PICTURE THIS!

Brooklyn Bridge
Picture This!:: Brooklyn Bridge

© 2004

Written and developed by the
the Brooklyn Historical Society Education Department

Jaime Joyce, Curriculum Developer
Kate Fermeole, Vice President for Exhibits and Education

Designed by Carolyn Crowley
www.ccgdesignstudio.com

Other Picture This! kits include:
Picture This!: Brooklyn on the Move
Picture This!: Brooklyn at Work

Special Thanks to:
Ann Meyerson, Sean Ashby and Destyn Downes at BHS; Christine Cucci, Melissa Luca and the Third and Fourth Grade teachers and students at PS 69; Dana Rappoport and Allegra Kapovich and their Second Grade students at PS 321; Seth Flicker and his Fourth Grade students at Brooklyn Friends School.

Funded by Grants From:
The New York City Department of Cultural Affairs, the New York State Council on the Arts, Brooklyn Borough President Marty Markowitz and the City of New York Department of Youth and Community Development.

The Following Foundations and Corporations Provided Additional Support:

Teacher's Guide: Introduction

- About this Kit ................................................................. 1
- New York City & State Performance Standards ......................... 2
- Lesson Plans ................................................................. 6
- Interpreting Prints and Photographs ...................................... 11
- Questions to Ask About Images .......................................... 12
- Vocabulary List .......................................................... 13
- Cross-Curricular Activities ................................................ 15
- Field Trips and Cultural Resources ...................................... 19
- Additional Resources ..................................................... 23
- Teacher Evaluation Form .................................................. 25

Section One: Before the Bridge ............................................. 26
Main Ideas, Image Facts, General Information, Guiding Questions, Laminated Images

Section Two: Building the Bridge ........................................... 30
Main Ideas, Image Facts, General Information, Guiding Questions, Laminated Images

Section Three: Crossing the Bridge ........................................ 37
Main Ideas, Image Facts, General Information, Guiding Questions, Laminated Images

Section Four: Brooklyn Bridge Art ............................................ 43
Main Ideas, Image Facts, General Information, Guiding Questions, Laminated Images

Section Five: Other East River Crossings ................................ 47
Main Ideas, Image Facts, General Information, Guiding Questions, Laminated Images

Student Worksheets ................................................................. 52

K-W-L Chart

Before the Bridge: Compare & Contrast, Putting It Together

Building the Bridge: Compare & Contrast, Putting It Together

Crossing the Bridge: Crossing the Bridge, Putting It Together

Brooklyn Bridge Art: Compare & Contrast, Putting It Together

Other East River Crossings: Compare & Contrast, Putting It Together

More To Think About

Brooklyn Bridge Math: On the Promenade, Paying Your Way, Totally Wired
About this Kit

Dear Teachers:

The Brooklyn Historical Society is pleased to present Picture This!: Brooklyn Bridge, the third in a series of document-based curriculum kits designed to help students develop visual analysis and critical thinking skills while gaining the valuable experience of doing non-text-based research. In this kit, you’ll find a full range of materials intended to guide your study of the Brooklyn Bridge and New York City history including:

- Twenty-four laminated museum-quality images, organized around five themes — Before the Bridge: Building the Bridge; Crossing the Bridge; Brooklyn Bridge Art; and Other East River Crossings. Photographs, prints, paintings and drawings are among the primary source documents provided in this kit. All are rich in content. Students can return to the images again and again, developing questions and making discoveries over time.

- A Teacher’s Guide with detailed lesson plans as well as Main Ideas, Image Facts, General Information and Guiding Questions for each theme. Historical information can be easily assimilated into a variety of social studies topics. Detailed lesson plans, curriculum connections, suggested field trips, and a bibliography are also included.

- Reproducible worksheets designed to help students observe, question, analyze and draw conclusions. For the first time, we’ve included a series of cross-curricular worksheets. The More to Think About series helps students gain experience with document-based questions (DBQ’s), a key component of the fifth grade New York State social studies examination. Brooklyn Bridge Math worksheets present students with real-life mathematical challenges connected to their study of the bridge.

We hope that you and your students enjoy using Picture This!: Brooklyn Bridge. It has been our pleasure producing it, and we are very proud to share it with you.

Sincerely,

Jaime Joyce, Curriculum Developer
The Brooklyn Historical Society

© BROOKLYN HISTORICAL SOCIETY
New York City and State Performance Standards

Picture This!: Brooklyn Bridge is designed to help teachers use primary source documents and to meet performance standards set by the city and state.

Grade 2
Social Studies: My Community and Other United States Communities

Content Understandings
My community and region today
- My community has changed over time

People and the physical environment
- Communities are influenced by geography and environment

Meeting needs and wants
- Communities provide facilities and services to help meet the needs and wants of their citizens

Skills and Strategies
Getting Information
- Collect information from print and nonprint resources

Using Information
- Continue to build social studies vocabulary, in discussions and in writing.
  In the areas of history, economics, geography and government
- Classify information by developing tables, charts, maps and graphs

Presenting Information Orally and in Written Form
- Plan for an oral presentation
- Present information by constructing and using tables, charts, graphs, maps, etc.

Collaborative Learning
- Participate in group planning and discussion by following procedures in place
- Assume individual responsibility for tasks
Grade 3
Communities Around the World—Learning About People and Places

Content Understandings

Cultures and civilizations
• Historic events can be viewed through the eyes of those who were there, as shown in their art, writings, music and artifacts

Communities around the world
• Important events and eras can be displayed on timelines

People depending on and modifying their physical environments
• People in world communities depend on and modify their physical environments in different ways

Challenge of meeting needs and wants in world communities
• Production, distribution, exchange and consumption of goods and services are economic decisions all societies must face

Skills and Strategies

Getting Information
• Collect and organize information from various sources
• Collect information from primary and secondary sources

Using Information
• Continue to build social studies vocabulary, in discussions and in writing, in the areas of history, economics, geography and government
• Categorize and/or classify information gathered using tables, graphs, charts, maps, timelines, etc.

Presenting Information Orally and in Written Form
• Use information from sources/documents to respond in writing to a question
• Organize and present information orally using notes or other memory aids

Collaborative Learning
• Participate in group planning and decision-making, recognizing that others have different but equally valid points of view
• Be responsible for individual and group tasks
Grade 4
Local History and Government

Content Understandings

Colonial and Revolutionary Periods
• Lifestyles in colonial New York City and State
• Different types of daily activities

Industrial growth and expansion
• Transportation, inventions, communication and technical progress
• Immigration and migration

Urbanization
• Rural to urban migration
• Economic interdependence (e.g., resource use: from farm to market)

Skills and Strategies

Getting Information
• Locate information by investigating different types of primary and secondary sources
• Identify the main ideas and supportive elements in print and nonprint sources
• Differentiate relevant from irrelevant information

Using Information
• Interpret information found in primary and secondary source documents
• Identify differences and similarities in information gathered
• Evaluate information found in documents

Presenting Information Orally and In Written Form
• Prepare and deliver a presentation based on a researched topic
• Express opinions and back them up with reasons
• Organize and present information orally using notes or other memory aids

Collaborative Learning
• Understand that others may have a different point of view
• Participate in group planning and discussion of projects by following democratic procedures and helping to make group decisions
• Take responsibility for completing individual and group assignments

Source: A Standards-Based Scope & Sequence for Learning: A Teacher’s Framework for Standards-Based Planning, Fall 2001, Kindergarten – Grade 8, Board of Education of the City of New York

© BROOKLYN HISTORICAL SOCIETY
In addition to addressing social studies standards, activities in Picture This! Brooklyn Bridge fulfill New York City Department of Education Performance Standards in the following areas:

**English Language Arts**
E1 Reading  
E1c Read and comprehend informational materials

E2 Writing  
E2a Produce a report of information

E3 Speaking, Listening and Viewing  
E3b Participate in Group Meetings  
E3c Prepare and deliver an individual presentation

**Mathematics**
M4 Statistics and Probability Concepts  
M4a Collect and organize data to answer a question  
M4b Display data

M4d Gather data about an entire ethnic group or by sampling group members to understand the concept of sample

M7 Mathematical Communication  
M7e Comprehend mathematics from reading assignments and from sources


Lesson Plan

Explain to students that they will be looking at images—photographs, drawings, paintings, etc.—to learn about the history of the Brooklyn Bridge, and of New York City.

Part 1: Modeling Observation of Images (Whole Class)

Materials
- Two demonstration images found in the Picture This! Brooklyn Bridge kit
- Chart paper or chalkboard
- Markers or chalk

Aims
1. To demonstrate how to extract information from non-print resources
2. To model how to use a Venn diagram
3. To begin a discussion of how Brooklyn and Manhattan have changed over time.

Teacher Preparation
1. Look closely at the two demonstration images before sharing them with students. What do you notice? This will help you facilitate discussion.
2. Photocopy images. Distribute to the class. Partners should receive Image A and Image B. As an alternative, gather children in a central meeting area and display images in front of the group or use the transparency provided.

Teaching Tip:
You may want to use the K-W-L chart included in this kit to assess what students already know—and what they'd like to learn—about the Brooklyn Bridge. This makes a good homework assignment, or class discussion, before embarking on the following series of lessons. You can return to the chart as a follow-up to find out what children learned about the Brooklyn Bridge as a result of these lessons.
Teacher's Guide
Introduction

Procedure (10-15)
1. Draw a Venn diagram on chart paper or on the chalkboard.

2. Label the circle on the left Image A. Label the circle on the right Image B.

3. Explain to students that they will be looking carefully at the images to discover how Brooklyn and Manhattan have changed over time. On the board write: How have Brooklyn and Manhattan changed over time? As bullet points below, write buildings, vehicles and structures. Explain that these are items on which students should concentrate.

4. Ask: What do you see that is the same in both photographs? Encourage students to respond in complete sentences. For example: “I noticed that there are boats on the river in Image A and Image B.” Ask: Where in the diagram will I write that response? In Circle A, Circle B or in the center where the circles overlap? Explain that similarities go in the center, and differences are recorded in the corresponding circle.

5. Continue to compare and contrast the images. Record responses on Venn diagram.

6. Review the diagram. Ask: How have Brooklyn and Manhattan changed over time? Did you notice anything surprising? What? Did your observations bring up any questions? What? Jot observations on the board so you can return to them later.

Image Facts for the Demonstration Images

By the 1960’s, New York City had grown considerably. There were fewer ships on the river and more cars on the road. Steel and glass skyscrapers surrounded the church spires and made the Brooklyn Bridge towers seem small in comparison.

In the early 1900’s, tall ships lined the river and church spires pierced the sky. Until the Brooklyn Bridge opened in 1883 — with towers comparable in size to a modern, 23-story building — church towers were among the tallest structures in town.

© BROOKLYN HISTORICAL SOCIETY
Lesson Plan

Part 2: Examining the Images (Group Work)

Materials
- Laminated images
- Worksheets (Compare & Contrast and Putting it Together)
- Pencils

Aims
1. To use non-print primary source documents to discover change over time
2. To compare and contrast two images
3. To use graphic organizers
4. To give students the experience of working cooperatively

Teacher Preparation
1. Photocopy worksheets.
2. Groups (2-3 students each) will share one Compare & Contrast worksheet that corresponds to their images; combined groups (4-6 students each) will share one Putting it Together worksheet.

Procedure A (15 minutes)
1. Explain to students that they will be working in groups of 2-3. They will receive two images and a Compare & Contrast worksheet. They will look closely at the images and record their observations on the worksheet, which lists specific questions to focus their observations. One student will be the writer. He or she will record the group’s observations. They will have 15 minutes to work before moving on to the next activity.

2. Pass out images with the corresponding Compare & Contrast worksheet.

3. After 10 minutes tell students they have five minutes before beginning the next part of the assignment.

4. Give the signal to stop.
Procedure B (15 minutes)

1. Explain to students that they will now join others in the class working on the same topic. (Groups will now be 4-6 students each.) Topics are listed on the worksheets and on the laminated images, which are also color-coded.) They will receive a new worksheet called Putting It Together. As a group, they will put the images in chronological order, beginning with the oldest image and ending with the most recent. They must look at the images closely for clues.

2. When the group has decided on the order of the images the writer will record the letter of each image in the boxes along the top of the Putting It Together worksheet. The writer will also record the groups' reasons for putting the images in that particular order.

3. Distribute Putting It Together worksheets and have students begin. Explain that when they are done they will present their findings to the class.

Teaching Tip:
Images are easier to see and work goes more smoothly when students lay the images face-up, in order, on the worktable.
Lesson Plan

Part 3: Presenting Your Findings (Group and Whole Class Work)

Materials
- Laminated images
- Putting It Together worksheets

Aims
1. To give students the experience of speaking before an audience
2. To develop students' listening skills
3. To begin a discussion about the Brooklyn Bridge, and how crossing the East River has changed over time

Teacher Preparation
Circulate amongst the class as students finish Part 2 of the lesson. Choose the first group of presenters and help them prepare to present their work. They will serve as a model for the rest of the class.

Procedure (30 minutes)
1. Explain to students that they will now present their topic to the class. The suggested presentation order is as follows;
   - Group 1: Before the Bridge
   - Group 2: Building the Bridge
   - Group 3: Crossing the Bridge
   - Group 4: Brooklyn Bridge Art
   - Group 5: Other East River Crossings

   Students will stand in a line facing the class, holding their images in chronological order for the audience to see clearly. One student will read from the Putting It Together worksheet.

2. When they are done, students should remain standing with their images on display. Read aloud from the Image Facts sheet located in the Teacher Information pages of each section.
Interpreting Prints and Photographs

The primary sources in Picture This! are comprised of photographs and prints. These types of visual documents contain a great deal of information, but require specific skills to read them. The student activity sheets in Picture This! Brooklyn Bridge are organized to help students acquire these new skills and to think critically about the information they gather.

Before photography existed, people visually captured their world through paintings, drawings and prints. These media were made by one's own hand or created by a hired professional. The prints in Picture This! Brooklyn Bridge span the 18th and 19th centuries. These particular prints were made to popularize and spread information through magazines, postcards or newspapers.

Because prints were rendered by hand it is especially important to take time to look at them thoroughly. Conscious choices go into their composition. Small details are not accidents, neither is placement nor choice of subject matter: some things in the print are in the foreground and some things are in the background; some things in the print are more carefully rendered than others. Generally, prints are as much a representation of an artist's personal point of view as they are a record of history.

Prints were the only method of mass visual reproduction before photography. They were a popular medium for use in magazines and newspapers. The use of prints in magazines and newspapers remained popular until technological developments allowed photographs to replace them. Prints made before photography became popular (1860s) held a different meaning from those made after the popularization of photography. If a print was made after the development of photography and was not for use in a magazine or newspaper, an observer must consider why the artist chose the medium of printing to capture a scene.

Photographs differ from prints in that the artist did not render the scene depicted in the photograph. Though a photographer makes choices about composition, and certainly has a point of view, photographs capture a scene almost exactly as it exists in the world.

Because the prints and photographs included in Picture This! Brooklyn Bridge were made for a purpose – whether for a newspaper article, a personal record or a postcard – it is useful to think about when and why the images were made, and to guess the audience for which they were made.
Questions to Ask About Images

These questions help students carefully look at and interpret images. Encourage students to back up their conclusions with visual evidence by asking, “What do you see that makes you say that?”

- What first catches your eye?
- What is in the foreground? In the middle? In the background?
- Is the image in color or black and white?

- Describe any people you see in the image.
- What are the people in the image doing?
- Why do you think the artist who made the image wanted to show these people?

- What objects appear in the image?
- What do you think these objects are used for?
- Do you think they are important to the artist who made this image? Why?

- Does the image show a particular time period? When? How can you tell?
- What does the image tell you about life in Brooklyn and the United States at the time it was made?

- What do you think the image was made for and why?
- What does the image tell you about the artist’s point of view?
- What do you think could be on the top, bottom, left or right of this scene that the artist did not capture?
Vocabulary List

background: the part of an image that appears behind the objects in the front of the image

cable car (or trolley): a kind of vehicle used to carry multiple passengers, runs on a track and is attached at the top to a large cable which helps propel the vehicle

carrige: an early form of covered transportation with wheels and pulled by horses

commuting: travelling from home to work on a regular basis

contemporary: new or recent, from modern times

engraving: a print made from an engraved surface

ferry: a vehicle that travels over water with the purpose of carrying people to and fro

foreground: the part of an image that appears in the front of the image

historic: from the past, of historical value

horsecar: a large wagon used for public transportation pulled by horses whose metal wheels run on tracks like a trolley

image: a visual representation of an object or event. A painting, photograph, drawing, etc.

immigrant: a person who comes into a new country to live

lithograph: a kind of print produced when paper is set against a metal plate or stone brushed with ink

mass transit: an organized system of public transportation in use in cities for the purpose of transporting great numbers of people in a variety of vehicles such as buses, subways and elevated trains

pavement: any type of material used to make streets flat

pedestrian: a person walking on a street or sidewalk

rural: country (as opposed to urban)

urban: city (as opposed to rural)

vehicle: any form of transportation used to carry something from place to place

wage: money earned per hour
Brooklyn Bridge Vocabulary

**anchorage:** the large structures at either end of the bridge span, inside which the cables are securely fastened

**cable:** On the Brooklyn Bridge, one of four large wire ropes bound with soft metal, from which the roadway is suspended

**caisson:** a large, airtight structure shaped like a box and open on the bottom, used to carry out underwater construction

**caisson disease:** an illness suffered by men working in the bridge's underwater caissons, caused by entering and exiting the caisson too quickly and not allowing the body to adjust to changes in air pressure (high pressure inside and normal pressure outside); characterized by paralyzing pain, often in stomach and ears. Also known as "the bends" because sufferers bend over in pain

**engineer:** a person trained in engineering, one who plans and supervises a large construction project involving complex engineering issues, such as a suspension bridge

**promenade:** the elevated walkway above the roadway

**roadway:** the area beneath the promenade used for vehicular traffic, such as horse-drawn carriages or automobiles.

**suspenders:** thick metal ropes hung from the bridge cables and attached at the other end to the beams that make up the roadway

**towers:** the large, stone structures over which the cables are hung, characterized by their distinctive Gothic arches

**toll:** fee, usually charged when crossing a bridge or using a road
Cross-Curricular Activities

Expand your study of the Brooklyn Bridge with these cross-curricular activities.

Geography
Use a map on New York City to show the relationship between Brooklyn and Manhattan. Identify land forms and waterways.

On the bridge... Look for New York City landmarks including the Statue of Liberty and the Empire State Building. Identify landforms and waterways.

History
• Create a timeline that shows what was happening in the United States, and the world, during the years that the bridge was being built (1870-1883).

• Research the 50 states using the following questions to guide your study:
  How many stars were on the United States flag when the Brooklyn Bridge opened in 1883? (Answer: 38)
  What state joined the Union during the construction of the Brooklyn Bridge? (Answer: Colorado. It became the 38th state on August 1, 1876.)
  What was the first state to join the Union after the opening of the Brooklyn Bridge? (Answer: North Dakota. It became the 39th state on November 2, 1889, six years after the opening of the Brooklyn Bridge.) For more information visit the internet Public Library's Stately Knowledge page at www.pl.gov/div/kidspace/stateknow/dates.html.

• Research presidential history using the following questions to guide your study:
  Who was president of the United States when the Brooklyn Bridge opened in 1883? (Answer: Chester A. Arthur)
  Who was president when construction started in 1870? (Answer: Ulysses S. Grant)
  How many presidents were in office during the course of construction? (Answer: four)
  Who were they? (Answer: Ulysses S. Grant, Rutherford B. Hayes, James Garfield and Chester A. Arthur)

Visit the Kids portal at www.whitehouse.gov and click on U.S. Presidents for more information.
Reading

- Read primary source documents about the bridge including newspaper articles from the Brooklyn Daily Eagle. They can be accessed on-line at http://eagle.brooklynpubliclibrary.org. Use a keyword search for “bridge” or “East River Bridge,” which is what the bridge was known as at the time. Refining your search by date (1869-1883, for example) will give you a wide range of articles from which to choose.

Writing

- Write a biography of one of the members of the Roebling family. Choose either John Roebling, who designed the bridge; his son, Washington Roebling, who took over as Chief Engineer when his father died; or Emily Roebling, wife of Washington, who helped her husband complete the bridge despite a debilitating illness.
- Write a story from the perspective of one of the bridge workers. Think about what it would be like to work in the caissons, on the towers or high above the river spinning cables. What would the workers see, hear, smell or feel on the job? What is wonderful and exciting about their job? What is hard or frustrating?

Speaking

Debate contemporary bridge-related issues. Here are a few questions to consider:
- Do we need another bridge? When the Brooklyn Bridge opened in 1883 it was the first to span the East River. The Williamsburg Bridge opened 20 years later, followed by the Manhattan Bridge in 1909. Can the three bridges handle today’s traffic? Debate the pros and cons of building a new bridge connecting Brooklyn and Manhattan. Consider where the bridge would be built, the neighborhoods it would connect, and its impact on people and places.
- Should people pay to use the Brooklyn Bridge? For years, it cost money to cross. Should tolls be reinstated? Why? How should the money be used? What are the advantages and disadvantages of bridge tolls? What do you think the toll should be for cars? Should there be a pedestrian toll? See a list of Opening Day fares on the Brooklyn Bridge Math worksheet Paying Your Way. Visit the Bridge Tolls Advocacy Project (www.bridgetolls.org) and Transportation Alternatives (www.transalt.org) to see what people are saying today.
Mathematics
Create drawings depicting the actual size of a Brooklyn Bridge cables (each are 15 3/4 inches in diameter). See Brooklyn Bridge Math worksheet *Totally Wired* for the number of strands per cable and wires per strand. Draw the cable on a large sheet of butcher paper. Use a compass to draw the strands inside the cable.

On the bridge...
- Use the Brooklyn Bridge Math worksheet *On the Promenade* to keep track of the ways in which people use the walkway.
- Examine the different geometric shapes in the bridge’s design. Triangles, for example, are found in the truss work of the bridge. What other shapes can you find?

Science
Demonstrate how a caisson works. Fill a clear plastic storage tub with water to simulate the river. Use a small, clear plastic container as a caisson. Ask: *Do you think the container will sink or float?* Does it matter if it’s placed on its bottom or open-side down? Try it. Next, ask students what they think will happen if you push the container, open side down, to the bottom of the tub. Will it fill up with water or air? Tape a folded paper towel to the inside top of the container. If the container fills with water, the paper towel will be wet. If the paper towel stays dry, you will know that the water was kept out. Now, push the container to the bottom of the tub. Hold it in place for one minute. Remove slowly. Check the paper towel. Is it wet or dry? This experiment demonstrates how water is displaced, and gives students an idea of how the caisson served as an underwater work chamber.

Theatre
- Write a Brooklyn Bridge play. Base your account on secondary source materials provided in this kit’s bibliography. Select key scenes to recreate (Examples include John Roebling’s foot being crushed; sinking the caisson; Frank Farrington’s ride across the East River on the traveling rope and Opening Day festivities). Have small groups of students work together to write each scene. Present the play to students, faculty and families.
Art

- Create a model of the Brooklyn Bridge. Follow basic design principles for a suspension bridge. For instructions, visit the Web site for the PBS program NOVA at http://www.pbs.org/wgbh/nova/bridge/build.html.
- Have students create their own images of the Brooklyn Bridge. If you are in the New York City area take a field trip to the bridge. Visit the Brooklyn Bridge promenade or Empire-Fulton Ferry State Park, located near the base of the Brooklyn tower. As a class, select a medium in which to represent the bridge, be it photography, painting or drawing. If you can not visit the bridge, use the images in this kit, and the primary sources listed in its bibliography, as inspiration.

On the bridge...
Sketch the view. Photograph people using the bridge. Do close-up sketches of the towers and the web-like network of cables, suspenders and diagonal stays.

Music

- Compose a Brooklyn Bridge song based on sounds heard on and around the bridge. Consider the sounds one might have heard in 1883 and the sounds one hears today. Challenge students to recreate sounds with an instrument, their voices or bodies.

On the bridge...
Make a list of sounds heard on the bridge. Tape record for reference.
Field Trips and Cultural Resources

Brooklyn Historical Society
128 Pierrepont Street
Brooklyn, NY 11201
Phone: 718-222-4111
Fax: 718-222-3794
www.brooklynhistory.org
Visitors to our National Historic Landmark building, reopened in Fall 2003 after extensive renovation, will discover an exciting, interactive exhibition, Brooklyn Works: 400 Years of Making a Living in Brooklyn, along with new exhibit spaces and our History Discovery Center. The Othmer Library, which reopens in spring 2004, has been designated a major resource library by the U.S. Department of Education and is the premier source for Brooklyn history, with 155,000 bound volumes, 100,000 graphic images, 2,000 linear feet of manuscripts and more than 2,000 maps and atlases. The BHS image database, available by appointment, contains more than 33,000 historic prints and photographs, including more than 700 of the Brooklyn Bridge.

Brooklyn Center for the Urban Environment
The Tennis House
Prospect Park
Brooklyn, NY 11215
Phone: 718-788-8500
Fax: 718-499-3750
www.bcue.org
BCUE offers a broad menu of school and park-based environmental education programs for students in pre-kindergarten through high school focusing on Brooklyn's unique urban landscape.

Brooklyn Children's Museum
145 Brooklyn Avenue
Brooklyn, NY 11213
Phone: 718-735-4400 ext. 118
www.brooklynkids.org
Education programs at BCM focus on world culture and natural science. Visit www.brooklynxpedition.org, a joint project of BCM, the Brooklyn Public Library and Brooklyn Museum of Art to learn more about the Brooklyn Bridge.
Teacher’s Guide
Introduction

Brooklyn Information & Culture (BRIC)
647 Fulton Street, 2nd Floor
Brooklyn, NY 11217
Phone: 718-855-7882
Fax: 718-802-9095
www.brooklynx.org
Founded in 1979, BRIC provides cultural, educational, and informational programs that reflect Brooklyn’s diverse population. Check the Web site for a complete listing of Brooklyn walking tours.

The Brooklyn Museum of Art
200 Eastern Parkway
Brooklyn, NY 11238
Phone: 718-638-5000
Fax: 718-501-6134
www.brooklynmuseum.org
The BMA’s permanent collection includes numerous photographs and paintings of the Brooklyn Bridge, including Georgia O’Keeffe’s Brooklyn Bridge (1949), on view in the museum’s fifth floor Luce Center for American Art.

Brooklyn Public Library, Brooklyn Collection
BPL Central Branch
Grand Army Plaza
Brooklyn, New York 11238
Phone: 718-230-2762
www.brooklynpubliclibrary.org
BPL’s Brooklyn Collection documents the borough’s history through an extensive array of books, postcards, magazines, maps and more than 35,000 photographs from the late 19th century to the present. BPL also offers on microfilm the entire run of the Brooklyn Daily Eagle, the borough’s premiere paper from 1841-1955. A portion of the Eagle (1841-1902) is also available online at http://brooklynpubliclibrary.org/eagle.
Empire-Fulton Ferry State Park
26 New Dock Street
Brooklyn, NY 11201
(718) 858-4708
Located beneath the Brooklyn Bridge, this nine-acre waterfront park affords unrivaled views of the bridge towers and span, as well as the Manhattan skyline. Picnic tables are scattered throughout the lawn, and benches line the boardwalk along the water's edge. The newly opened Brooklyn Bridge Park is located just a few blocks north, at the foot of the Manhattan Bridge. To learn more about both parks visit the Brooklyn Bridge Park Coalition Web site, www.bbpc.net, and click on Park Information.

Gotham Center for New York City History
The Graduate Center, CUNY
Room 6103
365 Fifth Avenue
New York, NY 10016
Phone: 212-817-8460
Fax: 212-817-2987
www.gothamcenter.org
The Gotham Center provides a variety of resources to K-12 educators, including the Teaching NYC History conference designed to help teachers incorporate New York City history into the curriculum.

Museum of the City of New York
1220 Fifth Avenue
New York, NY 10029
Phone: 212-534-1672
Fax: 212-423-0758
www.mcny.org
MCNY offers guided tours of the museum for school groups, exploring New York City history through the use of visual images in the museum's collection.
New-York Historical Society
2 West 77th Street
New York, NY 1024
Phone: 212-873-3400
www.nyhistory.org
The New-York Historical Society offers programs to students in grades K-12. Its programs for 4th, 7th, 8th and 11th grade connect to New York State Social Studies standards and guide students in the use of primary source materials.

New York Transit Museum
Boerum Place and Schermerhorn Street
Brooklyn, NY Zip 11201
718-694-1600
http://mta.info/mta/museum
Located in an old subway station, the Transit Museum is now reopened after extensive renovation. The museum is filled with restored antique subway cars, trolleys and buses, many open for climbing, exploration or make-believe, telling the story of New York City’s fabled public transportation system and its role in the growth and history of the metropolis. Visit www.transitmuseumeducation.org for an interactive lesson on mural making, a look at old subway tokens and a game of MTA concentration.
Additional Resources

For Teachers

Books
The Great Bridge: The Epic Story of the Building of the Brooklyn Bridge by David McCullough
A Picture History of the Brooklyn Bridge by Mary J. Shapiro
Brooklyn Then and Now by Marcia Reiss
Brooklyn Bridge: Fact and Symbol by Alan Trachtenberg
Bridge of Dreams: The Rebirth of the Brooklyn Bridge photos by Burhan Dogançay, intro. by Phillip Lopate
Silent Builder: Emily Warren Roebling and the Brooklyn Bridge by Marilyn E. Weigold

Videos and DVD's
Brooklyn Bridge by Ken Burns
Originally aired on PBS in 1982, this Academy Award-nominated documentary provides excellent background for teachers. Preview before sharing with students in grades 2-6, who will get the most out of it by viewing selected sections over time. Available on www.pbs.org.

For Students

Nonfiction
The Brooklyn Bridge: They Said It Couldn't Be Built by Judith St. George
The Brooklyn Bridge: A Wonders of the World Book by Elizabeth Mann. Illus. by Alan Witschanke
Brooklyn Bridge by Lynn Curlee

Fiction
Hey Kid, Want to Buy a Bridge? (The Time Warp Trio, #11) by John Scieszka, illus. by Adam McCauley
Web Sites

www.brooklynpubliclibrary.org
The first half of the Brooklyn Daily Eagle, the borough’s premiere newspaper from 1841-1955, is available online at this Web site. When researching the Brooklyn Bridge, do a key word search for "bridge" or "East River Bridge," which is what the Brooklyn Bridge was known as when it opened. Refining your search by date (1869-1883, for example) will give you a wide range of articles from which to choose.

www.endex.com/gf/buildings/bbridge/bbridge.html
For Brooklyn Bridge facts, figures, photos, poetry and more check out this site.

www.inventionfactory.com/history/RHABridg/bb.html
This site contains facts and figures about the Brooklyn Bridge.

brooklynjuniorleague.org/BRIDGE.HTM
This timeline by the Brooklyn Junior League starts in 1802 with a proposal by the New York State Legislature to build a bridge and ends in 1883.

www.pbs.org/wgbh/nova/bridge/build.html
On this Web site, the PBS program NOVA gives directions on how to build a suspension bridge.

www.brooklynxpedition.org
Click on "Brooklyn History" to learn more about the Brooklyn Bridge, or "Structures" to find out how the bridge was built, at this site, a joint project of the Brooklyn Public Library, Brooklyn Museum of Art and the Brooklyn Children’s Museum.
# Teacher's Guide

## Introduction

## Teacher Evaluation Form

Dear Teacher:
Please take a moment to fill out our evaluation form. Your feedback will shape our next publication!

### Date ____________________________ Grade Taught _________________________

### School Name ___________________________________________________________

### School Address __________________________________________________________

Please rate these materials by circling the number that best reflects your thoughts.

1. Did the materials provide new and useful methods of looking at historic images?
   - Not at all ________________ O.K. ________________ Excellent ________________
   - 1 ________________ 2 ________________ 3 ________________ 4 ________________ 5 ________________

2. Did the materials provide your students with an understanding of how Brooklyn has changed over time?
   - Not at all ________________ O.K. ________________ Excellent ________________
   - 1 ________________ 2 ________________ 3 ________________ 4 ________________ 5 ________________

3. Did the materials provide useful information about Brooklyn's history, and the Brooklyn Bridge, as it relates to NYS Standards?
   - Not at all ________________ O.K. ________________ Excellent ________________
   - 1 ________________ 2 ________________ 3 ________________ 4 ________________ 5 ________________

4. Did the materials encourage students to develop and use improved observation skills?
   - Not at all ________________ O.K. ________________ Excellent ________________
   - 1 ________________ 2 ________________ 3 ________________ 4 ________________ 5 ________________

5. Which materials did you find most valuable? Why?
   - ____________________________

6. On the back of this form, describe how your students used these materials, if different than the suggested lesson plans.

7. Would you share with us any overall comments, observations or samples of students work? You can write on the back of this form or attach a photocopy of student work.

Please mail this form back to:
The Brooklyn Historical Society, 128 Pierrepont Street, Brooklyn, NY 11201

© BROOKLYN HISTORICAL SOCIETY
Main Ideas

1. Brooklyn and Manhattan are separated by the East River.

2. Before 1883, the only way to cross the East River was by boat.
   a. Cornelius Dirksen operated the first ferry service between New Amsterdam (now called Manhattan) and Breuckelen (Brooklyn) beginning in 1642. It traveled between what is now Peck Slip in Manhattan to Fulton Street (then called Ferry Road) in present-day Brooklyn. Dirksen's ferry was a small rowboat.
   b. Sailboats and horse-powered boats were also used to travel back and forth across the river.
   c. Steam-powered ferries soon replaced sailboats and people-powered boats as the transportation of choice. Steam-engine ferries were faster than other modes of transportation. People could cross the river in as little as 5 minutes.
   d. Robert Fulton operated the first steam engine ferry across the East River in 1814.

3. People traveled between Brooklyn and New York (now called Manhattan) for different reasons.
   a. In the 1700s and early 1800s people took farm goods and animals into New York to sell at public markets.
   b. The invention of steam ferries allowed people to commute and shop in New York on a more frequent and regular basis.
Image Facts

(Note: Read Image Facts aloud at the end of students’ group presentations.)

Image A Fulton Street, Brooklyn, NY 1746 from Valentine’s Manual of 1858.
Lithograph.
This image depicts a 1746 scene at the foot of Fulton Street in Brooklyn. Today, the Brooklyn Bridge is located in this same spot. But back then, the bridge had not been built. People wishing to cross the East River did so in small rowboats. The larger sailboats and flat skiffs were used to transport goods and livestock (animals), which were sold at market in New York (Manhattan), seen in the background.

Image B View of Fulton Ferry Buildings, Brooklyn, Long Island from Ballou’s Pictorial (Boston), July 23, 1853. Engraving.
Rowboats, sailboats and a paddlewheel steamboat are seen in this image, which depicts the scene near Brooklyn’s Fulton Landing in 1853. The city was growing, and more and more people were traveling back and forth between the City of Brooklyn and New York (Manhattan). But a year earlier, in 1852, the river froze. Ferry service was suspended. An “ice bridge” formed and people crossed the river on foot. Some even ice-skated. Others weren’t so lucky. John Roebling, the man who went on to design the Brooklyn Bridge, was aboard a ferry stuck in ice.

Image C Brooklyn’s First Ferry by Keystone View Company, ca. 1700. Print.
This image depicts Manhattan Island in the 1600s. At that time, Dutch settlers lived in lower Manhattan in a settlement called New Amsterdam. The area was thick with trees and laced with streams and soggy marshes. The man in this image is blowing a horn to request a ride from ferry operator Cornelius Dirksen. Mr. Dirksen operated the first ferry service between Brooklyn and Manhattan beginning in 1642. Passengers traveled in his small canoe.

Image D The Ferry-boat “Brooklyn’ entering the slip on the Brooklyn shore, 1838.
Lithograph
Robert Fulton introduced steam-powered ferry service between Brooklyn and Manhattan on May 11, 1814 with a boat named Nassou. The boat carried more than 500 passengers, crossing the river in as little as 4-8 minutes. In this image, the ferryboat Brooklyn, with its distinctive chimney puffing out smoke, is pulling up to shore.

Chronological Order of Images: C, A, D, B
General Information

1642 Ferry service between New Amsterdam (now called Manhattan) and Breuckelen (Brooklyn) begins. Cornelius Dirksen, a farmer and owner of a small inn near what is now Peck Slip, operates the ferry. Passengers who want to cross the East River blow into a horn hanging on a tree to alert Mr. Dirksen. His rowboat carries only one or two people at a time. People cross primarily for trade.

1653 The government of New Amsterdam takes control of ferry service. More boats are added and the fare is increased. Native Americans are charged twice as much as Europeans. Five years later, the City of New Amsterdam begins leasing ferry service to individual operators as a way to make money.

1699 As ferry service increases, the City of New York creates more rules for companies that run the ferries.

1700s New two-story brick ferry house and tavern opens in Brooklyn (1700). Ferry service grows; new lessees every 4-5 years.

1776 Revolutionary War; Military monitors ferry service.

April 3, 1814 Horse boats replace rowboats. They are powered by horses. The animals stand in the center of the boats moving a treadmill. The treadmill makes the boat move. An eight horse power boat is used at Catherine Slip. It crosses the river in 12-20 minutes.

May 10, 1814 Robert Fulton introduces the first steamboat ferry service on the East River. The Nassau is large enough to hold 550 people, four horses and four horse-drawn vehicles. The Nassau ran on the Fulton Ferry line between Fulton St. in Brooklyn and Manhattan’s Peck Slip. For ten years it was the only steamboat in use. Travel time is from 4-8 minutes.

1836 South Ferry opens.

1839 Fulton Ferry and South Ferry join to become the New York and Brooklyn Union Ferry company. The Union Ferry company begins service with 17 boats, most of which are in use at all times. The ferries carry between 800 to 1000 people per trip and earn an estimated one million dollars per year.

1852 Ferry service suspended when East River freezes.
Guiding Questions

Image A  Which boats are used to carry people back and forth across the river?
By 1746, ferry service was firmly established on the East River. Of the several types of boats seen in this image the kind most likely to transport people would be the smaller, canoe-like boats. Goods and livestock were transported separately on larger boats.

Image B  Why is there so much traffic on the river?
By the 1850s, New York and Brooklyn were both thriving cities. The population had grown and more and more people were traveling back and forth between the two cities for business and pleasure.

Image C  What is the man in this image doing and why?
The man in this image is blowing into a horn, signaling to ferry operator Cornelius Dirksen that he wants to go for a ride. In 1642, the year this image depicts, few people lived in New Amsterdam. Demand for ferry service was light, so Mr. Dirksen, who was also a farmer and the owner of a small inn, did not run his ferry on a schedule. If you needed a ride, you blew into the horn hanging on the tree to let Mr. Dirksen know you were waiting.

Image D  How is this boat powered?
Introduced by Robert Fulton in 1814, steamboats were powered by coal. In this image, smoke is billowing out of the boat’s chimney. Steamboats were much faster than sailboats or people-powered boats and could cross the river in as little as 4-8 minutes. This boat carried people and livestock (animals).
Main Ideas

1. The Roebling family was in charge of the bridge's construction.
   a. John Roebling designed the bridge.
   b. When he died as the result of an injury suffered while surveying the bridge, his son, Washington, took over as Chief Engineer.
   c. Washington Roebling fell ill early in the project. He suffered from caisson disease, and was confined to his home. His wife, Emily, became the liaison between her husband and the workers on-site.

2. Bridge construction took 13 years (1870-1883).
   a. At the time, the Brooklyn Bridge was not only the most ambitious construction project ever undertaken in New York but, when completed, it would be the longest suspension bridge in the world.

3. Work progressed in stages.
   a. caissons
   b. towers
   c. cables
   d. roadway
   e. promenade

4. Innovative construction techniques and materials were used in the bridge's construction.
   a. Underwater caissons were a relatively new invention.
   b. Steel wires were used to create the cables. Previously, iron was the building material of choice.

5. The workforce was made up of a great number of immigrant laborers.
   a. Most were Irish and German.
   b. Caisson workers earned $2 per day, and received a twenty-five cent raise when the caisson sank deeper below the riverbed.
   c. Despite the difficulty of the work, and the number of men who either quit or left the job due to illness, injury or death, the constant flow of immigrants into the U.S. ensured a steady labor pool.

6. Work was difficult and dangerous.
   a. At the time the bridge was built, electricity had not yet been invented. All the work was done without power tools or electric light.
   b. Though no official records were kept, it is estimated that 20-30 men died during the course of construction.
Image Facts
(Note: Read Image Facts aloud at the end of students’ group presentations.)

The roadway is under construction in this image. Open steel beams are attached to suspenders, which hang from the cables. Work begins at the towers and proceeds outward. Here, the floor extends to the center of the span. The men in the image are standing on a temporary footpath.

Image B  Skyline of Lower New York when the Brooklyn Bridge was being built, ca. 1880. Photograph.
In this image, both towers have been completed and wire is being strung across to create four enormous cables. Workers unfurled a continuous spool of wire back and forth, over each tower, from anchorage to anchorage. Two hundred seventy eight wires were bound together to form a strand. Nineteen strands made a cable. Once each cable was complete it was wrapped with soft wire.

Image C  Attaching the suspenders, ca. 1875. Print.
The workers in this image are attaching suspenders to the cables. The suspenders hang from the cables. They are attached, at the other end, to large steel beams that form the roadway. The work is difficult and dangerous. The men work high above the river without safety harnesses or other protective gear.

The towers are built on top of the caissons. Here, the New York tower is under construction. Workers use huge derricks to haul large granite stones into place. Electricity has not been invented, so the derricks are raised and lowered by hand. When it is completed, the tower will reach a height of 276 1/2 feet above the high water mark, making it one of the tallest structures in New York.
Image E  Brooklyn Caisson Longitudinal Section, from Pneumatic Tower Foundations of the East River Suspension Bridge by W.A. Roebling, 1872.

The caissons are the foundation upon which the bridge towers are built. The "sinking" of the Brooklyn caisson marks the first phase of bridge construction. In this drawing, the Brooklyn caisson is shown underwater, pushing through the riverbed to solid bedrock. (The New York caisson is located on the Manhattan side of the river.) The caisson's work chamber is shown in the shaded area on the bottom. Men work inside the caisson, on the riverbed, 24 hours a day, digging out rocks and mud so that the caisson will sink deeper and deeper until they reach solid bedrock. At the point this drawing was made, the caisson was 168 feet below the riverbed. When the caisson hit bedrock it was filled with concrete.

Chronological Order of Images: E, D, B, C, A
General Information

June 28, 1869  John Roebling and his son Washington begin to survey the site on which the bridge will be built. The elder Roebling is injured when an oncoming ferry crushes his foot, which was caught in the dock's wooden pilings. He dies of tetanus, or lockjaw, on July 22nd, less than a month after the accident. Washington Roebling takes over as Chief Engineer.

March 19, 1870  Brooklyn caisson is launched from the foot of Noble Street in Greenpoint, Brooklyn. It is made of pine and wrapped in steel (to keep sea worms out) by Greenpoint shipbuilder Webb & Bell.

May 3, 1870  Shaped like a giant, hollow box with an open bottom, the caisson is floated downriver to its final resting place near Brooklyn's Fulton Ferry slip. The caisson is plunged beneath the river, creating an underwater workspace from which workers dig out the bridge foundation.

May 21, 1870  Work begins inside the Brooklyn caisson. Men enter the caisson through airlock chambers and work on the riverbed digging out rocks and mud with picks and shovels. Their goal is to push the caisson through the riverbed until it rests on a foundation of solid bedrock.

December 2, 1870  Fire breaks out in Brooklyn caisson. It is believed to be the result of a candle used by a worker to locate his lunch pail left hanging from a nail in the structure's wooden walls.

June 16, 1870  Workers begin building the Brooklyn tower on top of the caisson. The weight of the heavy stone helps push the caisson deeper and deeper beneath the water and through the riverbed.

May 18, 1871  New York caisson launched from East 6th Street dock in Manhattan and towed downriver. It is designed by Webb & Bell, with modifications due to problems with the Brooklyn caisson.
1872  Washington Roebling forced to remain at home in bed due to caisson disease, the debilitating illness caused by air pressure inside the caissons. From now until the bridge is completed, Emily Roebling, Washington's wife, acts as liaison between her husband and workers at the construction site. Washington uses a telescope and binoculars to oversee the project from his bedroom window at his home in Brooklyn Heights.

November 1871  New York caisson sunk to riverbed.

June 1875  Brooklyn tower completed.

July 1876  New York tower completed. Concerned about the health and safety of his workers, Roebling orders digging stopped at 78 1/2 feet below the riverbed. To this day, the New York tower rests not on solid bedrock but on a foundation of hard-packed sand.

August 14, 1876  Frank Farrington, Master Mechanic, amuses onlookers when he travels across the river on a swing attached to the wire between the two towers.

May 29, 1877  Workers bring first cable wire between towers.

December 1881  First phase of roadway completed. Work on the roadway begins once the cables and suspenders are hung. Steel girders are attached to the suspenders. Each large, open-work beam is positioned at an interval of 7 feet 6 inches. Smaller beams are placed in between. Work begins at each of the towers and proceeds outwards.

April 1883  Promenade completed.

May 24, 1883  Brooklyn Bridge opens to the public.
Guiding Questions

Image A  Where did the workers lay the first part of the roadway, near the center of the span or alongside the towers? How can you tell? Why would the workers start in one place rather than the other?

When building the roadway, workers started at the towers and worked their way outward toward the center span and anchorages. In this image, the New York tower is visible in the background. Truss work can be seen emanating from either side of the tower. The foreground of the image shows truss work emanating from the Brooklyn tower toward the center span.

Image B  How did the workers string the wire between the towers?

In this image, three platforms are visible between the towers. They are attached to the growing network of wires. Workers stood on these movable platforms, rolling the wire out between the towers.

Image C  What special skills or qualifications would you need if you were the person responsible for hanging the suspenders?

Men who hung the suspenders had to be physically strong. The suspenders were made of steel and were very heavy. Workers also had to have a good sense of balance. And since their job required them to work high above the river, these men could not be afraid of heights. In fact, many of the workers had experience rigging the sails of tall-masted ships.

Image D  How tall do you think the tower is in this image?

To estimate an answer, begin by figuring out the height of the people in this image. Look at the men standing alongside the tower. How many men would have to stand on top of each other's shoulders to equal the height of the tower? Use the height of an average adult today to find a more exact estimate of the height of the unfinished tower. When it was completed, the tower would rise to a height of 276 1/2 feet above high water, equal in size to a 23-story building. At the time, most buildings in New York did not rise above six or seven stories.
Image E  What do you think it was like to work inside the caisson?

Working inside the caisson was extremely difficult. It was dark, hot and smelly at the bottom of the river. The air pressure made it difficult for workers to breathe. Still, they worked around the clock in three eight-hour shifts. During the day shifts, 112 men worked in the caisson at one time. Forty men worked over night. There was no electricity at the time, so workers had to rely on the flickering light of calcium lamps, or limelights, that were fueled by a mixture of coal gas and compressed oxygen. (Candles and kerosene lamps proved hazardous.) Temperatures inside the caisson often reached 80 degrees or higher, and because there was no ventilation, the odor from makeshift toilets, perspiration and mud could be intense.
CROSSING THE BRIDGE

Brooklyn Bridge
Main Ideas

1. The Brooklyn Bridge was not designed for automobiles.
   a. The first vehicles to travel on the bridge were horse-drawn carriages, cable cars—which were pulled by steam locomotives—and electric trains.

2. The Brooklyn Bridge has changed with the times. It has been modified to accommodate new modes of transportation as well as the increased traffic of the growing city.
   a. John Roebling designed the bridge to be many times stronger than necessary in order to account for unforeseen advances in transportation technology and increased traffic.
   b. The Brooklyn Bridge looks different today than it did when it first opened more than 100 years ago.

3. Tolls were in place on the bridge until 1911.
   a. Tolls differed depending on who, or what, was crossing.
   b. Tolls helped repay the costs of building the bridge.
Image Facts
(Note: Read Image Facts aloud at the end of students' group presentations.)

Image A From the Footpath on the Brooklyn Bridge. New York Harbor looking towards Manhattan by Esther Bubley, ca. 1945. Photograph. Standard Oil (New Jersey) Collection, Photographic Archives, University of Louisville

This photograph shows two lanes of automobile traffic on the Brooklyn Bridge. Railroad tracks were removed from the roadway after World War II, so we can assume this photograph was taken after 1945. And since the roadway was expanded in 1952 to accommodate three lanes of traffic — and there are only two lanes of traffic in this picture — we can also assume this photo was taken before 1952.


The Brooklyn Bridge is busy on a beautiful fall day, with three lanes of traffic on the roadway and a steady stream of pedestrians on the promenade. Taxis, cars and vans travel on the roadway below. On the promenade, people walk and jog, ride bicycles and stop to take pictures.

Image C The First Horse and Carriage Driven Over the Brooklyn Bridge, ca. 1883. Photograph.

Emily Roebling crossed the completed bridge in 1883, before it was open to the public. She did so in a horse and carriage. (Automobiles had not yet been invented.) She carried with her a live rooster, which, at the time, was considered a symbol of victory. Though the woman in this photograph resembles Emily Roebling, it is not known for sure whether or not it is really she.

Image D Brooklyn Terminal, Brooklyn Bridge, ca. 1900. Color postcard.

This image shows the Brooklyn Bridge looking toward Manhattan. Pedestrians walk on the promenade next to elevated electric railroad tracks. Horse-drawn carriages and trolleys are visible on the roadway. At the time this postcard was produced the bridge was commonly referred to as the Brooklyn Bridge. (When it opened in 1883, it was called by many different names, including the Great East River Bridge and the New York-Brooklyn Bridge.) It would not be officially known as the Brooklyn Bridge until 1915.

Image E The Bridge - Showing Roadway, Walk[way] and Cable Cars from Glimpses of Brooklyn by the Mercantile Illustrating Company, ca. 1894. Photograph.

In this image, we see pedestrians on the promenade, elevated cable cars and, on the roadway, two lanes of vehicular traffic, which, at the time, meant horse-drawn carriages, not automobiles. Cars were not popularized in the United States until the early 1900s.

Chronological Order of Images: C, E, D, A, B
General Information

1883 Emily Roebling crosses the bridge in a horse-drawn carriage to test the strength of the roadway. She carries in her lap a live rooster, seen at the time as a symbol of victory.

May 24, 1883 The Brooklyn Bridge opens to traffic, which includes pedestrians, horse-drawn vehicles and electric trains. More than 150,000 people cross the bridge on opening day. Pedestrians pay a penny apiece. Eighteen-hundred (1,800) vehicles cross for five cents each.

May 31, 1883 Just days after its opening, 20,000 people pack the bridge promenade. When a woman falls down the stairs near the New York tower, the crowd panics, resulting in a massive pile-up in the stairwell. Twelve people die.

September 1883 Cable cars installed on bridge. Trains run alongside the roadway, on either side of the promenade, and are pulled by steam locomotives. They cross the bridge in five minutes. Six million passengers — paying five cents apiece — rode the cable cars during their first year of service. Five years later, the number of passengers increased to 31 million.

May 1884 Circus impresario P.T. Barnum leads a team of 21 elephants across the bridge in order to test its strength.

1891 Pedestrian tolls discontinued.

1898 Bridge is modified to accommodate electric trolleys. Trolley tracks are installed on the roadway, leaving just one lane for regular traffic. Cable cars are replaced by electric trains (except during high-traffic hours) and they run on elevated tracks.

July 18, 1911 All roadway tolls discontinued. Cable cars and trolley passengers must still pay fare.

Did you know?

In 2001, an average of 95,586 vehicles passed over the Brooklyn Bridge every day. But when John Roebling drew up his plans for the bridge cars hadn't even been invented.
Source: New York City Department of Transportation
1944 Last elevated train crosses the Brooklyn Bridge.

March 6, 1950 Last cable car crosses the Brooklyn Bridge.

1950-54 Brooklyn Bridge modernized. All tracks are removed from the roadway, which is reconditioned and expanded to accommodate three lanes of automobile traffic in either direction.

1982 Ramps replace stairs on the promenade approach, making the promenade more accessible to bicyclists and, for the first time, people in wheelchairs.
Guiding Questions

Image A  What year do you think this photograph was taken?

We can date this image in a number of ways. First, we know that since there are cars on the bridge this photograph was taken in the 1900s. By looking at the style of the cars we can tell this is not a recent picture. Based on the size and shape of the cars in this image we can guess the photograph was probably taken in the 1940s or 50s. We can also look to changes made on the bridge to help us date this photograph. Since there are just two lanes of traffic we know the photo was taken before 1952, the year the roadway was expanded to three lanes in either direction. And since tracks were removed from the roadway in 1945 we know this photograph was taken after that date.

Image B  What clues tell you this is a contemporary image?

There are a number of clues that tell us this is a contemporary image. First, it is in color. You can also see that there are electric lights installed on the bridge. On the roadway you can see there are three lanes for traffic, and that the cars are modern. The buildings in the background also help us to determine this photo's age.

Image C  What do you think it was like to travel by horse-drawn carriage?

In the 1800s, the streets of New York and Brooklyn were filled with horse-drawn carriages. It was the only way to get around town. The carriage attached to the horse and the driver "steered" the horse using reins and a switch. Streets were paved with cobblestone, which made the ride bumpy and loud. If you traveled on a dirt road you would probably kick up a trail of dust or, on a rainy day, get stuck in the mud. If you want to ride in a horse-drawn carriage today you can visit Manhattan's Central Park.
Image D  Compare this image with how the bridge looks today. How is it different? How is it the same?

In this image we can see pedestrians walking along the promenade. There are railroad tracks running alongside the promenade. Cable cars run on tracks installed on the roadway, which accommodates one lane of vehicular traffic. All rail travel was eliminated and tracks removed in the 1950s. Today, the roadway accommodates three lanes of traffic on either side, a modification that was made in 1952. Pedestrians cross the bridge the same way they always have.

Image E  What kinds of vehicles do you see on the bridge? What mode of transportation would you choose and why?

Electric trains, trolleys and horse-drawn carriages are visible in this image. You can also see pedestrians crossing the bridge on foot. To decide which mode of transportation you will use you will want to consider several factors, including the speed and cost of travel. Walking across the bridge will take the longest. Traveling in a horse-drawn carriage will be faster. But the quickest way to cross the bridge will be by train or trolley. Both took about five minutes. At the time this photograph was taken (1894), pedestrians crossed the bridge for free. (The one-cent toll was abolished in 1891.) Those traveling in a horse-drawn vehicle paid 10 cents. It cost five cents to ride the train or trolley.
Main Ideas

1. The Brooklyn Bridge is not only useful, it is a work of art.
   a. John Roebling designed the bridge to be both functional and beautiful.
   b. Roebling’s architectural drawings make clear his artistic vision.

2. The Brooklyn Bridge has inspired artists for more than 100 years.
   a. Artists have portrayed the bridge in visual mediums such as drawing, painting and photography.

3. Images of the bridge have been created for different purposes.
   a. construction
   b. art
   c. advertising
Image Facts
(Note: Read Image Facts aloud at the end of students’ group presentations.)

Image A  Bird’s-Eye View of the Great New York and Brooklyn Bridge...On Opening Night, 1883. Lithograph.
This image depicts the long-awaited Opening Day celebration on May 24, 1883. Festivities began at noon and continued throughout the evening. The pyrotechnic display kicked off at 8 p.m. with fireworks dropped from hot air balloons and launched from boats, land and the bridge itself. All together, fourteen tons of fireworks were detonated. This image shows fireworks shot off the bridge towers.

Georgia O’Keeffe (1887-1986) completed this painting of the Brooklyn Bridge in 1949. The tower’s dark, dramatic arches frame the light-filled sky and a criss-crossed network of cables, suspenders and diagonal stays. A cable runs down the center of the image and to the left. Brooklyn Bridge is the last in a series of paintings O’Keeffe created while living in New York City. She completed the painting the same year she left New York for New Mexico, where she lived for the rest of her life.

Andy Warhol (1928-1987) — known, among other things, for his images of Campbell’s Soup cans — created this image in 1983 to mark the 100th anniversary of the opening of the Brooklyn Bridge. It is done in his signature style—repeated black and white images layered with bright blocks of color. At the time, it was available as a poster.

John Roebling created detailed architectural drawings of the Brooklyn Bridge, including this image of the bridge span. Other drawings focused on the anchorages, the approach and various aspects of bridge construction and design. Here, Roebling referred to the bridge as the East River Bridge. (It would not be officially known as the Brooklyn Bridge until 1915.) This drawing — and 8,000 like it — was unknown to the public until the 1970s, when historians found them in the Brooklyn anchorage. The drawings are now housed in New York City's Municipal Archives.

Chronological Order of Images: D, A, B, C
Guiding Questions

Image A  What is happening in this image?
This image depicts the Opening Day celebration on May 24, 1883. Events kicked off at 12:00 noon and continued well into the evening with a pyrotechnic, or firework, display commencing at 8 p.m. Here, the artist shows fireworks being shot off boats docked in the harbor and from the bridge towers.

Image B  What clues tell you that this is an image of the Brooklyn Bridge?
O'Keeffe’s 1949 painting is framed by the bridge’s distinctive Gothic arches. The bridge’s criss-crossed suspenders and diagonal stays — as well as a single cable — are also visible. These elements have come to symbolize the Brooklyn Bridge.

Image C  How can you tell when and by whom this image was created?
The label below this image is a give-away. In order to reproduce this image, it must be clearly labeled with the artist's name — Andy Warhol. Warhol was well known for his colorful silkscreen prints, which layered bright blocks of color on black and white images. The vibrant, geometric arrangement gives this image a contemporary feel. This image was created in 1983 in honor of the bridge’s 100th birthday.

Image D  Why can we consider the architectural drawings to be an artistic representation of the bridge?
In his original plan for the bridge John Roebling called for a structure that was not only useful but also beautiful. His architectural drawing of the bridge span has the feel of fine art, with its delicate lines and precise rendering of the bridge over water. Today, reproductions of this image are popular as framed posters.
General Information

1865  John Roebling, with the help of his assistant Wilhelm Hildenbrand, begins work on a series of drawings of his proposed East River Bridge. Two years later on May 23, 1867, the New York Bridge Company officially names John Roebling Chief Engineer. After Roebling’s death his son, Washington, and others create additional drawings, including detailed renderings of the anchorages and approaches.

1870s-80s Numerous publications of the day, including Harper’s Weekly and Scientific American, enlist illustrators to follow the progress of bridge construction. Some illustrators even travel inside the caisson to give readers a look into an underground world the likes of which few will ever experience. Photographers did not bring their cameras inside the caisson because it was too dark.

1883  A variety of paintings and illustrations are created to depict Opening Day ceremonies. The historic occasion and the festivities surrounding it make a compelling subject.

1949  Georgia O’Keeffe completes Brooklyn Bridge. It is the last in a series of paintings set in New York City.

1970s  Historians working in the Brooklyn anchorage find more than 8,000 of Roebling’s original architectural drawings. Previously, it was not known that these images had survived. Today, they are held for safekeeping in New York City’s Municipal Archives.

1983  New York-based artist Andy Warhol creates Brooklyn Bridge in honor of the 100th anniversary of the opening of the Brooklyn Bridge. It is done in his signature style — repeated black and white images layered with bright blocks of color. At the time, the image was widely available as a poster captioned “Brooklyn Bridge 1883-1983.”
Main Ideas

1. The Brooklyn Bridge was the first to span the East River.
   a. Before the bridge, people crossed by boat.
   b. The growth of Brooklyn and New York necessitated bridge construction.

2. Bridges connect communities and make it easier to travel between different parts of the city.

3. As the city grew, more East River crossings were needed.
   a. The Williamsburg Bridge opened in 1903.
   b. The subway was extended to Brooklyn in 1908, four years after it opened in Manhattan.
   c. The Manhattan Bridge opened in 1909.
   d. The Brooklyn-Battery Tunnel opened in 1950.

4. After an absence of 60 years, ferry service was restored on the East River in 2002.
Image Facts

Image A  East River showing Brooklyn, Manhattan and Williamsburg Bridges, New York City, ca. 1930. Color postcard.

By 1909 a trio of bridges — the Brooklyn, Williamsburg and Manhattan — spanned the East River, connecting Manhattan and Brooklyn. The Brooklyn Bridge is in the foreground of this image, which offers a birds-eye view of the bridges.


This postcard was probably printed sometime between 1903 and 1909. At that time, there were just two bridges connecting Manhattan and Brooklyn. The Brooklyn Bridge was the first to cross the East River. It opened in 1883. The Williamsburg Bridge opened 20 years later, in 1903, connecting Manhattan's Lower East Side and Williamsburg. Brooklyn, both of which were bustling immigrant communities.


Founded in 2002, New York Water Taxi operates six ferries on the East and Hudson Rivers, with stops in Brooklyn, Queens and Manhattan. This image shows two of the ferries — high-tech catamarans painted bright yellow with black and white checks to look like an old-fashioned taxicab — beneath the Brooklyn Bridge at Brooklyn's Fulton Ferry Landing.


This postcard is split into two images. On top, we see the East River. Below, we see the first subway to cross beneath the river. The subway opened in Manhattan in 1904, but it wasn't extended to Brooklyn until 1908.

Chronological Order of Images: B, D, A, C
General Information

May 24, 1883  The Brooklyn Bridge opens (at the time, it was officially known as the New York-East River Bridge). Under construction for thirteen years, it is the first bridge to cross the East River and the longest suspension bridge in the world. Fourteen thousand people are invited to the opening ceremony, though thousands more come from all over to attend. Pedestrians pay a penny apiece to cross the bridge and the celebration— which kicked off at noon— continues until late that evening.

November 7, 1896  Construction begins on the Williamsburg Bridge. Just as John Roebling anticipated, it’s needed to keep pace with the growing population and alleviate congestion on the Brooklyn Bridge.

October 1, 1901  Construction begins on the Manhattan Bridge, the third East River crossing. At the time, it was known simply as "Suspension Bridge #3."

December 19, 1903  After 20 years with just one East River crossing, New Yorkers celebrate the opening of the Williamsburg Bridge, which connects Manhattan’s Lower East Side and Williamsburg, Brooklyn. The bridge supports horse-drawn carriages, pedestrians and bicyclists, but trains do not begin running on the bridge for another five years. With a main span of 1600 feet, it surpasses the Brooklyn Bridge as the world’s longest suspension bridge.

1904  The New York City subway opens in Manhattan. It makes 28 stops, running 9.1 miles from City Hall to 145th Street.

1905  Subway service extended to the Bronx.

1908  The subway is extended underneath the East River to Brooklyn.
December 31, 1909  The Manhattan Bridge opens, connecting Canal Street and the Bowery in Manhattan with Brooklyn's Flatbush Avenue. It is the first East River bridge designed specifically to accommodate automobiles. In fact, only cars can cross on opening day – the pedestrian walkway, trolley tracks and subway tracks are incomplete.

1915  Subway service extended to Queens.

1942  The Greenpoint Ferry closes, signaling the end of East River ferry service.

May 25, 1950  Brooklyn-Battery Tunnel opens to traffic. The tunnel's two underground tubes are 9,117 feet long. In its first year of operation, approximately 41,000 vehicles pass through the tunnel.

September 2002  New York Water Taxi begins service on the East River. It is the first ferry to operate on the river in 60 years.
Guiding Questions

Image A Why are the bridges built so close together?
The bridges are so close together because, when they were built, they were designed to connect some of the most heavily populated areas in Brooklyn and Manhattan. For example, when the Brooklyn Bridge opened in 1883 it connected Brooklyn Heights with lower Manhattan and the Wall Street area, which was, and still is, a significant business center. When the Williamsburg Bridge opened 20 years later, it connected the bustling immigrant communities of Manhattan’s Lower East Side and Williamsburg, Brooklyn. (It was also meant to alleviate traffic on the Brooklyn Bridge, so it was built close by.) The Manhattan Bridge connects Chinatown with Downtown Brooklyn.

Image B If this postcard was created today, how would it look different?
If this postcard was created today it would include the Manhattan Bridge. (The Manhattan Bridge didn’t open until 1909.) Steamboats (identifiable by their tall chimneys) would not be on the river. The only tall-masted ships would be the ones permanently docked at South Street Seaport. The image would probably include some larger buildings, and it would probably be in color, too.

Image C Are the people on the boats traveling for business or pleasure?
The people in this image are probably traveling for pleasure. Since there are only a few people on the boat on the right, we can guess that they are not commuting to work in the morning. If that were the case, we would expect the boat to be more crowded. Another way we can tell that the people are traveling for pleasure is that they are on the boat’s upper deck, a good place for sight seeing. Two of the people are standing, which gives the impression that they are taking in the view.

Image D Why is this postcard divided into two parts?
This postcard, created in 1908, is divided into two parts to show the subway that travels in a tunnel underneath the East River. Subway service had just been extended to Brooklyn, and the tunnel was the first to go beneath the river. In fact, there were very few underwater tunnels in the United States at that time. The tunnel was a major engineering achievement. People were excited by it. What better reason to send a postcard to a friend or family member far away?