

**WATERS -
SHAPING A NATION**

**NEH JULY 2010 WORKSHOP
THE MOST SOUTHERN PLACE ON EARTH
LESSON PLAN
BY
BRIDGET KRACIK**

SUBJECT: Earth Science - (History, English, Music, Religion)

UNIT: The Flow of Freshwater

LESSON: Waters-Shaping a Nation

AUTHOR: Bridget Kracik

Grade Level: 7th Grade (Middle School)

OVERVIEW: This Unit/Lesson will be made up of different phases to help students identify the basic characteristics that allow water to be a powerful force in shaping the landscape of the United States and how this water force impacted many other aspects of the surrounding culture. In addition, students will learn the available options and techniques used by humans to try to control the flow of nature's water to suit their needs. The first phase will ask students to compare the control forces applied to the Mississippi River (i.e.: levees, jetties, outlets, etc.) with the control forces applied to the Chicago River (, canals, lakes, locks). The next focus of study will ask students to research how these controls have impacted the various cultural aspects of the surrounding area. (Agricultural, economic, historical, literary, spiritual, etc.) Finally, to better understand how bodies of water are controlled, students will use science to create models of sediments and river formations to get a visual understanding of the lessons terminology and concepts.

OVERALL

GOAL: To help students realize how scientific events impact other areas of study.

UNIT

OBJECTIVES: SWBAT identify how the surface of the Earth is continuously reshaped by water.

SWBAT explain the constant struggle between the forces that build up the Earth's land features and the forces that break them down.

SWBAT name ways nature and man continue to compete to live in a peaceful symbiosis. (Nature vs. mans need to control nature for beneficial needs.)

SWBAT use models and conduct experiments to enhance their understanding of how water shapes the earth as well as affects surrounding cultural aspects.

LESSON

OBJECTIVES: SWBAT identify four ways rivers are described (Youthful, Mature, Old, Rejuvenated) and how rivers can continually change characteristics from one to another.

SWBAT describe the types of soil and percent of each (Mississippi vs. Illinois sand, silt and clay)

SWBAT explain how different properties of soil affect plant growth in various regions (what crops grow in each soil type, Mississippi vs. Illinois)

SWBAT describe how variations in climate affect soil (Mississippi – summers vs. Illinois – winters)

SWBAT describe how moving water builds up and destroys the surface of the Earth (compare Mississippi river to Illinois and Chicago River)

SWBAT illustrate the terms sediment, load, gradient, watershed, tributary, channel, levee, jetty, canal, lock, outlet, delta, deposition, alluvial fan, floodplain

SWBAT connect the physical affects created by water to its human impact (Mississippi flood to loss, Chicago River to Sanitary conditions.)

ILLINOIS SCIENTIFIC STANDARDS ADDRESSED:

11. A.3a, 11.A.3b, 11.A.3c, 12.E.3b, 13.B.3d, 13.B.3e, 13.B.3f

PROCEDURE:

A. Introduction/Motivation

To introduce this lesson, the teacher will first read a starter story. The story outlines a slow calm ride down a river suddenly turning into a grand rapid adventure. (Resource available in Holt Science and Technology Transparency started kit)

In addition, a content trailer (much like a movie trailer however, it captures student attention relating to the topic by using flashes of visual imagery and strong emotions and personal conflict to introduce upcoming concepts and terminology to be studied) created by the teacher will be presented using visuals from the Mississippi floods and the unsanitary conditions within Chicago but the reversal of the river system.

B. Study/Learning

Activity 1 – Estimated Time frame Day 1

An opening experiment will be conducted to introduce students to concepts such as abrasion, sediment, load, deposition, unbalanced forces, rock composition, soil type, etc, and how these items create various particles of sediment. The opening activity asks students to use limestone gravel or rocks, water and a 3 liter (or other size) jar to simulate the erosion and the creation of sediments. Students will design a rock table in which they record their observations to an increasing number of shakes starting with zero and going to 800 shakes in intervals of 100. Students will complete a lab write-up analyzing the results of their experiment.

Activity 2 – Estimated Time frame Day 2 to 4

The teacher will familiarize students with background information on the Mississippi River system, the Illinois River system, and the Chicago River system through the use of films, literature, lecture, group discussions, etc.

This introduction will be followed by the teacher showing the students types of soil (sand, silt, clay, Mississippi soil samples compared to Illinois soil sample. The students will compare the sediments they created as well as the soil types of Mississippi and Illinois. Teacher will guide the discussion to include the above mentioned concepts. Students will follow this activity with one of the connecting journal entry as follows.

Journal Entry –

The source of the Mississippi River is said to be Lake Itasca in Northern Minnesota. Is this really the ultimate source of the Mississippi? Can a river really be said to have a source? Describe what a river’s source might look like.

The Mississippi River Delta floods frequently, but many farms are located on the delta. In fact, even through flooding along the river is potentially devastating; many farmers have traditionally located their farms near the river. Is this a sound agricultural practice? Why or Why not? Where would you locate a farm?

Activity 3 – Estimated Time frame – Day 5 to 10

Students will work on a project to build miniature models of river systems. Students will use various soil types, large plastic tubs or bins, and choice of structural materials such as paper, plastic, wood, plaster, etc to build controlling structures such as levees, dams, locks, canals, jetties, etc. to help reshape the river system and the landforms surrounding the water system. The students will use a hose to test their structures. As a follow-up, to this activity the teacher will use a variety of resources to guide students in comparing the results of their own river models to the challenges that the engineers of the Mississippi and Chicago River experienced.

C. Culmination

To assist students in internalizing the concepts presented within this unit, students will select a river system in the United States to research the following. 1. The physical and historical accounts of the river system. 2. The reshaping of the land

created by the river system. 3. The impact the river system had on aspects of the human experience such as agriculture, economic, cultural, spiritual life, etc. The students will include the key terms and ideas introduced in previous lessons using a variety of resource materials available.

D. Follow-up

Students will create a field guide. Students will make a field guide for their river. Included will be photos of streams and rivers. Captions will be used to describe each photo. The captions should incorporate terms such as gradient, erosion, load, channel, levee, jetty, etc. Finally, students will hypothesize the river's speed, load, and erosional capacity.

E. Materials/Resources

- Content Trailer Video
- Transparencies
- Journal Entry Question
- Lab Sheets
- Textbook- Holt Science and Technology
- Chicago Resource Listing
- Mississippi Resource Listing
- Limestone Rocks (Enough for each student group)
- 3 Liter Jars with Lids (Enough for each student group)
- Water (Enough to fill each jar almost completely full)
- Sand/Silt/Clay – (Enough for each student group model)
- Large Plastic Bins to build river system model
- Construction Items for River System (student choice)

- <http://mccormickbookinn.com>
- <http://www.resourcecenterchicago.org>
- <http://www.chicagoriver.org>
- <http://egov.cityofchicago.org>

- http://switchboard.nrdc.org/blogs/hhenderson/cleaning_the_chicago_river_tim.html
- <http://www.leveeboard.org>
- <http://www.msleveeboard.com>
- <http://www.waterscape.com>
- <http://www.greatriver.com/tribs.htm>
- <http://biotech.law.lsu.edu/maps/mrtp/mrtp.htm>
- [Soil Science Education Home Page](#) This site contains a Soil Gallery, soil stories, songs, and even games.
- [University of Illinois Extension](#) A great game for students! Help the detective dig up clues and learn about soil.
- [U.S. Department of Agriculture S.K. Worm](#) answers questions about soil.
- [Soils of Arid Regions of the U.S. and Israel](#) This site provides excellent ideas for expanding your students' knowledge of soil.
- [Field Museum](#) Underground Adventure Exhibit at the Field Museum of Natural History, Chicago, IL.
- [Soil Investigation](#) Here are some activities that you might want to look into.
- Benn, Nathan. (1985). *God of the Country: A Voyage on the Mississippi River*. Thomasson, Grant & Howell. (0934738130).
- Carter, Hodding. (1970) *Man and the River: The Mississippi*. Rand McNally & Co. LC72-122391.
- Solzman, David M. (?) *The Chicago River: An Illustrated History and Guide to the River and Its Waterways*, Second Edition.
- <http://www.journals.uchicago.edu/toc/hr/current>

*Note that this is an ongoing list of resources and can be expanded

F. Evaluation

Teacher will use a series of rubrics, lab write-ups, discussions, classroom participation, exit questions, quizzes and final test to assess student understanding.