

**Course Name: Crop and Soil Science**

**Teacher: Mr. J. Curran**

**Credit: 1 Credit (For completion of full year)**

**Clock Hours: 182**

**Grade Level: 11-12**

**Prerequisites: Ag Tech Exploration and Animal Science**

**Teaching Resources: Textbook-Soil Fertility Manual; Dr. James J. Connors, Ms. Susan Cordell; Copyright 1995. Prentice-Hall-Crop Production, 5th Edition; Richard J. Delorit, Louis J. Greub, Henry L. Ahlgren; Copyright--1984. Land Judging and Homesite Evaluation manual from KSU; 1991. Crop production publications from KSU Research and Cooperative Extension Service.**

**Course Description: This class is designed to better prepare the student to produce quality food and fiber. Information on production, marketing and processing of the more commonly grown crops in this area will be presented to the student. Soil is very important to the successful production of these crops, therefore the make-up, conservation and upkeep of our soils will also be covered in this class.**

# Crop and Soil Science Curriculum Outline

<b>Areas of Instruction/Topic Headings</b>	<b>Week</b>
<b>I. FFA/SAE</b>	<b>2 - 1st Quarter</b>
A. Explanation of CDE's involving crops and soils	
B. Announcement of upcoming FFA events	
C. Review of SAE programs involving crop production or soil conservation	
<b>II. Careers and Opportunities</b>	<b>1 - 1st Quarter</b>
A. Importance of crop production and soil conservation	
B. Discussion of numerous careers available	
C. Student activity: make a list of all the careers and/or job opportunities in the local area	
<b>III. Soil and Homesite Evaluation</b>	<b>3 - 1st Quarter</b>
A. Texture--surface and subsurface	
B. Depth	
C. Slope	
D. Erosion-wind and water	
E. Permeability	
F. Surface Runoff	
G. Major Factors and Capability Class	
H. Vegetative practices	
I. Mechanical practices	
J. Lime and nutrients	
K. Shrink-swell	
L. Water table	
M. Flooding	
N. Final Evaluation	
O. Student activity: several field trips on and off campus will be made to utilize practices covered in the classroom, participation in the District and State CDE is encouraged	
<b>IV. Plant Nutrients and Soil Fertility</b>	<b>2 - 1st Quarter</b>
A. Nutrients from the atmosphere and water	
B. Photosynthesis	
C. Exchange capacity	
D. Soil organic matter	
E. Student activity: samples of soils from the surrounding area will be collected and looked at for organic matter content and exchange capacity	

- V. Soil pH** **1 - 2nd Quarter**
- A. What is it?**
  - B. Measuring**
  - C. Desirable levels**
  - D. Correcting pH levels**
  - E. Liming materials available and effectiveness**
  - F. Student activity: collect soil samples and run pH tests on samples**
- VI. Nitrogen Fertilizer** **2 - 2nd Quarter**
- A. Importance**
  - B. Deficiency symptoms**
  - C. Mineralization and immobilization**
  - D. Nitrification and Denitrification**
  - E. Sources**
  - F. Student activity: prepare a poster showing plant deficiencies**
- VII. Phosphorus Fertilizer** **2 - 2nd Quarter**
- A. Roles of phosphorus**
  - B. Deficiency symptoms**
  - C. Sources**
  - D. Availability in the soil**
  - E. Student activity: field trip to local fertilizer plant to look at different forms of phosphorus and other fertilizers**
- VIII. Potassium Fertilizer** **2 - 2nd Quarter**
- A. Why potassium is important**
  - B. Deficiency symptoms**
  - C. Forms in the soil**
  - D. Sources of potassium**
  - E. Student activity: give an oral report on sources of potassium available locally**
- IX. Secondary Nutrients** **2 - 2nd Quarter**
- A. Calcium**
  - B. Magnesium**
  - C. Sulfur**
  - D. Sources of each**
  - E. Student activity: bring in samples of sources of each of the secondary nutrients**

- X. Micronutrients** **2 - 3rd Quarter**
- A. Identification of those most essential**
  - B. Function of each**
  - C. Student activity: prepare a written report on one of the micronutrients-discuss the function, deficiency symptoms, sources and cost**
- XI. Soil Testing** **2 - 3rd Quarter**
- A. Taking soil samples**
  - B. Where to test**
  - C. interpreting results**
  - D. Student activity: field trip to take soil samples, prepare samples and send to lab, interpret results from lab**
- XII. Fertilizer Blending, Mixing and Application** **2 - 3rd Quarter**
- A. Calculating blends**
  - B. Mixing procedures**
  - C. Application equipment**
  - D. Student activity: field trip to local fertilizer plant to observe mixing techniques and view application equipment**
- XIII. Plants, Growth and Reproduction** **3 - 3rd Quarter**
- A. Reproduction**
  - B. Germination**
  - C. Photosynthesis**
  - D. Nutrient uptake**
  - E. Use of water**
  - F. Student activity: prepare a poster using different plants and placing them into annual, biennial, or perennial categories**
- XIV. Corn Production** **2 - 3rd Quarter**
- A. Climate and soil requirements**
  - B. Seed selection**
  - C. Soil preparation and fertilization**
  - D. Harvest, storage and marketing**
  - E. Student activity: field trip to local elevator to view moisture testing, grading and storage**

- XV. Wheat Production** **2 - 4th Quarter**  
A. Types of wheat  
B. Methods of seeding  
C. Fertilization  
D. Harvest, storage and marketing  
E. Student activity: field trip to local producers to observe different seeding methods and discuss variety selection
- XVI. Soybean Production** **2 - 4th Quarter**  
A. Maturity groups  
B. No till vs. conventional seeding  
C. Estimating yields  
D. Marketing  
E. Student activity: guest speaker-crop insurance adjuster explaining how to estimate yield or yield loss, possible field trip
- XVII. Legume Production** **2 - 4th Quarter**  
A. Alfalfa  
B. Lespedeza  
C. Clover  
D. Student activity: prepare written report on one of the legumes after interviewing a local producer of that legume
- XVIII. Conventional, Minimum-till, No-till** **2 - 4th Quarter**  
A. Advantages/disadvantages of each  
B. Soil types best suited  
C. Equipment differences  
D. Student activity: field trip to view each kind of tillage operation and look at differences in some of the equipment used
- XIX. Pasture Management** **1 - 4th Quarter**  
A. Plant populations  
B. Tame/Native grasses  
C. Ecologic practices  
D. Piparian areas

# Girard High School

# Crop and Soil Science

Name \_\_\_\_\_ SSN \_\_\_\_-\_\_\_\_-\_\_\_\_\_

Instructor \_\_\_\_\_

**RATING SCALE:** 3: Skilled, works independently  
2: Competent, may need assistance  
1: Received instruction, skill undeveloped  
0: No exposure, instruction or training

**INTEGRATION:** (M) Math (S) Science  
(E) Language Arts (C) Career Development Skill  
(L) Lab Activity

Enrollment Date ____/____/____	Completion Date ____/____/____	Hours completed _____
I certify that the student received the training in the area indicated.		
Student Signature _____	Date _____	
Instructor Signature _____	Date _____	
Administrator Signature _____	Date _____	

## I. FFA/SAE

- 3 2 1 0 1. Defines long-range leadership goals
- 3 2 1 0 2. Completes inventory of business and personal assets/liabilities
- 3 2 1 0 3. Compiles records for budgeting of resources
- 3 2 1 0 4. Works on financial statement (M)
- 3 2 1 0 5. Generates information for SAE enterprises
- 3 2 1 0 6. Presents cash flow
- 3 2 1 0 7. Prepares for CDE's relating to Crop and Soil Science (S)(M)(L)
- 3 2 1 0 8. Performs good sales tactics during magazine and fruit sales
- 3 2 1 0 9. Serves on POA committee
- 3 2 1 0 10. Researches community needs for landscaping or other needs
- 3 2 1 0 11. Prepares application for proficiency award or State FFA Degree (E)

## II. Careers and Opportunities

- 3 2 1 0 1. Summarizes the need for plant life (S)
- 3 2 1 0 2. Defends the importance of soil and soil conserving practices
- 3 2 1 0 3. Researches and reports on a career in the area of crop production or soil science (E)
- 3 2 1 0 4. Compiles a list of higher education institutions with crop and soil curriculums

## III. Soil and Homesite Evaluation

- 3 2 1 0 1. Differentiates between sand, silt and clay (S)
  - 3 2 1 0 2. Identifies the differences between topsoil and subsoil (S)
  - 3 2 1 0 3. Estimates depth of soil (L)
  - 3 2 1 0 4. Approximates the slope in feet and converts to a percentage (M)(L)
  - 3 2 1 0 5. Contrasts wind from water erosion (S)
  - 3 2 1 0 6. Analyzes the subsoil to determine permeability (S)
  - 3 2 1 0 7. Interprets all areas and chooses a final land class (L)
  - 3 2 1 0 8. Describes all mechanical practices needed for selected land class (E)
  - 3 2 1 0 9. Chooses the best recommended vegetative practices for the selected land class
  - 3 2 1 0 10. Determines lime and nutrient requirements from given information (S)
  - 3 2 1 0 11. Relates shrink-swell, water table, and flooding to homesite selection (S)
- ## IV. Plant Nutrients and Soil Fertility
- 3 2 1 0 1. Writes the formula and explains in detail the photosynthetic process (S)(E)
  - 3 2 1 0 2. Discusses the exchange capacity of different soils (S)
  - 3 2 1 0 3. Collects and analyzes different soils in the community (S)(L)
  - 3 2 1 0 4. Explains the different nutrients found in the atmosphere and the soil

## V. Soil pH

- 3 2 1 0 1. Defines pH (S)
- 3 2 1 0 2. Orally explains how to measure pH (S)(E)
- 3 2 1 0 3. Discusses how to correct pH levels (S)(E)
- 3 2 1 0 4. Prepares a written report on the effectiveness of liming materials found in the area (E)
- 3 2 1 0 5. Calculates the amount of lime needed when given the ECC rating (M)

## VI. Nitrogen Fertilizer

- 3 2 1 0 1. Explains the need for Nitrogen (S)
- 3 2 1 0 2. Identifies deficiency symptoms of nitrogen (L)
- 3 2 1 0 3. Differentiates between nitrification and denitrification (S)
- 3 2 1 0 4. Analyzes and reports on different sources of nitrogen available
- 3 2 1 0 5. Calculates least cost source of nitrogen (M)

## VII. Phosphorus Fertilizer

- 3 2 1 0 1. Identifies the roles of phosphorus (S)
- 3 2 1 0 2. States the deficiency symptoms (S)
- 3 2 1 0 3. Reports on forms of phosphorus in soil and forms commercially available (E)

## VIII. Potassium Fertilizer

- 3 2 1 0 1. Defends why potassium is important

- 3 2 1 0 2. Recognizes deficiency symptoms (S)
- 3 2 1 0 3. Describes different sources available

#### IX. Secondary Nutrients

- 3 2 1 0 1. Names all secondary nutrients
- 3 2 1 0 2. Identify deficiency symptoms of each (S)
- 3 2 1 0 3. Prepares a chart and gives oral report on finding sources of secondary nutrients (E)(S)

#### X. Micronutrients

- 3 2 1 0 1. Identifies the most essential micronutrients
- 3 2 1 0 2. Completes a written report on one micronutrient (E)
- 3 2 1 0 3. Describes the function of each micronutrient (S)

#### XI. Soil Testing

- 3 2 1 0 1. Distinguishes where to take soil samples (L)
- 3 2 1 0 2. Prepares a written report on the correct procedure for taking a soil test (E)
- 3 2 1 0 3. Explains how to interpret test results

#### XII. Fertilizer Blending, Mixing and Application

- 3 2 1 0 1. Discusses different application methods
- 3 2 1 0 2. Prepares written procedure for calculating various blends of fertilizer (E)
- 3 2 1 0 3. Calculates different blends requested (M)
- 3 2 1 0 4. Describes different mixing methods

#### XIII. Plants, Growth and Reproduction

- 3 2 1 0 1. Explains sexual and asexual reproduction (S)
- 3 2 1 0 2. Performs germination tests (L)
- 3 2 1 0 3. Calculates percent germination (M)
- 3 2 1 0 4. Writes and explains the photosynthesis process (S)
- 3 2 1 0 5. Contrasts nutrient uptake (S)
- 3 2 1 0 6. Discusses the use of water by plants

#### XIV. Corn Production

- 3 2 1 0 1. Summarizes climate and soil requirements (S)
- 3 2 1 0 2. Compares seed varieties and maturity stages
- 3 2 1 0 3. Discusses soil preparation and fertilization
- 3 2 1 0 4. Calculates seeding rate per acre (M)
- 3 2 1 0 5. Prepares written report on harvesting, storage and marketing (E)

#### XV. Wheat Production

- 3 2 1 0 1. Differentiates between hard and soft wheat
- 3 2 1 0 2. Researches and reports on different seeding methods (E)
- 3 2 1 0 3. Calculates fertilizer rates and blends (M)
- 3 2 1 0 4. Discusses harvest, storage and marketing

#### XVI. Soybean Production

- 3 2 1 0 1. Interprets different maturity groups
- 3 2 1 0 2. Estimates potential yield of a field (L)(M)
- 3 2 1 0 3. Contrasts between no-till and conventional seeding orally (E)
- 3 2 1 0 4. Understands the difference between cash and futures marketing

#### XVII. Legume Production

- 3 2 1 0 1. Appraises the need for legume production in heavy clay soils
- 3 2 1 0 2. Prepares a written report on the production of a selected legume (E)

#### XVIII. Conventional, Minimum-till, No-till

- 3 2 1 0 1. Compares the three tillage methods for use in the local area
- 3 2 1 0 2. Distinguishes between methods to be used on different soil types
- 3 2 1 0 3. Explains in and oral report the different type of machinery needed for each method of tillage. (E)

#### XIX. Career Development Skills

- 3 2 1 0 1. Listens for and identifies key words
- 3 2 1 0 2. Organizes notes and ideas for formal or informal presentations
- 3 2 1 0 3. Converts common units of measurement within and/or across measurement systems
- 3 2 1 0 4. Creates and presents technical information in common graphs and charts
- 3 2 1 0 5. Composes, organizes and edits information using a computer
- 3 2 1 0 6. Demonstrates characteristics of a positive self concept
- 3 2 1 0 7. Utilizes problem-solving skills: Examines results of a problem
- 3 2 1 0 8. Participates in team tasks: Receives and gives information
- 3 2 1 0 9. Identifies fixed and flexible expenses

- 3 2 1 0 10. Estimates the time required to perform activities needed to accomplish a specific task
- 3 2 1 0 11. Takes responsibility for decisions and actions
- 3 2 1 0 12. Applies self-assessment skills to the career decision-making process

#### XX. Life Knowledge Skills

- 3 2 1 0 1. Being responsible and accountable HS 47
- 3 2 1 0 2. Evaluates plans and goals HS 47
- 3 2 1 0 3. Understands career clusters HS 31
- 3 2 1 0 4. Defines teamwork HS 65

#### XXI. Global Positioning Systems

- 3 2 1 0 1. Demonstrate how to set and locate waypoints
- 3 2 1 0 2. Differentiate land elevation(S)(L)(C)
- 3 2 1 0 3. Demonstrate parallel tracking(L)
- 3 2 1 0 4. Triangulate a designated location(M)(L)
- 3 2 1 0 5. Track using gps equipment(L)
- 3 2 1 0 6. Set up and participate in a geocach(L)
- 3 2 1 0 7. Develop maps(C)
- 3 2 1 0 8. Understand importance of global positioning equipment(C)