

# IPRO 344

## Building a Community Garden



# Purpose

- Promotion of Community Gardens
- Finding which plants pick up the most heavy metals
- Testing two types of soil
  - Promoting plant growth
  - Nutrient tests

# Roles of the Team

- Research
- Watering Coordinator
- Choosing the right seeds
- Building a fence
- Photography
- Lab work
- Buying/Bringing materials
- Documentation
- Sponsor Coordinators

# Constraints

- Time
  - 8 weeks
- Money
  - \$500
- Lab Work\*
  - No labs were available
  - Lack of necessary equipment
  - Plants did not have enough time to grow to be tested

# The Site

- Choosing the appropriate site
  - Close to the highway
    - More heavy metals
  - Previously occupied
  - Poorly maintained area



# The Dedication



- Before planting, all students worked hard at clearing the site of rocks and metal scraps. We then had divide each trench in half: filling half of each with organic soil and the other half with dirt that was on site.

# Manual Labor



# Testing

- It is necessary to estimate the metal concentration in the soil
- Since the predominant interaction of plant roots with soil is uptake of liquid, only metal that has dissolved in water to form a solution will be available to the plant
- The process whereby soil constituents become incorporated into plant tissues is called bioaccumulation
- \*Statements (not confirmed) that lead is not efficiently transferred from food in the intestines to the bloodstream, that it does not accumulate in the body, and that it concentrate in the brain

# Test Results

- Nutrient Test on Soil from the site
  - pH – 6.5
  - Potash – Depleted
  - Phosphorus – Adequate
  - Nitrogen – Deficient
- Heavy Metal (specifically Lead) Testing
  - Flame Atomic Absorption Spectrometry Method
  - Organic Soil – 0.0005 ppm (no lead present)
  - Site Soil – 0.005651 ppm (lead present)

# Background Information

## ■ Project

- Testing for metals in the existing soil and organic soil
- Testing for metals in plant grown on site

## ■ Site

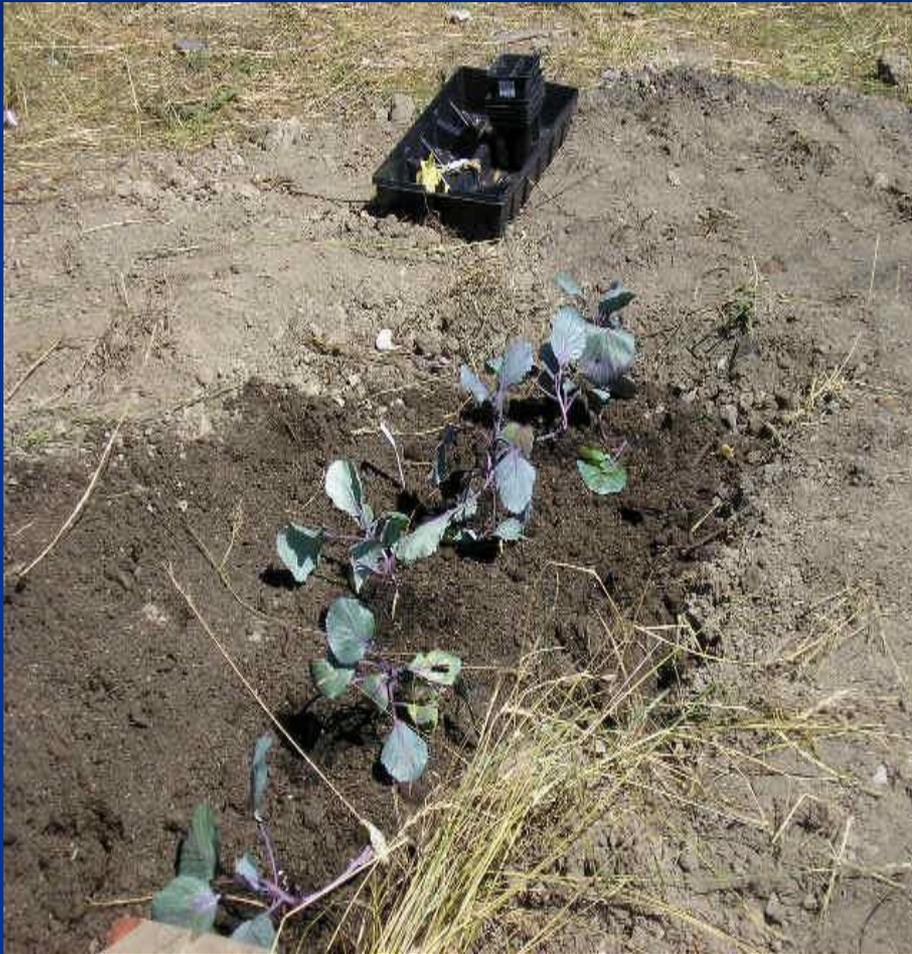
- Near the highway
- Previously contained a structure containing hazardous material
- Poorly maintained area

# Background Information

## ■ Goals

- To find tendencies about vacant lots in Chicago.
- To provide new information about community gardens.
- To learn about metal existing in soil and their dangers.
- To help the City of Chicago, Botanical Gardens and other community garden sponsor's want to build more gardens about the city.

# Future Plans



- City will help communities build gardens
  - Supplies food source
  - Extracurricular activity
  - Further quality of life
- Plans to test current plants
  - Leaves, Stems, and Roots for heavy metals

# References

- Raskin, Ilya and Burt D. Ensley. *Phytoremediation of Toxic Metals: Using Plants to Clean Up the Environment*. New York, New York: John Wiley & Sons, Inc. 2000.
- Environmental Protection Agency. *Brownfields Technology Primer: Selecting and Using Phytoremediation for Site Cleanup*.  
<http://www.brownfieldstsc.org/pdfs/phytoempriemer.pdf>