

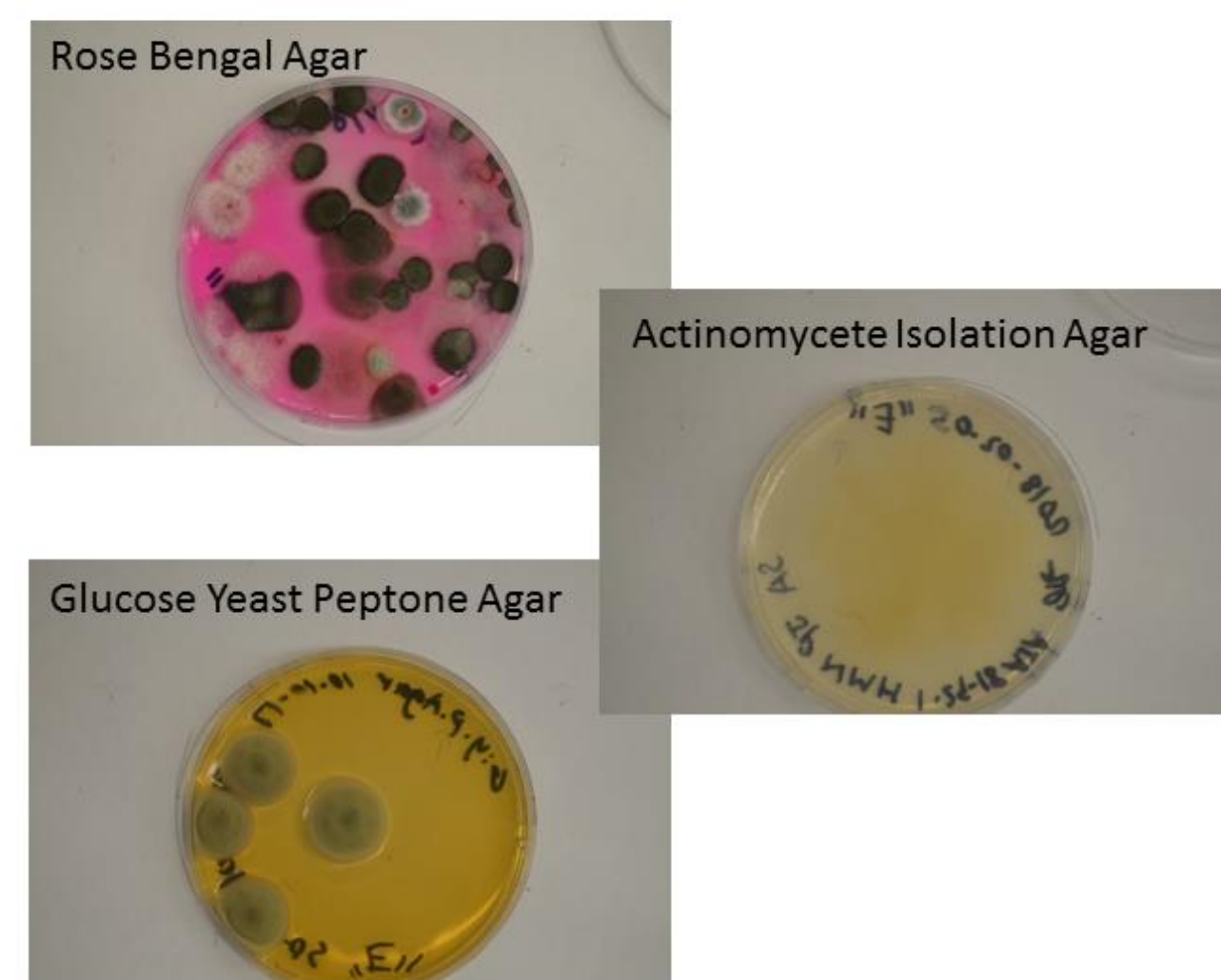
# Soil Microbiome Project: Project Management & Quality

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## Soil Analysis

The Soil Analysis experiment involves aseptically plating dilutions of the soil on three types of media that foster different types of microorganisms. Time is allowed for the microorganisms to grow and the characteristics that can be seen on the plates are recorded.

Steps Taken	SOPS Followed	SOPS Revised
14	9	3
Samples	Samples Plated	Photos in Database
18	54	54

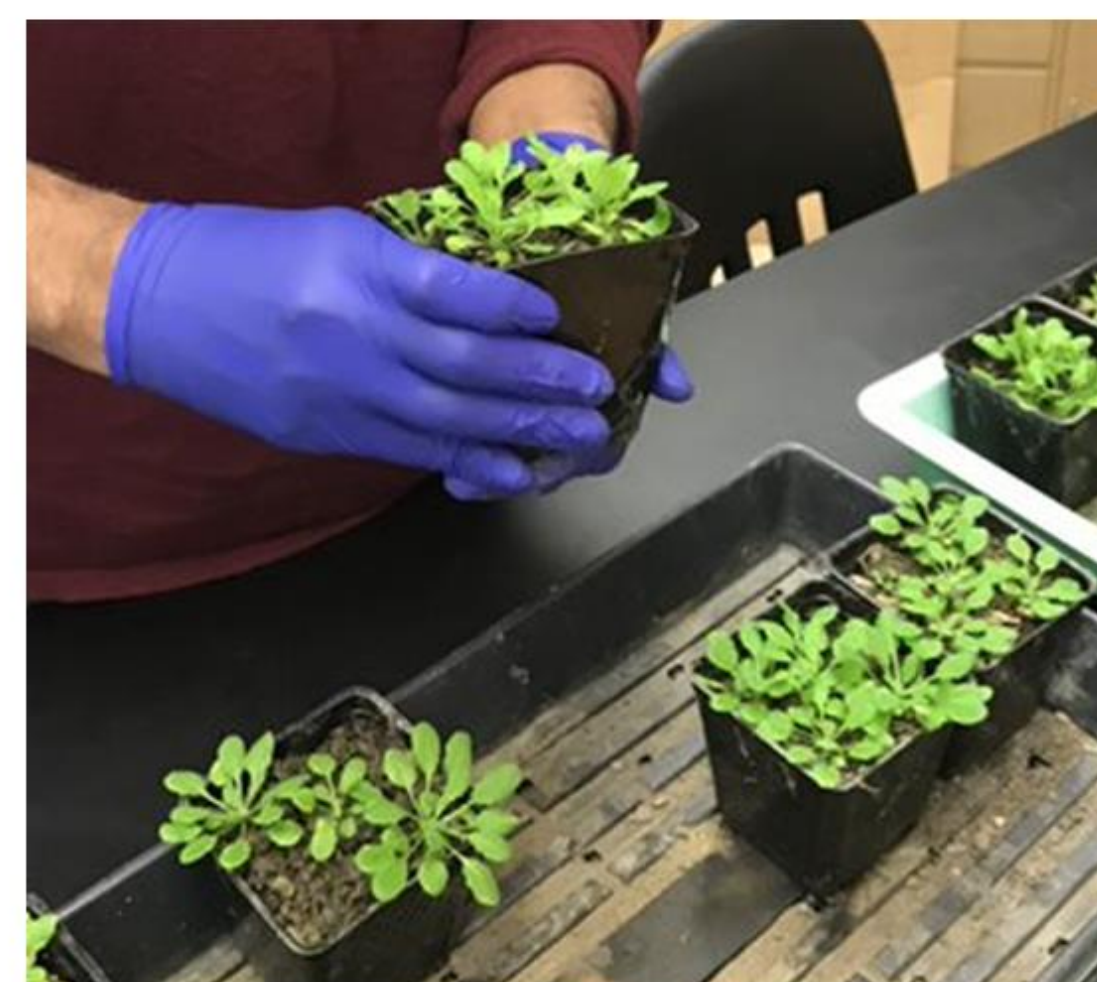


### Quality Control Audit:

- Mock trial with soil from various locations of Dr. K's yard.
- Quality inspections of agar plates poured (i.e. pH, appearance, amount, contamination, texture).

## Arabidopsis Phenotype Experiment

The Arabidopsis Phenotype experiments uses a species of mustard called *Arabidopsis thaliana*. Seeds are sterilized and allowed to sprout in gel plates. The seedlings are transplanted into potted soil samples from the North Richmond farm site. The growth of the plants are observed and recorded. Once the plants have matured, the soil, rhizospheres, roots, and PBS water are harvested and collected for further analysis.



Steps Taken	SOPS Followed	SOPS Revised
8	5	2
To Complete All Samples from One Farm Visit		
Potted Soil Samples	Seedlings Planted	Harvest Samples
54	270	216
Completed this Semester		
Potted Soil Samples	Seedlings Planted	Harvest Samples
18	90	72

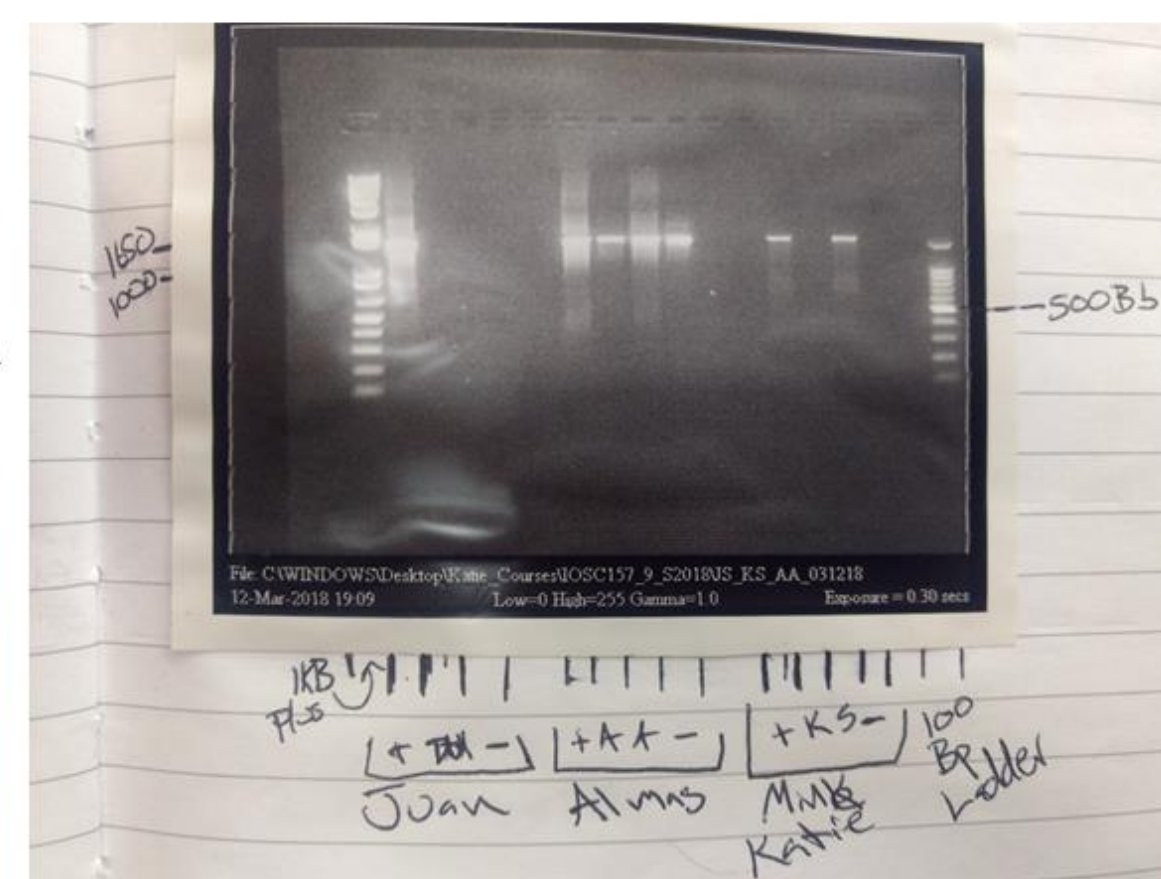
### Quality Control Audit:

- Batch Records
- Calibrating equipment/maintenance
- Labeling
- Aseptic technique

## DNA Extraction

The DNA Extraction experiment involves extracting bacterial DNA from the soil using small scale chromatography. Polymerase Chain Reaction (PCR) is performed and the product is poured onto gel plates to image the results. The images can be used to detect the bacterial DNA present in the soil. The DNA is then tagged and sequenced to determine the species of bacteria in the soil.

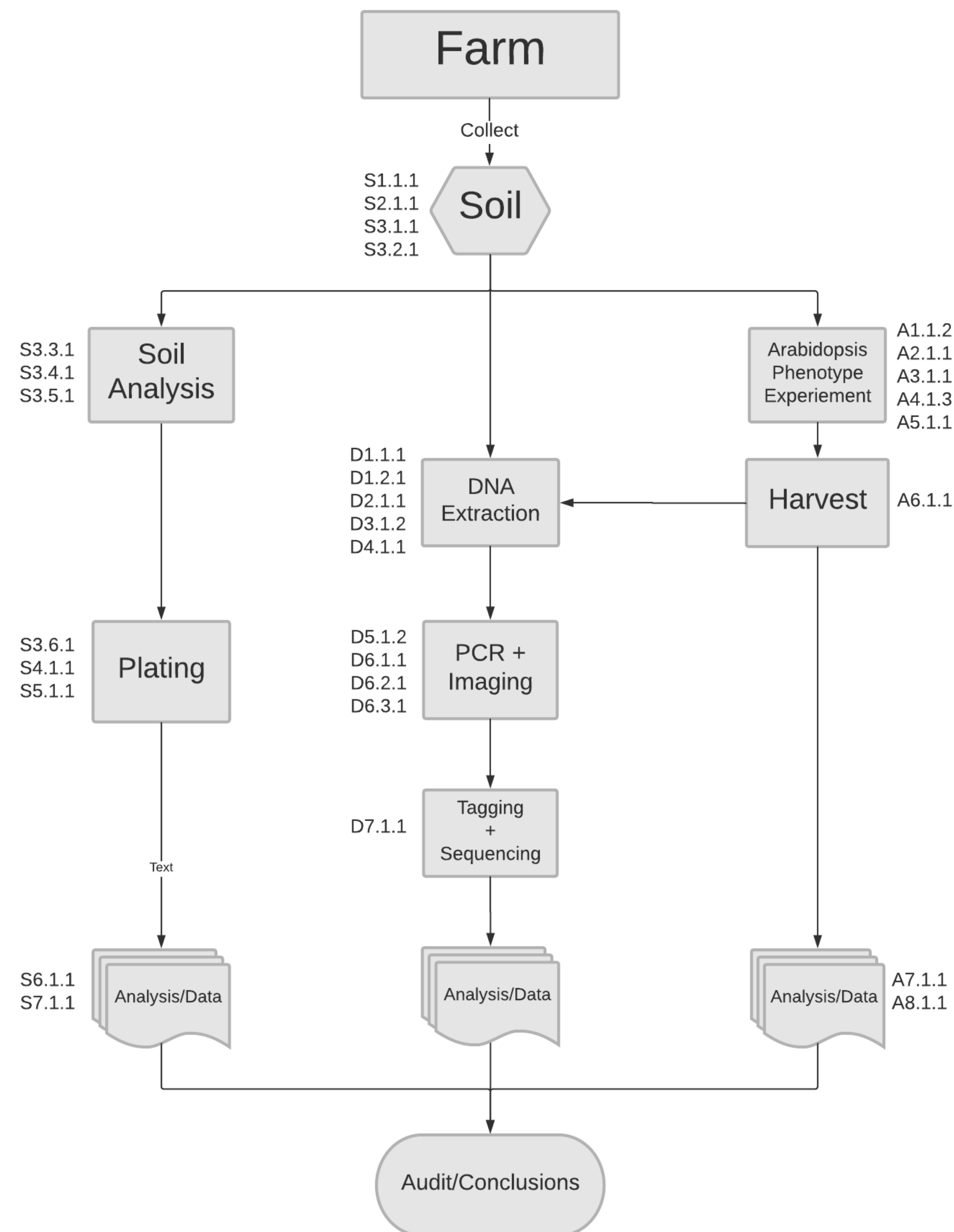
Steps Taken	SOPS Followed	SOPS Revised	
7	5	3	
Soil Samples	DNA Extracts	PCR + Imaging	Tagging + Sequencing
18	18	18	18



### Quality Control Audit:

- DNA extract with "spiked" soil.
- Verifying results by repeating colleagues' samples
- Positive and Negative Controls
- Nanodrop Reading
- PCR Imaging
- Documenting Lot #s
- Aseptic Technique

## Project Workflow



## Mission

The Foundations in Biotechnology course benefits Contra Costa College students and the Urban Tilth project. The project's mission is to detect different species of microorganisms, primarily bacteria, that exist on the Urban Tilth's North Richmond Farm by performing different experiments. The soil is tested at different points in time; the data collected can be used to determine how the microorganisms affect plant growth.

### Mission Briefing

Trips to the farm: 3

Students Worked on the Project:

- Spring 2017: 9
- Fall 2018: 16
- Spring 2018: 15



## Conclusion

The Soil Microbiome project performed by CCC students provides Urban Tilth with valuable information. This information can be used to improve the soil and make adjustments to the farm. The Soil Microbiome project also gives students hands-on experience in the biotechnology field. Students gain experience in: lab training, quality control/assurance, keeping deadlines, documentation, troubleshooting, and working with a team. Every semester that CCC works with Urban Tilth the project continuously improves and collects more data.

## Spring 2018 Soil Microbiome Core Lab Team

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Gabby Groff	Jessica Preston	Albert Wong
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