Illinois 4-H | Spark Ideas. Ignite Possibilities.

It's more than just dirt. Soil gives us life and food. Find out all about soil, bugs, beetles and other stuff, and how they affect the crops we grow and the food we eat. Whether it's corn, soybeans, tomatoes, or zinnias, this project can help you learn more about how plants grow.

Exploring 4-H Plants & Soils
Spark Activity: Soil Layer Cake

The mineral components of different soil types are made up of different amounts of sand, silt, and clay particles. This soil activity demonstrates the different types and proportions of mineral particles that make up different soils. Compare two or more topsoil samples from diverse locations to see the differences in soil types found in your neighborhood. Topsoil is specifically the upper 2 to 6 inches of the land surface in which plant roots grow.

1. From two or more areas, collect a quart of topsoil from a garden, flowerbed, woodland, or field. Label each sample by location. Please note that potting soil will not work for these purposes.
2. Predict which site will have the most sand and which will have the most clay. Write down your predictions.
3. Empty the soils onto an old newspaper to dry. Crush lumps between your thumb and fingers as the soil dries.
4. After removing trash, rocks, and roots from the soil, label quart jars for each site and fill them ¼ full with dry soil from that site.
5. Add water until each jar is ¾ full.
6. Add a tablespoon of non-foamy detergent or soap to each jar.
7. Close the lids and shake hard for about three minutes. Keep shaking until particles are well separated.
8. Set the jars on a table and watch very closely for a few minutes. Make observations and write down what you observe.
9. Do not disturb the jars for two days.
10. Place an index card alongside the jars. Mark off the depth of the clay (top layer), silt (second layer), fine sand (third layer), and coarse sand (last layer). Label a card for each layer. Fasten the card to the jar with tape. Draw a picture of the layers that have settled out in the jar. Be sure to label each card for the correct sample site.
11. Compare the soils. How are they the same or different? Discuss your observations with a parent or helper.
12. What percentage of the soil is clay? Silt? Sand? (Example: # mm sand ÷ # mm total soil sample = decimal fraction of the sand. Now convert the decimal fraction into a percentage.)
13. Record your observations and calculations. Do you have any small plant or insect materials floating in the water?
14. How do the results compare with your predictions? Discuss what you learned about the components of soil with a parent or helper.

4-H Project Levels and Goals

Beginner
- Collect soil and discover what animal life is present
- Learn how plants prevent soil erosion
- Conduct soil tests
- Compare how soil types affect growth

Intermediate
- Identify stages of plant life cycles
- Recognize plant parts
- Experiment with seed germination methods
- Propagate plants

Advanced
- Learn how plants compete for air, water, light, and nutrients
- Demonstrate importance of soil nutrients in healthy plant growth
- Learn how plants adapt to different light levels
- Understand seeds and planting depths

Put Your Project Into Action

Show Your Skills
- Display showing the life cycle of a plant
- Seed board of specimens collected and dried
- Exhibit on container gardening
- Display about pH of soil samples; compare to common items throughout the pH scale; include how make acidic soil more basic and vice versa

Service and Leadership
- Plant something to beautify your local area
- Gather flowers to share with an elderly person
- Give a talk or demonstration on a topic like soil testing, plant growth needs, or plant adaptations
- Plan a tour of a greenhouse or soil testing lab
- Organize a team for a local clean-up day
- Speak to local officials about soil erosion concerns in your community

Entrepreneurship
- Sell plants during different holidays
- Grow lavender to dry or make different items such as: soaps, lip balms, sprays, etc.
- Grow an herb plot; offer you-pick, fresh, or dried herb options for sale
- Design and sell corsages and boutonnieres

Technology Connection
- Drone use in agriculture
- GPS technology / precision agriculture
- Robots / Farm Bots
- Biotechnology

Connecting with a Mentor
- Illinois Extension Ag Educators and Specialists
- Local farmers
- Local farmer cooperatives
- Local soil and water agencies
- Local garden clubs

Events
- County and state fairs (4-H and open exhibits)
- Soil judging contests
- University of Illinois Extension Master Gardener & Master Naturalist programs
- Illinois local foods and small farms programs
- National Junior Horticultural Association

Careers Related to Plants & Soils

Soil Scientist	Horticulturist
Civil Engineer	Florist
Farmer	Forest Scientist
Arborist	Conservation Officer
Plant Geneticist	Food Scientist
Irrigation Engineer	

Start a Conversation

How can soil testing aid in better growth for your plants?
What kind of organic materials can you add to soil to make it healthier?
How can plants be grown in less than ideal conditions?
What are some ways you can grow plants not using soil?
Why is the clay/sand composition of a soil important?
Does the composition of soil effect how a plant grows?
What is a textural triangle?

Want to learn more?
go.illinois.edu/4Hplantsandsoils

Explore more at Illinois 4-H!
4-H.extension.illinois.edu

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