



The Find Your Park Lab for Ecology Students during a Pandemic

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Abstract

During the fall of 2020 and, following a resurgence of Covid-19 cases in New York City and State, we were forced to conduct the Ecology lab course online. However, in order to expose the students to some ecological concepts through hands-on activities, we required them to participate independently in a lab in which they got to choose a local park/habitat to study. Students chose a variety of parks that were planted with native species such as the High Line in Manhattan and the Brooklyn Bridge Park, a botanical garden on Long Island, and wild chaparral by a student who remained in California. Activities included taking pictures of and identifying plants using iNaturalist, researching whether the plants were native or invasive, learning about the range of the plants and any medicinal uses, determining rates of soil settling in a cup or jar (and thus learning more about porosity and permeability of soils), measuring seed dispersal, setting up a Winogradsky column, and calculating a species diversity index. Students revisited the park over the semester and noted any changes. They then compiled their data into tables and charts and presented their findings in both the form of a lab report and a poster that they presented to the class online over Zoom.



Introduction

Students in the Fall 2020 Ecology course were queried as to whether or not they would participate in outdoor labs. As only a few were willing to attend, the professor decided to devise an alternative assignment. Their professor had recently camped in Cape Cod and visited the National Seashore there and thus "borrowed" the expression "Find Your Park". The students were required to choose a park from a list provided, or to pick their own to study. The list provided included the High Line, Central Park, Brooklyn Bridge Park, the Brooklyn Botanic Garden, the NY Botanical Garden in the Bronx, and Prospect Park. The professor also invited students to tour these places with her, on alternate Fridays, as she traveled to these parks on her bike. (Everyone was avoiding public transportation, if they could, at this time). The students were required to photograph and identify plants through iNaturalist, "throw" 100 seeds of the same kind to simulate seed dispersal and measure a subset of these, calculate an average soil settlement time of three different areas in their parks, calculate a species diversity index of a subset of their species, make a Winogradsky column of a soil sample in their park, and re-visit the park and record species found. At the end of the semester, students made posters and presented them to the class on Zoom.

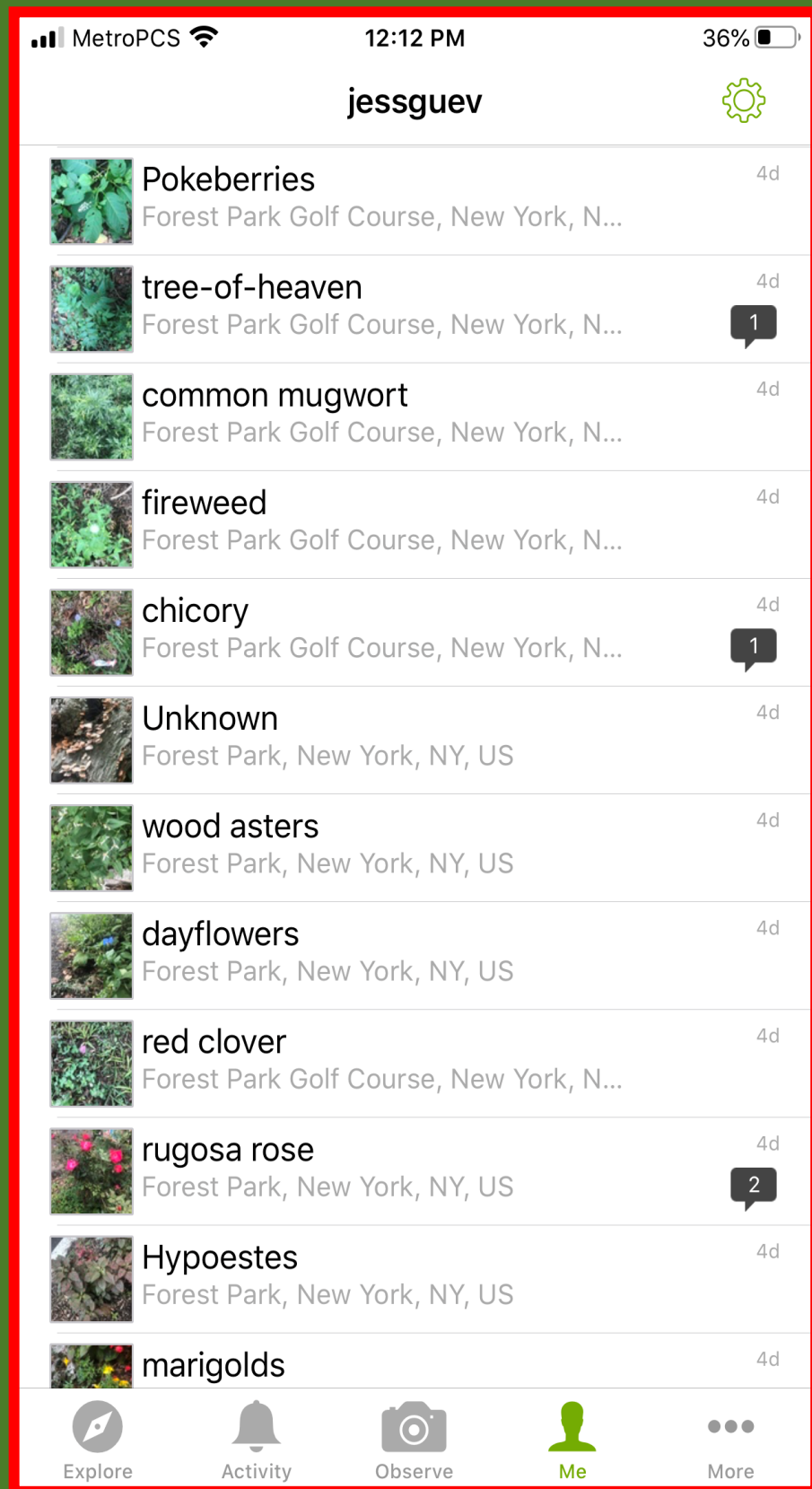


Fig. 5 Autumn Flowering Cherry: This tree blooms sporadically during a warm fall.



Winogradsky column:



Figure 3 – Bottle to left was day 1. Bottle in the middle was 4 weeks later containing the newspaper strips. Bottle to the right was 4 weeks later containing the egg yolk.

Picture	Common Name	Species name	Invasive/Native	Range	Medicinal us
	Common Earthball	<i>Scleroderma scleroderma</i>	Native	Eastern U.S.	N/A
	Ringless Honey Mushroom	<i>Armillaria tabescens</i>	Native	East Coast	Antioxidant effects
	Viscid Violet	<i>Cornicularius lodes</i>	Introduced	Eastern U.S.	N/A poisono
	Turkey Tail	<i>Trametes versicolor</i>	Native	Most of the U.S. Not Midwest Europe Asia	Antioxidant Fights cancer gut bacteria balance
	Chicken of the Woods	<i>Lactiolepus subulatus</i>	Native	Eastern U.S. Europe	Anti-carcinogen Anti-inflammatory Anti-bacteri
	Spotted Wintergreen	<i>Chimaphila maculata</i>	Native	Eastern Mountain ranges Mexico	Anti-inflammatory Arthritis (MS) sci
	Wineberry	<i>Rubus phoenicolasius</i>	Introduced/Invasive	Eastern Mountain ranges Western Europe	Anti-inflammatory Vitamin E, Immune System Boost

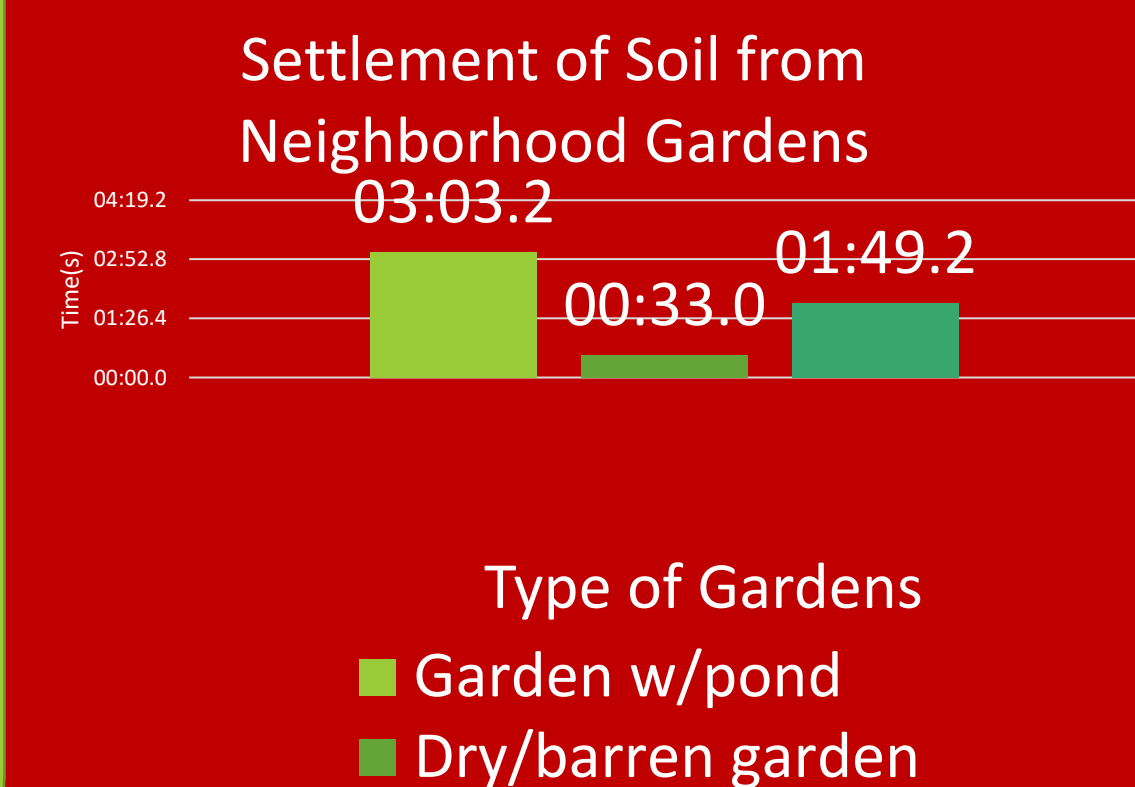
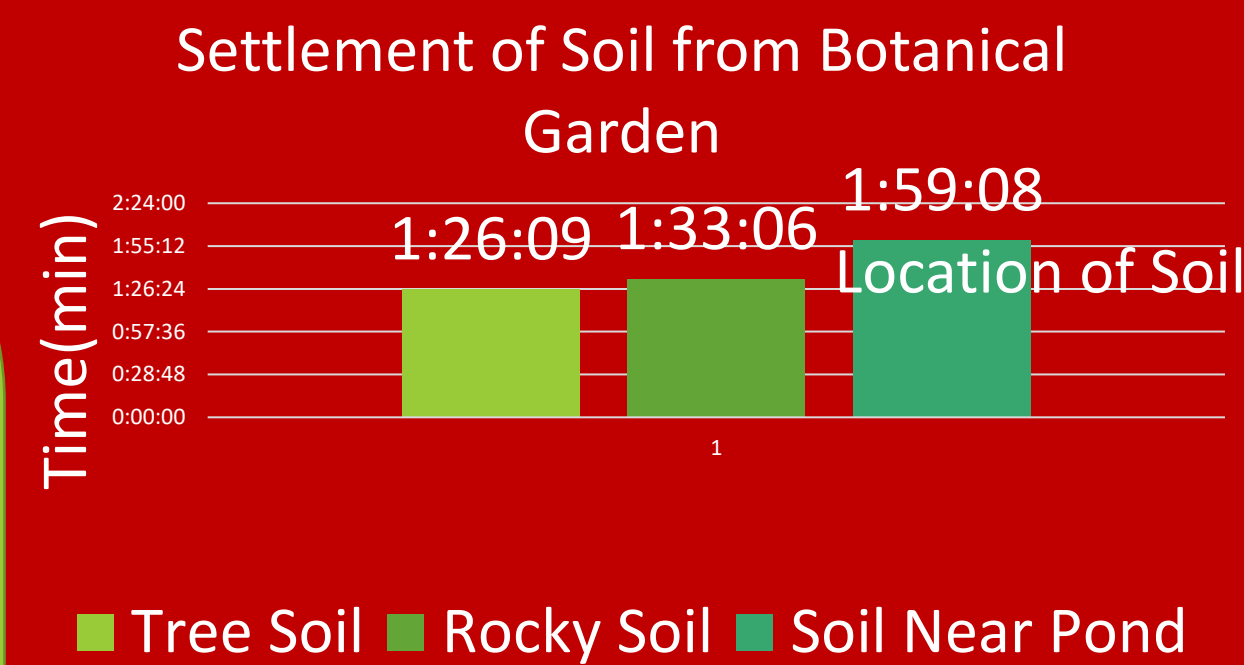
	White Wood Aster	<i>Eurybia divaricata</i>	Native	Eastern U.S. Mountain Ranges	N/A
	Garlic Mustard	<i>Alliaria petiolata</i>	Invasive	Eastern U.S. Europe	Antiseptic
	Catherine's Moss	<i>Atrichum nudobutrum</i>	Native	Eastern U.S. Northern Europe	N/A
	Sweet Pepper Bush	<i>Clethra alnifolia</i>	Native	Eastern U.S.	Soap Substitu
	Carolina Buckthorn	<i>Frangula caroliniana</i>	Native	Eastern U.S.	Laxative, Jaundice Treatment
	American Juniperseed	<i>Pariscadia virginiana</i>	Native	Mid-East U.S.	astringent, demulcent, diuretic, pectoral an: tonic

	Pin Cushion Moss	<i>Leucobryum glaucum</i>	Native	U.S. Europe	N/A
	Lizards Tail	<i>Saururus cernuus</i>	Native	Eastern U.S.	anti-inflammatory, poultice, stomachic, and sedative
	Japanese Skullcap	<i>Microsteadium vimineum</i>	Introduced	Eastern U.S. East Asia Coast	N/A
	Eastern Black Walnut	<i>Juglans nigra</i>	Native	Eastern U.S. Europe	Treatment for parasitic infections, syphilis
	Virginia Creeper	<i>Parthenocissus quinquefolia</i>	Native	United States Europe	Tonic, Anti-rheumatic, cure dropsy
	Northern Spicebush	<i>Lindera benzoin</i>	Native	Eastern U.S.	Blood purifier
	Poison Ivy	<i>Toxicodendron radicans</i>	Native	Most of the U.S.	Treats RA, Cramps, Stimulates Immune System

These plants are from the Salt Marsh Nature Center

Materials and Methods

Students chose from over 20 different parks to study. They were mostly New York City parks with a few from Long Island, and one student compared two parks in California. They photographed plants and identified them with the aid of the app iNaturalist. They used clear plastic cups to calculate the settlement time of soil sampled from three different areas. They made Winogradsky columns with a clear soda bottle. They measured the dispersal distance of a subset of 20 seeds of 100 that they dispersed throwing. They calculated a Simpson species diversity index of a subset of their species (they had to be able to count number of specimens). They re-visited the park twice and made additional observations.



A student made bar graphs depicting soil time settlement.

Results

This poster depicts sample student results. Depicted are a sample of plants that a student photographed and identified using iNaturalist, a list of plants (common name, species names, native or invasive, and the range of the plants, and medicinal uses. Students were supposed to make Excel spreadsheets of average seed dispersal of twenty seeds of the same species. Students photographed clear cups depicted the turbidity of soil in water and recording average settling times. Students photographed Winogradsky columns before and after a period of time. They calculated Simpson species diversity indices of species of which they could count total number of specimens for each species.

This project was worth 30 points; the two lab reports were 10 points each and the poster and presentation was 10 points. A sample rubric is given; this one was for the posters.

Grading Rubric

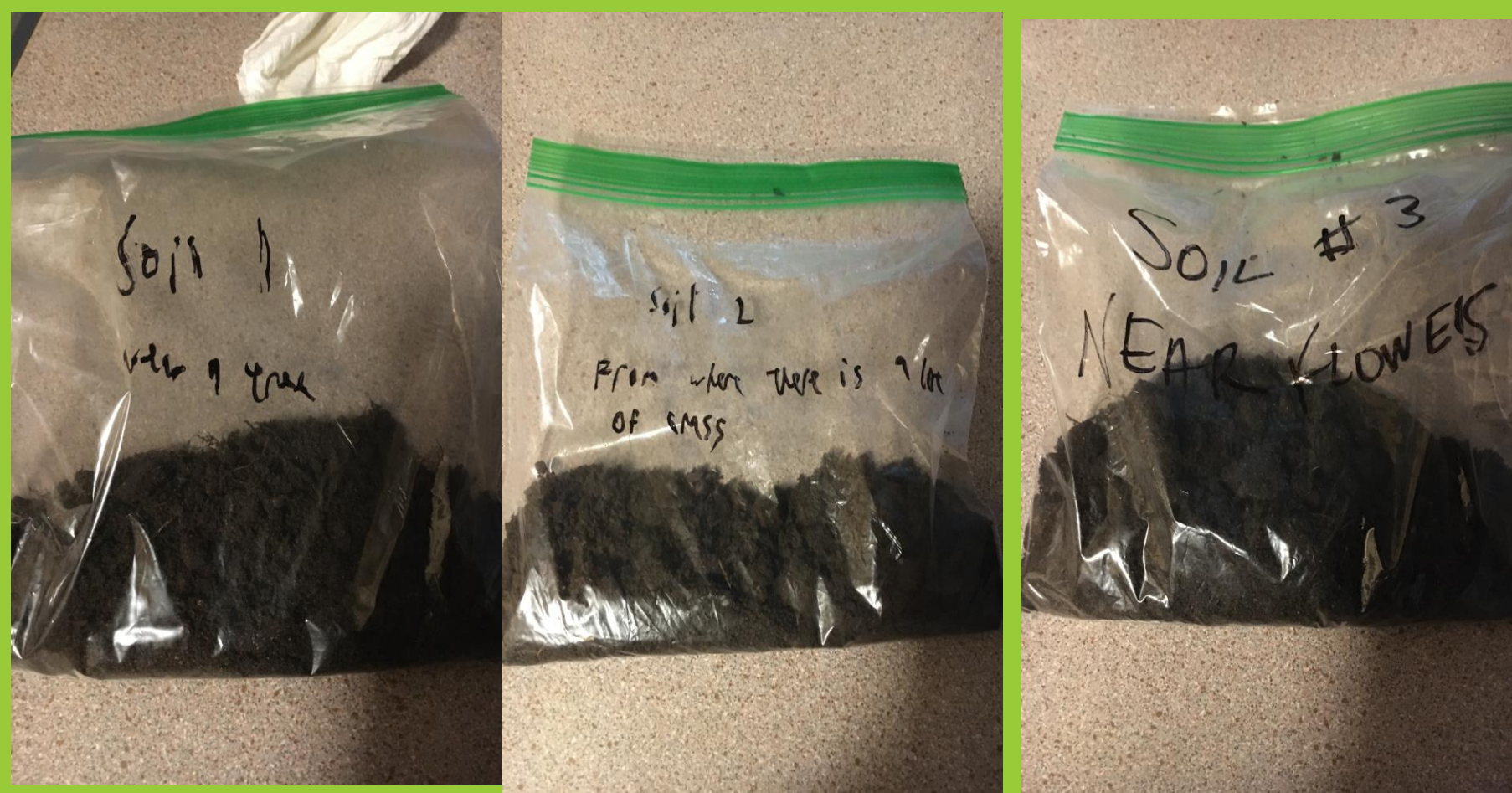
Criteria	Ratings	Pts
This criterion is linked to a Learning OutcomeComponents and Content All components included: Abstract, Introduction, Material and Methods, Results, Discussion, References and Content	4 pts Exceptional All components included; content accurate	4 pts
	3 pts Proficient One item missing from component and/or content	
	2 pts Approaching More than one item missing from component and/or content	
	0 pts No Marks	
This criterion is linked to a Learning OutcomeData/tables/figures of poster font size, organization, figures and tables	3 pts Exceptional Font size good, not too many words, pictures clear balance	3 pts
	2 pts Proficient Too many or too few words, pictures, disorganized	
	1 pts Approaching Too many words, too few pictures, disorganized	
	0 pts No Marks	
This criterion is linked to a Learning OutcomeVisual presentation Speak clearly; do not read poster; have key points and rationale for project handy; be enthusiastic	3 pts Exceptional Articulate; did not read from poster; presented interesting and key points and rationale behind project	3 pts
	2 pts Proficient Read from poster; left out some key information and did not provide rationale behind project	
	1 pts Approaching Read from poster; left out many key points and did not provide rationale for project	
	0 pts No Marks	
Total Points: 10		



Soil Samples



Soil Sample #	Time it took to settle (seconds)	Volume of water (mL)
1	30	250
2	60	250
3	10	250



Figures 11, 12, and 13 are pictures taken of soil samples from Tompkins Square park. Each soil sample is from a different site in the park. Figure 11 has soil sample 1 which was taken from near a tree. The soil is a dark brownish color and feels somewhat soft and light. Figure 12 has soil sample 2 which was taken where a lot grass grew. This soil is a light color and feels somewhat heavy. The soil also has a hard texture. Figure 13 has soil sample 3 which was taken near where flowers grew. The soil is a very dark brown and is very soft. The soil isn't as light as soil sample 1 but is softer than sample 2.