

River Geology

Grades: 5th-12th

Duration: 55 Minutes

Program Description

Discover the strong force water can be and how it affects the environment. Fifth grade students will look at possible remedies for water erosion. Middle and high school students will then relate their river observations to our exploration of Mars and draw conclusions about the presence of water on the fourth rock from the Sun.

Louisiana GLEs

Grade 5-8 Science Inquiry

- 1.Generate testable questions about objects, organisms, and events that can be answered through scientific investigation (SI-M-A1)
- 2.Identify problems, factors, and questions that must be considered in a scientific investigation (SI-M-A1)
- 3.Use a variety of sources to answer questions (SI-M-A1)
- 4.Design, predict outcomes, and conduct experiments to answer guiding questions (SI-M-A2)
- 7.Record observations using methods that complement investigations (e.g., journals, tables, charts) (SI-M-A3)
- 12.Use data and information gathered to develop an explanation of experimental results (SI-M-A4)
- 14.Develop models to illustrate or explain conclusions reached through investigation (SI-M-A5)
- 15.Identify and explain the limitations of models used to represent the natural world (SI-M-A5)
- 19.Communicate ideas in a variety of ways (e.g., symbols, illustrations, graphs, charts, spreadsheets, concept maps, oral and written reports, equations) (SI-M-A7)
- 22.Use evidence and observations to explain and communicate the results of investigations (SI-M-A7)
- 25.Compare and critique scientific investigations (SI-M-B1)
- 27.Recognize that science uses processes that involve a logical and empirical, but flexible, approach to problem solving (SI-M-B1)
- 29.Explain how technology can expand the senses and contribute to the increase and/or modification of scientific knowledge (SI-M-B3)
- 37.Critique and analyze their own inquiries and the inquiries of others (SI-M-B5)

Grade 5 Science

- 32.Demonstrate the results of constructive and destructive forces using models or illustrations (ESS-M-A7)
- 33.Identify the processes that prevent or cause erosion (ESS-M-A7)

Grade 5 English Language Arts

- 32.Adjust diction and enunciation to suit the purpose for speaking
- 33.Use complete sentences and standard English grammar, diction, syntax, and pronunciation when speaking
- 35.Restate or describe oral directions/procedures for tasks
- 36.Adjust volume and inflection to suit the audience and purpose of presentations
- 38.Demonstrate active listening strategies
- 39.Deliver formal and informal presentations for a variety of purposes
- 41.Participate in group and panel discussions

Grade 8 Science

19. Determine the results of constructive and destructive forces upon landform development with the aid of geologic maps of Louisiana (ESS-M-A7)
48. Communicate ways that information from space exploration and technological research have advanced understanding about Earth, the solar system, and the universe (ESS-M-C8)
49. Identify practical applications of technological advances resulting from space exploration and scientific and technological research (ESS-M-C8)
53. Distinguish among several examples of erosion (e.g., stream bank, topsoil, coastal) and describe common preventive measures (SE-M-A10)

Grade 9-12 Science and Inquiry

1. Write a testable question or hypothesis when given a topic (SI-H-A1)
2. Describe how investigations can be observation, description, literature survey, classification, or experimentation (SI-H-A2)
4. Conduct an investigation that includes multiple trials and record, organize, and display data appropriately (SI-H-A2)
7. Choose appropriate models to explain scientific knowledge or experimental results (e.g., objects, mathematical relationships, plans, schemes, examples, role-playing, computer simulations) (SI-H-A4)
9. Write and defend a conclusion based on logical analysis of experimental data (SI-H-A6) (SI-H-A2)
14. Cite examples of scientific advances and emerging technologies and how they affect society (e.g., MRI, DNA in forensics) (SI-H-B3)

Earth Science

30. Summarize how current technology has directly affected our knowledge of the universe (ESS-H-D7)

Key Terms

Bar – Deposit of sand silt or rocks formed in a river channel or parallel to a coastline

Braided Stream – Characterized by successive divisions and rejoining of stream flow. This is created when the discharge of water cannot transport its load creating bars. The bars separate the channel into smaller channels creating a braided appearance.

Channel – Open conduit with periodically or continuously moving water or it may form a link between two bodies of water. Rivers, creeks, run, branch and tributary are terms used to describe a natural channel.

Creek – Small stream of water that serves as a natural drainage course for a small basin. It is usually consistent in size.

Delta – Alluvial deposit, often in the shape of a triangle formed between the diverging branches at the mouth of a river

Floodplain – Flat area the borders a stream that is periodically inundated with water during floods.

Gradient – Slope of the river

Headwater(s) – (1) the source and upper reaches of a stream; also the upper reaches of a reservoir. (2) the water upstream from a structure or point on a stream.

Levee – An embankment raised to prevent a river from overflowing.

Oxbow Lake – Created when meandering streams make large loops. These loops are cut or eroded in the outside of the curve and sediments are deposited on the inside of the curve. Eventually the loop of the curve reaches a diameter about 5 times greater than the width of the stream and the river begins to cut the loop off. The river breaks through at the cutoff and forms a new streambed.

Ripple Marks – Sediment in moving water is pushed back and forth making these. This evidence can be interpreted to determine the depth and turbulence of the water that formed the ripple marks.

Sedimentary Rock – Rock formed by layers of material being pressed together. Examples are sandstone, limestone, and shale.

Terrace – This is a long bench-like surface, often bordering a stream lake or sea. This is level or near level and generally above the river or ocean separated from it by a steeper slope.

V shaped Valley – River valley with a V-shaped cross-section. The steeper the gradient the more erosion cut downward rather than sideways.

Connections to Permanent Exhibits: All exhibits are in Red River Gallery.

The Red Flyer: Use chromakey technology to see yourself “flying” over the Red and the nearby countryside and cities with views of meanders, oxbows, and the flood plain.

Map of Louisiana: Put the puzzle together. Where do you live? What river is close to you?

Locks and Dams: Move a model boat from a lower to a higher pond and use dams to adjust water levels in the two “river” sections.

Aaron & Peggy Selber Red River Interactive Theater: Enjoy a memorable 15-minute film that will immerse you in the power and influence of the river on our lives. Using objects, sound and projected images, the Theater demonstrates past and present relationships of the Red River to the landforms, the flora, and fauna.

A Different View and 3-D Map: Interpret images from above – stereo pictures, satellite images, infrared color-coded, radar images, or thermal scans.

This exhibit is found in the Planet Earth Cluster downstairs.

Digital Earth: Can you find Sci-Port on Google Earth? Can you find the source of the Red River? Can you find the mouth of the Red River?

Resources!

“Discover School-Flood” Discovery Education
<http://school.discovery.com/lessonplans/programs/flood/>
Lesson Plan looking at soil characteristics and its ability to hold water.

Erosion Control Forrester Communication, Inc
http://www.forester.net/ec_0005_river.html
Article for teacher education that explains the evolving world of river geology.

GeoDetectives Bryce Canyon National Park
<http://www.nps.gov/archive/brca/Geodetect/Earth%20Systems/water%20erosion.htm>
Activity that deals with the physical and chemical forces on landforms and different types of erosion. This is a good follow-up activity to the River Geology Program.

Geology Labs on Line Virtual River-US National Science Foundation and the California State University System
<http://www.sciencecourseware.org/VirtualRiver/>

This website has two interactive activities on river discharge and river flooding. These contain information, pictures, and questions about river geology.

Hydrology, Running Water, Erosion, and Sediment Transport
Pamela J. W. Gore Georgia Perimeter College

<http://gpc.edu/~pgore/geology/geo101/hydro2.htm>

These are college notes that provide the teacher with background information.

Marlin Space Science Systems Mars Global Surveyor Mars Orbiter Camera

http://www.msss.com/mars_images/moc/index.html

This website is a gallery of captioned pictures of Mars.

Reducing Flood Damage In Coastal Louisiana: Communities, Culture & Commerce

Conceptual Ecological Model Workshop

[http://www.clear.lsu.edu/clear/web-content/Web_items/1 LA Flood Protection Newsletter.pdf](http://www.clear.lsu.edu/clear/web-content/Web_items/1_LA_Flood_Protection_Newsletter.pdf)

This excellent PDF provides an overview of Louisiana coastal resources and conclusions and recommendations for protection and restoration of coastal Louisiana.

TerraServer USA

Microsoft

<http://terraserver-usa.com/default.aspx>

Here are topo and aerial maps of the United States. Locate our area by using longitude and latitude or by city and state. You have the ability to zoom in and out, move N, S, E, and W and print your maps.

Pre-Visit Activities

Post-Visit Activities