

# Changing Perspectives Teachers Guide

## THEME FOUR; NAVIGATION LEARNING ACTIVITY

**Grade Level:** Grade 6/7 (can be modified for Primary and Intermediate)

**Activity:** Students will learn about the development of the ability to calculate latitude and longitude, map making techniques, and European shipbuilding technology, and how these concepts tie to early European exploration of the Pacific Northwest coastline.

**Estimated Time:** 2–3 periods

**Prescribed Learning Outcomes:**

- Construct and use a variety of methods, including tables, graphs, and digital technologies, as appropriate, to represent patterns or relationships in data
- Apply multiple strategies to solve problems in both abstract and contextualized situations
- Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving
- Visualize to explore mathematical concepts
- Identify and apply the concepts and equations required to calculate latitude and longitude in the context of early PNW exploration and make connections as to how these concepts are used today

## RESOURCES REQUIRED

Section of Website containing relevant information, photographs and film clips:

- Video: Navigation
- Navigation Learning Activity; including Longitude and Latitude Equations and image of map with Longitudinal and Latitudinal Markings

## PERIOD 1 – HOW DID VANCOUVER NAVIGATE THE OCEANS?

Prior to lesson discuss with class that we will be learning more about the scientific elements of Captain George Vancouver's voyage along the Pacific Northwest coastline. This lesson builds on previous lessons about Vancouver's

journey, but can also stand alone to introduce students to the concepts of longitude and latitude and how sailors plot a course. Remind students of some of the key motivations for European exploration at the time of Vancouver's voyage, and how navigation was at a very different place than it is now. Challenge them to identify early navigation techniques that are still in use today.

Start lesson by showing students the video titled "Navigation".

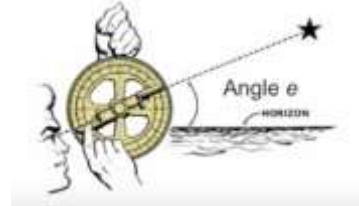
Before handing out the *Navigation Learning Activity*, review the key concepts of longitude and latitude. Provide equations for students. Give students some time working alone or in partners to complete the calculations and plot Vancouver's points on the map and then share out their findings.

To complete the lesson have students brainstorm as teacher records what they now know about longitude and latitude (keep this recording of what they now know for use at the end of the Unit to compare what they knew in the beginning with what they learned during the unit.)

## LEARNING ACTIVITY ANSWERS

### 1) Latitude

Can you calculate how many degrees of latitude the ship is north of the equator? The following sextant measurements show the angle of the North Star relative to the horizon. Remember, the North Star is at 90 degrees to the North Pole and the equator is at 0 degrees.



Day	North Star Reading degrees south of the North Star	Latitude
One	46 degrees	46
Two	47 degrees	47
Three	49 degrees	49
Four	50 degrees	50

### 2) Longitude:

Knowing that one hour is equal to 15 degrees and 4 minute is equal to 1 degree calculate the ships position for the following GMT readings.

Day	Greenwich Time at 12 noon local time	Longitude
One	8:00 PM	$8 \times 15 = 120$
Two	8:32 PM	$8 \times 15 + 32/4 = 128$
Three	8:32 PM	$8 \times 15 + 32/4 = 128$
Four	8:16 PM	$8 \times 15 + 16/4 = 124$

- 3) Using the longitude and latitude figures you have calculated plot the ship's location for each of the four days

### Pacific North West Coast

LATITUDE

