

Pittsburgh Bridges, Our History

Eileen Butler 2009
Gifted Resource Teacher

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Overview

My unit, *Pittsburgh Bridges, Our History*, will explore and discuss the magnificent view of the city of Pittsburgh with an emphasis on the rivers and their bridges. Pittsburgh and its many neighborhoods and communities would be isolated and less accessible without bridges. This unit will focus on the history of bridges from the 1700's to 2009. One goal is to make students aware of Pittsburgh's Three Rivers, the Monongahela, the Allegheny and the Ohio and their impact on the region. A second goal is to have students research a specific bridge. The third goal is to have the students present their research and incorporate an art form.

During a period of four months, third and fourth grade students will be immersed in regional western Pennsylvania bridge architecture. Students will identify the Three Rivers in Pittsburgh and explore how the bridges are used by people everyday. Students will look at current bridges, past bridges, types of bridges and materials for bridges. Students will choose a bridge, research to answer questions about the bridge and present their findings to the class. Each student will choose a different bridge. Students will choose an art form to present their findings to the class. The student will become an expert on their particular bridge. The culminating art project may be a model, a sculpture or a collage.

Rationale

The purpose of this unit is to provide students with opportunities to do research about the architectural engineering of marvels in Pittsburgh, such as The Liberty Bridge or The Roberto Clemente Bridge. This unit will provide insights into the creation of designs of bridges and the diverse styles of bridges emphasizing their uniqueness, function, architectural beauty, form and structure.

Pittsburgh Bridges, Our History, is designed to support the Pittsburgh Public School curriculum and align the following prescribed Pennsylvania Content Standards: Reading, Writing, Speaking and Listening; Mathematics; Science and Government and Technology and Economics and Ecology; History; Production, Performance and Exhibition of Dance, Music, Theatre of the Visual Arts. Students learn about the Monongahela, the Allegheny and the Ohio Rivers as part of the third grade *Pittsburgh* Social Studies Curriculum. Students learn about the world in the fourth grade social studies curriculum *Around the World*. This unit will be an opportunity for students to discover how the environment shaped and influenced the culture in Western Pennsylvania and how this continues to impact their lives today. This involves understanding the history of how rivers were formed here in Western Pennsylvania, why flooding has occurred and how it is a natural place to build bridges.

The Allegheny River's origin is a spring on a farm near Colesburg, Pennsylvania and it flows north in a large "u" shape direction in New York. It flows past Olean, the town of Allegheny, continues west, and eventually flows into the Allegheny River reservoir near Warren, Pennsylvania. This is the Kinzua Dam. It turns south. It flows through the forests, emptying into streams, through open country, down to Pittsburgh to Point State Park, where it joins the Monongahela River to form the Ohio River. Today, the river is used for recreational vehicles primarily because it flows through beautiful landscape and is good for fishing. The bridges that have crossed the Allegheny River in Pittsburgh include: Fort Duquesne Bridge, Sixth Street Bridge, Seventh Street Bridge, Ninth Street Bridge, and Veteran's Bridge and Sixteenth Street Bridge.

The Monongahela River runs north from the confluence of the West Fork and Tygart Rivers at Fairmont, West Virginia. It flows through coalfields as well as mountains in West Virginia and Pennsylvania and joins the Allegheny to form the Ohio in Pittsburgh. Along the Monongahela, boat building was popular. The boat that Lewis and Clarke had was built along the Monongahela. Today, the Mon has nine locks and dams, which are responsible for carrying tonnage. The bridges that have crossed the Monongahela River in Pittsburgh include: Point Bridge (demolished), Fort Pitt Bridge, Wabash Bridge (demolished), Smithfield Street Bridge, Panhandle Bridge, Liberty Bridge, South Tenth Street Bridge, South 22nd Street Bridge, Birmingham Bridge, Hot Metal Bridge, and Glenwood Bridge.

With the rivers in Pittsburgh came the bridges. It is hard to imagine the city without them. It would isolate the neighborhoods. The bridges provide access and connection. A bridge is an awesome work of structural art. The Pittsburgh area boasts 30 river bridges in Pittsburgh alone, with an additional 29 within Allegheny County. If you were to add in bridges that cross streams, roads, railroads, or ravines, the number climbs to over 2000!

The study of bridges is the story of people who have a vision and work to make it a reality. To be a bridge builder, you must possess the skills and qualities of a scientist, architect, environmentalist, innovator, and historian. It is the story of how beauty and strength combine in structures that help us connect our lives with each other across expanses of water and land. Bridge building is a story of the past and the present. Steel and concrete materials give engineers the ability to make bridges.

The Pittsburgh area contains some of the most technologically advanced bridges in the world, and some of the most effective bridge-building techniques were pioneered here. The history of our city's bridges is extensive, and the combinations of design and beauty are testaments to Pittsburgh's long tradition and heritage of steelmaking. However, Pittsburgh's very first bridge wasn't steel at all, it was wood. The Smithfield Street Bridge, first built in 1820, was one of the many popular covered bridges, designed so the weather wouldn't affect the wooden roadway. The Smithfield Street Bridge has been rebuilt since its original debut; today it features suspensions and arches. Cars, buses, pedestrians and subways use it today, which speaks to its ingenuity and design. Not surprisingly, Pittsburgh also features other distinguishing bridge characteristics.

The identical 6th, 7th, and 9th Street Bridges, nicknamed "The Three Sisters," are chain suspension bridges, the only example in the country of identical bridges constructed side-by-side. In 1999, the 6th Street Bridge was renamed "The Roberto Clemente Bridge," in commemoration of the legendary Pittsburg Pirate baseball player. In 2005, the 7th Street Bridge was renamed "The Andy Warhol Bridge," in honor of Pittsburgh native artist Andy Warhol. In 2006, the 9th Street Bridge was renamed "The Rachel Carson Bridge," memorializing the Pittsburgh born author who wrote 1962's "Silent Spring."

The city of Pittsburgh has saved several bridges of the past for future generations. These are now considered historic landmark bridges. Two examples are the Schenley Park and Panther Hollow Bridges of 1897. In need of repair after one hundred years of use, the decks of these steel bridges were reconstructed with the latest technology of reinforced concrete. Preserving them was a positive step for the beauty and aesthetic value of architecture in Pittsburgh.

Today, Pittsburgh is recognized around the world for its impressive collection of bridges. Throughout the city's history and continuing into the next Millennium, Pittsburgh bridges stand as the ultimate marriage of form and function, and serve as a fitting tribute to the

region's proud steel heritage.

Objectives

The first goal of this unit is to make students aware of Pittsburgh's Three Rivers, The Allegheny, The Monongahela and the Ohio, and their impact on the region. This goal will be met by identifying the Three Rivers by name, identifying the Three Rivers on a map and understanding the topography of Pittsburgh. Students will be given an introduction of the Three Rivers and the history of their names. Students will receive the history of how the rivers were utilized in the past and students will discuss what the rivers are used for everyday.

The second goal of this unit is to have students research a specific Pittsburgh bridge. Students will choose a bridge that crosses The Allegheny or The Monongahela River. Students will be given a template for their research. The student will need to find a picture of their bridge, the history of the bridge, when it was erected, what materials were used, who designed the bridge, the purpose of the bridge and any unusual details of the bridge. The students will design a power point to present the information.

The third goal of this unit is to have the students present their research and incorporate it into an art form. The students will present their information to the class and cite their research. The students will review information on the different types of art forms. The students may choose to make a model, sculpture or collage of their bridge. When the research is complete the students will choose an art form for demonstration.

Strategies

The first goal of this unit is to make students aware of Pittsburgh's Three Rivers, The Allegheny, The Monongahela and the Ohio and their impact on the region. To reach the objectives the students will review the *Pittsburgh* Social Studies curriculum about the Three Rivers. The teacher will present other literature and video of the Three Rivers. Students will look at a map of the city of Pittsburgh and focus on the rivers, identify the location of the rivers and look at the topography in the region. Students will use literature as a base for finding out what the rivers were used for in the past and discuss what the rivers are used for today. Current websites will provide information on river recreational vehicles and transporting tonnage along the rivers.

The second goal of this unit is to have students research a specific Pittsburgh bridge. Students will use current websites that will provide information on the specific bridge they choose to research. Students will also use the library to research and gain information needed for completing their template about their bridge. Students will combine information in a power point format. The students will be given information on using

computer technology to organize information and make slides.

The third goal of this unit is to have the students present their research and incorporate it into an art form. The students will be given demonstrations of the three art forms, a model, a sculpture or a collage. The students are familiar with these art forms from art class, but a refresher demonstration may be necessary. The project will allow the students independence in the format and the medium they choose. The students may choose pictures, text or other materials for their model, sculpture or collage. The students will be given ample time to work on their project and space to display the completed project.

Classroom Strategies

The first goal of this unit is to make students aware of Pittsburgh's Three Rivers, The Allegheny, The Monongahela and the Ohio and their impact on the region.

The student will make a K-W-L chart (what the student already knows, what the student wants to know about the Three Rivers of Pittsburgh) as a group. The student will read and understand essential content of informational texts. The teacher will display a map of the city of Pittsburgh and point out the rivers. The teacher will show a video of Pittsburgh's Rivers and related literature to aid in the background knowledge of the students. A discussion will follow which will provide students the opportunity to clarify the information. The student will complete the K-W-L chart (what the student has learned about the Three Rivers). The student will work in a small group to list the impact of the rivers on Pittsburgh. Specifically, the student will list what occurs on the rivers and the advantages and disadvantages of Pittsburgh's rivers. The teacher will provide current websites for the student to gather and organize information about the Three Rivers: The Allegheny, The Monongahela and The Ohio rivers on Pittsburgh. This research will aid in the small group activity.

The second goal of this unit is to have students research a specific Pittsburgh bridge.

The teacher will provide a template identifying the information needed for the student to complete. The template will identify information that the student needs to research. The research can be completed using current websites provided by the teacher and the library. The student will choose a specific bridge to research. Each student will choose a bridge and become an expert on that bridge. The teacher will complete a demonstration on how to make a power point. The computer technology piece will be included in the research. The power point presentation will be used as an assessment.

The third goal of this unit is to have the students present their research and incorporate it into an art form.

The student will draw a design of their art product. The drawing will be two dimensional and include their representation of their research about a specific bridge. Upon adult approval the student will incorporate their research into an art form. The guidelines for this art project are going to be open-ended so the student may be creative. The student will incorporate their research into a three dimensional product. The student may choose text, pictures or other materials to represent their specific bridge. The student will choose the medium for the art project. The student will write a short paragraph explaining the art work through the artist's voice. This writing will be included in the display.

Annotated Bibliography for students

Hill, Le Sullivan. *Bridges Connect*. Mineapolis: Carolrhoda Books, 1997.
This book introduces different kinds of bridges, their materials, construction and maintenance.

Hunter, Ryan Ann. *Cross A Bridge*. New York: Holiday House, 1998.
This book discusses the different kinds of bridges: how they are built and how they are used.

Macgregor, Anne and Scott. *Bridges: A Project Book*. New York: Lothrop, Lee and Shepard Books, 1980.
This book discusses the history, uses and construction of the three types of bridges. It includes instruction for making models and variations of each type.

Peet, Creighton. *The First Book of Bridges*. New York: F. Watts, 1953.
This book is an explanation of the hows and whys of bridge building from the simplest to the most modern.

Sheppard, Jeff. *I Know A Bridge*. New York: Maxwell Macmillan International, 1993.
Simple text and illustrations , presents various kinds of bridges, from a steel bridge for trains to a stone bridge for cars.

Annotated Bibliography for Teachers

Herbertson, Elizabeth Taylor. *Pittsburgh Bridges*. New York: Exposition Press, 1970.
This book describes Pittsburgh bridges, the buildings and structures.

Kidney, Walter C. Life's Riches: Excerpts on the Pittsburgh Region and Historic Preservation. Pittsburgh, PA: Pittsburgh History and Landmarks Foundation, 2006. This book describes Pittsburgh's bridges, architecture and engineering and the Three Rivers.

Regan, Bob. The Bridges of Pittsburgh. Pittsburgh, PA: Local History Company, 2006. This book includes pictures and the history of Pittsburgh bridges.

Sebak, Rick. Flying off the Bridge to Nowhere! (Videorecording): and other Tales. Pittsburgh PA:WQED, 2007. This videorecording presents stories behind some of the numerous bridges.

Sebak, Rick. The Mon, The Al and The O. (Videorecording) Pittsburgh, PA :WQED, 2007. This videorecording looks at Pittsburgh's Three Rivers. It visits individuals whose work is on the river or along the rivers.

Template for Bridge Research

Use five different sources to find the following information. The sources may include only three websites. Other resources may include newspaper, books, or periodicals. Be sure to include the sources following the information.

1. Name the bridge.
2. How did the bridge get its name, provide some history.
3. Find a current picture of the bridge.
4. Find the date the bridge was erected.
5. Find the materials used in the bridge, for example, wood, steel, etc.
6. Find the name of the designer of the bridge.
7. Find the purpose of the bridge
8. Find any unusual or unique details of the bridge.
9. Include this information in a power point presentation.
- 10.

Rubric for Power Point Presentation

To receive a 4 on the rubric the student needs to:

- *name the bridge
- *include two facts about the history of the bridge

- *include a current picture of the bridge (this could include a photograph, drawing or internet picture)
- *include the date the bridge was erected
- *include the materials used in making the bridge
- *include the name of the designer of the bridge
- *include the purpose of building the bridge
- *include two details about the bridge

To receive a 3 on the rubric the student needs to:

- *name the bridge
- *include one fact about the history of the bridge
- *include a current picture of the bridge (this could include a photograph, drawing or internet picture)
- *include the date the bridge was erected
- *include the materials used in making the bridge
- *include the name of the designer of the bridge
- *include the purpose of building the bridge
- *include one detail about the bridge

To receive a 2 on the rubric the student needs to:

- *name the bridge
- *include a current picture of the bridge (this could include a photograph, drawing or internet picture)
- *include the materials used in making the bridge
- *include the name of the designer of the bridge
- *include the purpose of building the bridge

To receive a 1 on the rubric the student needs to:

- *name the bridge
- *include a current picture of the bridge (this could include a photograph, drawing or internet picture)
- *include the name of the designer of the bridge

Internet websites for bridge research

11. www.pittsburghbridge.org
Pittsburgh Bridge Association
12. www.pghbridges.com
Bridges and Tunnels of Allegheny County and Pittsburgh, PA
13. www.abcdpittsburgh.org
Association for Bridge Construction and Design
14. www.eswp.com/bridge
Engineers Society of western Pennsylvania, The International Bridge Conference
15. www.phlf.org
Pittsburgh History and Landmarks Association

PENNSYLVANIA STANDARDS FOR THIRD GRADE STUDENTS

Academic Standards for Reading, Writing, Speaking and Listening

1.1 Learning to Read Independently

- F.** Understand the meaning of and use correctly new vocabulary learned in various subject areas.

1.2. Reading Critically in All Content Areas

- H.** Read and understand essential content of informational texts and documents in all academic areas.· Differentiate fact from opinion within text.· Distinguish between essential and nonessential information within a text.· Make inferences from text when studying a topic (e.g., science, social studies) and draw conclusions based on text.

1.4. Types of Writing

- B.** Write informational pieces (e.g., descriptions, letters, reports, instructions) using illustrations when relevant.

1.5. Quality of Writing

- B.** Write using well-developed content appropriate for the topic.· Gather and organize information.· Write a series of related sentences or paragraphs with one central idea.· Incorporate details relevant and appropriate to the topic.

1.6. Speaking and Listening

- C.** Speak using skills appropriate to formal speech situations.· Use appropriate volume.· Pronounce most words accurately.· Pace speech so that is understandable.· Demonstrate an awareness of audience.

1.8. Research

- B.** Locate information using appropriate sources and strategies.· Locate resources for a particular task (e.g., newspapers, dictionary).· Select sources (e.g., dictionaries, encyclopedias, interviews to write a family history, observations, electronic media).· Use tables of contents, key words and guide words.

Academic Standards for Mathematics

2.3. Measurement and Estimation

- G.** Estimate and verify measurements.

2.9. Geometry

- B.** Build geometric shapes using concrete objects (e.g., manipulatives).

Academic Standards for Science and Technology and Environment and Ecology

3.1. Unifying Themes

- A.** Know that natural and human-made objects are made up of parts.· Identify and describe what parts make up a system.· Identify system parts that are natural and human-made (e.g., ball point pen, simple electrical circuits, plant anatomy).· Describe the purpose of analyzing systems.· Know that technologies include physical technology systems (e.g., construction, manufacturing, transportation), informational systems and biochemical-related systems.
- D.** Know that scale is an important attribute of natural and human made objects, events and phenomena.· Identify the use of scale as it relates to the measurement of distance, volume and mass.· Describe scale as a ratio (e.g., map scales).· Explain the importance of scale in producing models and apply it to a model.

3.2. Inquiry and Design

- D.** Recognize and use the technological design process to solve problems.· Recognize and explain basic problems.· Identify possible solutions and their course of action.· Try a solution.· Describe the solution, identify its impacts and modify if necessary.· Show the steps taken and the results.

3.5. Earth Sciences

- A. Know basic landforms and earth history.· Describe earth processes (e.g., rusting, weathering, erosion) that have affected selected physical features in students' neighborhoods.· Identify various earth structures (e.g., mountains, faults, drainage basins) through the use of models.· Identify the composition of soil as weathered rock and decomposed organic remains.· Describe fossils and the type of environment they lived in (e.g., tropical, aquatic, desert).
- B. Know types and uses of earth materials.· Identify uses of various earth materials (e.g., buildings, highways, fuels, growing plants).· Identify and sort earth materials according to a classification key (e.g., soil/rock type).
- D. Recognize the earth's different water resources.· Know that approximately three-fourths of the earth is covered by water.· Identify and describe types of fresh and saltwater bodies.· Identify examples of water in the form of solid, liquid and gas on or near the surface of the earth.· Explain and illustrate evaporation and condensation.· Recognize other resources available from water (e.g., energy, transportation, minerals, food).

3.6. Technology Education

- A.· Identify waste and pollution resulting from a manufacturing enterprise.· Explain and demonstrate the concept of manufacturing (e.g., assemble a set of papers or ball point pens sequentially, mass produce an object).· Identify transportation technologies of propelling, structuring, suspending, guiding, controlling and supporting.· Identify and experiment with simple machines used in transportation systems.· Explain how improved transportation systems have changed society.

3.8. Science, Technology and Human Endeavors

- A. Know that people select, create and use science and technology and that they are limited by social and physical restraints.· Identify and describe positive and negative impacts that influence or result from new tools and techniques.· Identify how physical technology (e.g., construction, manufacturing, transportation), informational technology and biotechnology are used to meet human needs.· Describe how scientific discoveries and technological advancements are related.· Identify interrelationships among technology, people and their world.· Apply the technological design process to solve a simple problem.

4.1. Watersheds and Wetlands

A. Identify various types of water environments. · Identify the lotic system (e.g., creeks, rivers, streams). · Identify the lentic system (e.g., ponds, lakes, swamps).

4.8. Humans and the Environment

B. Know that environmental conditions influence where and how people live. · Identify how regional natural resources influence what people use. · Explain the influence of climate on how and where people live.

C. Explain how human activities may change the environment. · Identify everyday human activities and how they affect the environment. · Identify examples of how human activities within a community affect the natural environment.

Academic Standards for Civics and Government and Technology and Economics and Ecology

6.4. Economic Interdependence

G. Identify local geographic patterns of economic activities. · Agriculture · Travel and tourism · Mining and mineral extraction · Manufacturing · Wholesale and retail · Health services

7.1. Basic Geographic Literacy

A. Identify geographic tools and their uses. · Characteristics and purposes of different geographic representations · Maps and basic map elements · Globes · Graphs · Diagrams · Photographs

· Geographic representations to display spatial information · Sketch maps · Thematic maps · Mental maps to describe the human and physical features of the local area

B. Identify and locate places and regions. · Physical features · Continents and oceans · Major landforms, rivers and lakes in North America · Local community

· Human features · Countries (i.e., United States, Mexico, Canada) · States (i.e., Pennsylvania, Delaware, Maryland, New Jersey, New York, Ohio, West Virginia) · Cities (i.e., Philadelphia, Erie, Altoona, Pittsburgh, Scranton, Harrisburg,

Johnstown, Allentown, Washington D.C., Baltimore, New York, Toronto, Cleveland· Local community

- Regions as areas with unifying geographic characteristics· Physical regions (e.g., landform regions, climate regions, river basins)

7.1. Basic Geographic Literacy

- Human regions (e.g., neighborhoods, cities, states, countries)

7.2 The Physical Characteristics of Places and Regions

- A.** Identify the physical characteristics of places and regions. · Physical properties· Landforms (e.g., plains, hills, plateaus and mountains)· Bodies of water (e.g., rivers, lakes, seas and oceans)· Weather and climate· Vegetation and animals
- Earth's basic physical systems· Lithosphere· Hydrosphere· Atmosphere· Biosphere

7.3 The Human Characteristics of Places and Regions

- A.** Identify the human characteristics of places and regions by their population characteristics. · The number and distribution of people in the local community· Human movement in the local community (e.g., mobility in daily life, migration)
- A.** Identify the human characteristics of places and regions by their cultural characteristics. · Components of culture (e.g., language, belief systems and customs, social organizations, foods, ethnicity)· Ethnicity of people in the local community (e.g., customs, celebrations, languages, religions)
- A.** Identify the human characteristics of places and regions by their settlement characteristics. · Types of settlements (e.g., villages, towns, suburbs, cities, metropolitan areas)· Factors that affect where people settle (e.g., water, resources, transportation)

7.4 The Interactions Between People and Places

- B.** Identify the impacts of people on physical systems. · Effects of energy use (e.g., water quality, air quality, change in natural vegetation)· Ways humans change local ecosystems (e.g., land use, dams and canals on waterways, reduction and extinction of species)

Academic Standards for History

8.2. Pennsylvania History

- C.** Identify and describe how continuity and change have influenced Pennsylvania history. · Belief Systems and Religions (e.g., Native Americans, early settlers, contemporary religions)· Commerce and Industry (e.g., jobs, trade, environmental

change)· Innovations (e.g., technology, ideas, processes)· Politics (e.g., rules, regulations, laws)· Settlement Patterns (e.g., farms, towns, rural communities, cities)· Social Organization (e.g., relationships of individuals, families, groups, communities; ability to be educated)· Transportation (e.g., methods of moving people and goods over time)· Women's Movement (e.g., changes in roles and rights over time)

Academic Standards for Production, Performance and Exhibition of Dance, Music, Theatre and Visual Arts

9.1. Production, Performance and Exhibition of Dance, Music, Theatre and Visual Arts

E. Demonstrate the ability to define objects, express emotions, illustrate an action or relate an experience through creation of works in the arts.