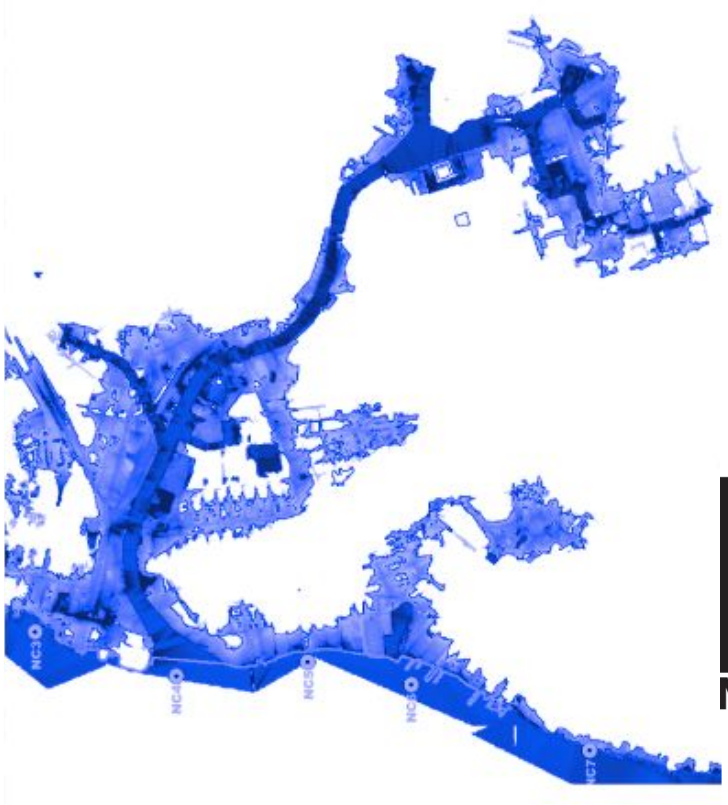
STEM
Newtown Creek
Urban Ecology Curriculum



NCA
NEWTOWN CREEK ALLIANCE

About this Curriculum

The Project:

The Newtown Creek has captivated people for more than 400 years, from its time as a productive tidal salt marsh to an era of intense industrialization that created the polluted waterway that we see today to its current potential to usher in a resilient future of restoration coupled with industrial revitalization. This curriculum was originally created by the Gowanus Canal Conservancy and the Urban Memory Project then adapted to its current form by the Newtown Creek Alliance for teachers to use the Newtown Creek and its watershed and sewershed as a teaching tool and learning environment. The lessons were reviewed and tested with assistance from the National Wildlife Federation Eco-Schools during the 2018 - 2019 school year in four local public schools in Greenpoint — P.S. 110, P.S. 34, P.S. 31, and M.S. 126. The lessons, maps, and worksheets are available to any teacher who wishes to engage their students with the Creek's complex and fascinating urban ecology. The Newtown Creek Watershed and surrounding area is home to dozens of upland schools in both Brooklyn and Queens. It is our hope that all schools in the watershed and sewershed will introduce their students to the urban ecology of the Newtown Creek.

Who we are:

Newtown Creek Alliance

Mission:

> The Newtown Creek Alliance is a community-based organization dedicated to restoring, revealing and revitalizing Newtown Creek.

Vision:

The Newtown Creek:

The 3.8 mile long Newtown Creek was dredged and channelized during the 19th and early 20th centuries. Once a rich and productive salt marsh and Native American fishing grounds, the Creek has seen more than its fair share of environmental problems. For more than 150 years, the waters captured raw sewage and other wastes from nearby neighborhoods, industrial waste products from the businesses located along its banks, and polluted runoff from the surrounding streets.

The Creek is dotted with structures that tell the story of an industrial legacy, an integral part of the history of New York. It's banks are also home to local and migratory birds of all sorts, surprising native plants and marine life, the vestiges of the abundant wildlife that was plentiful and can be once more. Today the Creek remains an industrial waterway but the businesses that polluted it are either gone or operating in a different way, sewage still flows into it with every heavy rain. In 2010 Newtown Creek was designated a federal Superfund and investigations into the extent of its contamination are still underway. Many of your students will be grown before the Creek is fully cleaned up.

Contributors:

The bulk of this content has been adapted for use for Newtown Creek by Lisa Bloodgood, Education Coordinator for the Newtown Creek Alliance. Lisa Bloodgood and Willis Elkins from the Newtown Creek Alliance would like to thank the many individuals, organizations and funders who have generously helped us to make this curriculum. We are grateful for everyone's commitment to this project.

First and foremost thanks and appreciation goes to the Hudson River Fund, Andrea Parker, Christine Petro and the Gowanus Canal Conservancy for developing the initial curriculum that served as our template and guide in this work. We would not have been able to create this learning tool without their leadership and hard work. To learn more about their efforts in education and towards revitalizing the Gowanus Canal, visit their

webpage https://gowanuscanalconservancy.org.

Thank you to Emily Fano and Sarah Ward, our partners at National Wildlife Federation Eco-Schools and all of the Sustainability Coaches, Fran Agnone, Alison Schuettinger, Fai Walker, and Tina Wong. Thank you to District 14 Superintendent Alicja Winnicki, as well as Greenpoint Eco-Schools Principals, Carmen Asselta (PS 34), Anna Cano-Amato (PS 110), Maria Ortega (MS 126), and Mary Scarlato (PS 31). We are especially grateful for the contributions of each of the teachers who workshopped these modules and collaborated with us to bring the Creek into the classroom and the classroom out to the Creek; from MS 126: Steven House and Amber Howes; from PS 110: Dana Raciunas, June Biolsi, Matthew Dicarlo, LuAnn Fortunato, Matt Jensen, Antoinette LoCascio, Michele McLee, and Allison Sweeney; from PS 34: Daniel Granito, Jeanne Marshall, and Elizabeth Wildermuth; from PS 31: Lou Ann Gallo, Lisa Derwin, Amy North, Patti Ratcliff, and Gabby Schiff.

Thank you to Shino Tanikawa and Korin Tangtrakul from the New York City Soil and Water Conservation District for all of your help, guidance and the incredible maps!

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Please credit the Gowanus Canal Conservancy, the Newtown Creek Alliance, and Greenpoint Eco-Schools when using this curriculum.

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Introduction & Methodology

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Curriculum Overview

What is this curriculum about and who is it for?

This curriculum was designed by the Newtown Creek Alliance for use by middle schools and elementary schools that are located within the Newtown Creek Watershed. However, it is a flexible resource that can be used by older elementary school students and younger high school students at any school that is interested in the Newtown Creek or the Newtown Creek Watershed and the issues that surround them.

The curriculum focuses on content and skills relevant to understanding and becoming a steward of the Newtown Creek and Watershed. It includes lessons designed for both the classroom and the outdoors. We believe taking students outdoors (or “in the field” as we say) is essential to studying the Newtown Creek and in becoming active participatory learners and engaged in their community.

Curriculum Goals

What do we hope to accomplish with this curriculum?

- Build an understanding of the Newtown Creek and its Watershed as an urban ecosystem.
- Create opportunities to explore and study the Newtown Creek.
- Provide tools for students and teachers to be environmental stewards and engage in Science, Technology, Engineering and Math (STEM)
- To foster a relationship between students and their local ecosystems.

Enduring Understandings

What important ideas from this curriculum will students remember in ten years?

- Newtown Creek is part of the urban ecosystem. (The city is comprised of natural and built environments).
- You can study STEM in your community and use the environment as a classroom.
- Newtown Creek is a tidally influenced estuary that has changed over time, especially due to human industry and activity.
- We have the ability to positively change our environment through stewardship, design, and engineering.

Source: Newtown Creek Alliance

How is the Newtown Creek part of an urban ecosystem?

This is a place-based curriculum that uses the Newtown Creek as a lens to understand how urban ecosystems work. Each unit in this curriculum unpacks a layer of the Newtown Creek ecosystem, and reveals how humans impact the ecological health of our cities and waterways.

An urban ecosystem is made up of:

- Living things, including plants, animals and humans
- The natural environment, including air, water, and soil
- The built environment, including buildings, roads and sewers

The study of these city ecosystems is urban ecology.

Human impact is especially significant in the case of the Newtown Creek, which once was a pristine salt marsh that became one of the most polluted bodies of water in the United States, primarily from a long history of industrial dumping and sewage discharge. Though human actions have historically had a negative impact on the Creek, there are significant efforts underway to remediate the water and soil, with a vision for a cleaner, healthier waterway.

The full picture of the Newtown Creek as an urban ecosystem must include analysis of how the built environment and human activity affect water and soil quality, as well as plant and animal life. It is also helpful to understand the Creek's history as a salt marsh turned industrial waterway, where it is geographically located in relation to the rest of Brooklyn, and the other water bodies it is connected to. The Newtown Creek ecosystem can be defined by the Newtown Creek Sewershed boundaries, or the upland areas surrounding the Creek that once naturally drained into it and are now solely fed by

storm and sanitary sewer pipes. Today, many human activities in the upland neighborhoods impact the health and vitality of the Creek, primarily through the combined sewage overflows that empty into the Creek from sanitary and storm sewers throughout the Sewershed.

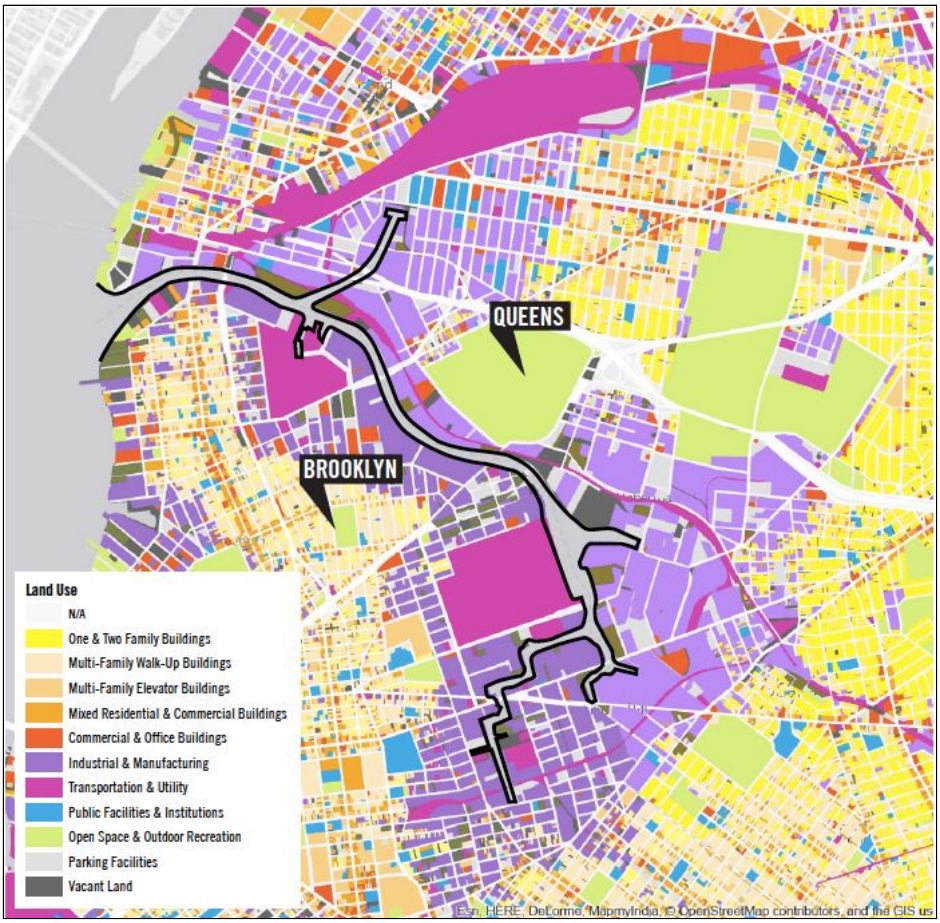
A primary strategy is to offset negative impacts of sewage overflow into the Creek is to create more “green spaces,” which are areas that are planted with trees and other vegetation. Green spaces act like sponges and absorb stormwater before it overwhelms the sewage system.

The benefits green space can provide to an urban ecosystem are significant:

- Lower heat island effect and reduce energy costs
- Filter out pollutants in air and water
- Reduce noise by natural buffers
- Manage stormwater through permeable surfaces, which recharges groundwater
- Increase biodiversity and habitat
- Increase health and well-being through public and recreational space
- Provide space for food production

The lessons in this curriculum allow students to apply concepts related to ecosystems and urban ecology both indoors and outdoors, and to learn specifically how the Newtown Creek could be a much cleaner, healthier waterway and urban ecosystem by having sufficient upland green spaces.

It is our intent that teachers and students who experience the Creek through this curriculum will develop concern for its particular issues and become active stewards of our local waterway. Stewardship may involve advocating for Creek ecological health, educating others or implementing a project that addresses the Creek’s environmental issues. Teachers and students can focus this concern on the issues of the Newtown Creek watershed, or apply this knowledge to understanding urban environmental issues around the world.



Map of Newtown Creek, showing today's land use

Source: Newtown Creek Alliance

Curriculum Format and Flexibility

How is the curriculum organized?

There are four units in this curriculum: Flora & Fauna, Water Quality, Watersheds & Sewersheds, and Soil Quality. Each unit includes: a Teachers Introduction with resources, two to three Lessons, a Field Lesson, and an Applied Learning Lesson.

- The Introduction to each unit is written for the teacher, in order to provide background information related to the unit; however, the introduction text could be modified for student use.
- The Lessons can be completed within one or two typical class periods and cover concepts and skills that prepare students for their time in the field. Taking time to expand the Lessons or do some of the Extension Lessons is encouraged, but not necessary.

- The Field Lessons are meant to be done outdoors, include a variety of activities, and can last from one to several hours.
- The Applied Learning Lessons help the students reflect on their field experience by analyzing the data they collected, then considering how stewardship, engineering or design would impact data results.

Overall, the units are designed to be flexible. We feel it is ideal to complete all lessons sequentially within the unit; however, you can easily pick and choose which lessons you want to use and in what order. For example, you can do the lessons without going in the field, or you can go in the field without doing the applied learning lesson. Additionally, you can pick and choose lessons from different units to create your own specialized unit.

Discussion Questions/Assessment Tools

How can teachers assess students on their knowledge?

The Lessons include a list of Discussion Questions. These questions can be used in a variety of ways. For example, you may simply use the questions in coordination with the "Procedures" to help guide the lesson. Or you may use the questions to create a handout or written assessment for the students. Each Field Lesson includes both Discussion Points and Journal Prompts, which are also very flexible and can be made into appropriate assessments.

Consider using and/or modifying the Introductions to each unit for your students. Giving students this informational text will allow for another layer of assessment as students cite the text and make comparisons between the text and the lesson activities.

The most rigorous assessments are found in the Applied Learning Lessons and within the Design Project, where students take the skills and content they have learned in the Lessons and Field Lessons and apply it to their own design ideas. Throughout the design process students have to explain, defend, and modify their own design ideas, while analyzing, critiquing and incorporating the ideas of their classmates.

Vocabulary

How is the vocabulary organized in this curriculum?

All of the vocabulary is collected and defined in the Glossary. In cases where there are multiple definitions for a word, the definition with the most relevance to this curriculum was chosen.

This curriculum provides three categories of vocabulary for each unit: Background,

Extension, and Essential Vocabulary for the unit.

- *Essential vocabulary* are words and concepts students should master for the unit
- *Background vocabulary* are helpful to understand context prior to working in the unit
- *Extension vocabulary* are more advanced terminology that can be used with the lessons

There are so many ways to introduce, teach and reinforce vocabulary, that we felt it best left up to the teachers to decide what works for their students.

Journal Writing

How and why should teachers use journal writing as part of this curriculum?

Regardless of whether you spend a hour or a day in the field, conclude the experience by having the students write a journal entry. Journaling allows students time to reflect on their experiences and to think meta-cognitively.

Journal writing can include:

- Observation
- Inference
- Description
- Detail
- Site Metadata (e.g. location, time, weather conditions)
- Procedure (so someone else can do what you did)
- Personal experience
- Reflection (e.g. self to lesson, self to world, lesson to world)
- Opinions
- Feelings

Journal illustrations can include:

- Organisms
- Landscapes
- Structures
- Measurements
- Labels
- Additional written information
- Being “good at drawing” is not required!

Journal prompts can include:

- One of my goals is...
- Today I improved upon...

- One of my challenges is...
- This experience taught me…

Relate journal assignments to the Five Habits of Mind:

- Point of View – From what point of view are we looking at this topic?
- Evidence – What is the evidence used to support the major point of view, argument, or hypothesis?
- Connections – What are the connections of content within the chosen topic?
- Alternatives – What other point of view can be used to investigate this topic?
- Significance – Why is the topic under investigation important to the student and within the larger context of society?

Journal assessment can be based on:

- Meaningful observations and reflections
- Touching on all points in the prompt
- Level and depth of detail
- Completeness/thoroughness of ideas

It is often helpful to:

- Have students write silently
- Have more than one prompt for students to choose from
- Include “Write anything else you want to write” at the end of each prompt
- Give written, personal feedback when assessing journals

Field Work

What should teachers keep in mind when bringing students in the field?

Field work is an exciting part of this curriculum; however in order for the field work to be safe and of the highest educational value you will need to do a fair amount of prep work. Here are a few suggestions as you plan your field day:

- **Site Pre-Visit:** Be sure to visit the field site(s) yourself before bringing your students there. Scope out where students can put their bags down, where they can sit, where you can gather and talk to the whole class, where small groups can work, and any safety questions and concerns.
- **Field Trip Forms:** Follow the Chancellor’s Regulations and have all the appropriate forms required by the DOE for a field trip.

- **Expectations:** Make sure your students know what to expect. Prep them at least a day in advance regarding the schedule, weather, lesson and classwork for their day in the field. Review what you expect of them in terms of conduct in the field. Create a field expectation contract for your students to sign.
- **The Field as a Classroom:** It is important the students understand that going into the field is NOT a field trip. They are simply having class outdoors, in a new setting. Students are expected to participate and complete their assignment just as they would in the classroom.
- **Student Preparedness:** Students should expect to get wet and dirty in the field. Be sure they wear clothes and shoes that are appropriate for the weather conditions. Even if it seems warm at school, students should have jackets, and in cooler weather hats and gloves. They should also bring a water bottle and a snack. Being hot, cold, dehydrated or hungry leads to discomfort and crankiness — which can really disrupt your day in the field!
- **Agenda**: Go over an agenda for the field day before you leave the classroom. For example, tell students how they'll be traveling to and from the site and when they will have lunch. This kind of information can allay students' concerns and make your day go more smoothly.
- **Supplies:** Pack and organize all your supplies for the field before your students show up. Use bags that are easy to transport such as backpacks and bags with wheels.
- **Clipboards:** Students need a reliable surface on which to write in the field. We highly recommend using clipboards. Binders are awkward and folders do not protect papers from flying away in the wind.
- **Volunteers:** Recruit a core group of adult volunteers to help you manage students and run small group activities in the field.

Small Groups in the Field

How can you structure field work so it goes smoothly?

In the field, you will likely need to talk to your whole class at certain times throughout the day in order to give directions. We recommend you spend limited time talking to your class as a whole and spend as much time as possible having your students work in small groups.

Group work does not always come naturally. Have your students begin to work in their small groups during the preceding lessons. To promote group cohesion and collective support, consider evaluating the group's work rather than the work of the individuals within the group.

Before heading out to the field, make sure that each group knows the assignment and

what role each student will play. Every student should have an assignment, so no one wanders around disturbing other groups.

Nature is inspiring and exciting. It's okay if your students feel this excitement and make observations unrelated specifically to the assignment. It's important to support the student's curiosity and exploratory nature.

Field Expectations Contract

INSTRUCTIONS: Please read and sign this contract with your parent/guardian.

Teacher Responsibilities:

- Keep you in a safe environment in class, in the Field
- Help you develop critical thinking skills
- Support the curiosity and exploratory nature of students in the field

Student Responsibilities:

Behavior

You are expected to behave according to the following guidelines.

Respect for Self

- Be prepared for class.
- Be on time.

Respect for Others

- No foul language or shouting.
- Keep hands, feet, and objects to yourself.
- Listen when others are speaking.
- Raise your hand and wait to be called on before speaking.

Respect for Classroom Environment

- No electronic devices are permitted to be seen, heard, or used in class or in the field.
- Head coverings of a non-religious nature are not allowed.
- Keep the classroom clean.

Respect for Outdoor Environment

- Put all garbage in a garbage can. Please do not litter!
- Respect all wildlife. Please do not feed or scare animals!
- Respect the vegetation. Do not unnecessarily pick or trample plants.
- Respect the built environment. No scraping, tagging or graffiti.

Preparedness

Each day you are in the field you will be graded on having the following items with you:

- clipboard
- reading book
- water bottle
- snack
- layer (jacket or other clothing needed)
- pencil
- field bag (backpack or messenger bag – no purses or tote bags)

Clothing and Supplies

The Newtown Creek is part of our classroom. This means that some of our activities will take place outside. While this is fun, exciting, and makes school a special place, it also requires that you dress properly and care for yourself when we are outside.

Required Clothing & Supplies:

__ Water Bottle

Part of staying comfortable and safe outside is making sure you have enough water. We often do not have access to drinks, so bring your refillable bottle.

__ Old Clothes & Shoes

Don't throw away your old clothes. Keep a pair of old jeans and an old sweatshirt around to wear in the field. We do get dirty sometimes.

__ Waterproof or Water Repellent Jacket

A big part of staying warm is having an insulated, outer layer that can keep water out. If the jacket and insulation are non-cotton, so much the better.

__ Hat, Gloves, Scarf

Baseball hats protect you from the sun. Knit hats and scarves will keep you warm because you lose a lot of your body heat from your head and neck. You need gloves to do your writing when it's cold!

__ Book Bag

You need a sturdy, good-sized bag. No plastic bags, purses or handbags! The book bag needs to hold your work for the day, a book to read on the subway, your water bottle and extra layers of clothes.

Suggested Clothing & Supplies:

__ Long Underwear

We will be outside when the temperature is low. In order to stay warm, especially if it is damp outside, you should wear non-cotton or synthetic long underwear under your clothes. The less cotton the better because cotton absorbs water and can make you cold!

__ Wool or Synthetic Socks

Nothing is worse then cold feet!! Your cotton socks will make your feet
cold if they get wet. It's also a great idea to bring an extra pair of socks to change into at the end of your day in the field.

__ Sunglasses & Sun Block

Even if you have dark eyes or skin you are still susceptible to the ultraviolet rays of the sun. These items will help protect you on the sunnier days, even if it is not hot out.

What it means to be In The Field...

- You must ***eat breakfast*** before school. No breakfast equals crankiness.
- You ***may not buy*** lunch (or anything else) once we have left the school building.
- You must bring a ***water bottle*** with you in the field.
- ***Do not*** wear new clothes and shoes. Wear things that can get dirty and wet.
- You must have a ***full-size*** school bag. No plastic bags or purses.
- You should use the restroom before you leave the school.
- As a class we will ***wait for the light***. Do not cross the street in front of your teacher. Stay with the group at all times!
- You must ***stay with the class*** at all times. If you leave the class group you will be considered truant and for safety purposes the principal and truancy police will be notified.
- You are to be on your ***best behavior*** while in the field. All school rules and policies apply.

Contract

We have read and agree to the above Field Expectations

Student Signature:

_____Date:_____

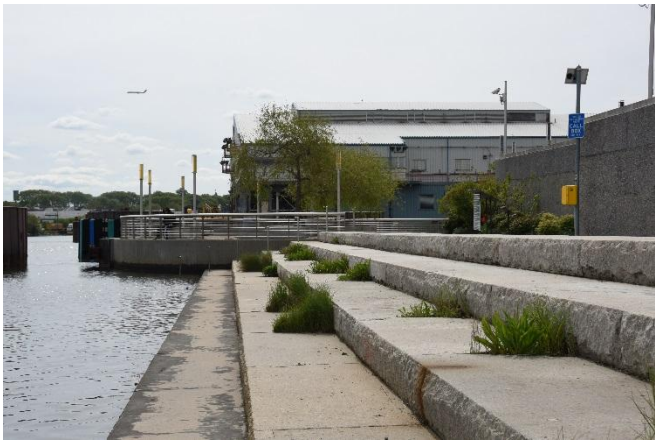
Parent/Guardian Signature:

_____Date:_____

Guides to Newtown Creek Field Sites
The best places to explore for the Field Lessons in this curriculum.

Newtown Creek Nature Walk

Entrance near 88 Paidge Avenue, Brooklyn 11222



The Newtown Creek Nature Walk is maintained by the Department of Environmental Protection (DEP). It features access to Newtown Creek and is open to the public every day, sunrise to sunset, weather permitting.

Designed by environmental sculptor, George Trakas, the site contains thought-provoking features like seven stone circles that pay tribute to the area's Lenape heritage. Design elements can be explored in whole or part with the assistance of **The Newtown Creek Nature Walk Scavenger Hunt.** Also notice the **Constructed Wetland Frames** installed in the water by **The Newtown Creek Alliance (NCA)** to improve **water quality** and provide **habitat**. The Nature Walk can be utilized to provide a rich site visit for many of the units in this curriculum.

Learning Activities

Self-guided or Invite a Guest Expert from Newtown Creek Alliance (NCA).
Pre-site visit is essential to the success of this trip.

Flora & Fauna

· Identify species of flora and fauna using the **Newtown Creek Field Guide**. Many plants are labelled.

· Complete the **Flora and Fauna Field Survey Handout** and **Metadata Survey.**

· Complete **Observation Inference Chart** for plants with the Observe a Plant Activity.

· **Collect a plant sample** for a herbarium press.

Water Quality

· With direct access to Newtown Creek water, you are able to **collect water samples** by tossing a bucket over the side of the railing with a rope line.

· **Water Quality Testing**: pH, Temperature, Salinity, Dissolved Oxygen, Turbidity

· **Journal Writing** with prompts from their field experience.

· Observe the **Rain Garden** on Provost Street near Paidge Avenue.

Watersheds & Sewersheds

· Map the **permeable** and **impermeable surfaces** with **Land Surface Survey** handout **and Newtown Creek Nature Walk Site Map**.

· Complete the **Make it Rain Activity** using the **Observation Inference Chart**.

· Have students clean the space using the **Litter Pickers Activity** as a guide.

Information

No Bathroom on site | Tables are available for eating bagged lunches or snacks.

- **Getting There:** Reserve a school bus; Buses can park on the corner of Provost Street and Paidge Avenue. Nearest address to give Bus Driver is 88 Paidge Avenue. 11222 (Time Warner Cable Office Address right next to Entrance.)
- **To Book a Trip:** No cost or booking required. *Site could be occupied by another class and is open to the general public.*
- **What To Bring:** Several adult chaperones, appropriate materials for learning activity, student journals, data collection sheets, clipboards, water bottles, appropriate clothing

Kingsland Wildflowers Green Roof

520 Kingsland Ave, Brooklyn, NY 11222 • www.kingslandwildflowers.com

The Kingsland Wildflowers is a 21,000 square foot rooftop green space that provides a corridor of native grass and flower habitat for NYC's bird and insect populations; it features all elements of a Certified Wildlife Habitat because it provides wildlife with: *food, water, cover, places to raise their young*. Designed and built by Alive Structures, the green roof is managed through a joint partnership by NYC Audubon and NCA.

Kingsland Wildflowers is also stocked with educational materials, including field guides, birding books, plant identification charts, binoculars, and more.

Learning Activities

Led by Newtown Creek Alliance Educator

Flora & Fauna

- Identify species of flora and fauna on the rooftop.
- Complete the **Observe a Plant** Activity, using the **Flora Observation Worksheet**.
- **Collect a plant sample** for a herbarium press.
- Observe interactions between native plants and wildlife, including birds, pollinators or insects.

Watersheds & Sewersheds

- Map the **permeable** and **impermeable surfaces** with **Land Surface Survey**
- Conduct the **Make it Rain Activity** using the **Observation Inference Chart**.
- Discuss the sewershed system using the DEP Wastewater Treatment Plant as a reference

Information

Tours typically last 1 hour | Bathroom on site

- **Getting There:** Walk or reserve a school bus; address: 520 Kingsland Avenue
- **To Book a Trip:** contact education@newtowncreekalliance.org to book a trip and discuss your class' specific learning objectives
- **What To Bring:** Several adult chaperones, appropriate materials for learning activity, student journals, data collection sheets, clipboards, water bottles, appropriate clothing

McCarren Park Demonstration Garden

457 Leonard Street, Brooklyn, NY 11222 (behind McCarren Pool)

The **McCarren Park Demonstration Garden**, "Demonstration" because its main purpose is to serve residents and gardeners as a learning tool. The garden features “best practices” in urban gardening, including raised bed gardens, herb, vegetables, native pollinator gardens, and even a few invasive plant species; the space also features a **rain garden**, intensive and extensive **green roofs**, and a **rainwater catchment system** for managing and collecting stormwater. Picnic tables and storage containers are perfect for bringing classes and storing lesson materials. Three of the four units can be easily taught in this space as soil, water, green infrastructure elements, and flora and fauna are all available.

Learning Activities

Led by Newtown Creek Alliance Educator

Watersheds & Sewersheds

- Investigate examples of green infrastructure; observe the rain garden and green roof.
- Map the **permeable** and **impermeable surfaces** using the **Land Surface Survey** worksheet.
- **Calculate** how much **rainwater** the rain barrels can capture during a one inch rainstorm.

Soil Quality

- **Conduct Soil Quality Tests:** collect soil samples from multiple locations and record data on **Soil Quality Data Sheet.**
- Identify **Soil Organisms**: collect soil samples for close observation.

Flora & Fauna

- Complete the **Observe a Plant** Activity, using the **Flora Observation Worksheet**.
- **Collect plant samples** for a herbarium press.
- Complete the **Observe a Plant** Activity, using the **Flora Observation Worksheet**.

Information

“Porta san” toilet | storage for Lesson Activity materials | picnic tables

Getting There: G train to Nassau Avenue; B26 or B46; L train to Lorimer Station

To Book a Trip: By appointment only. Contact your Sustainability Coach, and/or NCA.

What To Bring: See the Field Site Visit Contract for required clothing and supplies, student journals and other necessary learning activity materials and worksheets.

The Ed Shed @ North Brooklyn Boat Club

51 Ash Street Brooklyn, NY 11222 www.northbrooklynboatclub.org

The Ed Shed (at North Brooklyn Boat Club) features access to Newtown Creek, as well as a number of hands-on educational components and activities including a centerpiece aquarium, water quality monitoring, and plankton sampling and observation.
The Ed Shed is also stocked with educational materials, including field guides, microscopes, and a Sewer in the Suitcase; an on-site educator can lead students through STEM-based activities while providing an industrial and ecological history of Newtown Creek.

Learning Activities

Led by Newtown Creek Alliance Educator

Flora & Fauna

- Identify species of flora and fauna using the **Newtown Creek Field Guide**.
- Complete the **Observe a Fish** Activity. Identify and investigate the **aquatic wildlife species** of Newtown Creek, including plankton, mussels, crabs, and fish under the microscopes.
- Complete the **Observe a Plant** Activity, using the **Flora Observation Worksheet**.

Water Quality

- **Water Quality Testing**: with direct access to Newtown Creek, this is an ideal location to conduct pH, Temperature, Salinity, Dissolved Oxygen, and Turbidity tests.
- **Journal Writing** with prompts from their field experience.

Watersheds & Sewersheds

- Use the **Sewer in a Suitcase** to demonstrate how combined sewer overflows (CSOs) affect water quality.
- Map the **permeable** and **impermeable surfaces** at or near the Ed Shed using the **Land Surface Survey** worksheet.

Soil Quality

- **Conduct Soil Quality Tests:** collect soil samples from multiple locations and record data on **Soil Quality Data Sheet**
- Identify **Soil Organisms**: collect soil samples for observation under microscopes

Information

Fees pending | Bathroom on site

- **Getting There:** Reserve a school bus; address: 51 Ash St., Brooklyn, NY 11222
- **To Book a Trip:** contact the Education Department at education@newtowncreekalliance.org to discuss your class' specific learning objectives
- **What To Bring:** Several adult chaperones, appropriate materials for learning activity, student journals, data collection sheets, clipboards, water bottles, appropriate clothing, hand sanitizer

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Manhattan Ave Street End Park

Northern End of Manhattan Ave, beyond Ash Street, Brooklyn, NY 11222

This location, the only public park in Brooklyn near the banks of Newtown Creek, was established in 2009. The site features a grassy area, trees, benches, decorative granite stones, as well as a public launch site for canoes, kayaks, and other small boats. Educational signage about Newtown Creek's history and NYC's watershed and waterways are displayed in several locations throughout the park. This accessible public space offers students the opportunity to view visible signs of the city's infrastructure (notice all of the underground maintenance/utility holes), the Creek's present-day industry (look for barges and boat traffic), and novel ecosystems along the water's edge.

Learning Activities

Self-guided or Invite a Guest Expert from Newtown Creek Alliance (NCA)

Flora & Fauna

- Identify species of flora and fauna using the **Newtown Creek Field Guide**. Look for birds on land and water!
- Complete the **Observe a Plant** Activity, using the **Flora Observation Worksheet**.
- **Applied Learning:** How can the addition of native plant species benefit wildlife that live in or near the park?

Water Quality

- **Water Quality Testing**: conduct Temperature, pH, Salinity, Dissolved Oxygen, and Turbidity tests; toss a bucket attached to a rope line over the railing to collect water samples.
- Use the NYC watersheds and waterways signs for **journal prompts** and reflections about Newtown Creek.
- **Applied Learning:** How can the Creek's water quality be improved by the addition of plants?

Watersheds & Sewersheds

- Map the **permeable** and **impermeable surfaces** using the **Land Surface Survey** worksheet.
- Have students practice stewardship using the **Litter Pickers Activity** as a guide.
- **Applied Learning:** What engineering or design solutions could increase the absorption of rainwater at this site?

Soil Quality

- **Conduct Soil Quality Tests:** collect soil samples from multiple locations and record data on Soil Quality Data Sheet
- Discuss **built vs. natural environment** and the role of industry over time.
- **Applied Learning**: How can soil health in this area be improved by the addition of plants?

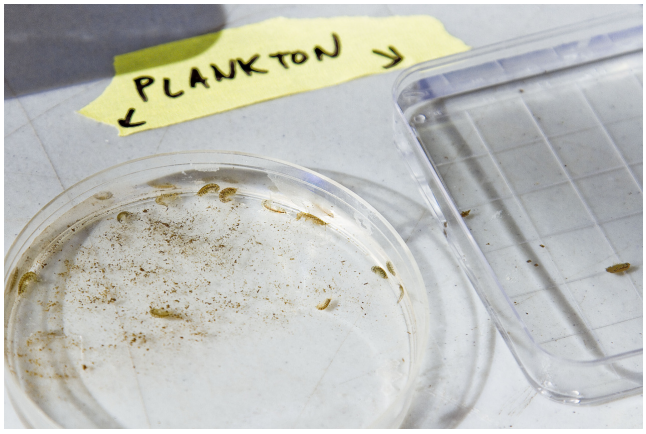
Information

No Bathroom on site | Benches are available for eating bagged lunches or snacks.

- **Getting There:** Reserve a school bus; buses can park at the end of Manhattan Ave to the left of the park there is a parking space.
- **To Book a Trip:** No cost or booking required. *Site could be occupied by another class and is open to the general public.*
- **What To Bring:** Several adult chaperones, appropriate materials for learning activity, student journals, data collection sheets, clipboards, water bottles, appropriate clothing, hand sanitizer

Living Dock

459 North Henry Street, Brooklyn, NY 11222



The Living Dock is a 200 square foot floating structure designed to promote marine life and provide important habitat. The Dock provides a protected place for marsh grasses to grow, shellfish to live, and marine animals to hide and feed. The dock can host visitors to provide a first hand look at the habitat and numerous species that have been returning to Newtown Creek.

The site features access to Newtown Creek, a number of hands-on educational components and activities including water quality testing, and fish and other marine life observation, flora and fauna observation opportunities. The Living Dock is also stocked with educational materials, including field guides, microscopes, and a Sewer in the Suitcase; an on-site educator will lead students through STEM-based activities while providing an industrial and ecological history of Newtown Creek.

Learning Activities

Led by Newtown Creek Alliance Educator

Flora & Fauna	Water Quality	Watersheds & Sewersheds
• Identify and investigate the **aquatic wildlife species** of Newtown Creek, including fish, mussels, oysters, crabs and plankton under microscopes • Wildlife Survey and **Observe a Fish** activities.	• With direct access to Newtown Creek water, the Living Dock is an ideal location to conduct **water quality tests.** • Use the **Sewer in a Suitcase** to demonstrate how combined sewer overflows (CSOs) affect water quality • Newtown Creek Ecological and Industrial History	• Permeable and impermeable surfaces are on site. • A demonstration of how runoff gets into the Creek is available.

Information

Workshops must be a minimum of one hour | price for workshop pending | No bathroom on site

- **Getting There:** Reserve a school bus; address: 459 North Henry Street, Brooklyn, NY 11222
- **To Book a Trip:** contact education@newtowncreekalliance.org to discuss your class's specific learning objectives
- **What To Bring:** See the Field Site Visit Contract for required clothing and supplies, student journals and other necessary learning activity materials and worksheets, hand sanitizer.