

# LEWIS & CLARK IN COLUMBIA RIVER COUNTRY



## LESSON PLANS / MIDDLE SCHOOL

### Math of the Path: Students Calculate Data from the Lewis & Clark Journey

by [Darin Detwiler](#)

#### Summary:

We cannot possibly take a class of students to walk the entire length of the Lewis and Clark trail just for a math lesson. The paperwork alone would prove more challenging than the journey.

In this lesson, students will embark on a journey of the mind as they use measurements and calculations from a path at their school to compare with data from the path of Lewis and Clark's Corps of Discovery.

#### Essential Questions for Students:

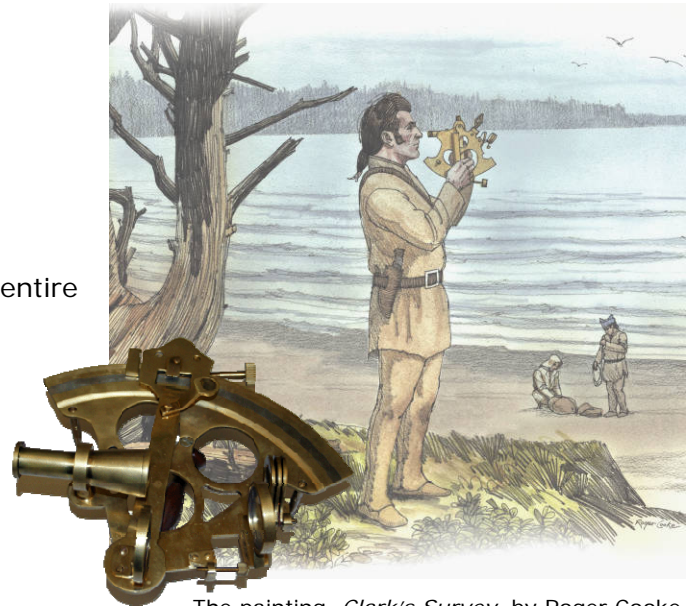
- How did Lewis and Clark and the CORPS OF DISCOVERY travel on their journey?
- What route did they take?
- How long was the distance they covered?
- How much distance did the group travel in a day?
- What geographical features or forces impacted the group's speed?
- What was the average speed of the group?
- What is the average speed of students walking the distance of a school hallway?
- How does the travel speed of the Lewis and Clark expedition compare to that of students?

#### Essential Understandings:

- Students will predict and measure distances of different areas in their environment.
- Students will identify and/or calculate the minimum and maximum values, mean, median, and mode for a set of values.
- Students will collect data to make calculations and critical comparisons between their environment and that of the Corps of Discovery.

#### Essential Academic Learning Requirements (EALRs)

This lesson plan satisfies the following EALRs: History 2.2.2, and US 1.2.2, Geography 1.2.2a, Mathematics 3.1.1, 3.2.1, 3.3.1 and Reading 3.1.1 as well as Science 2.1.3 and 2.1.5. [Click here](#) to print out the material for your reference.



The painting, *Clark's Survey*, by Roger Cooke shows William Clark looking at the ocean by using a sextant (device pictured left). Washington State Historical Society Collection.

#### DOWNLOAD AREA

Download the PDFs required for this lesson plan

- [The Lesson Plan](#)
- [Primary Source Documents](#)
- [Secondary Source Documents](#)
- [Student Worksheets](#)
- [Other Teacher Materials](#)

### Method:

Students will work with predictions, data collection from a known path, data from the journey of Lewis and Clark, and geographical information. They will apply this data to complete a worksheet and a map of the journey.

### Primary Sources for Student Examination (provided):

1. [1806 Lewis and Clark map detail](#)
2. [1803 map of Northwestern territories](#)
3. [Lewis and Clark journal excerpts](#)

### Secondary Sources for Student Examination (provided):

1. [The Vote: Station Camp, Washington](#) reading excerpt

### Teacher Reading (provided):

1. [Sold our Canoes for a Few Strands of Beads](#) reading

### Materials Needed:

1. Tape Measurers, calculators, stopwatches, pens, colored pencils, map of North America, black-line master outline of North America for every student, copies of [worksheet](#) for each student.
2. (Optional) trundle wheels, clipboards, globes, various maps of North America.
3. (Optional) Instructional Technology: Digital Camera, Computer, LCD projector, ActivBoard (or Smart Board,) TI Emulator, internet access, video(s) on the Lewis and Clark journey.

**Primary Sources:** A piece of evidence created during the time period under investigation by someone who participated in, witnessed, or commented upon the events that you are studying. It is the surviving record of past events such as photographs, diaries, or artifacts.

**Secondary Sources:** Books, articles, essays, and lectures created, often using primary sources that describe and interpret a time period after events

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### Instructions for Teachers:

#### PREPARATION

Schools typically have a main hall or corridor. Maybe yours begins at the school's main entrance or passes along the main office. Any significant or symbolic distance will work for this activity: the perimeter of the gym or field, or the distance between the classroom and the library or lunchroom. Whatever you as the teacher choose to use for the class, the choice to use a defined and very public distance will allow for students to better identify and communicate the distance traveled by the Corps of Discovery during their journey.

Note: Students should have been introduced to the history of Lewis and Clark prior to this lesson plan.

One idea is to use this activity in a math class in conjunction with a history class unit on Lewis and Clark.

Prepare yourself for the discussion of the journey by reading about Lewis and Clark's journey on the Columbia River. The website, <http://WashingtonHistoryOnline.org/L&C-columbia/index.html>, offers various lesson plans and readings if you wish to provide them for your students. You will be discussing not only the distance traveled by the explorers on their journey but also the methods by which they traveled. As you read, consider the various means of travel that the Corps of Discovery utilized on this expedition and be prepared to communicate that variation to your students.

### THE JOURNEY OF LEWIS AND CLARK by the numbers

1. The journey westward and back took place May 14, 1804 – Sept. 23, 1806.
2. The journey took two years, four months (28 months) to complete.
3. The length of the journey was approximately 7500 miles (12,075 Kilometers.)
4. They crossed through 11 of today's states.
5.  $7500/28 = 268$  miles per month = 67 miles per week = about 10 miles per day! (However, they did not travel every day, nor did they travel 10 miles every day.)

Sold Our Canoes for a Few Strands of Beads

The Vote: Station Camp, Washington

The following terms should be understood and/or defined by students either early in this activity or before this activity:

TERM / CONVERSION	DEFINITION
Speed	The amount of time required to travel a distance
Average speed	Total distance traveled divided by the total time required to travel that distance
Inches to feet conversion	12 inches = 1 foot
Feet to miles conversion	5280 feet = 1 mile
Seconds to hours conversion	3600 seconds in 1 hour

## SESSION ONE

### Part I.

Explain to students that during this lesson plan they will be examining the distances traveled by the Corps of Discovery and their methods of transportation. Project the maps provided to remind them of the route of the Corps of Discovery and of their contribution to charting a relatively unmapped area.

1804 map of Northwest territories by Nicholas King

1806 map (detail) by Meriwether Lewis and William Clark

Tell them that they will be undertaking their own expedition by walking across an area in their school and using those measurements to record distances and walking speed. They will then take their classroom journey and compare it with the one made by Lewis and Clark.

### Part II.

Ask students to brainstorm a list of items (natural or man-made) that are not easily measured due to extreme lengths. Some possible suggestions could be the Columbia River, the Great Wall of China, the Mississippi River, the distance between Seattle and Hollywood, etc. This collection could be done on a chalkboard or white board or by using a computer/LCD projector/ACTIVboard (or Smart Board).

Pick one distance (or add one) for which you have the actual length and have students guess the length. Record the guesses and identify the minimum and the maximum values, then work with students to identify/calculate the mean, median, and mode. Then reveal the true length (or use the internet as a class to find the length.)

#### Sample Distances

The distance from Seattle to Hollywood: 1137 mi.

The length of the Columbia River: 1240 mi.

The length of the Mississippi River: 2340 mi.

The length of the Great Wall of China: 4161 mi.

The length of the Pacific Ocean (from north to south): 9630 mi.

### Part III.

Have the students predict the length of the hallway you have chosen to measure. This can be done in any units, most likely feet and inches. You may wish to record the predictions on a graph or number line. This graph or number line can be projected on a screen or written on a chalkboard or whiteboard.

Identify the minimum and the maximum values, then work with students to identify/calculate the mean, median, and mode. Ask students to record this information to use below as part of the homework assigned.

#### Part IV. (Homework)

Have students take their recorded values home and create either a **box and whisker plot** or a **stem and leaf chart** with the predictions. Instructions can be printed from the links below.

Box and whisker  
plot worksheet

Stem and leaf chart  
worksheet

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### SESSION TWO

#### Part I.

Refer back to the predictions and calculations from day one. Ask students if anyone went to the hallway and looked at it to confirm the estimated lengths.

Collect the tools your students will need to complete the data collection: something to write with and on, measuring tapes, and stopwatches. Assign the roles of measurers, timers, recorders, and walkers.

#### Part II.

Proceed with students to the hallway. Instruct students to measure the length of the hallway. Use the same units that you had students use to predict the measurement. You will want to have five or six trials for accuracy.

Have walkers and timers position themselves on opposite lengths of the hallway. With a wave of the hand, readied timers will signal the start of the clock for walkers to begin a normal-walking speed pace along the measured distance. In order to prevent speeding or racing, have walkers complete their lap one at a time.

Collect distances and times, all the tools, and your students and head back into the classroom.

#### Part III. (Optional)

Use this opportunity to take pictures of students at work.

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### SESSION THREE

#### Part I.

Revisit the data that was collected. The data can be shared with all students by one of these various means:

- Collect all data after day two and record onto one sheet by hand or by using a spreadsheet. Copy enough data sets for students to have an individual or a small group handout.
- Collect all data after day two and record onto one large poster or piece of butcher paper. Make sure to use large letters and numbers. Attach to the wall. Students can gain the needed data from the poster.
- Collect all data after day two and record onto one sheet by using word processing program or a spreadsheet program. Project onto a screen using an overhead projector.
- Collect all data after day two and record onto one sheet by using word processing program or a spreadsheet program, then project using CPU/LCD projector/ ACTIVboard (or Smart Board).

#### Part II.

Work with students to complete the worksheet provided. Computer/LCD projector/TI Emulator could be used to demonstrate calculator use while class is completing the worksheet.

Near the end of class, regroup and spot check student performance. Collect and grade papers for students to use on day four.

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### SESSION FOUR

#### Part I.

Pass back graded worksheets from day three (or pass back and have students peer grade.)

Engage students in a discussion to evaluate the meaning of average daily speed. Remember to focus on the length of time involved and how the average daily speed was not maintained every day (they did not travel on some days.) Thus if we decrease speed or distance on some days, what is the resulting effect on overall average speed?

## Part II.

Hand out colored pencils and a black-line master outline of North America for every student.

Use a projected or wall-mounted map of North America to look at the path of the Corps of Discovery. Revisit the [1803 map of the Northwest Territories](#) and the [1806 Lewis & Clark Map](#) and note the differences between those maps and a more modern map of the United States.

Have students mark the westward and eastward journeys using arrows and different colors.

Guide students to give the map a title, label basic map elements (Pacific Ocean, Washington, D.C., Columbia River, Rocky Mountains, Mississippi River, etc.)

Guide students to accurately show **all three** of the **three** elements listed below:

- Starting location
- Destination
- Route

Provide students with examples of journal excerpts to explore the challenge of physical obstacles that the expedition faced, such as those of rivers or mountains. Split the class into four or five different groups. Give each group a different excerpt from the Corps of Discovery expedition and ask students to read it, paying particular attention to the geographic challenges involved in the journey.

The Corps of Discovery  
Journal Excerpts

The Vote: Station Camp,  
Washington excerpt

Reconvene as a class and discuss these challenges. Rivers, mountains, snow, and unfamiliar land conditions are appropriate responses as are other obstacles mentioned in the journal excerpts.

Near the end of class, regroup and spot check student performance. Have students staple worksheet and map together. Collect and assess using rubrics provided.

Technology notes: Computer/LCD projector/Activeboard (Smart Board) could be used for students to trace over map of North America. Pre-installed maps could be used, as well as images from the internet.

## OPTIONAL EXTENDED ACTIVITY

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Ask students to compare their walking speed and the travel speed of Lewis and Clark with the travel speed of a commercial jet. Have them use a flight planner online (such as Travelocity or that of a specific airline) to calculate the speed of a transcontinental flight that changes in St. Louis and ends in Portland, Oregon. This can serve as a platform for discussing technological change and the impact on our perception of geographic scale.