Name Leo McGuinness Class of 2019

Marine Biology Research Program

WSEP: Work Skills Employability Profile

Program Description

The Marine Biology Research Program (**MBRP**) is a three-year program that will jump start you in core marine science topics employing hands-on, problem-based learning strategies. In these challenging college level courses, you'll begin by creating Aquatic Ecosystem Models to learn the basics in biology, ecology, and oceanography. As an intermediate student you'll choose from one of two paths: A) Geographic Information Systems and B) Interdependent Research. In path A) you'll begin a certification curriculum in map making and spatial data analysis. In path B) you'll acquire college level reading, writing, and statistics skills while creating a project. As an advanced student, you'll finish your Geospatial curriculum or your research project with the help of a scientist and, ultimately, use your own data to propose resource management solutions for the Hudson-Raritan Estuary. Along the way, you'll learn how to make maps, manage projects, submit professional reports, and present at national and international conferences. You'll also be given important career development opportunities such as career exploration techniques, ePortfolio development, and internships with scientists. Throughout the program you'll be eligible for at least 18 college credits and various certifications that will give you a competitive advantage in college and industry. Research scholars in this program have gone on to universities such as Fordham, Columbia, MIT, Carnegie Mellon, Vanderbilt, Brown, and the University of Pennsylvania with full scholarships to pursue careers in Marine Biology, Environmental & Mechanical Engineering, Finance, Medicine, Veterinary Medicine, and other challenging careers. They have also won 1st, 2nd and 3rd prize in the NYC Science and Engineering fair over all public and private schools in the city.

Program Objectives

01. Prepare students for resource management and conservation.
02. Give students a strong foundation in marine science.
03. Expose students to professional settings and careers in marine science.
04. Prepare students for college with rigorous research projects and college credit bearing courses.
05. Characterize the Hudson-Raritan Estuary's marine environment.
06. Monitor the oyster restoration project.

Skills Overview	Certifications & College Credit
Personal Characteristics Career Management Skills Universal Foundation Skills Project Management Skills Basic Science and Lab Skills Field Sampling Skills Instrumentation Skills Data Acquisition, Management, and Analysis Skills Physical-Chemical & Biodiversity Analysis Skills Information Technology + Statistics Skills Geographic Information Systems Skills Genetic Barcoding Skills Financial Management Skills	01) NOCTI Natural Resources Systems Certificate + 3 College Credits 02) SPACE Geographic Information Systems Certificate 03) 12 SUNY Albany College Credits 04) 3 SUNY Stony Brook College Credits 05) NYCSEF Research Certificate 06) CFM – EverFi Certificate 07) Urban Genetics Barcoding Certificate 08) Chemical Safety Certificate (Compliance Solutions, Inc.) 09) Laboratory Safety Certificate (Compliance Solutions, Inc.) 10) YSI EXO University Certificate

THE URBAN ASSEMBLY New York HARBOR SCHOOL

Name _____ Class of _____

URBAN ECOLOGY New York MARINE BIOLOGY

Lab Skills	Rating Scale 3 Above Average 2 Average 1 Below Average			Date Evaluated	Instructors' Initials
	3	2	1		
Basic					
Using correct Personal Protective Equipment (PPE)	✓				
Measuring Length with at least 3 different tools	✓				
Measuring Volume with at least 3 different tools		✓			
Measuring Mass with at least 2 different tools		✓			
Germinating seeds hydroponically		✓			
Substrate establishing (*i.e.* fluorite, gravel, and/or sand)		✓			
Aeration applications in biology experiments			✓		
Building and maintaining a fresh water non-re-circulating aquatic ecosystem model		✓			
Intermediate					
Understands requirements for Biological Safety Level I		✓			
Disinfecting with chlorine		✓			
Initiating nitrification with ammonia and nitrifying bacteria			✓		
Calculating simple solution concentrations (chemical + biological)			✓		
Building a freshwater re-circulating aquatic ecosystem model			✓		
Maintaining a freshwater re-circulating aquatic ecosystem model			✓		
Neutralizing pH for waste water solutions		✓			
Using an R/O DI filter system			✓		
Advanced					
Understands Biological Safety Levels II and above		✓			
Sterilizing with pressure pot			✓		
Calculating energy flow			✓		
Building and installing manifold			✓		
Building and maintaining a brackish and/or salt water aquatic ecosystem model			✓		
Building or maintaining an R/O DI filter system			✓		

THE URBAN ASSEMBLY New York HARBOR SCHOOL

URBAN ECOLOGY New York MARINE BIOLOGY

Name _____ Class of _____

Field Sampling Skills	Rating Scale 3 Above Average 2 Average 1 Below Average			Date Evaluated	Instructors' Initials
	3	2	1		
Basic					
Water quality sampling with bucket	✓				
Water quality sampling with dipper		✓			
Crab traps		✓			
Minnow traps			✓		
Slide preparation	✓				
Using a manual depth sounder			✓		
Intermediate					
Water quality sampling with Beta Bottle	✓				
Small manual plankton nets	✓				
Benthic grab manual sampler		✓			
Epiphyton sampler		✓			
Transept sampling		✓			
Using a seine net	✓				
Advanced					
Water quality sampling with Niskin Bottle		✓			
Large tow plankton nets onboard vessel	✓				
Benthic sampler onboard vessel		✓			
Quadrat/transept sampling			✓		
Digital transepts			✓		

THE URBAN ASSEMBLY New York HARBOR SCHOOL

Name _____ Class of _____

URBAN ECOLOGY New York MARINE BIOLOGY

Instrumentation Skills	Rating Scale 3 Above Average 2 Average 1 Below Average			Date Evaluated	Instructors' Initials
	3	2	1		
Basic					
Maintaining Test Strips		✓			
Using a calibrated stop watch	✓				
Using a calibrated thermometer	✓				
Using magnifying glasses	✓				
Using a manual depth sounder			✓		
Using a manual hanging scale		✓			
Intermediate					
Preparing pH standards		✓			
Calibrating pH sensor		✓			
Using a micropipette	✓				
Folsom Plankton Splitter		✓			
Maintaining an Electrical Conductivity probe		✓			
Measuring mass with a digital balance		✓			
Using a light microscope without immersion objective lens	✓				
Using a light stereoscope	✓				
Using a sonar depth sonde			✓		
Using a flow meter	✓				
Using a digital scale	✓				
Using light and/or temperature sensors		✓			
Keeping an instrument calibration log		✓			
Keeping an instrument maintenance log		✓			
Advanced					
Using a digital microscope with immersion oil		✓			
Using a digital stereoscope		✓			
Maintaining optical probes (*e.g.* dissolved oxygen, chlorophyll)		✓			
RS232 Communication protocol with sensor			✓		
Replacing probes on meters (Hanna Combo and YSI)		✓			
Replacing filters for CO_2 detection			✓		
Calibrating a LICOR CO_2 sensor			✓		
Running a MetOne Particulates sensor			✓		
Running a Magee Scientific Aetholometer Black Carbon sensor			✓		

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New York HARBOR SCHOOL

Name _____ Class of _____

URBAN ECOLOGY New York MARINE BIOLOGY

Data Acquisition & Management Skills	Rating Scale 3 Above Average 2 Average 1 Below Average			Date Evaluated	Instructors' Initials
	3	2	1		
Basic					
Creating a data table with metadata section using a word processor or digital spread sheet		✓			
Using a picture key to identify organisms	✓				
Using a data table to collect qualitative data	✓				
Using a data table to collect quantitative data - counts	✓				
Intermediate					
Creating a dichotomous key to identify organisms		✓			
Using a dichotomous key to identify organisms		✓			
Creating digital images with digital microscope/stereoscopes	✓				
Inputting and managing data in a spread sheet	✓				
Log of missing data		✓	✓		
Log of data entry and transcription errors			✓		
Log of protocol errors			✓		
Advanced					
Creating identification fiches for organisms			✓		
Determining data precision		✓			
Determining data bias	✓				
Determining data representativeness	✓				
Determining data comparability	✓				
Determining data completeness		✓			
Determining instrument sensitivity		✓			
Managing a website with project data.			✓		

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THE URBAN ASSEMBLY New York HARBOR SCHOOL

Name _____ Class of _____

URBAN ECOLOGY New York MARINE BIOLOGY

Physical-Chemical Analysis Skills	Rating Scale 3 Above Average 2 Average 1 Below Average			Date Evaluated	Instructors' Initials
	3	2	1		
Basic					
Measuring ammonia concentration using colorimetric test		✓			
Measuring pH using colorimetric test		✓			
Measuring nitrite concentration using colorimetric test		✓			
Measuring nitrate concentration using colorimetric test		✓			
Measuring buffering capacity using colorimetric test			✓		
Measuring phosphate concentration using colorimetric test			✓		
Measuring hardness using colorimetric test		✓	✓		
Measuring alkalinity using colorimetric test		✓			
Measuring temperature with a calibrated thermometer	✓				
Intermediate					
Measuring salinity with a refractometer			✓		
Measuring pH with a conductivity probe		✓			
Measuring electrical conductivity with a conductivity probe			✓		
Measuring turbidity with a turbidity tube or Secchi disk			✓		
Measuring current with meter tape, floating device, and chronometer		✓			
Adjusting pH levels of a solution	✓				
Measuring nutrients using photometer		✓			
Adjusting nutrient levels (hydroponics germination)		✓			
Advanced					
Measuring dissolved oxygen using the Azide modified Winkler Method		✓			
Measuring enterococcus using Enterolert		✓			
Measuring nutrients using a spectrophotometer		✓			
Measuring dissolved oxygen using optical probe			✓		
Measuring chlorophyll a using optical probe			✓		
Measuring turbidity a using optical probe			✓		
Measuring dissolved organic matter a using optical probe			✓		

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THE URBAN ASSEMBLY New York HARBOR SCHOOL

Name _____ Class of _____

URBAN ECOLOGY New York MARINE BIOLOGY

Information Technology and Statistics Skills	Rating Scale 3 Above Average 2 Average 1 Below Average			Date Evaluated	Instructors' Initials
	3	2	1		
Basic					
Turning on and shutting down a computer correctly	✓				
Naming digital files	✓				
Creating and naming digital folders		✓			
Organizing a USB thumb drive		✓			
Data table creation	✓				
Basic statistics (digitizing data on to Microsoft Excel, central tendency)		✓			
Digitizing data on to Microsoft Word		✓			
Search queries on the internet		✓			
Google Earth – Basic functionality		✓			
Intermediate					
Graphing in Microsoft Excel		✓			
Experimental design (problem definition, hypothesis/null hypothesis formulation, objective definition, variable definition, controls, constants, assumptions, limitations, replicating, pseudoreplicating, task definition, materials definition, protocol definition)	✓				
Intermediate statistics (probability, regression analysis, correlations)		✓			
Boolian logic for internet search engines		✓			
Google Earth – Intermediate functionality*		✓			
Bluetooth technology for remote data transfer - telemetry		✓			
Parametric Statistics - error types		✓			
Parametric Statistics - t-test, and/or Chi square test		✓			
Advanced					
Parametric Statistics – ANOVA and or ANCOVA			✓		
Primer + Permanova applications for non-parametric ecological statistics			✓		
Spip4q application for automated instrument data retrieval			✓		
Hyperterminal application for remote instrument communication			✓		
Radio technology for remote data transfer - telemetry			✓		
Cell phone technology for remote data transfer - telemetry			✓		

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Name _____ Class of _____

Geographic Information Systems Skills	Rating Scale 3 Above Average 2 Average 1 Below Average			Date Evaluated	Instructors'/Mentors' Initials
	3	2	1		
Basic					
Opening an Existing Map document					
Navigating Data Frames					
Using Select by Attributes and Select by Location					
Labeling Features					
Adding and Editing Data Layers					
Using Zooming Techniques					
Selecting Tabular Data					
Creating Shapefiles					
Edit Symbology					
Edit Layer Properties					
Defining the History of Mapping					
Defining Coordinate Systems					
Defining Map Projections					
Intermediate					
Defining Map Scale					
Defining Remote Sensing and Aerial Photography					
Creating Buffers – both Single and Multiple Ring					
Merging Shapefiles					
Clipping Layers					
Create an Address Locator					
Geocode Addresses					
Create a GIS Report					
Format a map layout					
Plotting X,Y Coordinates					
Heads Up Digitizing					
Export a Data Layer					
Building Data Layers from Aerial Photography					
Advanced					
Using GPS Technology & Geocaching					
Creating a Layout with Multiple Data Frames					
Create a Map Animation					
GIS Project Planning Sequence					
Planning and Building a Local Data Inventory					
Formatting Local Data Inventory					
Creating a Geodatabase					
Creating 3D map layout					

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New York HARBOR SCHOOL

Name _____ Class of _____

New York MARINE BIOLOGY

Project Management Skills	Rating Scale 3 Above Average 2 Average 1 Below Average			Date Evaluated	Instructors' Initials
	3	2	1		
Basic					
Science report writing	✓				
Keeping a basic research journal		✓			
Organizing a research portfolio	✓				
Literature review	✓				
Basic bibliography writing skills		✓			
Active note taking (*i.e.* style and unknown word definition)		✓			
Presentation skills in front of class audience	✓				
Creating a procedures flow chart		✓			
Creating a materials list	✓				
Intermediate					
Active note taking strategies (*i.e.* inquiry questions, reading conditions)		✓			
Keeping a professional science journal		✓			
Keeping an updated research portfolio	✓				
Cornell and Harvard style notation		✓			
Writing a Research Plan	✓				
Obtaining and keeping open communication with a professional scientist as an advisor or mentor		✓			
Technical reading and summarizing of peer reviewed journal articles	✓				
Technical writing (Introduction, Background, Materials, Procedures, Results)		✓			
APA style bibliography writing		✓			
Application process for science enrichment programs	✓				
Presentation skills in front of school wide audience	✓				
Preparing a digital presentation	✓				
Creating a materials budget		✓			
Ordering project materials		✓			
Advanced					
Technical writing (Analysis and Conclusions)		✓			
Writing a journal article style paper		✓			
Research fair application		✓			
Travel preparations		✓			
Presentation skills in front of regional wide audience	✓				
Preparing a poster board	✓				

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Name _____ Class of _____

URBAN ECOLOGY New York MARINE BIOLOGY

Genetics Skills	Rating Scale 3 Above Average 2 Average 1 Below Average			Date Evaluated	Instructors'/Mentors' Initials
	3	2	1		
Basic					
Field sampling for marine organisms					
Labeling sampling vials					
Keeping a sampling log					
Defining Restriction Enzyme					
Defining Polymerase Chain Reaction					
Defining Gel Electrophoresis					
Defining Cytochrome Oxidase 1					
Defining Phylogenetics					
Defining Bioinformatics					
Defining Base Pairs					
Intermediate					
Creating a research plan for SRC approval					
Extracting a subsample for DNA isolation					
Pipetting					
Adjusting and employing a hot water bath					
Centrifuging					
Pouring gel into electrophoresis chamber					
Advanced					
Running a Polymerase Chain Reaction					
Running a Gel Electrophoresis					
Running Bioinformatics					
Creating a Phylogenetic Tree					
Analyzing Genetics Data					

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Name _____ Class of _____

URBAN ECOLOGY New York MARINE BIOLOGY

Additional Project Skills	Rating Scale 3 Above Average 2 Average 1 Below Average			Date Evaluated	Instructors'/Mentors' Initials
	3	2	1		
Basic					
Intermediate					
Advanced					

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THE URBAN ASSEMBLY New York HARBOR SCHOOL

Name _____ Class of _____

URBAN ECOLOGY New York MARINE BIOLOGY

Career and Financial Management	Rating Scale 3 Above Average 2 Average 1 Below Average			Date Evaluated	Instructors' Initials
	3	2	1		
Financial Management:					
Savings (*i.e.* interest, liquidity, plans, budgeting, "needs vs. wants")					
Banking (*i.e.* financial institutions, Federal Reserve System, account types, FDIC insurance, account fees, checking, online banking)					
Payment Types (*i.e.* debit cards, credit cards, cash advances, payday loans, electronic payment options)					
Credit Scores (*i.e.* calculations, habits, payment history, decisions, future financial decisions, credit reports)					
Financing Higher Education (*i.e.* return on investment, financial aid options, FAFSA)					
Renting vs. Owning (*i.e.* appreciating and depreciating assets, leases, mortgages, buying a car)					
Insurance and Taxes (*i.e.* insurance types and policies, deductibles, premium amounts, tax forms, paystubs,)					
Consumer Protection (*i.e.* laws and organizations, consumer fraud and id theft, strong passwords)					
Investing (*i.e.* terms, stocks, bonds, risk, return, portfolios, retirement plans)					
Career Management					
Self-assessment (*i.e.* Holland Code, Myers-Briggs, etc.)					
Resume & Cover Letter Creation					
Portfolio Creation					
ePortfolio Creation					
Career Exploration (*i.e.* ONET, CareerZone, etc.)					
LinkedIn Account					
Pre-employment Skills (*i.e.* Cold Canvassing, Job applications, Interview Skills, Evaluating Job Offer, Thank You Letter)					
Employment Skills (*i.e.* Transferrable skills, Sexual Harassment, Worker's Rights, Unions, Benefits, FMLA)					

WBL, Certifications & College Credit	Grade 10-11	Grade 12	Total	Date Evaluated	Instructors' Initials
CTE Coursework Hours (max 576)					
Internship Experience Hours					
SUNY Albany Research College Credit (max 12)					
SUNY Stony Brook Oceanography College Credit (3)					
NOCTI Natural Resource Systems Certificate + 3 College Credits					
SPACE Geographic Information Systems Certificate (DQI)					
NYCSEF Research Certificate (or other regional accredited Science & Engineering Fair Certificates)					
Career/Financial Management Certificate (EVERFI)					
Urban Barcode Genetics Certificate (Cold Spring Harbor Lab)					
Chemical Safety Certificate (Compliance Solutions, Inc.)					
Laboratory Safety Certificate (Compliance Solutions, Inc.)					
EXO University Certificate (Yellow Springs Instruments)					

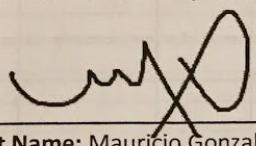
THE URBAN ASSEMBLY New York HARBOR SCHOOL

Name _____ Class of _____

URBAN ECOLOGY New York MARINE BIOLOGY

To whom it may concern,

The purpose of this letter is to confirm that the above-named student has been evaluated for the skills outlined in this document. Next to each competency skill you'll find the proficiency level that said student achieved during their course in the Marine Biology Research Program, academic classes at the Urban Assembly New York Harbor School, other enrichment opportunities, and Work-Based Learning Experiences. Below you will find the names and contact information of those persons that have evaluated the holder of this document.



Print Name: Mauricio Gonzalez, M.Sc.
Company: New York Harbor School
Title: Director, Marine Biology & WBL
Contact: 646-752-2071

Print Name:
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Contact:

Print Name:
Company:
Title:
Contact:

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