

Bronx River Alliance Education

Water Quality Monitoring in the Bronx River

OBJECTIVE:

Students will learn about how urbanization in the 19th and 20th century transformed the Bronx River from the pristine waterway that “ran silver” with migratory fish in the days of the Lenape, to a threatened urban waterway. They will then learn about what restoration efforts have been completed. Finally, they will perform a series of water quality tests to evaluate the current health of the river, and determine if it is a healthy habitat for creatures both big and small.

MATERIALS:

H-B Instrument™ Enviro-Safe™ Environmentally Friendly Liquid-In-Glass Pocket Thermometers
VeeGee STX-3 Refractometer
LaMotte Dissolved Oxygen Test Kit
LaMotte Precision pH 3.0-10.5 Test Kit
LaMotte Nitrate Nitrogen Low Range Comparator Test Kit
Turbidity Tubes
Latex Gloves (sizes M, L, XL)
Pencils
Clipboards
Animal Data Sheets

ACTIVITY SUMMARY:

Students become hands-on scientists at the Bronx River. First, they spend a few moments observing conditions and animals in real-time on (and in!) the river. Second, they learn about the history of the Bronx River. Next, students divide into groups and receive a fact sheet about a specific sea creature who lives in the Bronx River: Alewife, American Eel, Eastern Oyster, Mummichog, or Blue Crab. Finally, students perform tests using the same equipment that our field

Best For Grades:

9-12

NYS Science Learning Standards:

HS-LS2-6
HS-LS2-7
HS-ESS2-2
HS-ESS3-1
HS-ESS3-4
HS-ESS3-6

Skills:

Quantitative data collection, observation, critical thinking

volunteers use, and record results. Results are added to our database and used to draw conclusions and make change going forward! We end the day with a discussion about what future endeavors we can take to make sure the river stays healthy, both for the health of the creatures and the health of our communities.

BACKGROUND INFORMATION:

History of the Bronx River

The Bronx River was called Aquehung by the Lenape people who lived in small villages in the area. Aquehung translates to “River of High Bluffs” and is likely a reference to the steep hills along its course. The river was incredibly clean, so much so that early colonists wrote that it “ran silver” every spring with the throngs of alewives migrating upstream. The first dam on the Bronx River, at today’s 182nd Street, was built in the late 1600s. Dams were used to operate mills for things like flour and tobacco. Naturally, these dams restricted the movement of migratory fish.

Much of the original forest in the Bronx River Watershed was cut down to provide farmland for the European settlers, except in the areas that were too hilly or rocky. By 1844, the New York and Harlem (later Metro North’s Harlem Line), was built along the river. This railroad brought more industry and more people to the river’s valley. With more people, of course, came more pollution. The river was treated by many municipalities as an open sewer. This led to the creation of the Bronx River Parkway in the 1910s, under the idea that this preserved recreational green space would preserve the river’s character. But, this soon became a major commuter route.

The river’s condition declined in the 20th century. In the Bronx, “out of sight, out of mind” was a common idea and people discarded large debris in the water. In addition to that, New York City has a combined sewer system. This means that on dry days, wastewater is sent to a sewage treatment plant and discharged cleanly. However, on rainy days, wastewater and rainwater mix and overwhelm the system, causing raw sewage discharges into rivers like the Bronx River. In Westchester, storm drains frequently discharge runoff from streets and highways into the Bronx River, and occasionally sewage. These factors, combined with the presence of dams, trash, industrial runoff, and lack of green space, made the Bronx River an eyesore in the 1970s. However, a band of determined community members were frustrated by this and chose to physically get in the water and clean it up. This group, called Bronx River Restoration, eventually became today’s Bronx River Alliance. Through their work, parks were improved, trees were planted, and debris were removed. Their work has led the river to be in a much better state now than it was 40 years ago, but there is much more to do!

Activity 1: Learn About Your Fish

Students divide into small groups of four or five (depending on the size of the class) and receive a fish guide:

[Alewife](#)

[American Eel](#)

[Blue Crab](#)

[Eastern Oyster](#)

[Mummichog](#)

(note that not all creatures will be found in all parts of the river in all seasons - that's the catch!)

Students will read these sheets and take note of what the fish needs to thrive. The question they will keep in mind is: Would your fish thrive in the Bronx River, at this time, today?

Activity 2: Data Sheets

Each group will receive a [water quality monitoring data sheet](#). With this sheet, the group observes current site conditions and records the date, time and location. The table is to be filled out once each test is completed. Students will be reminded of how to properly take note of quantitative data, including using the correct units of measurement.

Activity 3: Tests

The water quality monitoring test protocol is approved by the U.S. Environmental Protection Agency and are typical of environmental organizations across the country. We start with recording the air temperature and water temperature using hand-held thermometers. Then, the following tests are performed:

- pH
- Dissolved Oxygen
- Salinity (not applicable north of East Tremont Avenue in the Bronx)
- Nitrate
- Turbidity

CONCLUSION

The lesson wraps up with a discussion with critical thinking questions:

- Would your animal thrive? Why or why not?
- Are certain values higher or lower than expected?
- What can we do with this information? If you could share this with your elected officials, what would you tell them about it?
- What are some ways we can improve the health of the Bronx River?
- Do you feel the Bronx River is treated differently than rivers in other communities?
Let's discuss environmental justice.