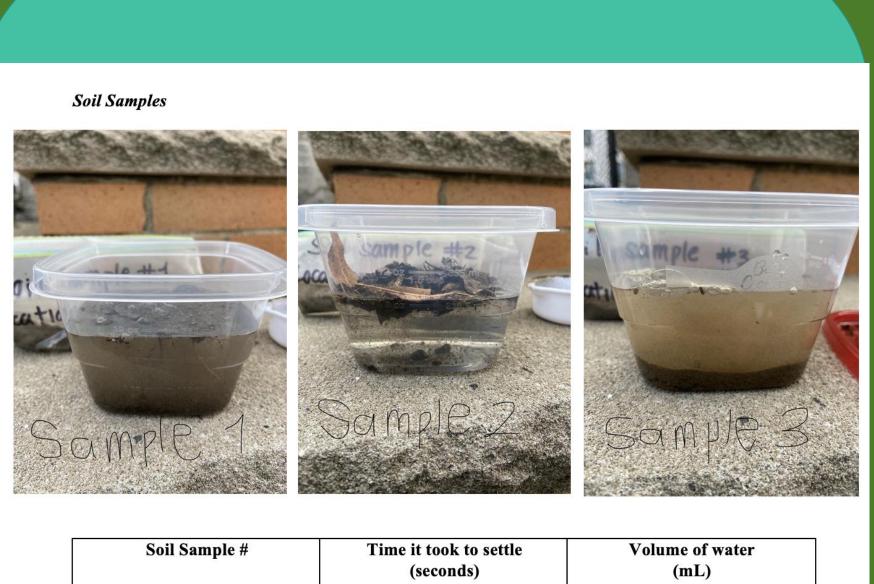
Abstract

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 Winogradskey 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 assigned 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.



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The Find Your Park Lab for Ecology Students during a Pandemic

Kathleen A. Nolan, St. Francis College, Brooklyn, NY 11201 USA

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	f-heaven Park Golf Course, Nev	^{4d} v York, N
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Explore Ad	ctivity Observe	Me More



California chappara \rightarrow

				Califor	ппа спарра		in the star free for		
ıre	Common Name	Species name	Invasive/Native	Range	Medicinal us	1			
	Common Earthball	Scleroderma citrinum	Native	Eastern U.S.	N/A		White Wood Aster	Eurvbia divaricata	Native
Contraction of the second	Ringless Honey Mushroom	Armillaria tabessens	Native	East Coast	Antioxidan effects		Garlic Mustard	Alliaria petiolata	Invasive
	Viscid Violet <u>Cort</u>	Cortinarius iodes	Introduced	Eastern U.S.	N/A poisono		Catherine's Moss	Atrisbum undulatum	Native
	Turkey Tail	Trametes versicolor	Native	Most of the U.S Not Midwest Europe Asia	Antioxidani Fights cance gut bacteri: balance		Sweet Pepper Bush	Clethra <u>alnifolia</u> .	Native
	Chicken of the Woods	Laetioporus. sulphureus	Native	Eastern U.S. Europe	Anti- carcinogeni Anti- inflammato Anti-bacteri		Carolina Buckthorn	Frangula caroliniana	Native
N. Contraction	Spotted Wintergreen	Chimaphila mactulata	Native	Eastern Mountain ranges Mexico	Anti- Inflammator Arthritis (<u>ursolic</u> aci				
	Wineberry	Rubus phoenicolasius	Introduced/Invasive	Eastern Mountain ranges Western Europe	Anti- Inflammato Vitamin E, (Immune System Boos		American Jumpseed	<u>Persicaria</u> virginiana	Native

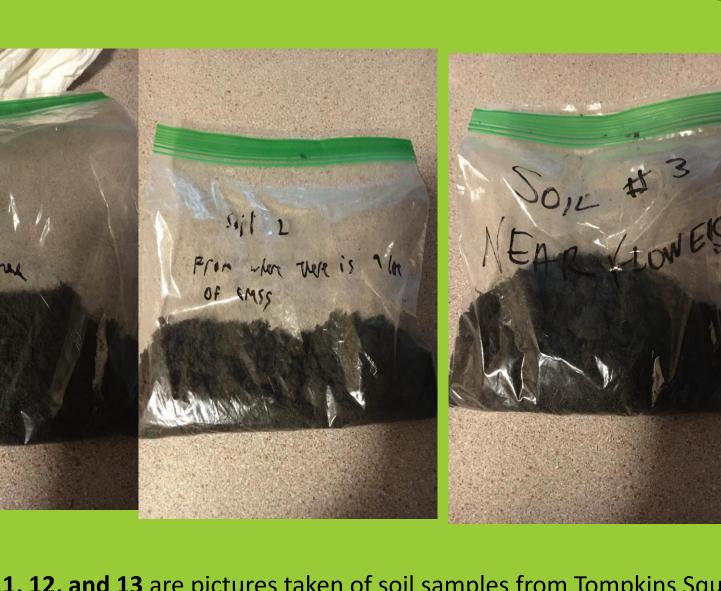
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ame	Counts	Р	p^2
aple	8	0.36	0.1296
ık	10	0.45	0.2025
hickory	3	0.14	0.0196
Holly	1	0.045	0.002025
chness:	Total:	Σ p2	
4	22	0.36	
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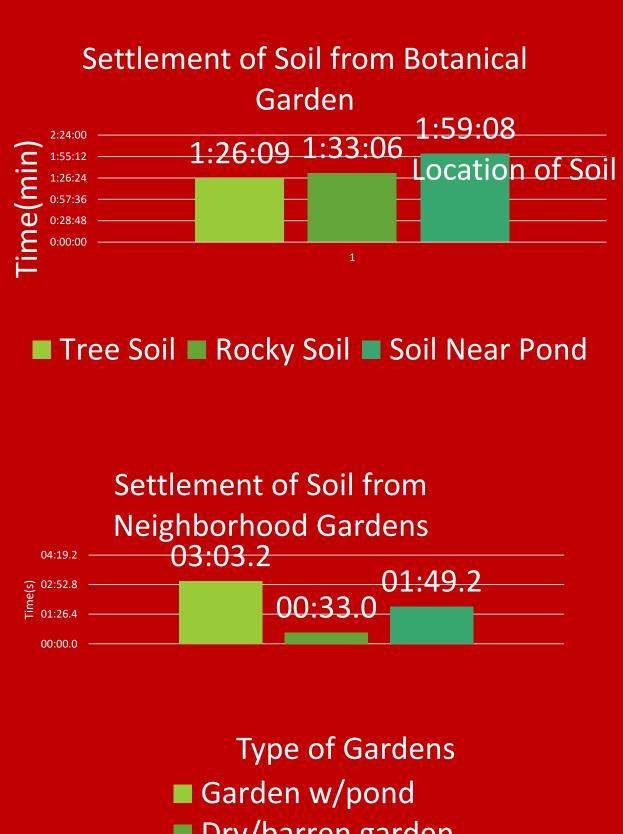
These plants are from the Salt Marsh Nature Center

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.



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.



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.





nogradsky column

			newspaper	strips. Bottle to the right	ht was 4 weeks later c	containing the egg yolk	ξ.
asters U.S. Mountain Ranges	N/A						
astern U.S	Antiseptic		Pin Cushion	Leucobryum	Native	U.S	N/A
Europe			Moss	glaucum	Notive	Europe	175
astern U.S. thern Europe	N/A		Lizards Tail	Saururus cernuus	Native	Eastern U.S.	anti- inflammatory, poultice, stomachic, and sedative
astern U.S.	Soap Substitu	A STAT	Japanese Stillgræss	Microstegium vimineum	Introduced	Eastern U.S. East Asia Coast	N/A
			Eastern Black Walnut	Juglans nigra	Native	Eastern U.S. Europe	Treatment for parasitic infections, syphilis
astern U.S.	Laxative, Jaundice Treatment		Virginia Creeper	Parthenocissus quinquefolia	Native	United States Europe	Tonic, Anti- rheumatic, cure dropsy
lid-East U.S.	astringent,		Northern Spicebush	Lindera benzoin	Native	Eastern U.S.	Blood purifier
-Lust 0.5.	demulcent, diuretic, pectoral and tonic		Poison Ivy	Toxicodendron radicans	Native	Most of the U.S.	Treats RA, Cramps, Stimulates Immune System

Dry/barren garden



Discussion

In order to have buy-in from the students, this project was worth 30% of their total grade for the course. There were three parts to this project. There was an initial and a final lab report and a poster that was presented to the other students. I was surprised at the variety of the places the students chose and especially pleased that my Californian compared two parks. In the future, comparing two parks would be advisable, or data sharing of the students could be encouraged. I feel that the data analysis was weak, probably because I did not give them enough direction. Some students took it upon themselves to at least make bar graphs or other visual depictions of their data. Some students misunderstood directions and did not always list the Latin names of the species or understand what was meant by the range. I believe they liked the iNaturalist app; an additional app that some used was Picture This. Some used more opaque cups for the soil settling experiment---they were supposed to use clear. Since I had given them lecture material on soils, I should have asked them to guess what the composition of their various soils could have been. Some used a variety of seeds for the dispersal rather than the one species requested, although comparisons may have made it more interesting for them. It would have also good to have a species diversity "contest" and they could compare their data. All in all, due to extreme limitations (such as they could not weigh the seeds), the students found the projects interesting and I believe they were able to see some ecological tenets while doing these projects. An additional component that could have been added would be bird or other animals (such as frog) recordings on Audacity. Spectrograms could have been examined for patterns. As I was not with them physically, it was difficult to ascertain whether or not they really collected the data in person, but unless a teacher has the luxury to work one-on-one with the students, we never really know anyway!

Acknowledgements

Criteria		Ratings				
his criterion is linked to a Learning utcomeComponents and Content II components included: Abstract, itroduction, Material and Methods, esults, Discussion, References and ontent	Exceptional I All components included; I	B pts Proficient One item missing from component and/or content	ficient Approaching item missing from More than one item missing from		4 pts	
his criterion is linked to a Learning utcomeAttractiveness of poster ont size, organization, figures and tables	3 pts 2 pts 1 pts Exceptional Proficient Approaching Font size good, not too many words; Too many or too few words; too few charts or pictures Too many words; too few pictures; disorganized			0 pts No Marks	3 pts	
his criterion is linked to a Learning automeOral presentation peak clearly; do not read poster; have ey points and rationale for project andy; be enthusiastic	3 pts Exceptional Articulate; did not read from poste presented interesting and key poin and rationale behind project		1 pts Approaching Read from poster; left out many and key points and did not provide rationale for project	0 pts No Marks	3 pts	



I would like to thank the BIO-2204 Ecology class students of St. Francis College for their contributions to this poster.