



MATHEMATICS

Exploring Oregon Plankhouses

ESSENTIAL UNDERSTANDINGS

- **Identity**
- **Lifeways**

LEARNING OUTCOMES

Students will understand

- that plankhouses reflect the lifeways and identity of Native American Tribes in Oregon
- how to identify shapes in plankhouse structures, and
- how to measure and compare lengths of different parts of a plankhouse.

ESSENTIAL QUESTIONS

- Why are plankhouses important to the identity and lifeways of Native American Tribes in Oregon?
- What shapes can we find in plankhouse structures?

REQUIRED TIME

- 35 minutes

Overview

In this lesson, students will explore the traditional architectural structure of plankhouses used by several Native American Tribes in Oregon, such as the Chinook and Kalapuya. They will measure and compare lengths using informal and standard measurement tools and identify shapes used in traditional architecture. The lesson aims to foster appreciation for Native identity and traditions through the lens of mathematics

Background for Teachers

Plankhouses were the traditional homes used by several Native American Tribes of the Pacific Northwest, including Oregon Tribes such as the Chinook, Clatsop, Tillamook, and Kalapuya. These structures were made primarily from cedar planks, a resource that was abundant and deeply valued for its durability and cultural significance. Plankhouses were large, rectangular buildings designed to house extended families and even multiple



families, reflecting the communal values central to Native life in the region.

The architecture of plankhouses was highly developed and varied depending on the Tribe and the environment. For example, coastal Tribes built larger, more permanent structures suitable for wet climates, while inland Tribes adapted similar designs to suit different weather patterns. These homes often included elevated sleeping platforms, communal fire pits, and elaborately carved or painted house posts, all reflecting cultural identity, craftsmanship, and familial roles. One Coast Salish plankhouse was described as a "food-processing and storage plant, and it was a workshop, recreation center, temple, theater and fortress." ([The Oregon Encyclopedia](#))

The construction and use of plankhouses directly reflect the lifeways of Oregon Tribes. They represent more than shelter; they are expressions of how Native communities organized themselves socially, used their environments sustainably, and passed down knowledge through generations. The design and craftsmanship of these homes relied on skills in mathematics, geometry, and engineering—measuring, cutting, joining, and aligning materials precisely, often without metal tools.

Oregon Tribes' identity is also deeply reflected in these structures. Each Tribe's plankhouses had unique features that expressed their cultural heritage. The homes served as gathering spaces for storytelling, ceremonies, and daily life. The layout and

STANDARDS

Oregon Mathematics Standards

- **2.MD.1:** Measure the length of objects using standard units (inches, feet, centimeters, meters).
- **2.MD.4** - Compare lengths of two objects using subtraction.
- **2.G.1:** Recognize and draw shapes having specified attributes.

KEY WORDS and IDEAS

- **Lifeway:** How a group of people live, work and play together.
- **Plankhouse:** A big house made with wide wooden boards, where some Native American families lived together a long time ago, especially in Oregon.
- **Length:** How long something is from one end to the other.
- **Width:** How wide something is from one side to the other side.
- **Height:** How tall something is from the top to the bottom.

decoration of a plankhouse could reflect family lineage, spiritual beliefs, and tribal values. For Native children, these homes were the setting for the early formation of identity—rooted in community, tradition, and place.

Today, many Oregon Tribes are revitalizing cultural practices, rebuilding traditional homes, and teaching new generations about the importance of ancestral architecture. By learning about plankhouses through math and design, students not only develop important math skills but also gain a respectful and meaningful understanding of Native heritage and contemporary presence.

MATERIALS

What materials are needed for students to engage in this activity?

- Slide deck
- Worksheet with plankhouses to measure
- Rulers (one per student or pair)
- Student self-assessment

Considerations for Teachers

Practices

While teaching this lesson, the following principles can help guide your decision-making and engagement with students.

- Focus on teaching the Essential Understanding through an exploration of measurement of and the geometric shapes in plankhouses.
- When sharing content with students, address the “why” not just the “what”.
- Highlight the strengths /struggles of Oregon’s Indigenous peoples today while also acknowledging their history and tradition.
- Ensure your teaching practices are accessible and appropriate for Native and non-Native students.

Assessment

During this lesson, observe and listen to students during discussions and as they work independently and collaboratively to determine how their learning is progressing. Write down what you notice about what students say and do in relation to the success criteria. Use this formative information to provide feedback to students and plan next steps.



At the end of the lesson, provide students with an opportunity to reflect on their learning through a self-assessment. Students can indicate their level of learning in relation to specific success criteria. They can also write out an explanation of why they feel they are at that learning stage.

Success Criteria

- I can name shapes found in a plankhouse.
- I can measure lengths using a ruler.
- I can explain why plankhouses are important to Native American identity and culture.

For the following activities, use the slide deck to support your implementation.

Lesson Activity

Opening

Time: 5 minutes

Step 1:

Show students the map of Oregon with the nine federally recognized Tribes. Assist students to find the one closest to them. Let students know that they will be learning more about the traditional homes of these Tribes, looking at examples of houses from the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians (CTCLUSI). Show students where the CTCLUSI are on the map.

Explain to students that in the past many Oregon Tribes built homes called plankhouses.

Step 2:

From the slide deck, show the photos of plankhouses. The first is a photo of a current plankhouse from the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians and the second two photos are from the past.

Share with students that:

- Plankhouses are traditional, large, rectangular structures built by Native American Tribes in Oregon. Cedar was used to build plankhouses because it is naturally resistant to rot and insects.
- Plankhouses were designed to house many generations, with one or more extended families living in them in the past. Some plankhouses could house up to 100 people from several families!
- Plankhouses were anywhere from 30 to 400 feet long and commonly from 15 to 30 feet wide. Some were as wide as 55 feet (Explain this size relative to how many classrooms the house would be.). Plankhouses were built with removable roof planks that could be adjusted for smoke ventilation.
- Ceremonies and meetings were also held in plankhouses. They were important in supporting healthy communities, families, and cultures. Today, Tribes have rebuilt plankhouses. In fact, the Confederated Tribes of Grand Ronde have rebuilt plankhouses as cultural centers.

Step 3:

Share the learning outcomes, success criteria, key words and ideas and essential questions with students to support their understanding of the learning expectations.

Main Activity

Time: 15 minutes

Step 1:

Let students know that they will be doing an activity where they get to measure different plankhouses (pictures) and compare their sizes.

Give each student a ruler and the worksheet located at the end of this lesson plan. Ask students to measure the length, height, and width of each of the three plankhouses.

Have students compare the measurements each plankhouse and record their answer in the worksheet, then answer the questions based on the measurement comparisons.

[Pause here if completing the lesson over two days]

Step 2:

Ask students to look again at the plankhouse images and identify shapes: rectangles (walls), triangles (roofs), squares (doors) and circles (designs in artwork).

In the worksheet, have students draw a simple plankhouse using those geometric shapes. Have students use their rulers to measure and label the length, width, and height of the plankhouse they have drawn.

When students are done, have them explain their drawing to a peer.

Step 3:

Post all the drawings on the classroom wall and give students an opportunity to view them all together.

Closing

Time: 5 minutes

Step 1:

Facilitate a discussion focused student learning.

- Discuss how the Oregon Tribes' homes used math (shapes, measurements, patterns).
 - Ask students about the math they used to understand plankhouses.
- Reinforce that plankhouses are important homes that connect Native people to their traditions, land, and their identity as Native people. Tribes today work to preserve their culture and rebuild plankhouses as part of their identity.
 - Ask students if there are ways their own homes show something about what they like.
- Indicate that while people may not live in plankhouses today, they are still important structures and continue to build and use math and engineering.

Step 2:

Ask students to complete the self-assessment. Review the success criteria and scaffold the process as necessary.

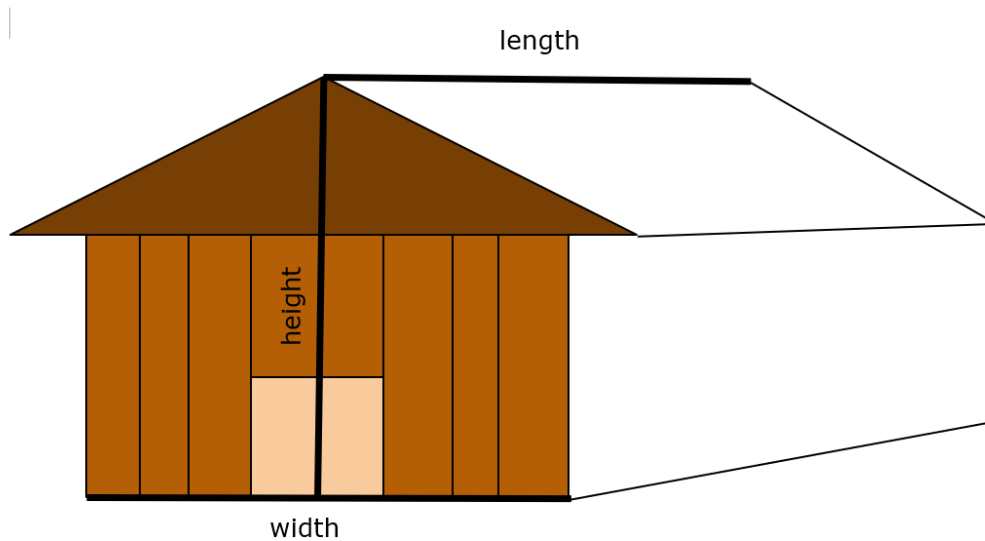
Additional Resources

- 2nd Grade Lesson by the [Confederated Tribes of the Siletz Indians, The Dance House](#)
- 6th grade mathematics lesson by [The Confederated Tribes of Grand Ronde, Plankhouse Building Capacity](#)
- 8th grade social sciences lesson by [The Confederated Tribes of Grand Ronde, Plankhouse Construction](#)
- [Native American plankhouses](#)
- [Chinookan plankhouses](#)

Plankhouse Measurement Worksheet (4 pages)

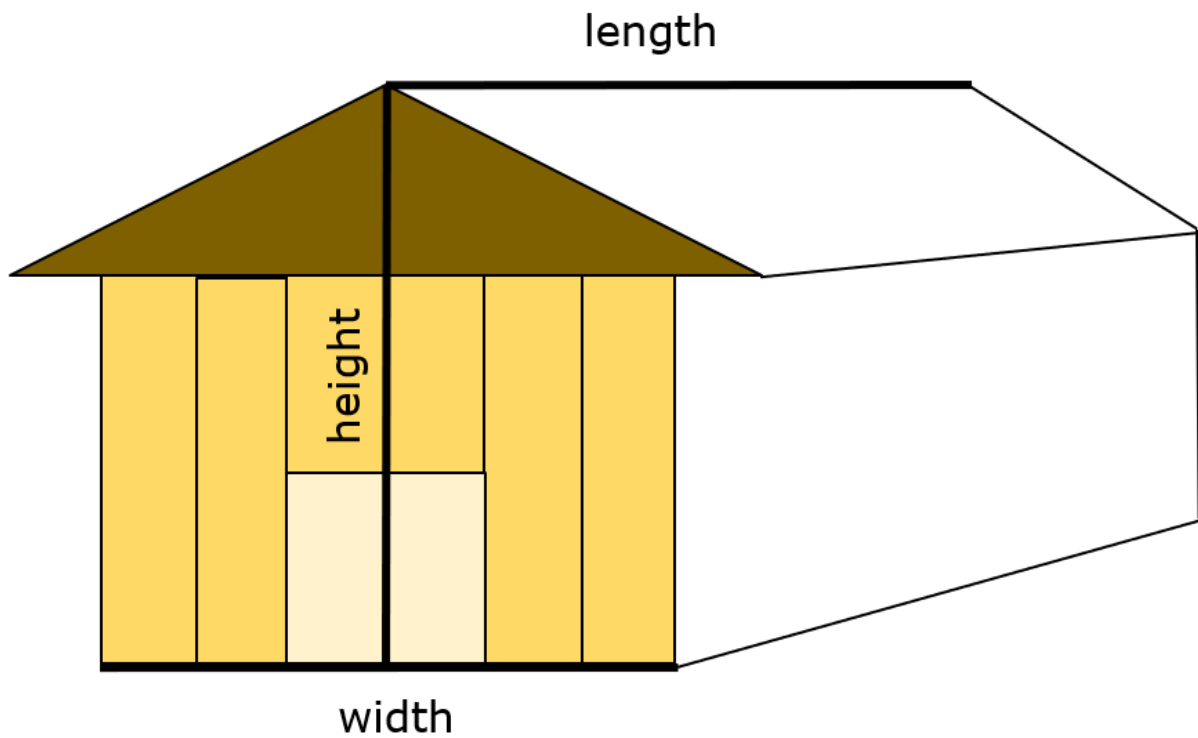
Name:

Directions: Use your ruler to measure the plankhouses. Write down the number of inches that are closest to the plankhouse height, length and width.



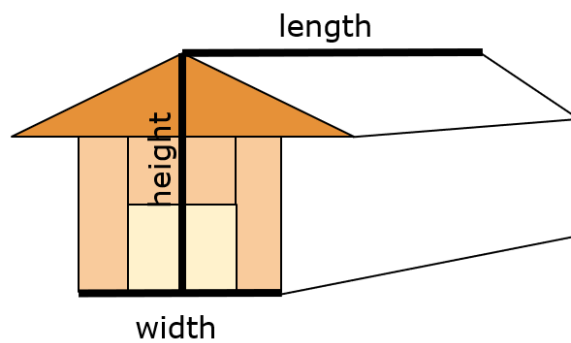
Large plankhouse measurements:

1. Length = _____ inches
2. Width = _____ inches
3. Height = _____ inches



Medium plankhouse measurements:

1. Length = _____ inches
2. Width = _____ inches
3. Height = _____ inches



Small plankhouse measurements:

1. Length = _____ inches
2. Width = _____ inches
3. Height = _____ inches

Plankhouse Comparison

Complete the table below.

Size	Length	Width	Height
Large			
Medium			
Small			

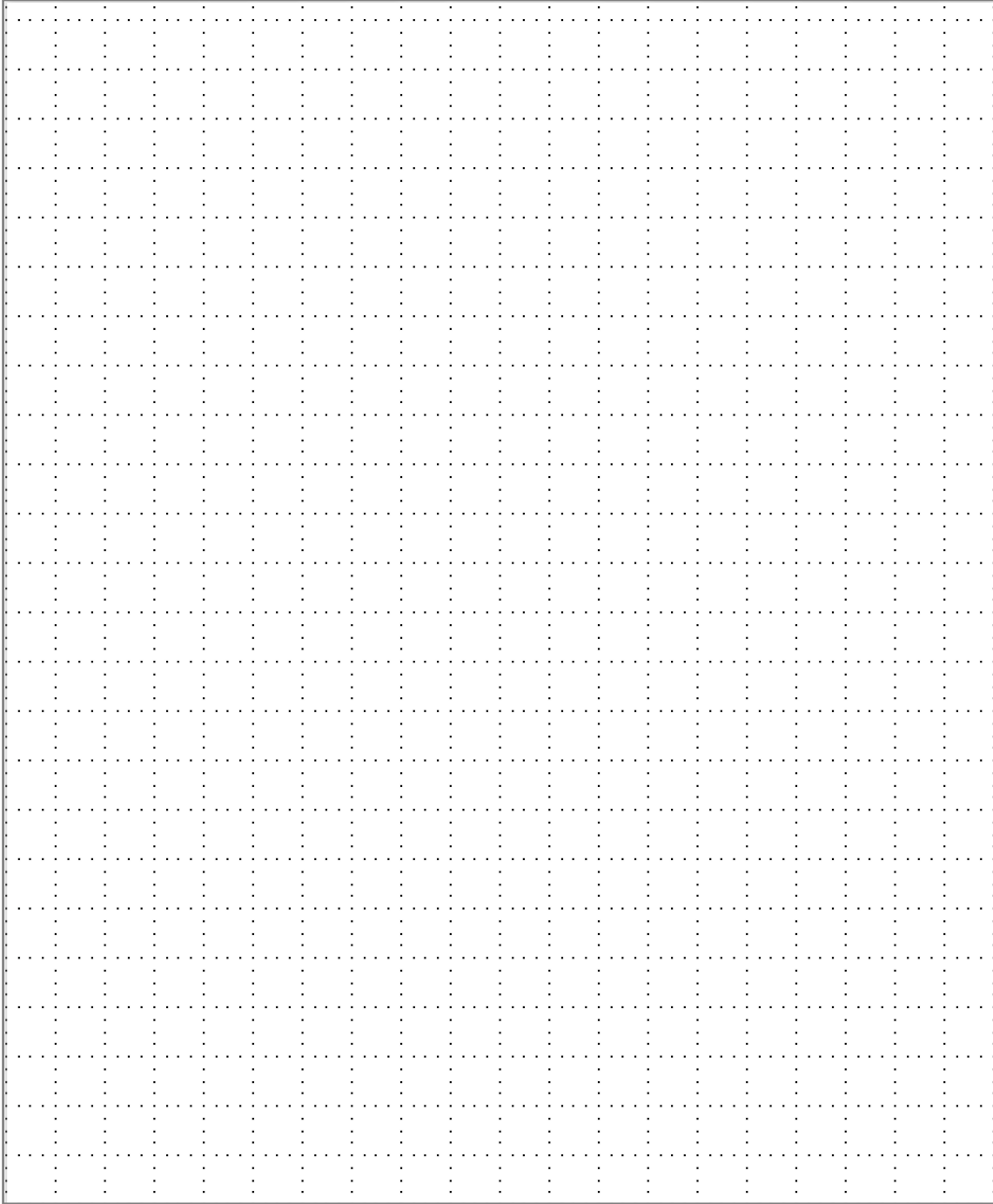
Answer the following questions.

1. What is the difference between the length of the large plankhouse and the small plankhouse?
2. Which plankhouse has the same measurements for its length, height, and width?



Drawing Activity

Draw your own plankhouse. Include shapes you noticed in the other plankhouses. Label and measure your plankhouse's length, width, and height.





Student Self-Assessment

Name:

Directions: Read the lesson success criteria in the first column. Then decide, did I meet these criteria? Choose Not Yet or Yes.

If you chose Not Yet, share one thing you can do to meet the criteria. If you chose Yes, share what you did well to meet that criterion.

Success Criteria	Not Yet 	Yes 
I can name shapes found in a plankhouse.		
I can measure lengths using a ruler.		
I can explain why plankhouses are important to Native Americans in Oregon.		