

INGENIOUS INVENTIONS TOUR

Pre- and Post-
Visit Materials

Brooklyn Navy Yard Center at BLDG 92

BLDG
92

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NAVY YARD
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BROOKLYN
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92

Brooklyn Navy Yard Center at BLDG 92 | Ingenious Inventions Tour

Contents | Pre-Visit: Lesson • Innovators Interactive • Cards & Handouts | Post-Visit: Lesson • Handouts | Glossary | Resources



Dear Educator,

Thank you for your interest in the Brooklyn Navy Yard Center at BLDG 92. Education programs at BLDG 92 have been developed by our staff at Brooklyn Historical Society and support Common Core and NYS Standards. Activities in this curriculum were designed to complement the Ingenious Inventions tour at BLDG 92, although you may also use them to introduce your class to the Brooklyn Navy Yard without leaving the classroom. As you click through the following pages, you'll find pre- and post-visit lesson plans complete with detailed Teacher's Guides, glossaries, printable handouts and worksheets for your students, and extensions to reach all learners. To schedule a tour of BLDG 92 for your class, please contact our Education Department at 718-222-4111 ext. 241 or email us at education@brooklynhistory.org or schools@bldg92.org.

We welcome your feedback! Please let us know what you think of these pre- and post-visit materials. Your input is important to us and will help us to develop future programs. Click here to fill out a brief survey about these activities: <http://www.surveymonkey.com/s/9W7ZBHJ> or email us with your thoughts.

From all of us at BLDG 92 and Brooklyn Historical Society, we thank you for bringing the history of the Brooklyn Navy Yard into your classroom!

Sincerely,

Andrea Del Valle

Director of Education
Brooklyn Historical Society



Supporters

Education programs at Brooklyn Navy Yard Center at BLDG 92 are generously supported by Con Edison and Barclays/Nets Community Alliance.

Brooklyn Historical Society is proud to partner with the Brooklyn Navy Yard Center at BLDG 92 as the education programs advisor.

Education programs at Brooklyn Historical Society are generously supported by Astoria Federal Savings, Barclays Capital, Barclays/Nets Community Alliance, Bloomberg Philanthropies, Brooklyn Community Foundation, Con Edison, Department of Youth and Community Development, The Max and Victoria Dreyfus Foundation, The Ferriday Fund, The Gilder Lehrman Institute of American History, The Hearst Foundations, The Leona M. and Harry B. Helmsley Charitable Trust, Herman Goldman Foundation, Martha A. and Robert S. Rubin, Moran Towing, JPMorganChase, National Grid Foundation, New York City Department of Cultural Affairs, New York State Council on the Arts, Pine Tree Foundation of New York, Timothy Bradley, Tisch Illumination Fund, and the Verizon Foundation. Additional funding provided by New York City Council Members Letitia James, Brad Lander, Stephen Levin, Domenic Recchia, and Albert Vann.

Credits

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Cover Image: *Intelligent Whale*; National Archives and Records Administration - Northeast Region, courtesy of the Brooklyn Navy Yard.

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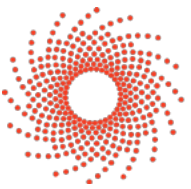


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Symbol Key **I** = Interactive Feature
P = Printable Handouts



Pre-Visit Lesson: Innovation Investigation

Time Needed:

45 minutes
(15 minutes discussion; 25 minutes activity; 5 minutes wrap-up)

Essential Question:

How have people and their ideas contributed to the evolution of the Brooklyn Navy Yard?

Learning Objective:

Students will use short biographies to gain an understanding of key players throughout the Brooklyn Navy Yard’s history, and to develop a broad understanding of how the Brooklyn Navy Yard has changed over time.

Materials:

- Innovator Cards
- Innovation Investigation Worksheet
- Pens/pencils
- Optional: nametags

Standards:

New York State Social Studies Standard 1:
History of the United States and New York

New York State English Language Arts Standards: 1, 3, 4

Common Core Standards: College and Career Readiness (CCR)
Anchor Standards for Reading: 1, 2, 3, 4, 6, 7, 10



Discussion

1. Ask students: If you could have a job developing new technology, what kinds of products would you invent? For example, would you develop a cure for cancer, make a breakthrough in rocket science, or invent the newest and coolest kind of cell phone or computer?

2. Next, imagine a place (real or imaginary) that is known for developing such cutting-edge technology. What kinds of companies and technological ideas come to mind? (Examples: Facebook, a medical research lab, electric car manufacturers, LA Gear - the company that made the first light-up sneakers, NASA, the iPad)

3. Have students share their ideas for numbers one and two, above. Explain that all these new ideas and products are examples of **innovation**: a new method, idea or product.

4. Then, ask students: what if I told you that New York City (or Brooklyn) is home to a place that has been a leader in innovation for more than two hundred years? That place is the Brooklyn Navy Yard.

5. Explain to students that today we will be learning about the kinds of innovations that have been developed at the Brooklyn Navy Yard, both in the past and present. These innovations may differ from some of the technological advancements mentioned above, yet their effects have been equally significant.

6. Ask students:

- What is the **Navy**?

(One of the 5 branches of the military, the U.S. Navy works on ships at sea. Its mission is to “maintain, train and equip combat-ready Naval forces capable of winning wars, deterring aggression and maintaining freedom of the seas.”)

- What kinds of innovation might be developed for the Navy? (types of ships, weapons, etc.)

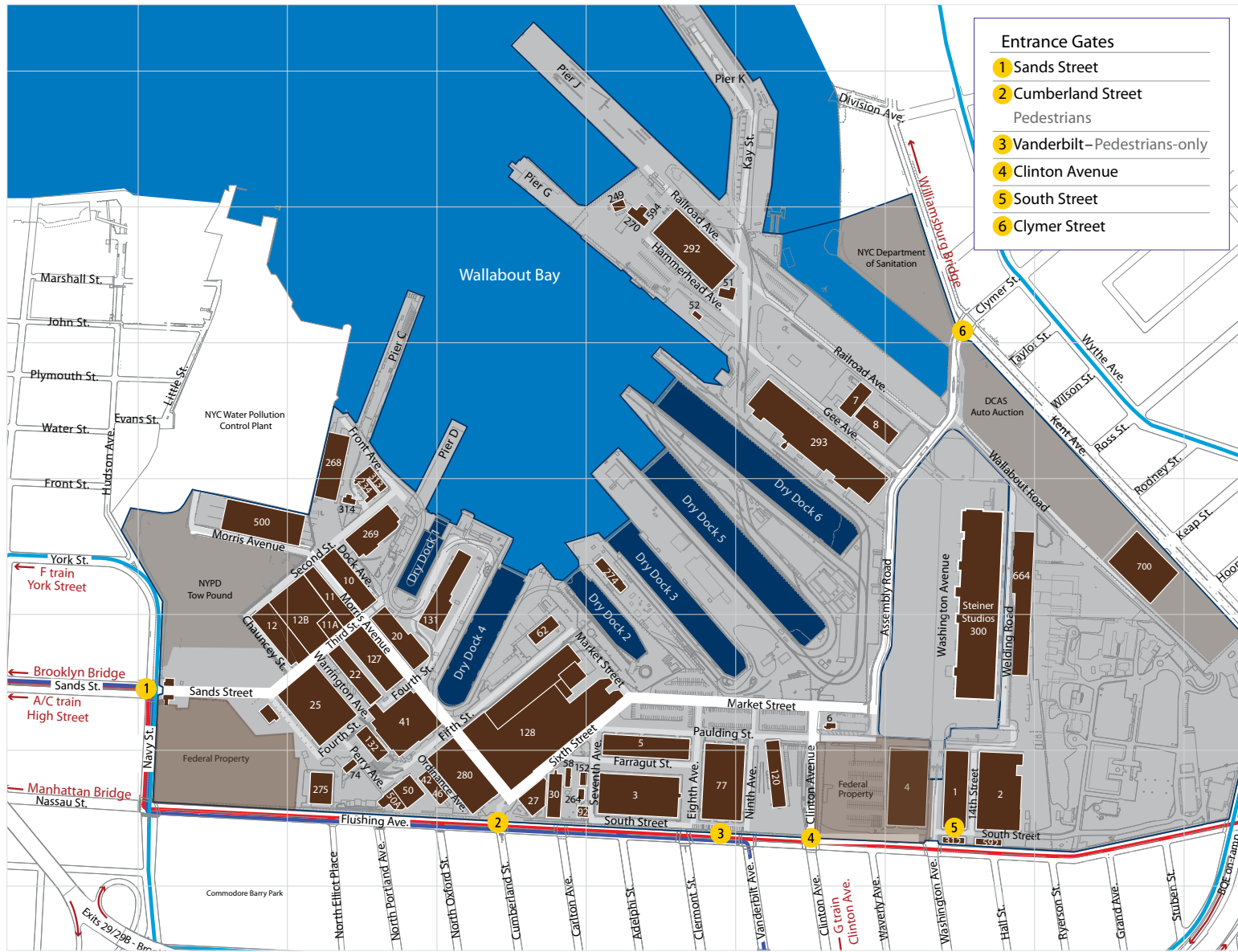
7. Optional: Show students the map of the Brooklyn Navy Yard (next page) or link to the map at the [Navy Yard’s website](#).

Ask students:

- What do you notice about where the Navy Yard is located? (strategically located near the East River, Atlantic Ocean, and NYC’s five boroughs)
- What do you think the different buildings are used for?
- What do you think a **dry dock** is? (seen as dark blue areas on the map)

Note: it’s okay if students don’t know the answers to these questions. Explain to students that we will investigate these questions through today’s lesson and our visit to the Brooklyn Navy Yard.

A **dry dock** is a narrow basin where boats are repaired. Water is pumped out to allow access to the bottom of the boat; after the boat is fixed, water is pumped back in so the boat may sail away.





Main Activity: Innovation Investigation

1. Explain to students that today we will be studying the innovations of the Brooklyn Navy Yard by learning about some key people who made their mark there—going all the way back to the American Revolution, and all the way forward to people who work at the Brooklyn Navy Yard today. These people and their jobs may not be what you predict!
2. Pass out Innovation Investigation Worksheet. Read all directions with students, and read/explain all questions as needed. Allow students time to familiarize themselves with each question, to gain a sense of the kinds of people they will be “meeting” today.
3. Distribute Innovator Cards, one to each student. Allow students a few minutes to read about their assigned identities, and to take notes as needed.
4. Optional: pass out nametags (not included). Have each student write the name of his/her assigned identity on his/her nametag. Explain to students that when they put on their nametags, they will “become” their assigned identity from Brooklyn Navy Yard’s history.
5. Instruct students to stand up, introduce themselves to each other (as their new Brooklyn Navy Yard identities), and complete the Innovation Investigation Worksheet.

Modifications for Success with All Learners

Differentiation Note: Innovator Cards are of varying lengths and reading levels. Assign shorter passages to beginning readers; challenge advanced students to the lengthier biographies.

Small Group Work: There are 16 Innovator Cards included with this lesson. The lesson may also be completed with as few as 8 Innovator Cards (see “Lesson Extenders for Grades 3 and Under” on page 10 for suggested identities). In most classes, two or three students will be assigned to each identity. Students with the same assigned identity may work together throughout this activity.

Structured Circulation: Divide your class in two groups, assigning the same card to two students (one in each group). Keep one group seated, while the other group stands and rotates through the seated students, each sharing their identities one at a time. Then, switch groups to give all students a chance to complete their worksheets.

Go Green! Have a SMART Board, tablets, or individual computers available for your class? Use this interactive document in full screen mode to learn about these innovators, rather than distributing paper cards; see page 11.

Complete lessons in the style of the Brooklyn Navy Yard: use innovative technology, and go green!



Conclusion

1. Select volunteers to share one interesting thing they learned about someone from the Navy Yard's history. Ask students: why was this person significant to the Brooklyn Navy Yard? What role did s/he play in innovation at the Yard?
2. Ask students: based on the people you "met" today, how do you think the Brooklyn Navy Yard has changed over time? How has the Yard stayed the same over time?
3. Have students respond to the following prompt in writing or discussion:

Based on today's activity, what is one question you have about the Brooklyn Navy Yard that you hope to answer when you visit?

Lesson Extenders

For All Students:

- **Create a living timeline!** Put the Navy Yard innovators in chronological order, by having students line up according to assigned person and when s/he made his/her contributions to the Yard. Then, create a visual representation of the timeline to document the Yard's history of key innovators.
- **During your visit:** Put history in context! Remind students to look out for their innovator while they're on the tour – they might see a picture or hear about him/her from the tour educator!



Lesson Extenders, Continued

For Grades 8 and Up:

- Use the Advanced version of the Innovation Investigation sheet. In this version, students will write down why each of the Yard innovators was significant to the history of the Brooklyn Navy Yard.
- Have students put their assigned identities into the greater historical context. What else was happening in U.S. history while this person was having his/her effect on the Yard? How did this person's contributions to the Yard fit into the overall narrative of U.S. history at that time? For assistance, use Brooklyn Historical Society's interactive timeline:

www.brooklynhistory.org/default/timeline.html



Then, have students present their findings in your preferred format.

Students may write short **essays** through which they will defend their opinions.

Or, students may participate in a **Socratic seminar** through which they discuss: how did the Brooklyn Navy Yard influence historical events and trends? How did historical events and trends influence the Brooklyn Navy Yard?

Or, students may work in **small groups** to research: how did Yard contributions contribute to innovation throughout the country? Each group may be assigned an area of innovation (wood ships, iron ships, medicine, communications, sustainable design, etc.) to research. Then, groups will present their findings to the class.

For Grades 3 and Under:

- Read selected Innovator Cards aloud to your students. Suggested innovators: James Forten, Skilled Worker: Joiner, Robert Fulton, William McAlpine, Edward Robinson Squibb, John Ericsson, Construction Worker, Baldev Duggal.
- If you have access to a SMART Board, use the Innovators Interactive (page 11) to show each Innovator Identity to your students.
- Divide your students into small groups, and assign each group one Innovator Identity. Have students work together to read about their assigned identities.
- Use the enclosed Innovator Bingo Board with your students, instead of the *Innovation Investigation Worksheet*. Bingo Board is designed to work with as few as the eight selected identities listed above, and as many as all sixteen Innovator Identities. There are several ways to set up the game, see *Innovator Bingo!* directions on page 22.
- Or, have students pair up at computers to play *Innovator Memory Match!*, a version of the game *Memory*, in which students pair innovators with brief descriptions of their work at the Yard.



Innovators Interactive

Click a square ▼ **James Forten**

I was a young man during the American Revolution, when New York City was occupied by the British. Before Wallabout Bay became the home of the Brooklyn Navy Yard, British prison ships occupied these waters. They captured anyone who disobeyed the British **embargo**. In 1781, I was fifteen years old and worked on the **privateer** *Royal Louis*. The British captured our ship, and

To access the innovator biographies in an interactive presentation for SMART Board or projector, go to:

http://www.brooklynhistory.org/iit_curriculum/IngeniousInventionsTourSupportingCurriculum.swf



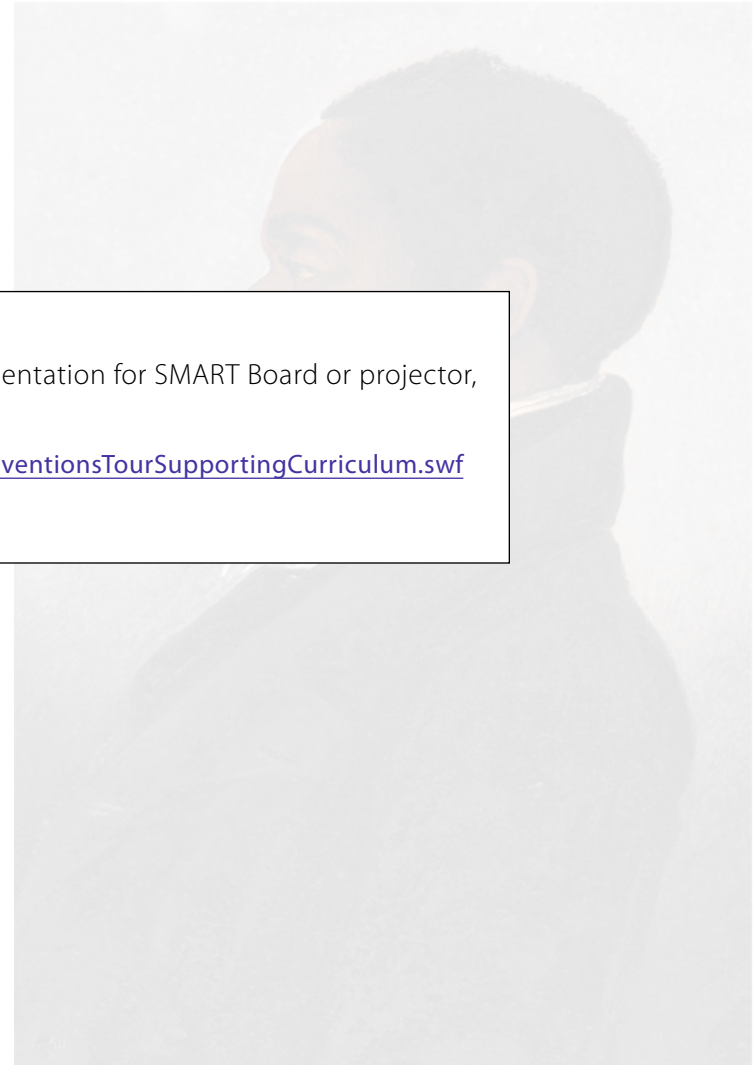
I proudly refused; I would never betray my American patriotism by going to live with the enemy! Instead, I went back to Philadelphia, where I **apprenticed** with a sail maker. There, I invented a device to **hoist** sails, which made it easier to control the large sails on the ships of my time. Eventually taking over the business as owner, I became one of the richest men in Philadelphia, and throughout my life, I worked tirelessly to end slavery.

embargo – a government’s order to ban merchant ships from entering or exiting its ports

privateer – a privately owned armed ship, ordered by a government to fight enemy ships

apprenticed – worked for another in order to learn a trade

hoist – raise or lift, often with the help of a mechanical device



Portrait of James Forten, artist unknown; The Historical Society of Pennsylvania (HSP), Leon Gardiner Collection.



Innovation Investigation: Activities and Handouts Index

P [Innovator Cards](#)

Print Innovator Cards **double-sided** and cut in half before beginning activities.



Important: Check your printer settings are set to flip the paper along the short side when printing double-sided; otherwise the innovator image and descriptions will not match.

P [Innovation Investigation Worksheet](#)

P [Innovation Investigation Worksheet / Advanced](#)

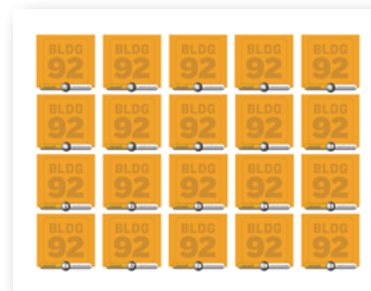
Print worksheets **double-sided** to save paper.



Tip: If your handouts are not printing in *landscape* direction, try switching to a different internet browser or download the entire PDF and print it directly from your computer.

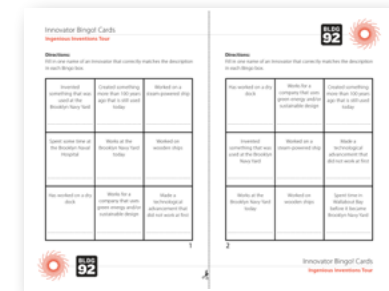
I [Innovator Memory Match! Online Game](#)

Pair up students to play online (will need 1 computer/pair).



P [Innovator Bingo! Boards](#)

Print Bingo boards **one-sided** and cut apart before playing.
 Directions found on page [22](#).





Innovation Investigation: Meet the People of the Brooklyn Navy Yard

Name _____

Your Assigned Identity _____

When (what year(s)) did you make your mark on the Brooklyn Navy Yard? _____

Directions: Introduce yourself to your fellow innovators from the Brooklyn Navy Yard. Complete all questions below. Find a different person to answer each question.

Find someone who...

1. Invented something that was used at the Yard.

Who was this person? _____

What was the invention? _____

2. Worked on wooden ships.

Who was this person? _____

During what years did this person do this work? _____

What did this person do?

3. Spent time in Wallabout Bay, before it was called the Brooklyn Navy Yard.

Who was this person? _____

What did this person do there?

4. Spent some time at the Brooklyn Naval Hospital.

Who was this person? _____

When was this person at the Naval Hospital? _____

What did this person do?

5. Played a role in the design of Building 92 (past or present).

Who was this person? _____

When did this person do his or her work? _____

What did s/he do for Building 92?



6. Worked on a steam-powered ship.

Who was this person? _____

What did this person do?

7. Works at the Navy Yard today.

Who is this person? _____

What does this person do? _____

What company does s/he work for? _____

What kind of work does this company do in today's Navy Yard?

8. Has worked on a dry dock.

Who was this person? _____

What did/does this person do? _____

What does a dry dock do?

9. Made a technological advancement that was not successful at first.

Who was this person? _____

What was the advancement? _____

What happened the first time around?

10. Is a woman who made an impact on the Navy Yard.

Who was this person? _____

What did she do?

11. Works for a modern industry that promotes sustainable design and green energy.

Who is this person? _____

What does this person do?

12. Created or tested something at the Yard more than 100 years ago that is still used today.

Who was this person? _____

What did this person create or test?



Innovation Investigation: Meet the People of the Brooklyn Navy Yard

Name _____

Your Assigned Identity _____

When (what year(s)) did you make your mark on the Brooklyn Navy Yard? _____

Directions: Introduce yourself to your fellow innovators from the Brooklyn Navy Yard. Complete all questions below. Find a different person to answer each question.

Find someone who...

1. Invented something that was used at the Yard.

Who was this person? _____

What was the invention? _____

Why was this invention significant?

2. Worked on wooden ships.

Who was this person? _____

During what years did this person do this work? _____

What did this person do? _____

Why were wooden ships important?

3. Spent time in Wallabout Bay, before it was called the Brooklyn Navy Yard.

Who was this person? _____

What did this person do there? _____

What was happening in Wallabout Bay at that time?

4. Spent some time at the Brooklyn Naval Hospital.

Who was this person? _____

When was this person at the Naval Hospital? _____

What did this person do? _____

Why was this person significant?



5. Played a role in the design of Building 92 (past or present).

Who was this person? _____

When did this person do his or her work? _____

What did s/he do for Building 92? _____

Why is Building 92 significant?

6. Worked on a steam-powered ship.

Who was this person? _____

When were steam engines produced? _____

What did this person do? _____

How did steam technology change the capabilities of the US Navy?

7. Works at the Navy Yard today.

Who is this person? _____

What does this person do? _____

What company does s/he work for? _____

What kind of work does this company do in today's modern Navy Yard?

8. Has worked on a dry dock.

Who was this person? _____

What did/does this person do? _____

What does a dry dock do?

9. Made a technological advancement that was not successful at first.

Who was this person? _____

What was the advancement? _____

What happened the first time around? _____

How was the problem fixed?



10. Is a woman who made an impact on the Brooklyn Navy Yard.

Who was this person? _____

What did she do? _____

Why was her role in the Yard's history significant?

11. Works for a modern industry that promotes sustainable design and green energy.

Who is this person? _____

What does this person do? _____

What kinds of sustainable products does his/her company advocate and/or produce?

12. Created or tested something at the Yard more than 100 years ago that is still used today.

Who was this person? _____

What did this person create or test? _____

When was this product first made? _____



Innovation Investigation: Answer Key

1. Invented something that was used at the Yard.

Who was this person? What was the invention?

James Forten invented a device to hoist sails.

Robert Fulton invented the torpedo (an underwater explosive) and he built the first successful steam-powered ship.

Edward Robinson Squibb invented a pure and safe form of ether (an anesthetic).

John Ericsson invented rotating guns used on naval warships.

2. Worked on wooden ships.

What did this person do?

During what years did this person do this work?

John Jackson built the first shipyard where wood ships were built on the property that is now the Brooklyn Navy Yard, in 1781. The USS *Adams* was built on his shipyard in 1798.

James Forten worked on the privateer Royal Louis during the American Revolution in 1781. He later made sails for wooden ships and invented a device to hoist sails.

Henry Eckford was chief naval constructor at the Yard from 1817-1820. He designed the USS *Ohio*, the first Navy Yard-built ship to launch.

A **joiner** was a woodworker/craftsman who hand-built and repaired the parts of wooden ships during the early 1800s.

3. Spent time in Wallabout Bay, before it was called the Brooklyn Navy Yard.

What did this person do there?

John Jackson bought the property on Wallabout Bay where the Brooklyn Navy Yard stands today. After purchasing the property with his brothers in 1781, he built a shipyard on the land. The USS *Adams* was built on his shipyard in 1798.

James Forten worked on the privateer Royal Louis as a fifteen-year-old during the American Revolution in 1781. He was captured by the British and survived a seven-month sentence on the HMS *Jersey*, a British prison ship in Wallabout Bay.

4. Spent some time at the Brooklyn Naval Hospital.

What did this person do?

When was this person at the Naval Hospital?

Edward Robinson Squibb was a surgeon who came to the Brooklyn Naval Hospital in 1852. He started a laboratory at the Naval Hospital, and made many advances in medicine, including his invention of a pure and reliable form of ether, an anesthetic that forever improved surgery.

Nurse at the Brooklyn Naval Hospital was a member of the Nurse Corps, and worked at the Naval Hospital during the 1920s and 1930s. She helped improve patient care.



5. Played a role in the design of Building 92 (past or present).

When did this person do his or her work?

What did s/he do for Building 92?

Thomas Ustick Walter was the architect who designed Building 92 in 1858. The building was originally used as the U.S. Marine Corps Commandant's Residence.

Construction Worker helped rebuild Building 92 through the BNYDC's adaptive reuse project. The building was on the verge of collapse in 2007, and through successful construction work and sustainable design, Building 92 re-opened its doors in 2011.

Meredith Wisner provided plans from the Building's archives that identified an unused sewer pipe that was later used as part of the green system of reusing rainwater for toilet plumbing.

6. Worked on a steam-powered ship.

What did this person do?

When were steam engines produced?

Robert Fulton built the first commercially successful steam-powered ship, *Clermont*, in 1807. He also designed the first steam-propelled warship, *Demologos*, which was renamed *Fulton* after his death in 1815.

John Ericsson designed the USS Princeton, a 700-ton steam warship built for the US Navy in 1839. Due to a gun installation error, Ericsson did not design another ship for the Navy until he rose to success with his design of the ironclad USS *Monitor* in 1862.

7. Works at the Navy Yard today.

What does this person do?

What company does s/he work for?

What kind of work does this company do in today's modern Navy Yard?

Construction Worker helped with the adaptive reuse project to rebuild Building 92. S/he works for a local contractor who brings to life the sustainable designs of architects *Beyer Blinder Belle* and *workshop/apd*.

Baldev Duggal is the president and founder of Duggal Visual and Energy Solutions, a graphics and energy company. Among other achievements, his company installed fifty solar- and wind-powered streetlamps at the Yard.

Nigel Friday is the mechanics supervisor for GMD Shipyard. With the largest dry dock facilities in New York Harbor, GMD uses Brooklyn Navy Yard's historic dry docks plus 21st-century technology to repair large ships.

Meredith Wisner is the archivist for the Brooklyn Navy Yard Development Corporation (BNYDC). She maintains the collections of historical maps, photographs, and other documents and uses these pieces to inform new projects at the Yard.

Michelle Greene is a sculptor who designed functional pieces for the Yard grounds, including tables made from recycled ship doors, and bicycle racks made from railroad tracks that used to run through the Yard.



8. Has worked on a dry dock.

What did/does this person do?

What does a dry dock do?

William McAlpine was the chief project engineer on Dry Dock 1, the first dry dock built to repair boats at the Brooklyn Navy Yard.

Nigel Friday is the mechanics supervisor for GMD Shipyard, home to the largest dry dock facilities in New York Harbor.

A **dry dock** is a narrow basin where boats are repaired. Water is pumped out to allow access to the bottom of the boat; after the boat is fixed, water is pumped back in so the boat may sail away.

9. Made a technological advancement that was not successful at first.

What was the advancement?

What happened the first time around?

Robert Fulton invented a torpedo (an underwater explosive for attacking enemy ships), but it failed to explode during tests at the Yard.

John Ericsson invented a revolving gun on a warship he designed, the USS *Princeton*. The gun was installed incorrectly and during a test it misfired, killing the Secretary of the Navy and several others. Ericsson later designed a turret (a revolving gun holder) for the ironclad USS *Monitor*, but the turret was sealed with rope and tar instead of Ericsson's metal seal design. The seal leaked, almost causing the ship to sink.

10. Is a woman who made an impact on the Brooklyn Navy Yard.

What did she do?

Ada Eugenia von Böös-Farrar transmitted the first radio sound to a ship at the Brooklyn Navy Yard. She sang "I Love You Truly" into a phonograph horn in Manhattan, and the sound was received by an engineer at the Yard.

Nurses at the Brooklyn Naval Hospital improved patient care, kept accurate records, and helped run the Naval Hospital.

Meredith Wisner is the archivist for the Brooklyn Navy Yard Development Corporation (BNYDC). She maintains the collections of historical maps, photographs, and other documents and uses these pieces to inform new projects at the Yard.

Michelle Greene is a sculptor who designed functional pieces for the Yard grounds, including tables made from recycled ship doors, and bicycle racks made from railroad tracks that used to run through the Yard.



11. Works for a modern industry that promotes sustainable design and green energy.

What does this person do?

Construction Worker on Building 92 helped install green building features, such as a solar screen to reduce glare and control temperature, and captured rainwater used for toilet plumbing.

Baldev Duggal is the president and founder of Duggal Visual and Energy Solutions. His company installed fifty solar- and wind-powered streetlamps at the Yard.

Meredith Wisner works as the archivist for the Brooklyn Navy Yard Development Corporation (BNYDC). She uses historical plans and documents to help inform new green building projects for the 21st-century Yard.

Michelle Greene is a sculptor who uses recycled materials from the Yard's history to create functional outdoor pieces that promote green living, like park tables and bicycle racks.

12. Created or tested something at the Yard more than 100 years ago that is still used today.

What did this person create or test?

Thomas Ustick Walter designed the original Building 92 in 1858.

Edward Robinson Squibb invented a safe anesthetic and other medical advancements. (Note: although his exact products may not be used today, his company still exists and works to produce innovations in medicine.)

William McAlpine was the chief project engineer on Dry Dock 1, which is still used today to repair ships.

Ada Eugenia von Böös-Farrar tested radio communication to ships.

The following question numbers represent possible answers for each Innovator Identity:

John Jackson #2, 3

James Forten #1, 2, 3

Skilled Worker: Joiner #2

Henry Eckford #2

Robert Fulton #1, 6, 9

Edward Robinson Squibb #1, 4, 12

William McAlpine #8, 12

John Ericsson #1, 6, 9

Thomas Ustick Walter #5, 12

Ada Eugenia von Böös-Farrar #10, 12

Nurse, Brooklyn Naval Hospital #4, 10

Construction Worker, Building 92 #5, 7, 11

Meredith Wisner #5, 7, 10, 11

Baldev Duggal #7, 11

Nigel Friday #7, 8

Michelle Greene #7, 10, 11



Innovator Bingo! Directions

Invented something that was used at the Brooklyn Navy Yard	Created something more than 100 years ago that is still used today	Worked on a steam-powered ship
Spent some time at the Brooklyn Naval Hospital	Works at the Brooklyn Navy Yard today	Worked on wooden ships
Has worked on a dry dock	Works for a company that uses green energy and/or sustainable design	Made a technological advancement that did not work at first

Fill in one name of an Innovator that correctly matches the description in each Bingo box.

Note to Game Leader: Print and cut out the [P Innovator Bingo! Boards](#). There are 10 boards total.

To play multiple games: Reorder the questions below.

How you set up the game is teacher's choice

- Read aloud with the Interactive PDFs displayed on a SMART Board; students may fill in the Bingo Board as teacher reads the identities.
- Assign Innovator Identities using the printed cards; the activity may operate like the *Innovation Investigation*, page 8, with students exchanging information to find the answers.
- Set parameters for Bingo Game; inform your students of the rules before you begin. Students may be required to complete 3 in a row, four corners, or the entire board to “win” Bingo.

Questions

1. Invented something that was used at the Brooklyn Navy Yard
2. Worked on wooden ships
3. Spent time in Wallabout Bay before it became the Brooklyn Navy Yard
4. Spent some time at the Brooklyn Naval Hospital
5. Worked on a steam-powered ship
6. Works at the Brooklyn Navy Yard today
7. Has worked on a dry dock
8. Made a technological advancement that did not work at first
9. Works for a company that uses green energy and/or sustainable design
10. Created something more than 100 years ago that is still used today

Answers

1. James Forten / Robert Fulton / Edward Robinson Squibb / John Ericsson
2. John Jackson / James Forten / Henry Eckford / joiner
3. John Jackson / James Forten
4. Edward Robinson Squibb / nurse
5. Robert Fulton / John Ericsson
6. Construction worker / Baldev Duggal / Nigel Friday / Meredith Wisner / Michelle Greene
7. William McAlpine / Nigel Friday
8. Robert Fulton / John Ericsson
9. Construction worker / Baldev Duggal / Meredith Wisner / Michelle Greene
10. Thomas Ustick Walter / Edward Robinson Squibb / William McAlpine / Ada Eugenia von Böös-Farrar



Innovator Memory Match! Interactive

Goal: Find all 10 Innovator matches

Directions: Each card has hidden behind it an Innovator's image or the description of an Innovator's contribution.

There are 10 Innovator pairs, represented by 20 cards.

- Allow two or more students to play in turns. The first player will reveal two cards, selected by the gray round, numbered buttons, ranging from 1- 20.
- If the card identities match, click the white "remove" bar on the right of the selected two gray buttons to clear both cards. The student could then continue until he/she reaches an incorrect answer or you might move on to a second student at this point, depending on the number of players.
- If the match is incorrect, click the golden "reset" bar on the left of the two selected gray buttons to return both cards to their original face-down state. Move on to the next player.

The game is over when all the cards are removed.

To play again, close, then reopen the game.

Have fun!



reset 1 remove

Reset

Return cards to face-down position after an incorrect answer or to reset the game to play again

Reveal

Turn two cards face up to find matching pairs of Innovators

Remove

Clear card pairs from board after a correct match



PLAY



Post-Visit Lesson: Connections Through Time

Time Needed:

45 minutes

(10 minutes discussion; 30 minutes activity; 5 minutes wrap-up)

Essential Question:

How can the present and future of the Brooklyn Navy Yard be traced to the innovative spirit of its past?

Learning Objective:

Students will compare and contrast the present, future, and past innovations at the Brooklyn Navy Yard through a letter writing activity.

Materials:

- Innovator Cards
- Letter Writing Template
pens/pencils

Standards:

New York State Social Studies Standard 1:
History of the United States and New York

New York State English Language Arts Standards: 1, 2, 3, 4

Common Core Standards: College and Career Readiness (CCR)
Anchor Standards for Writing: 1, 2, 3, 4, 7, 9, 10



Introduction

Responses to Visit

1. What stands out to you about your visit to the Brooklyn Navy Yard? What was one thing you enjoyed seeing or experiencing on your visit? Why?
2. If you could have any job at the Brooklyn Navy Yard, what would it be and why? Would you prefer to work there in a previous era (e.g. the Age of Wood and Sail, the Age of Iron and Steam, etc.) or today? Why?
3. Have students share selected responses to numbers one and two, above.
4. Then ask: what kind of future innovations do you think could happen at the Brooklyn Navy Yard property? How might these developments pave the way for a better future?

Main Activity: Letter to a Past Innovator

1. Explain to students that today we will be using our knowledge of today's Yard and our ideas for the future to connect with important people from the Brooklyn Navy Yard's past. How will we send our ideas through time? Through letter writing!
2. Assign each student an Innovator Card from the past. Or, have students select their own Innovator Identities. Choose identities from the following list: John Jackson, James Forten, Skilled Worker: Joiner, Henry Eckford, Robert Fulton, Edward Robinson Squibb,

William McAlpine, John Ericsson, Ada Eugenia von Böös-Farrar, Nurse (Brooklyn Naval Hospital).

3. Have students write letters to their selected Innovator, through which they explain how the Brooklyn Navy Yard has changed since their assigned person made his/her mark on the Yard. Choose letter Template A for grades 4 – 7, Letter Template B for grades 1 – 3, and Drawing Template C for grades 1 – 5 or to focus primarily on sequencing. Letters should include:

- What the Yard was like during the assigned identity's time.
 - Innovations at the Yard and in the selected person's field that have happened since then.
 - At least one vocabulary word from the biography card .
 - What has stayed the same about the Brooklyn Navy Yard.
 - Student's ideas for how the Yard might continue to make advancements in the future.
4. If possible, have students share Innovator Cards with each other to gather more information about the history of the Brooklyn Navy Yard. Students may also use their Innovation Investigation worksheets from the Pre-Visit materials.
 5. If necessary, read [model letter](#) (to Thomas Ustick Walter) to students to help generate ideas.



Conclusion

1. Select student volunteers to read their letters (or portions of their letters) aloud to the class.
2. Discuss: how has the Navy Yard changed over its history?
How has it stayed the same?
3. As a final discussion or short writing prompt:
What kinds of innovations do you predict will occur at the Brooklyn Navy Yard in the future?



Lesson Extenders

For Grades 8 and Up:

- In their letters, require students to include historical facts that are not included on their biography cards. Ask students to explain what was happening in U.S. history during the time of their Yard Innovators, and to include changes in history that have affected the Brooklyn Navy Yard's path to innovation.
- Have students conduct additional research on their assigned Yard Innovators. Ask students to include this additional biographical information in their letters.
- Ask students to type their letters and/or to include a bibliography of additional research sources.
- See also Pre-Visit Lesson Extenders for Grades 8 and Up, page 10. Essay writing, Socratic seminars, and/or small group research presentations may be equally suitable for a post-visit assignment.

For Grades 3 and Under:

- Use the **P** [Letter Template B](#) for younger students, in which students have room to draw a picture of something in action at today's Yard (Dry Dock 1, wind-solar streetlamp, etc.).
- Have students work in pairs, small groups, or as a whole class to compose their letters. Instruct different students to focus on different components of the letter: what the Yard was like in the past/during the assigned Innovator's time; what the Yard is like today; what the Yard might be like in the future.
- Instead of letter writing, use **P** [Drawing Template C](#). Challenge students to complete a four-frame drawing of activities at the Yard.
 - Frame 1 should include: the Brooklyn Navy Yard during the assigned Innovator's time.
 - Frame 2: new developments at today's 21st-century Brooklyn Navy Yard.
 - Frame 3: how the Yard has stayed the same since the time of the assigned Innovator.
 - Frame 4: predictions for a successful, innovative future at the Brooklyn Navy Yard.



Connections Through Time: Activities and Handouts Index

P [Letter Template A](#)

P [Extra Letter Page](#)



P [Letter Template B](#)

P [Extra Letter Page](#)



P [Drawing Template C](#)



Tip: If your handouts are not printing in *landscape* direction, try switching to a different internet browser or download the entire PDF and print it directly from your computer.



Keep the story of the Brooklyn Navy Yard alive!

Directions:

Write a letter to your selected Yard Innovator, through which you explain:

- What the Brooklyn Navy Yard was like during your Innovator’s time
- How the Yard has changed since that time
- How the Yard has stayed the same since that time
- Innovations you predict will occur in the future of the Brooklyn Navy Yard

Include at least one vocabulary word from your Innovator Card.

Use facts and details from your card and your visit to the Navy Yard.

Have fun!

Name _____

Your Assigned Identity _____

When (what year(s)) did you make your mark on the Brooklyn Navy Yard? _____

Date _____

Dear _____,

Sincerely,

Connections Through Time: Post-Visit Extra Page for Letters

Ingenious Inventions Tour | Brooklyn Historical Society



Two columns of horizontal lines for writing a letter. The left column contains 15 lines, and the right column contains 15 lines. The word "Sincerely," is printed on the right side, with a horizontal line below it for a signature.



How has the Navy Yard changed?

Directions:

Your Yard Innovator wants to know how the Brooklyn Navy Yard has changed over the years. Write a letter to your selected Yard Innovator, through which you explain:

- What the Brooklyn Navy Yard was like during your Innovator’s time
- How the Yard has changed since that time
- How the Yard has stayed the same since that time
- What you predict for future innovations at the Brooklyn Navy Yard

Use at least one vocabulary word from your assigned Innovator Biography card. Finally, add facts and details from your card and your visit to the Navy Yard.

Include a picture of the Yard at work today.

Have fun!

Name _____

Your Assigned Identity _____

When (what year(s)) did you make your mark on the Brooklyn Navy Yard? _____

Date _____

Dear _____,

Sincerely,



Draw your picture of the Yard at work today.

Connections Through Time: Post-Visit Drawing Template C

Ingenious Inventions Tour | Brooklyn Historical Society



Directions:

Create four drawings of the Brooklyn Navy Yard throughout history.

Name _____

Your Assigned Innovator _____

Years Innovator was at Navy Yard _____

What was happening at the Yard during your assigned innovator's time?

What are new developments at today's 21st-century Brooklyn Navy Yard?

What is the same at the Yard since the time of your assigned Innovator?

What new innovations do you predict will happen at the Brooklyn Navy Yard in the future?



June 6, 2012

Dear Mr. Walter,

My class just returned from a trip to the Brooklyn Navy Yard, and you would not believe all the great innovations happening at the Yard today! Remember back in 1858 when you used your impressive architectural skills to design Building 92 at the Brooklyn Navy Yard? At that time, Building 92 was used as the Marine Commandant's Residence, and it was just one building in a whole complex of living quarters for marines. There were Officers' Quarters, Barracks, and a Gate House to protect the property.

None of that stuff exists today. Would you believe there aren't even any Marines or official Navy Personnel at the Navy Yard today?

As you probably saw when you visited the Yard in 1858, steam warships were being developed to take over from the days of wood and sail. Since then, ironclad warships have had big success in battles, and many of those ships were built right here at the Brooklyn Navy Yard. You probably also noticed the Brooklyn Naval Hospital when you were here last, and the medical inventions of Edward Robinson Squibb. But did you know that a Nurse Corps was established in 1908, and by the 1940s women nurses were helping to run the hospital?

Today's Navy Yard has kept the spirit of innovation alive and well. Today we use something called green technology and

sustainability within Building 92. Your building was part of an adaptive reuse project, meaning that some of the old structure was kept, but the building was rebuilt for a new purpose. Now Building 92 is a museum that tells the story of the Brooklyn Navy Yard! Plus, the building has these cool green features like solar panels, and a system of using rainwater for plumbing.

One thing has stayed the same though. Remember when Dry Dock 1 was finally finished in 1851? Well it's still used today to fix boats. The Navy might not own this facility anymore, but there are still lots of boats out there in need of repairs.

I don't know what we can predict about the future of the Brooklyn Navy Yard. I'm sure it will be home to many more innovations though—new ideas in medicine, technology, and environmentally friendly products that will make our world a better place. Today there are 275 businesses and nearly 6,000 people who work at the Yard—and it's still growing. Thanks for giving us Building 92. Now your building gives us the chance to learn all about the history of the Brooklyn Navy Yard.

Sincerely,

Ima Student



Glossary of Terms

accurate – correct in all details

adaptive reuse – process of making something new out of an old structure

agility – ability to move quickly and easily

amputation – removal of a limb (arm, leg, hand, etc.)

anesthesia – branch of medicine concerned with administering pain-numbing medications

anesthetic – a substance that makes someone unable to feel pain

apprenticed – worked for another in order to learn a trade

archivist – a person who maintains collections of historical documents

authorized – gave official permission or instruction

Barbary Pirates – pirates from the North African Coast, they fought two wars against the U.S. in 1801 and 1815

barracks – large building or group of buildings where many soldiers are lodged

blockade – the forced closing off of a place to prevent people or supplies from entering and exiting

boasted – took pride in

commandant – officer in charge

commercially – intended to make a profit

Confederacy – the southern states that seceded from (left) the United States during the Civil War, 1861-1865

contractors – people who provide materials or labor to do a job

craftsmanship – made by someone who is highly skilled in a craft

dry dock – a dock that can be drained of water to allow repair of the bottom of a ship

embargo – a government's order to ban merchant ships from entering or exiting its ports

expedition – voyage with a specific purpose

expertise – advanced skill or knowledge

foundation – the base of a building or other structure, usually below ground level

functional – designed with a practical and useful purpose

gate house – a building at the main entrance or front gate, often used for protection against enemies

granite – a type of hard rock

green technology – environmentally-friendly practices for conserving energy or resources

hoist – raise or lift, often with the help of a mechanical device

immigrants – people who come to live permanently in another country

indispensable – absolutely necessary

industrial – relating to the manufacturing of goods in factories

innovation – a new method, idea, or product

innovative – brand new, using advanced and original methods



Glossary of Terms, Continued

innovators – people creating new ideas, methods, or products

invaluable – extremely useful

ironclad – covered or protected with iron

launched – set a boat in motion for the first time

Mexican-American War – the first armed conflict between the United States and Mexico, 1846-1848

misfired – failed in setting off (a weapon such as a gun or cannon)

nautical – concerning sailors or sea navigation

navy – the branch of the military that works on ships at sea and engages in sea warfare

outfitted – supplied with or have equipment added

phonograph – an early record player that used cylinders to record and reproduce sound

pile driver – a machine for driving **piles** into the ground

piles – long, narrow columns made of wood, concrete, or steel, designed to add support in the ground during construction of a building or other structure

pioneer – one of the first to develop an activity or new area of knowledge

pivoting – turning on a central point

predecessors – people who came before in the same job or place

privateer – a privately owned armed ship, ordered by a government to fight enemy ships

quarters – rooms or lodgings

Quasi-War – an undeclared war between the United States and France, fought mostly at sea, 1798-1800

refurbished – renovated or rebuilt

shipyard – a place where ships are built and repaired

smugglers – people who move goods illegally into or out of a country

stability – ability to stay upright and not fall over

steam-powered – operated by the force of vapor produced by boiling water

surgeon – a doctor who performs surgery (operations) on people

sustainable – capable of being self-supportive, without overusing natural resources

thrive – grow or develop well

turret – a rotating, armored holder for a gun

Union – the northern states during the U.S. Civil War, 1861-1865.

unreliable – not consistent or able to be trusted

vessels – ships or large boats

War of 1812 – a conflict between the United States and England, 1812-1814

World War II – the most widespread war in history, involving most of the world's nations; fighting took place throughout Europe, Asia, and North Africa, 1939-1945



Resources

Brooklyn Historical Society

brooklynhistory.org

Visit the BHS website to find out about special exhibits and education programs, search online collections or schedule a school visit to the Brooklyn Navy Yard.

Brooklyn Navy Yard Center at BLDG 92

brooklynnavyyard.org

Contact the Brooklyn Navy Yard Center at BLDG 92 for information about tours, exhibitions and public programming.

Brooklyn Navy Yard

brooklynnavyyard.org

The Brooklyn Navy Yard is operated by the Brooklyn Navy Yard Development Corporation. Go here to learn more about the history of the Navy Yard and the latest news about what's happening there today.

Naval History & Heritage Command

www.history.navy.mil

Extensive information on U.S. Naval history, including education programs and resources connected with four U.S. Naval museums.

Brooklyn History – The USS Monitor

brooklynonline.com/waterfront/work/monitor.html

More information about John Ericsson's ironclad Civil War warship, the USS *Monitor*, built at Continental Shipyard in Greenpoint, Brooklyn, and outfitted and commissioned at the Brooklyn Navy Yard.

Historical Photos of the Brooklyn Navy Yard

www.flickr.com/photos/brooklynnavyyard/sets/72157627152749449

Brooklyn Navy Yard Development Corporation's collection of historical photographs of the Brooklyn Navy Yard and the shipbuilding that took place there.

Brooklyn Navy Yard: Past, Present and Future



Looking to plan an in-depth unit on the history of the Brooklyn Navy Yard? Brooklyn Historical Society's Curriculum Kit, *Brooklyn Navy Yard: Past, Present and Future* includes a detailed teacher's guide, lesson plans linked to primary sources, and laminated images for use in your classroom. Students will use

primary source documents and images to connect the Brooklyn Navy Yard with larger themes in American history. Kits are available for purchase for \$99, including shipping. For more information, contact education@brooklynhistory.org

Books

Bartlestone, John. *The Brooklyn Navy Yard*, ed. Thomas Roma. Powerhouse Books, 2009.

A powerful series of Bartlestone's photographs, documenting the Yard's industrial landscape.

Berner, Thomas F. *The Brooklyn Navy Yard*. Arcadia Publishing, 1999. The history of the Yard alongside archival photographs. Part of the Images of America series.