



Plant and Soil Science II

EXAM INFORMATION

Items

80

Points

80

Prerequisites

PLANT AND SOIL SCIENCE I

Grade Level

10-12

Course Length

ONE YEAR

Career Cluster

AGRICULTURE, FOOD AND NATURAL
RESOURCES

Performance Standards

INCLUDED

Certificate Available

YES

DESCRIPTION

Students will demonstrate knowledge and skills in advanced areas of plant and soil science, including range resource management. The instruction will also include the importance of biotechnology in crop production. Students will also learn to identify common weeds, diseases, and insect pests.

EXAM BLUEPRINT

| STANDARD | PERCENTAGE OF EXAM |
|--|---------------------------|
| 1- Student Organizations in Agricultural Education | 3% |
| 2- Agricultural Experience in Agricultural Education | 3% |
| 3- Plant Physiology Concepts | 36% |
| 4- Range Resources and Management | 38% |
| 5- Integrated Pest Management | 20% |
| 6- Biotechnology in Plant Science (Optional) | |



STANDARD 1

STUDENTS WILL DEVELOP PERSONAL, LEADERSHIP, AND CAREER SKILLS THROUGH STUDENT ORGANIZATION PARTICIPATION

- Objective 1** Assess the role of student organization participation in developing personal and leadership skills.
1. Identify important personal skills and the strategies used in developing the skills.
 2. Identify important leadership skills and the role of student organization participation in developing the skills.
- Objective 2** Assess the role of student organization participation in developing career skills.
1. List and describe proficiency awards appropriate for horticulture
 2. List and describe career development events appropriate for horticulture.
 3. Relate the importance of supervised agricultural experience to student organization achievement.
 4. Utilize student organization and supervised agricultural experience participation to gain advanced degrees of student organization membership.

Standard 1 Performance Evaluation included below (Optional)

STANDARD 2

STUDENTS WILL EXPLAIN THE MAINTENANCE AND EXPANSION OF SUPERVISED AGRICULTURAL EXPERIENCE PROGRAMS

- Objective 1** Maintain and use agricultural experience records.
1. Explain how agricultural experience records are maintained from year to year.
 2. Explain how to summarize and analyze agricultural experience records.
- Objective 2** Devise long-range plans for expanding agricultural experience programs.
1. Evaluate the overall quality of a current agricultural experience and determine how to make it more productive or profitable.
 2. Explain factors that should be considered in expanding an agricultural experience program.
 3. Explain how placement agricultural experience and ownership agricultural experience programs may be expanded.

Standard 2 Performance Evaluation included below (Optional)

STANDARD 3

STUDENTS WILL DESCRIBE PLANT PHYSIOLOGY CONCEPTS

- Objective 1** Explain plant physiology concepts and energy conversion in plants.
1. Explain cell differentiation and the functions of the major types of plant cells.
 2. Relate the active and passive transport of minerals into and through the root system.
 3. Describe the processes of translocation.



4. Explain the process of secondary plant growth.
5. Explain the light-dependent and light-independent reactions that occur during photosynthesis and apply the knowledge to plant management.
6. Explain the four stages of aerobic respiration and relate cellular respiration to plant growth, crop management, and post-harvest handling.

STANDARD 4

STUDENTS WILL EXPLAIN RANGE RESOURCES AND MANAGEMENT PRACTICES

Objective 1 Describe practices associated with range management.

1. Evaluate range management systems, economics, and improvement techniques.
2. Determine livestock and wildlife use on rangeland.
3. Describe range management practices related to plant growth and development.
4. Establish a range transect and use it to evaluate a specific location.

Objective 2 Collect and prepare plant tissue and soil samples for analysis and interpret test results.

1. Explain the reasons for analyzing plant tissue and soil samples.
2. Describe the procedures in collecting and preparing plant tissue and soil samples for analysis.
3. Test soil samples for nutrient content.
4. Interpret test results from plant tissue and soil samples.

Standard 4 Performance Evaluation included below (Optional)

STANDARD 5

STUDENTS WILL DESCRIBE INTEGRATED PEST MANAGEMENT

Objective 1 Describe the principles of integrated pest management (IPM).

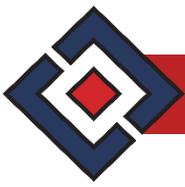
1. Explain IPM.
2. Identify benefits of IPM.
3. Describe pest control strategies associated with IPM.

Objective 2 Identify and manage plant pests and diseases.

1. Identify types of plant pests and disorders.
2. Describe the classification of weeds.
3. Explain the classification of insects and nematodes.
4. Explain the classification of plant diseases.
5. Identify weeds, insect pests, and infectious and noninfectious plant diseases.
6. Explain scouting of field crops for pests.

Objective 3 Explain procedures for the safe handling, use, and storage of pesticides.

1. Explain risks and benefits associated with the materials and methods used in plant pest management.
2. Interpret pesticide labels.
3. Explain procedures for mixing and storing pesticides.



4. Describe types of pesticide controls and formulations.
5. Explain the safety practices in applying pesticides.
6. Calibrate equipment used in applying pesticides.
7. Describe the proper disposal of surplus pesticides and empty containers.
8. Evaluate environmental and consumer concerns regarding pest management strategies.

Standard 5 Performance Evaluation included below (Optional)

STANDARD 6 (Optional)

STUDENTS WILL INVESTIGATE PRINCIPLES OF BIOTECHNOLOGY AS RELATED TO PLANT SCIENCE

Objective 1 Explain biotechnology.

1. Define biotechnology and explore its historic impact on agriculture.
2. Describe current applications of biotechnology in agriculture.
3. Describe the role of agencies that regulate biotechnology.
4. Identify examples of ethical, legal, social, and cultural biotechnology issues.
5. Describe benefits and risks associated with biotechnology.

Objective 2 Explain selective plant breeding.

1. Describe the selective plant breeding process.
2. Explain how to estimate the heritability of certain traits.
3. Predict the genotypes and phenotypes from monohybrid and dihybrid crosses by using the Punnett square.
4. Describe sex determination, linkage, crossover, and mutation.
5. Describe how biotechnology tools are used to monitor and direct plant breeding.

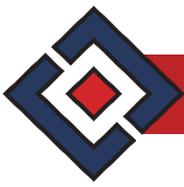
Objective 3 Examine genetic engineering of plants.

1. Explain the reasons for genetic modification of plants.
2. Identify transgenic plants on the market.
3. Describe the processes and techniques used to produce transgenic plants.
4. Describe how biotechnology can be used to evaluate existing transgenic plants.

Objective 4 Describe micropropagation techniques.

1. Define micropropagation and its importance.
2. Explain applications of micropropagation.
3. Describe procedures used in micropropagation.

Standard 6 Performance Evaluation included below (Optional)



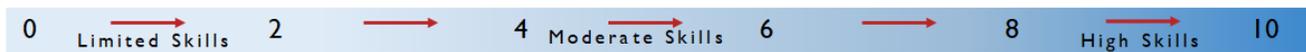
Plant and Soil Science II Performance Standards (Optional)

Performance assessments may be completed and evaluated at any time during the course. The following performance skills are to be used in connection with the associated standards and exam. To pass the performance standard the student must attain a performance standard average of **8 or higher** on the rating scale. Students may be encouraged to repeat the objectives until they average **8 or higher**.

Students Name _____

Class _____

PERFORMANCE RATING SCALE



STANDARD 1 Student Organizations in Agricultural Education

Score:

- Students will attend a student organization meeting
- Recite and explain a student organization creed

STANDARD 2 Agricultural Experience in Agricultural Education

Score:

- Students will use the approved record book to record financial transactions and activities on an agricultural experience
- Prepare and plan for a long-term agricultural experience

STANDARD 4 Range Resources and Management Practices

Score:

- Evaluate range management systems, economics, and improvement techniques
- Establish a range transect and use it to evaluate a specific location
- Develop a plan for multiple use of rangeland for both wildlife and livestock
- Prepare plant and soil samples for analysis

STANDARD 5 Integrated Pest Management

Score:

- Identify plant pests, diseases and their causes
- Identify weeds
- Demonstrate scouting of field crops for insect pests
- Develop an Integrated Pest Management Plan

STANDARD 6 Principles Related to Plant Science

Score:

- Design and conduct experiments to support known principles of genetics
- Demonstrate tissue culturing
- Research and debate ethical issues in modern biotechnology

PERFORMANCE STANDARD AVERAGE SCORE: