

Mapping the Colorado River through the Grand Canyon

DURATION	1 class period
LOCATION	Classroom
KEY VOCABULARY	Cartography Topographical Map
TRUNK MATERIALS	26 Laminated topographical Colorado River map cards (8 ½ x 11) Laminated cards of artwork of the Grand Canyon Map of the Grand Canyon Map of Arizona
ADDITIONAL MATERIALS (NOT SUPPLIED)	Tape or tacks to hang maps and art
ENDURING UNDERSTANDING (BIG IDEA)	Maps provide a sense of scale and perspective; and topographical maps, in particular, help one understand the natural and cultural contours of a place. Artistic landscapes reflect a particular vantage point, mood, and perspective.
ESSENTIAL QUESTION/S	How big is the Grand Canyon, in terms of its actual size? How does a topographical map differ from other maps? What does a topographical map seek to reveal? How do humans interpret the natural environment? How has the Grand Canyon been reflected in art? Does the art of the canyon reveal anything about visitation patterns (most frequently visited and least)?
LEARNING OBJECTIVES	This opening exercise has been designed to give students a sense of the scale of the Grand Canyon. It should increase spatial understanding and build map reading skills. It has also been created to introduce students to artistic and cultural representations of the Canyon. Students will be able to <ul style="list-style-type: none">• Understand the purpose of topographical maps• Read a topographical map for direction and contours• Gain a sense of the vast scale of the Colorado River and Canyon• Analyze relationships (similarities and differences) between a map of an area and an artistic rendering of the same area
BACKGROUND	Topographical maps chart the contours of the earth's surface. This includes natural features, such as deserts, mountains, ravines, vegetation, and bodies of water, as well as cultural features such as roads, fences, buildings, and other structures. Cartographers create "topo" maps today from traditional geological surveys and aerial photography. These maps represent scientific measurements of elevation, slope, altitude, and other features. Topographical maps are used for a number of purposes, including orienting hikers and river navigators. The first scientists who explored the Grand Canyon,

including especially John Wesley Powell, surveyed the area and brought their scientific readings back to Washington, D.C. Their foundational scientific work helped Americans understand the West and it was essential for future travelers, settlers, miners, railroads, tourists, and others.

Artists also studied the geographical and cultural wonders of the Grand Canyon and created their interpretations of what they saw through their drawings, photography, and paintings.

For this lesson, the laminated topographic map cards are taken from a river runner's guide to the Grand Canyon portion of the Colorado River. It marks certain land and water features especially relevant to river runners who transport groups of people down the river: the river, rapids, distinct land features, names of canyons and washes, creeks, reservations, and other points.

This lesson introduces students to the geography of the Grand Canyon. It also serves as a preview for the later lesson in the trunk, entitled, "Art at the Grand Canyon." As such, this lesson is intended to build student curiosity in the ways that the Canyon has been used and represented through cultural artifacts from maps to art.

SUGGESTED PROCEDURE

- Begin class with an aerial viewing of the Grand Canyon through:
 - Google Earth
 - on the Arizona State University Grand Canyon website:
<http://www.asu.edu/clas/grandcanyonhistory/>
- Warm up brainstorming activity to help give students an understanding of the size of the Canyon: Give the class two puzzles and have them postulate answers either as a group or in pairs and then as a group (write the following puzzles on the blackboard or distribute them to each student on paper):
 1. If there was an imaginary highway that followed the Colorado River completely through Grand Canyon, and you drove on it at the eye-blurring speed of 70 mph, how long would it take you?
Answer: 4 hours to go through the canyon. It's that big.
 2. If you stood at the El Tovar Hotel on the South Rim of the Canyon, how much of the Grand Canyon can you see?
Answer: From the area around the El Tovar Hotel you can only see about 1/12th of the entire length of the Grand Canyon.
- Pass out the 26 river maps to individual students or groups of students.
- Have students figure out how the maps go together and map them out on the wall or a floor, creating a scaled map of the entire Colorado River corridor.
- Once assembled, stop and study the assembled map, asking students in groups of three or as a class what is labeled and why? What is the purpose of the map?
- Give students the historical photographs and artists' renditions of the canyon. Have students locate the places in the photographs/paintings on the river maps and post them accordingly.

Discuss the relationship between an artistic rendering of a particular location and

a cartographic rendering. How are they similar? How are they different? What tone or emotion do these artistic representations evoke? Can you tell what the goal of each artist is? Why would they paint or draw the Canyon? Looking at the maps and art/photos, are there any clues into which parts of the canyon receive great attention and visitor traffic?

**EVALUATIONS
(ASSESSMENT)**

Grand Canyon Map has been correctly assembled.
Grand Canyon art has been correctly correlated with the geographic spot on the map. (Rubric: Maps and artwork has been numbered on the back of each card as a guide)

EXTENSIONS

- Compare and contrast a topographical map of the Canyon and the Grand Canyon National Park map.
- Read John Wesley Powell's journal where he discusses his survey methods.
- Find other maps of the region on the internet.
- Find other artistic works of the Grand Canyon and analyze the tone and message. Can you detect some of the most popular sites to visit or paint?
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RESOURCES

Kim Crumbo, *A River Runner's Guide to the History of the Grand Canyon*. Boulder, CO: Johnson Books, 1981.

Google Earth View of the Grand Canyon

Grand Canyon Association, "Maps,"
http://www.grandcanyon.org/fieldinstitute/planning_maps.asp.
Accessed May 24, 2008.

Grand Canyon Field Institute Virtual Tour, Grand Canyon Association website.
<http://www.grandcanyon.org/fieldinstitute/virtualtour.asp>. Accessed May 27, 2008.

"Nature, Culture, and History at the Grand Canyon," Arizona State University.
Online <http://www.asu.edu/clas/grandcanyonhistory/>. Accessed May 24, 2008.

Puzzles provided courtesy of Flagstaff, Arizona geologist Wayne Ranney.

For the Art and photos, see the resource section in the "Art at the Grand Canyon" Lesson Plan in the Travelin' Trunk.

**STANDARDS
(NATIONAL AND AZ,
CORRELATIONS
SOCIAL STUDIES,
LANGUAGE,
READING, WRITING,
ARTS, AND TECH**