch bark were sewn together by strips of green *basswood* bark or basswood twine.

Canoes

In addition to utilizing wood from the forests for shelter, the Ho-Chunk, Menominee and Ojibwe also relied on forest trees to help them travel the waters in and around what is now Wisconsin. All three tribes utilized both dugout and birchbark canoes.

The Ho-Chunk, Menominee and Ojibwe used stone and/or metal tools and small fires to carve an entire dugout canoe from a single tree. Dugout canoes were sturdy and heavy so were most often used for trips on large lakes or in areas where they did not need to carry the canoes. Dugouts were made from trees growing in the areas where the tribes lived. In Northern Wisconsin, the Menominee and Ojibwe often used *white pine* to make dugouts because it was abundant there and its wood was more buoyant than wood from other trees. Whereas hardwood trees, like *elm* and *oak,* were often used by the Ho-Chunk who lived further south in what is now Wisconsin. Elm was a good tree for dugouts because it grew straight and tall. Oaks that grew in a forest were also tall and worked well, but oaks that grew in savannahs (open areas) were usually shorter and had many low branches that made them

more difficult to use for canoes. If white pine, elm, and oak were not available, tribes used other trees like *hickory*, *hemlock* and *cottonwood* to build dugouts instead.

Birch bark canoes served a different purpose than dug-out canoes. Birch bark canoes were lighter and faster than dug-out canoes and could be used to travel long distances that portaging across land. Birch bark canoes were used to travel for trading and while harvesting wild rice. While the shell of the canoe was made from birch bark, the frame and ribs of birch bark canoes were most often made from *cedar*. Roots from *tamarack* trees or *spruce* were used to stitch the pieces of birch bark together and gum resin from evergreen trees, like *spruce*, was boiled to make pitch that was spread over the seems of the canoe to keep the water out. Birch bark canoes varied in length depending on what they were being used for. *White cedar* was used most often to make canoe paddles because cedar is lightweight and doesn't rot easily.

While the Ho-Chunk, Menominee and Ojibwe utilized materials from the forests to meet many needs, it is worth noting that they never depleted the forests of any wood resources. The Ho-Chunk, Menominee and Ojibwe did many things, like use fire, to help care for the forests and never took more from the forests than what they needed.

People Need Wood Products

Gina Smith, LEAF- Wisconsin's K-12 Forestry Education Program - June 2024

1800 – 1940: Settling and Growth of Wisconsin – Logging Era

Log Homes

Wood was important to the pioneers and settlers who came to what is now Wisconsin from Europe, New England, and other places on the east coast of the United States. Many of the first pioneers arriving in Wisconsin used trees and other resources found on the land surrounding them to build very simple **log homes**. *White pine* was preferred because it was tall and straight. Many pioneers were familiar with white pine before traveling to Wisconsin. This is because in addition to growing tall and straight, wood from white pine was light, soft and sturdy making it an ideal wood for building ship masts.

Pioneers used tools like axes, adzes and augers to cut, peel and notch logs from white pine to build their homes. An adz is like an axe, but it has an arched blade that is attached to the handle at a right angle. Adzes were used to cut and shape wood. An auger is a tool that is shaped like a drill bit. It was used to make holes in logs. Log homes were constructed by stacking logs on top of each other in a rectangular shape. The logs were notched in the corners to hold them together. Mud, clay and straw were used to fill the gaps between logs and keep out the wind and rain. Most log homes had a door that was attached using wood pegs. The roof of log homes was made from rows of short boards that overlapped with each other. Some pioneers eventually added wood siding (flat boards) on the outside of their homes to provide more protection and make the home look nicer.

Timber Framed Homes

Timber framed homes were also constructed by some of the first settlers in Wisconsin. Like log homes, timber framed homes were often made from *white pine* and other resources found on the land surrounding the home. Pioneers used heavy axes, adles, and chisels to cut and shape logs so they had flat edges. The flat-edged logs were used to make a frame for the home. The frame was held together by joints, wood pegs and notching. Most people did not have nails to use. Once the frame of the home was constructed, settlers covered it with wood siding (flat boards of wood).

Wood Framed Homes

As more people arrived in what is now Wisconsin, the demand for wood grew. During the mid-1800s lumber companies started to harvest *white pine* from the original, old-growth forests. Sawmills were built to cut timbers into standard sized pieces of lumber. Lumber from the old growth forests was sturdy and could be used for flooring, framing, siding, shingles, doors, trim, windows and cabinets.

By 1860, most homes in Wisconsin were built with standard sized *white pine* lumber from sawmills. Wisconsin pine lumber was also used to build cities, like Chicago, throughout the Midwest. White pine was used because, in addition to being tall, straight, light, and sturdy, it was also easily transported from the forest to the mill. Until railroads were built in Northern Wisconsin (early 1900s), the best way to transport logs was to float them down rivers. Because white pine is lightweight and buoyant (floats) it could easily make the trip downriver to the sawmill. Hardwood trees are less buoyant so were not harvested as often until railroads became more common in Northern Wisconsin.

The availability of standard-sized lumber made **wood framed homes** the most common to build from the mid-1800s until the 1920s. Wood framed homes were built on stone foundations using standard sized lumber from sawmills. Once the frame was built, wood siding was nailed to the frame with cut nails (wedge shaped nails with a blunt tip). Original wood framed homes had stud walls that went all the way from the stone foundation to the rafters of the roof (balloon framing). Wall studs for two-story homes built like this had to be 20-30 feet long to stretch from the foundation to the rafters. This made multiple story homes dangerous and expensive to build.

In the 1920s, many people started using a new method to construct wood framed homes where each story of the building had its own frame and stories were separated from each other by a horizontal wooden plate (western platform framing). This method was easier, quicker and less dangerous. It was also less expensive since the wall studs only needed to be 8-12 feet long (one story high). Builders still use western platform framing today.

While *white pine* was still used to construct most homes in Wisconsin during this time, by 1910-1920 some lumber had to be brought in from forests outside Wisconsin since nearly all of Wisconsin's white pine was logged by 1910-1920.

Boats

In addition to utilizing lumber from Wisconsin's forests to build homes, towns, and cities, settlers of Wisconsin also relied on the forests to provide them with the materials needed to build boats. From the mid-1800s to the 1940s boats of various types and sizes were made from Wisconsin wood to serve many different purposes.

In northern Wisconsin, where lumber was widely available, many settlers constructed their own boats to use for hunting and fishing. As the demand for boats grew, people started boat building companies. The most common boats built in northern Wisconsin were canoes, fishing boats, sail boats and row boats. Many of these boats were made by overlapping *white cedar* planking to create a waterproof hull (body). The Dunphy Boat Company was one of the first established boat companies (Eau Claire, 1854) but by the turn of the century there were several others including the Rhinelander Boat Company (Rhinelander,1903) and Thompson Boats (Peshtigo, 1904).

The Rhinelander Boat Company (RBC) built many of their boats for leisure activities like canoeing and fishing as people started to travel to Wisconsin's Northwoods for vacations. RBC boats were used by many resorts, fishing guides and by both President Coolidge and President Eisenhower when they visited Wisconsin. Builders at RBC often used *white oak* for boat frames and *cedar* strips for the hull. RBC built approximately 100 boats per year.

Thompson Boats was started in 1904 by two brothers who built their first *cedar* strip canoe in the hayloft of their barn. The next year they sold over 100 boats from their catalog. By 1912, six Thompson brothers were working at the company which moved into town. In the 1910s-1920s, Thompson Boats was the largest builder of outboard pleasure boats in the country. Like the Rhinelander Boat Company, Thompson Boats used *cedar* for the hull of most boats they built. Boat building was not limited to northern Wisconsin. As early as the late 1870s, a few different companies built boats in Racine. The Racine Hardware Manufacturing Company built canoes using veneer (layers of wood that were pressed thin and glued together) and the Racine Yacht and Boat Company used the same technique to create molded veneer rowboats. Both companies, and others in the area, also used planking from *white cedar* to make large sail boats, duck skiffs, and steam and gas-powered boats as well.

Large vessels, schooners, scows, and barges were also built in Wisconsin. Most were used to export lumber, grain and other resources from Wisconsin and bring people, goods, and coal to Wisconsin. Cities like Milwaukee, Manitowoc, and Sturgeon Bay were ideal locations for shipbuilding since they had lakefront harbors that were close to timber resources. The first large vessel built in Milwaukee was launched in 1837. From1847 to 1900, over 200 ships were built by hand in Manitowoc. Sturgeon Bay was a perfect place to build ships since there were few roadways or railways there and ships were needed.

The first large vessels built in Wisconsin were sailing ships, powered by wind. By the 1870s, steam powered ships became more common. Like the smaller boats built in Wisconsin, large vessels often had *oak* frames and *cedar* hulls. In 1890, the largest wooden steamer ever built on Lake Michigan (at that time) was launched at the Wolf and Davidson shipyard in Milwaukee. It was made of oak and iron and stretched 310 feet long. It could carry 3,000 tons of coal. The name of the boat was the Fred Pabst after a local captain and brewer. In 1891, Wolf and Davidson built an even larger wooden steamer, the Ferdinand Schlesinger which was 38 feet longer. By the early 1900s, large vessels were no longer being made from wood. Shipbuilders started to use iron and steel because those materials were stronger and could be used to make larger boats that could carry more goods.

WOOD YOU BELIEVE? – FOREST PRODUCTS OUR DAILY LIVES

People Need Wood Products – Properties of Wood Historically Used as Building Materials

Educational Partners:

Instructions:

Use the Forest Products Lab resource *Wood Handbook – Wood as an Engineering Material* to complete this activity.

- Open the pdf of Chapter 2: *Characteristics and Availability of Commercially Important Woods* https://www.fpl.fs.usda.gov/documnts/fplgtr/fplgtr282/chapter_02_fpl_gtr282.pdf
- Use pages 2-3 through 2-18 to fill in the chart for each of the woods used to build homes or boats by Wisconsin's First Nations and/or settlers. Basswood has been completed as an example.

Vocabulary:

- **Heartwood:** dense inner part of a tree trunk; hardest timber comes from heartwood
- **Sapwood:** soft, outer layers between the heartwood and the bark of the tree
- **Texture/Grain:** The arrangements of wood fibers
  - **Coarse grain**: wood with open growth rings with uneven texture – a more irregular look
  - **Fine grain**: wood with tighter growth rings with even texture – a more even look
- **Warping:** when wood is bent out of shape; usually due to wetness or heat

Tree / Wood	Latin Name	Heartwood	Sapwood	Weight / Hardness	Texture / Grain	Shrinkage / Warping	Woodworking Properties
Basswood (pg 2-4) American	*Tilia americana*	pale, yellowish brown with some darker streaks	Wide, creamy white or pale brown	Soft, light-weight	fine, even texture with straight grain	High shrinkage in width and thickness, seldom warps	Easy to work with tools
Paper birch (pg 2-4 & 2-5)							
Cottonwood (pg 2-6)							
American elm (pg 2-6)							

Into the Outdoors

Educational Partners:

Tree / Wood	Latin Name	Heartwood	Sapwood	Weight / Hardness	Texture / Grain	Shrinkage / Warping	Woodworking Properties
Eastern hemlock (pg 2-12)							
Hickory ***(True Group)*** (pg 2-7)							
Eastern spruce (pg 2-17)							
Tamarack (pg 2-18)							
Northern white cedar (pg 2-18)							
White oak (pg 2-8 & 2-9)							
Eastern white pine (pg 2-13)							

Into the Outdoors

Educational Partners:

WOOD YOU BELIEVE? – FOREST PRODUCTS OUR DAILY LIVES

People Need Wood Products – Written Assessment

Use and cite at least three pieces of evidence from *Activity 1: People Need Wood Products* and *Activity 2: Properties of Wood Historically Used as Building Materials* to answer the prompt below. Your answer should be written in complete sentences and include a minimum of three paragraphs, one paragraph for each piece of evidence.

WRITING PROMPT:

Select three different types of wood from the table in Activity 2 – Properties of Wood Historically Used as Building Materials and explain why Wisconsin's First Nations and settlers arriving to Wisconsin in the 1800s-1900s used those specific types of wood to build shelters or canoes/boats for transportation. Your response must:

- Include at least three pieces of evidence (cited correctly) from the table (Activity 2) and text (Activity 1) that help you answer the question
- Include an explanation of how each piece of evidence supports your answer
- Be at least three paragraphs long (one paragraph for each piece of evidence and explanation)
- Be written in complete sentences