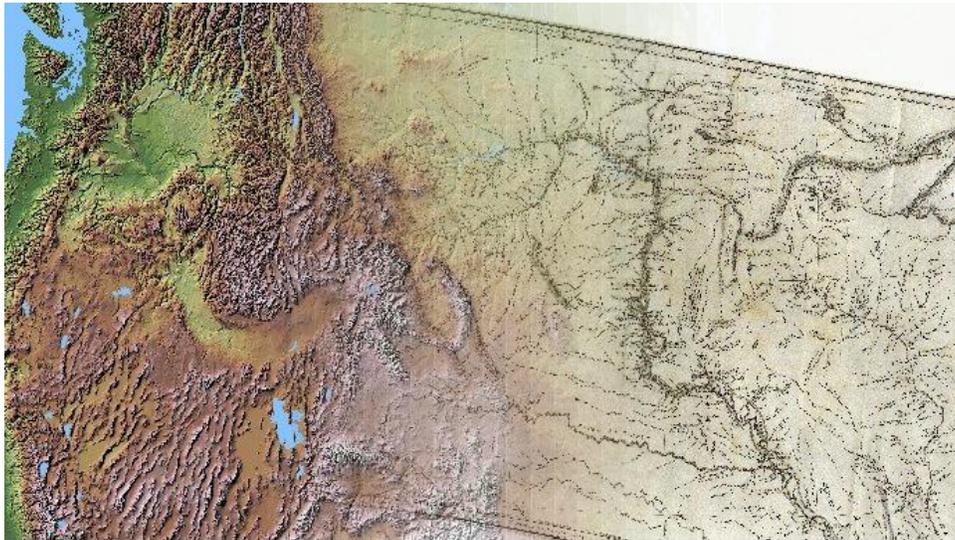


The Historian in Cyberspace: Using Online Maps to Explore America's Past

A New Look at Lewis & Clark
with Online GIS



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Using the David Rumsey Historical Map Collection to Investigate The Lewis and Clark Expedition

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Lesson Overview:

This lesson will introduce students to the tools and functions of the professional GIS browser (Maplicity) on the David Rumsey Historical Map Collection site. Students will use georeferenced maps from the Rumsey collection to examine the route of the 1803–1806 Lewis and Clark Expedition and evaluate its success or failure in achieving President Thomas Jefferson’s goals for that expedition.

Estimated Time:

Two 45-minute class periods

Materials:

Student handouts from this lesson to be copied:

- Introduction: The David Rumsey Historical Map Collection
- Goals: The Lewis and Clark Expedition, 1803 - 1806
- Timeline of the Lewis and Clark Expedition: Key Benchmarks
- GIS Activity: The Lewis and Clark Expedition

National Geography Standards:

- 1: How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective
- 4: The physical and human characteristics of places.
- 13: How the forces of cooperation and conflict among people influence the division and control of earth’s surface
- 17: How to apply geography to interpret the past

Objectives:

The student is able to:

- Describe and explain the diverse routes taken by Lewis and Clark’s expedition between 1803 and 1806.
- Describe the physical and human landscapes traversed by the expedition.
- Identify changes in knowledge and perception of the North American continent that resulted from the Lewis and Clark expedition.
- Evaluate the expedition’s success in terms of its given goals and objectives.

Lesson Introduction:

Introduce the lesson with an exploration of what students already know about the Lewis and Clark Expedition. One way to do that is to give students a short time (2 minutes) to write down as many words or phrases that come to mind when they think of the Lewis and Clark Expedition. Tell them there are no “right” or “wrong” answers – the purpose of the activity is just to explore their “associations” with the expedition. At this point, students should work individually - without any discussion.

When the time is up, go around the room and ask students to share one of the things they wrote down. Continue until all the student associations have been listed. As students share words/phrases write them on an overhead so that all can see. Ask students to hold their comments or questions about listed items until all these “associations” have been recorded. When the list is complete, ask students to look it over and allow them to question items that they don’t understand or that they believe are incorrect in some way. The student who originally suggested the word or phrase should explain it. This is an excellent way to find out what students already know about a topic, to correct misunderstandings, and to stimulate further interest in a topic.

After this introductory activity, use the student handout called Goals: The Lewis and Clark Expedition, 1803 – 1806 to develop a context and background for the exercise. Depending on the grade level of your students, your classroom goals, and time, you may want to use additional readings or resources to supplement the materials provided in this lesson.

NOTE:

The first time a user goes to the David Rumsey Historical Map Collection site, it is necessary to download a Java applet that is required to run the GIS browser. Depending on the configuration of your computers and your students’ computer skills, you may want to do this step on your own ahead of time. The very simple procedure is explained on the sheet called Introduction: The David Rumsey Historical Map Collection. You may want to use this sheet as an additional student handout

Student Activity:

Distribute Timeline of the Lewis and Clark Expedition: Key Benchmarks and GIS Activity: The Lewis and Clark Expedition handouts to the students. Explain that in this activity, they will be using a web site that allows them to explore historic maps with a geographic information system. (NOTE: The students do not need to have prior GIS experience to do the lesson.) The first part of the activity will introduce them to the basic GIS tools and functions of the web site. The second part of the activity will employ those tools and functions to explore the path of the Lewis and Clark expedition and the

characteristics of the landscape it traversed. They will also use the web site's tools to evaluate the relative success or failure of the expedition in meeting its established goals.

In addition to detailed instructions, the GIS Activity handout includes questions to help students focus on key issues. Some questions will have specific answers, while others call for speculation and will have a range of possible responses. In addition, answers to many questions will vary with student knowledge of American history. An answer key to questions in the GIS activity is located at the end of this lesson.

Conclusion:

If possible, use one computer and a projection device to process the GIS Activity as a group. As students compare answers and observations, it gives you an opportunity to elaborate on key points and to demonstrate GIS procedures.

As a final component to the lesson, go around the room as you did in the introductory activity and ask students to share their answers to the final question on the activity sheet: *Describe something that you have learned about the Lewis and Clark Expedition from this activity that you did not know before you began.*

Introduction: The David Rumsey Historical Map Collection, Cartography Associates www.davidrumsey.com

The David Rumsey Historical Map Collection contains over 8,000 maps online. The collection focuses on North and South America, but also includes maps of the world, Europe, Asia, and Africa. Selected content from the collection is available using a special GIS browser that allows detailed overlays of historical maps and current geospatial data. Maps that can be viewed with the GIS browser include maps of Boston, San Francisco, Washington DC, the area of North America covered by the Lewis and Clark Expedition, and Tokyo, Japan.

How to engage the GIS browser:

- On the David Rumsey Historical Map Collection home page (www.davidrumsey.com), select **GIS Browser**
- On the GIS and historical maps page, select **an area to view** (Boston, Lewis and Clark, San Francisco, or Washington).
- On the Lewis and Clark expedition GIS page select **View GIS Professional Browser**

(NOTE: the first time you do this, you will be asked if you want to download the Java applet required to run the GIS browser. Say *yes* to download the Java applet. After the script is downloaded, the GIS browser opens. Thereafter, the GIS browser will open when you click *View GIS Professional Browser*.)

User tip: Consult the site's excellent *Help* feature



- Select **Show Help** from the Help menu

- The first section briefly explains Maplicity (the GIS browser).
- The next two sections describe each Tool and Menu option on the browser interface.
- The fourth section answers “*How to...*” questions about the browser’s display and analysis operations.
 - How to print a map.
 - How to download vector data.
 - How to zoom to a location.
 - How to locate an address.
 - How to run a stored query.
 - How to toggle layer visibility.
 - How to set a layer as active.
 - How to re-arrange the layer order.
 - How to change layer symbology.
 - What are the popup menu options associated with layers?
 - How to set the label properties on a layer.
 - How to select layer features based on their attributes.
 - How to sort selection results.
 - How to zoom to a selected feature.
 - How to delete a graphic shape.
 - How to edit a graphic shape symbology.
 - How to use a graphic shape in a spatial selection.
 - How to zoom to a graphic shape.

Goals: The Lewis and Clark Expedition, 1803 - 1806

Thomas Jefferson had a number of goals in mind when he commissioned Meriwether Lewis to organize an expedition to explore the far west in 1803. In this activity you will use online maps from the David Rumsey Historical Map Collection to examine the Lewis and Clark Expedition's success or failure in satisfying some of those goals. Below is a partial list of tasks that Jefferson hoped the expedition would accomplish.

- Expand geographic knowledge by exploring, surveying, and mapping the path of the Missouri River to its source and from there down the Columbia River to the Pacific Ocean
- Find the most direct and practical water route across North America
- Establish good relations with Native Americans, impress them with the power and superiority of the United States, and foster intertribal peace
- Buttress American claims to Oregon by traversing it before the British could do so
- Collect information about and specimens of plant and animal species along the expedition route
- Determine the suitability of the western landscape for agriculture
- Determine the supply of fur and other commercially valuable resources in the region

Source:

DeVoto, Bernard, ed. 1953. *The Journals of Lewis and Clark*. Boston: The Houghton Mifflin Company.

Time Line of the Lewis and Clark Expedition: Key Benchmarks

1803

*

*

*

June 1803, Jefferson commissions Lewis to organize an expedition

*

*

*

1804 Winter 1803/04, CAMP DUBOIS, Illinois across the Mississippi from St. Louis (in preparation)

*

*

*

May 1804, leave ST. LOUIS

*

*

September 25-28 1804, stand firm in showdown with Teton Sioux

*

November 1804, build a fort near the Mandan villages

1805 Winter 1804-1805, FORT MANDAN on the Missouri River

*

*

April 1805, send specimens and artifacts to Jefferson, resume journey

*

June 21 – July 15, 1805 portage around the Great Falls of the Missouri

*

Midsummer 1805, cross Continental Divide at Lemhi Pass

*

September 1805, survive Lolo Pass blizzard

*

October 1805, navigate the rapids of the Snake and Columbia Rivers

1806 Winter at FORT CLATSOP at the mouth of the Columbia River

*

*

March 1806, begin return trip

*

July 1806, Lewis and Clark take separate routes to the Missouri

*

*

September 1806, return to St. Louis

GIS Activity: The Lewis and Clark Expedition

Before you begin: Follow the directions on the handout called Introduction: The David Rumsey Historical Map Collection to navigate to the David Rumsey web page, select the Lewis and Clark Expedition map collection, and engage the GIS browser.

Introduction: Using the Browser Tools

1. Enable Auto Refresh

- From the File menu, select **Auto Refresh**
- Scroll to the bottom of the Table of Contents (TOC) and uncheck 200 Anniversary Mosaic
- Scroll back up the TOC list and check 1814 NW America by Lewis and Clark

2. You can change the appearance of the map by using tools on the zoom toolbar. These tools allow you to control the map image that you see. Take a few minutes to practice using them.



Zoom In

Zoom Out

Pan

Full Extent

Zoom to Extent of Active Layer

Zoom to Selected Features

Zoom to Location

Return to Previous Extent

3. You can use the Identify tool  to identify attributes of a feature on the map.
- Turn on the Lewis and Clark Campsites layer. If this layer is grayed out, you must zoom further into the image until the layer can be checked.
 - Make Lewis and Clark Campsites the active layer (click on the layer name and it looks raised) Select the Identify tool and click on one of the campsite symbols.
- ? What is the year, month, and day that that campsite was occupied by members of the expedition? Yr _____ Mo _____ Day _____

(Hint: You may need to “stretch” the Identify Results window by dragging its right edge farther to the right.)

? What is the latitude and longitude of that campsite?

Lat _____ Long _____

Note: In a GIS, west longitude and south latitude are expressed as negative numbers. Also, minutes and seconds are shown here as the decimal portion of one degree.

- Make Lewis and Clark Trail the active theme (see above). Click on the identify tool and then click on any part of the yellow line indicating the trail.

? What segment of the expedition did you click on?

? Was this segment part of the Eastbound journey, the Westbound journey or both? _____

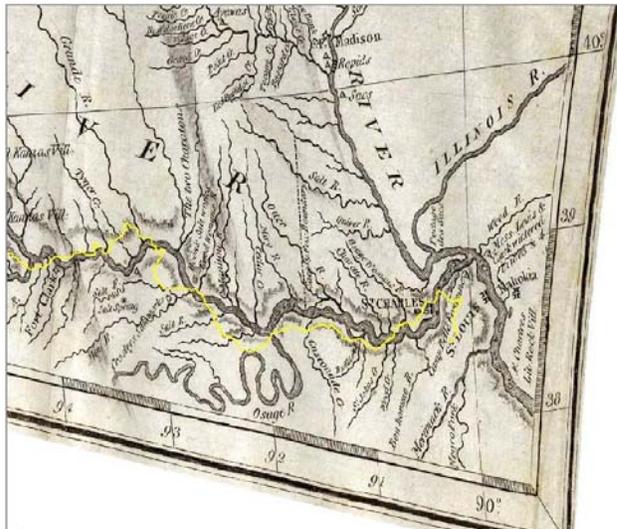
- With Lewis and Clark Campsites still the active layer; click the Zoom to Extent of Active Layer tool. Notice that the campsites do not display at this scale even though the layer is turned on.

Activity 1: Where are the key benchmarks along the Lewis and Clark Trail?

1. Make Lewis and Clark Trail the active layer. Click Zoom to Extent of Active Layer.
2. Use the Pan tool to locate St. Louis at the eastern end of the Lewis and Clark Trail and use the Zoom tool to drag a rectangle around this area.



Your map should now look approximately like the graphic below. The key is that you are zoomed in enough to be able to read map text.



3. From the Graphics menu, select Text Symbol. In the dialogue box that opens, change the font size to 24 and the color to red. Click OK and OK.

4. From the Graphics Toolbar select the Text tool.



Click on the eastern bank of the Mississippi where it says *Mess. Lewis and Clark wintered in 1803 & 4* and enter an upper case **A** in the Enter Text box. Click OK. This is the location of Camp Dubois. A red A now appears at that location on the map.

5. You will use the same procedure to label the locations where the expedition spent the winters of 1804-05 and 1805-06, and St. Louis, where the expedition terminated. The key for the locations is given below. Use the pan tool to follow the trail to each of these locations.

- B** Fort Mandan
- C** Fort Clatsop
- D** St. Louis

? In which segment of the expedition did Lewis and Clark travel the greatest distance? Circle one.

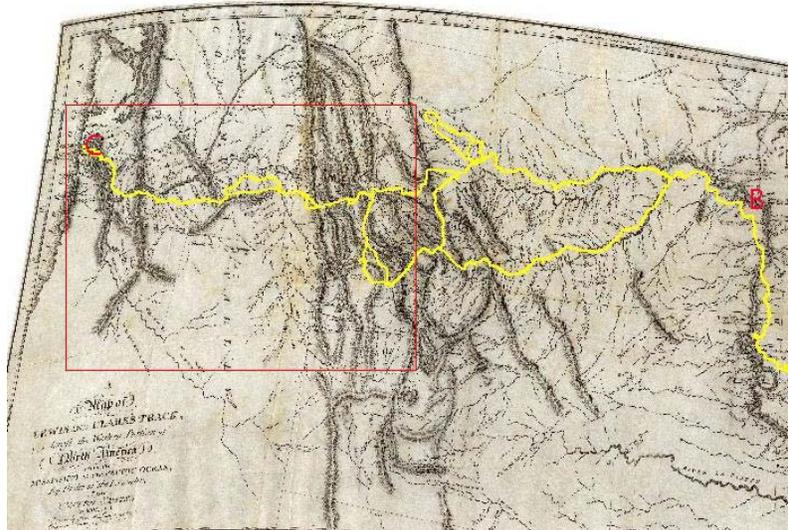
A – B B – C C - D

? List some possible reasons why this segment of the expedition might have gone so much faster?

- _____
- _____
- _____

Activity 2: How much did the Lewis and Clark Expedition contribute to geographic knowledge of the far west?

1. Use your Zoom tools to zoom your map to the part of the Lewis and Clark Trail that extends from Fort Clatsop (C) to a point in the mountains about midway between points B and C. (See below).



2. From the Image Viewer menu select **Swipe**. Leave the Top Image set to *1814 NW America by Lewis and Clark*. Change the Bottom Image to *1802/1811 N America by Arrowsmith*. Click OK.

3. Use the slider bars on the left and bottom of the image to cover the bottom image (what was known about this region prior to the expedition) with the maps produced by Lewis and Clark after their return. You can use the Zoom and Pan tools in this window as well.

? Do you think the Lewis and Clark Expedition accomplished its goal of expanding geographic knowledge by exploring, surveying, and mapping the path of the Missouri River to its source and from there down the Columbia River to the Pacific Ocean? Explain your answer briefly.

? List three examples of changes in geographic knowledge about Northwest North America that resulted from the Lewis and Clark Expedition.

- _____
- _____
- _____

Close the MapImager window when you have finished your analysis.

Activity 3: Did Lewis and Clark find a direct and practical water route across North America?

1. Use the Zoom tools to create a map view that extends from point B (Fort Mandan) to point C (Fort Clatsop). This span represents the area that was totally unknown to white America when Lewis and Clark began their expedition. The only information about this area came from Indian accounts.

2. From the Image Viewer menu select **Blend**. Set the Top Image set to *1802/1811 N America by Arrowsmith*. Change the Bottom Image to *USGS Color Shaded Relief*. Click OK.

3. Use the slider bar on the bottom of the view to change the opacity of the top image.

? Refer to the Arrowsmith map to describe misconceptions about the North American landscape that led Jefferson and others of his era to believe that there was a good possibility of a water route linking the Missouri River and the Columbia Rivers. (Remember, you can use the Zoom and Pan tools in the MapImage view.)

- _____
- _____
- _____

? Refer to the USGS Color shaded relief image in answering the following question. Why isn't it possible for such a water route to exist in North America?

Close the MapImager window when you have finished your analysis.

Activity 4: What Native American tribes did Lewis and Clark encounter on their expedition?

1. Another objective of the Lewis and Clark Expedition was to meet and establish good relations with Native American tribes along the expedition route. In the Table of Contents turn off the 1814 Lewis and Clark map and turn on the National Atlas Native American populations map.

2. Make National Atlas Native American populations the active layer and Zoom to the extent of the active layer. In the lower right corner of the map you will see a legend. Use the Zoom in tool to enlarge the legend so you can read it.

? Note the difference between the way Minor tribes and Major Tribes are indicated. Explain that difference in the space below.

3. Zoom to the expedition segment between points A (Camp Dubois) and B (Fort Mandan).

? Identify three major tribes that Lewis and Clark encountered in this segment.

- _____
- _____
- _____

4. One of the most difficult parts of the expedition was crossing the Rocky Mountains. Lewis and Clark needed the help and advice of local Indians to get through the mountains and to find the Columbia River. Turn on the 1814 Lewis and Clark map again and zoom to that part of the expedition route.

? Toggle between the 1814 map and the Native American map (by turning the 1814 layer on and off) to identify the Native American tribes from whom the explorers sought assistance in finding their way out of the mountains.

- _____
- _____
- _____

Conclusion: Observations and reflections

? List three more questions about the Lewis and Clark expedition that you could explore using the maps in the David Rumsey Historical Map Collection. Which maps would help you explore the questions?

| Question | Maps to Use |
|----------|-------------|
| | |
| | |
| | |

? Describe something that you have learned about the Lewis and Clark Expedition from this activity that you did not know before you began.

Answer Key: GIS Activity: The Lewis and Clark Expedition

Introduction: Using the Browser Tools

3. What is the year, month, and day that that campsite was occupied by members of the expedition?

Yr _____ Mo _____ Day _____

Answers will vary

What is the latitude and longitude of that campsite?

Lat _____ Long _____

Answers will vary

What segment of the expedition did you click on?

Answers will vary

Was this segment part of the Eastbound journey, the Westbound journey or both?

Answers will vary

Activity 1: Where are the key benchmarks along the Lewis and Clark Trail?

In which segment of the expedition did Lewis and Clark travel the greatest distance? Circle one.

A – B

B – C

C – D

List some possible reasons why this segment of the expedition might have gone so much faster?

Answers will vary, but possible answers include the following:

- The explorers knew where they were going – no need to take time looking for the best route
- Familiarity with the route enabled them to be prepared for difficulties and avoid costly delays
- The explorers were less focused on data and specimen collection than they had been on the outbound route
- The explorers were anxious to get home and report what they had learned.

Activity 2: How much did the Lewis and Clark Expedition contribute to geographic knowledge of the far west?

Do you think the Lewis and Clark Expedition accomplished its goal of expanding geographic knowledge by exploring, surveying, and mapping the path of the Missouri River to its source and from there down the Columbia River to the Pacific Ocean? Explain your answer briefly.

Answers will vary, but possible answers include the following:

- Yes, they did reach the Pacific via the Missouri and Columbia Rivers
- Yes, their maps of the route they traveled provided far more detail about the area than had been previously known
- Yes, they recorded detailed observations about the land, climate, and population they encountered along their route

List three examples of changes in geographic knowledge about Northwest America that resulted from the Lewis and Clark Expedition.

Answers will vary, but possible answers include the following:

- Yes, they discovered that the Rocky Mountains were much larger than previously believed
- Yes, they discovered that there were coastal mountains between the Rockies and the Pacific
- Yes, they realized that the Oregon and Columbia Rivers were one and the same

Activity 3: Did Lewis and Clark find a direct and practical water route across North America?

Refer to the Arrowsmith map to describe misconceptions about the North American landscape that led Jefferson and others of his era to believe that there was a good possibility of a water route linking the Missouri River and the Columbia Rivers.

Answers will vary, but possible answers include the following:

- They believed that the Rocky Mountains were a single ridge and (based on Indian reports) that the source of the Columbia River was only a short distance from the source of the Missouri
- They believed the continent was relatively flat between the Rockies and the Pacific coast

Refer to the USGS Color shaded relief image in answering the following question.

Why isn't it possible for such a water route to exist in North America?

Answers will vary, but possible answers include the following:

- Ruggedness and extent of the Rocky Mountains
- Coastal mountains (Cascade Range)
- Significant drop in elevation from the Rockies to the coast means the rivers have many rapids and falls

Activity 4: What Native American tribes did Lewis and Clark encounter on their expedition?

Note the difference between the way Minor tribes and Major Tribes are indicated. Explain that difference in the space below.

Minor tribes are labeled with Title Case and Major tribes are labeled with UPPER CASE

Identify three major tribes that Lewis and Clark encountered in this segment.

Answers will vary, but possible answers include the following:

- Missouri
- Omaha
- Yankton
- Arikara

Toggle between the 1814 map and the Native American map (by turning the 1814 layer on and off) to identify the Native American from whom the explorers sought assistance in finding their way out of the mountains.

Answers will vary, but possible answers include the following:

- Nez Perce
- Flathead
- Lemhi (Shoshone)

Conclusion: Observations and Reflections

List three more questions about the Lewis and Clark expedition that you could explore using the maps in the David Rumsey Historical Map Collection. Which maps would help you explore the questions?

Answers will vary

Describe something that you have learned about the Lewis and Clark Expedition from this activity that you did not know before you began.

Answers will vary