

Science Extensions

- Through an internship program, Eastern High School students created new maps for the Kentucky State Fair including, “Ecoregions Encountered by Lewis & Clark,” the only known map of this kind. Contact Scott Horan at Eastern High School to requests a copy of this map: shoran1@jefferson.k12.ky.us. Use it as a reference tool when studying the regional descriptions, plants, animals, and native peoples discovered by the explorers. The listing of the ecoregions along the Trail is attached. (E/M/H)
- Use maps of the Expedition Trail, including the Ecoregions map, and journals or logs of the Expedition (such as the one on the National Geographic Web site: http://www.nationalgeographic.com/lewisandclark/journey_intro.html), to “Name That Ecosystem!,” identifying the environments the Corps of Discovery was exploring when they wrote each of the descriptions provided as excerpts on the attached worksheet. Read the journals for more descriptions of plants, animals, and their environments, as encountered by the explorers and described for science for the first time. (M/H)
- Do the “Food Web Facts of the West Worksheet,” attached. (E)
- Log on and play the computer game created for the Kentucky State Fair Educational Exhibit, **Lewis & Clark +200**, “Animals of the Country.” www.lewisandclark1803.com (E/M/H)
- Create a Herbarium of Flora discovered by Lewis & Clark. Students may grow plants in a school garden and preserve plant specimens using a plant press as Lewis did. Students may also research plants discovered along the Trail and create botanical drawings labeled with the date and site of collection. Learn about the Lewis & Clark Herbarium at the Academy of Natural Sciences: http://www.acnatsci.org/museum/lewisclark/l&c_herbarium.html and the University of Maryland: http://www.inform.umd.edu/EdRes/Colleges/LFSC/life_sciences/.plant_biology/L&C/L&Cp_public.html
Laminate and punch holes in the botanical sheets and organize them in a binder or attach the pages together to form a paper quilt. (E/M)
- Create an “Animals of Lewis & Clark” database, with each student researching a different animal. Culminating products could be paper quilts, bulletin board exhibits, illustrated maps, picture books, or bound journal pages. Using descriptions from the journals and places observed, create a “Mystery Animals of Lewis & Clark” card game. (E/M)
- Make a box filled with specimens from your visit to a forest, park, vacation spot, etc. Include notes about the natural environment where you found each object and what you observed about it. The contents should help describe that place and its plant and animal life to someone who has never been there before. (E)
- Investigate how Meriwether Lewis, William Clark, and Thomas Jefferson contributed to the new science of paleontology through their studies of fossils from Big Bone Lick in northern Kentucky. (M/H)

- Research the scientific instruments that Lewis & Clark used along the Trail. How did the sextant, octant, surveyor's compass, and chronometer function? What role did magnets play in calculating location and mapping? Why did Lewis study astronomy to prepare for the Expedition? Why did the captains record data for analysis once they were back in the East, rather than doing all of their calculations on site?

Check out these Web sites:

Smithsonian Institution's EdGate:

http://www.edgate.com/lewisandclark/mapping_on_trail.html

Discovering Lewis & Clark:

http://www.lewis-clark.org/mapterrincog/nav_mti4.htm

National Geographic's Xpeditions:

<http://www.nationalgeographic.com/xpeditions/activities/01/lewis.html>

NebraskaStudies.org:

http://www.nebraskastudies.org/0400/frameset_reset.html?http://www.nebraskastudies.org/0400/stories/0401_0104.html

- Explore these resources to learn more about plants and animals discovered by Lewis & Clark:

National Geographic Lewis & Clark Journey Log:

http://www.nationalgeographic.com/lewisandclark/journey_intro.html

Sierra Club's In the Footsteps of Lewis & Clark:

<http://www.sierraclub.org/lewisandclark/>

And the report, "What's Lost, What's Left: A Status Report on the Plants & Animals of the Lewis & Clark Expedition:

<http://www.sierra-club.org/lewisandclark/species/species.pdf>

USGS Northern Prairie Wildlife Research Center, "Birds & Mammals Observed by Lewis & Clark in North Dakota:"

<http://www.npwrc.usgs.gov/resource/2000/bmam/bmam.htm>

Charles Willson Peale's sketches of L&C specimens at the American Philosophical Society:

www.amphilsoc.org

These books provide information and journal citations for quotes about specific plants and animals:

The Natural History of the Lewis & Clark Expedition, Raymond Darwin Burroughs, Ed., Michigan State University Press, 1961.

Lewis and Clark: Pioneering Naturalists, Paul Russell Cutright, University of Nebraska Press, 1969.

Animals on the Trail with Lewis and Clark, Dorothy Hinshaw Patent, Clarion Books, 2002.

Ecoregions Encountered by Lewis & Clark

Ecoregions Explored, East to West

Mapped for the 2003 Kentucky State Fair, based on the Level III Ecoregions as defined by the United States EPA: http://www.epa.gov/wed/pages/ecoregions/level_iii.htm
<ftp://ftp.epa.gov/wed/ecoregions/na/naeco3.pdf>

Ohio, Mississippi & Lower Missouri River Basins

(Eastern Temperate Forests & Southeastern Plains—The Middle West Region)

- Western Allegheny Plateau
- Interior Plateau
- Interior River Lowland

Upper Missouri River Basin

(Temperate Prairie, Semi-Arid Prairie & Great Plains—The Middle West Region)

- Central Irregular Plains
- Western Corn Belt Plains
- Northern Glaciated Plains
- Northwestern Great Plains
- Northwestern Glaciated Plains
- Northern Montana Glaciated Plains

Rocky Mountain Range

(Northwestern Forested Mountains—The West/Mountain Region)

- Middle Rockies
- Northern Rockies

North American Deserts

(Western Interior Basins & Ranges—The West/Pacific Region)

- Snake River Basin/High Desert
- Columbia Plateau

Pacific Northwest

(Northwestern Forested Mountains—The West/Pacific Region)

- Eastern Cascades Slopes & Foothills
- Cascades

Pacific Coast

(Marine West Coast Forest—The West/Pacific Region)

- Willamette Valley
- Coast Range

Name That Ecosystem!

Read the following excerpts from the Lewis & Clark Expedition journals, and see if you can identify the ecosystem or region where the passage was written. The dates provide clues, and so do the descriptions of the plants, animals, features, and climate. We've kept the misspelled words, to give you the true flavor of these primary sources! Can you name *that* ecosystem?!

Mystery Ecosystem 1.

Clue # 1: To go around the waterfalls, wagons had to be made, but there weren't many trees in the area.

...across the portage with one canoe on truck wheels...which was of cottonwood and willow, the only wood except Boxelder & ??? that grow in this quarter...

--William Clark, June 22, 1805

Clue #2: Some of the most terrible storms the men had ever seen pelted them, causing bruises and bleeding to the Corps of Discovery.

...hail which was so large and driven with such force by the wind that it knocked many of them down...

--Meriwether Lewis, June 29, 1805

Clue #3: Other hazards injured the explorers—cactus plants with sharp spines and soil made rough by the trampling of buffalo herds.

This evening the men repaired their mockersons, and put double souls to protect their feet from the prickly pears. During the late rains the buffaloe have trodden up the praire very much which having now become dry the sharp points of earth as hard as frozen ground stand up in such abundance that there is no avoiding them.

--Meriwether Lewis July 1, 1805

Study these three clues, then write the name of this mystery ecosystem here:

Mystery Ecosystem 2.

Clue #1: The character of the river was different in this new region—the water tasted different, and the waves had increased.

*... we are all wet and disagreeable, as we have been for Several days past, and our present Situation a verry disagreeable one in as much, as we have not leavel land Sufficent for an encampment and for our baggage to lie cleare of the tide, the High hills jutting in so close and steep that we cannot retreat back, and the water of the river too Salt to be used, added to this the waves are increasing to Such a hight that we cannot move from this place...
--William Clark, November 8, 1805*

Clue #2: A new food was experienced, shared by the native peoples. It's a good thing they were willing to share, for Captain Clark and the others arrived at the beach too late. Only a skeleton of the huge animal was left.

*...found only the Skelleton of this Monster on the Sand ... this Skeleton measured 105 feet... (The natives) possessed large quantities of this blubber and oil were ... [I was] not able to precure more blubber than about 300 lb. and a fiew gallons of oil; Small as this stock is I prise it highly; and thank providence for directing the whale to us; and think him much more kind to us than he was to jonah, having Sent this Monster to be Swallowed by us in Sted of Swallowing of us as jonah's did.
--William Clark, January 8, 1806*

Clue #3: Captain Lewis was right about seeing the largest bird in North America here: the California condor.

*Shannon and Labuishe brought me one of the large carrion Crow or Buzza[r]ds of the Columbia which they had wounded and taken alive. I b[e]lieve this to be the largest bird in North America...between the extremities of the wings it measured 9 feet 2 Inches...
--Meriwether Lewis, February 17, 1806*

Consider these three clues, and write the name of this mystery ecosystem here:

Food Web Facts of the West Worksheet

Lewis & Clark discovered 122 new animals and wrote descriptions of these animals for President Jefferson and for the scientists back in the East. The explorers noted each of the animals listed below in their reports for the President, and they told him about the animals or plants in the animals' diet.

Draw lines to match the animals in the left column with the foods that Lewis & Clark observed them eating (or guessed that they ate) in the right column.

Gray wolf

Salmon

Beaver

Bison or buffalo

Black-footed ferret

Black-tailed prairie dog

Black-tailed prairie dog

Seeds of pine trees & insects

Clark's nutcracker

Prairie grasses & weeds

Grizzly bear

Cottonwood & willow trees

Based on the explorers' notes about foods eaten, which animals were carnivores? herbivores? omnivores? Beside each animal name in the left column, write a letter to classify them as "C" for carnivore, "H" for herbivore, or "O" for omnivore.

On a separate piece of paper, draw a food web for the Great Plains, featuring prairie grasses, bison, gray wolves, prairie dogs, black-footed ferrets, coyotes, white-tailed jack rabbits, and bacteria & fungi (decomposers).