

Plant Sciences

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Understanding Soils

Investigation

- List the components of soil.
- Identify soil layers for undisturbed and cultivated sites.
- Define each of the basic soil properties such as pH, organic matter and nutrients.
- Cite reasons why soils can have different pH levels.
- Define soil organic matter.
- Describe the impact organic soil matter can have on soil.

Experimentation

- Take a soil sample and send it to a soil lab to measure pH, nutrients and organic matter and be able to explain the recommendations that were provided in the soil report from the lab.
- Classify soil texture using the hand-feel method.

Agronomic Crops and Plant Breeding

Investigation

- List the most common row crops grown in Tennessee.
- Classify common crops by whether they are annual or perennial and monocots or dicots.
- Label the major roles of each of the main plant parts (roots, stems, leaves, flowers).
- Classify examples of plants as monocots or dicots.
- Describe the difference between open pollinated and hybrid crops.



Experimentation

- Examine corn and bean flowers, seeds and seedlings to find the different parts and classify them as monocots or dicots.
- Visit the co-op store or an online seed supplier and investigate the agronomic crops and varieties for sale.

Crop Production in Tennessee

Investigation

- Identify the basic requirements for plant growth.
- List the basic requirements for germination of seeds.
- Describe how plants depend on soil for growth.
- Define macronutrient and micronutrient.
- Classify essential plant nutrients as macro- or micronutrients and their roles in plant growth.
- Investigate and list some of the main inputs for agronomic crops.
- Identify a crop that is common in West but not East Tennessee and then vice versa. Be able to describe reasons for these differences.
- Make a calendar for growing some of the main field crops. Include soil preparation, planting and harvest.

Experimentation

- Compare germination of some common vegetables (wheat, pea, bean, corn) with different temperature and moisture.
- Use a thermometer to track soil temperature daily over the course of three spring planting seasons to determine variability in potential planting dates.

Crop Management — Insects, Diseases, Weeds

Investigation

- List the most common insect pests for Tennessee crops.
- Identify the most common weeds in Tennessee crops.
- Describe the most common diseases in Tennessee crops.
- Describe the principles of integrated pest management.
- Define the term “organic” (as defined by the United States Department of Agriculture) and the term “conventional” as used in conjunction with organic.
- List some of the most common herbicides used by crop farmers.
- Match common weeds with herbicides labeled for their control.

Experimentation

- Take pictures of weeds and then provide identification to develop your own field guide for common weeds.
- Describe the disease pyramid concept and explain how it relates to real-world disease management tactics.

Understanding Pesticides

Investigation

- Look up a commonly used herbicide, fungicide and insecticide label and identify what crops it can be used on and what pests it can manage.
- Describe what resistance to a pesticide means.
- Explain what re-entry period is when listed on a pesticide label and why it is important.
- Explain what a pre-harvest interval is and why it is important.

Experimentation

- Use colored water in different spray bottles (or change the orifice of the spray bottle) to demonstrate the coverage that different droplets/nozzle types can make and discuss when large droplets are recommended over fine/small droplets and vice versa.

Past, Present and Future of Crop Farming

Investigation

- Research and describe the average yield of common crops in 1900 and 2000.
- Describe the mechanical methods of crop management 100 years ago and compare with machinery today.
- Develop a list of plants that have had the most impact on the development of Tennessee between 1900 and today.
- Define green revolution.

Experimentation

- Classify several types of foods (cereal, prepared meals, etc.) and determine which crops are used to prepare those foods.

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