

Agriculture, Food and Natural Resources: Plant Systems

Career Pathway Plan of Study for ► Learners ► Parents ► Counselors ► Teachers/Faculty

This Career Pathway Plan of Study (based on the Plant Systems Pathway of the Agriculture, Food and Natural Resources Career Cluster) can serve as a guide, along with other career planning materials, as learners continue on a career path. Courses listed within this plan are only recommended coursework and should be individualized to meet each learner's educational and career goals. *This Plan of Study, used for learners at an educational institution, should be customized with course titles and appropriate high school graduation requirements as well as college entrance requirements.

EDUCATION LEVELS	GRADE	English/ Language Arts	Math	Science	Social Studies/ Sciences	Other Required Courses Other Electives Recommended Electives Learner Activities	*Career and Technical Courses and/or Degree Major Courses for Plant Systems Pathway	SAMPLE Occupations Relating to This Pathway
Interest Inventory Administered and Plan of Study Initiated for all Learners								
SECONDARY	9	English/ Language Arts I	Algebra I	Earth or Environmental Science	State History Civics	All plans of study should meet local and state high school graduation require- ments and college entrance requirements. Supervised Agricultural Experience (SAE) and participation in ap- propriate FFA activities support and rein- force classroom and laboratory learning and should be a require- ment for all students.	• Introduction to Agriculture, Food and Natural Resources	Occupations Requiring Postsecondary Education ▶ Agricultural Journalist ▶ Biotechnology Lab Technician ▶ Commodity Marketing Specialist ▶ Custom Hay/Silage Operator ▶ Farmer ▶ Golf Course Manager ▶ Grain Operation Superintendent ▶ Green House Manager ▶ Rancher ▶ Tree Surgeon Occupations Requiring Baccalaureate Degree ▶ Agricultural Educator ▶ Bioinformatics Specialist ▶ Botanist ▶ Plant Breeder and Geneticist ▶ Plant Pathologist ▶ Soil and Water Specialist
	10	English/ Language Arts II	Geometry	Biology	U.S. History		• Introduction to Plant and Soil Science	
	11	English/ Language Arts III	Algebra II or other math course	Chemistry or other science course	World History		• Advanced Plant and Soil Science focusing on agronomy, forestry and range science or horticulture	
	College Placement Assessments-Academic/Career Advisement Provided							
	12	English/ Language Arts IV	Trigonometry or other math course	Botany or other science course			• Biotechnology and Agricultural Science Research Choose one of the following: • Agronomy • Forestry and Range Science • Horticulture	
Articulation/Dual Credit Transcribed-Postsecondary courses may be taken/moved to the secondary level for articulation/dual credit purposes.								
POSTSECONDARY	Year 13	English Composition	Algebra	Chemistry	American Government	All plans of study need to meet learners' career goals with regard to re- quired degrees, licenses, certifications or journey worker status. Certain local student organiza- tion activities may also be important to include.	• Principles of Plant Systems • Fundamentals of Plant Production and Management	
	Year 14	Speech/ Oral Communication		Biological Science Botany	American History Geography		• Students choose area of specialization and take related courses such as Horti- culture, Forestry or Agronomy	
	Year 15	Technical Writing	Statistics	Organic Chemistry Microbiology	Political Science		• Continue Courses in Area of Specialization	
	Year 16	Continue courses in the area of specialization.					• Complete Plant Systems Major (4-Year Degree Program)	

Creating Your Institution's Own Instructional Plan of Study

With a team of partners (secondary/postsecondary teachers and faculty, counselors, business/industry representatives, instructional leaders, and administrators), use the following steps to develop your own scope and sequence of career and technical courses as well as degree major courses for your institution's plan of study.

- 1** Crosswalk the Cluster Foundation Knowledge and Skills (available at <http://www.careerclusters.org/goto.cfm?id=82>) to the content of your existing secondary and postsecondary programs/courses.
- 2** Crosswalk the Pathway Knowledge and Skills (available at <http://www.careerclusters.org/goto.cfm?id=2>) to the content of your existing secondary/postsecondary programs and courses.
- 3** Based on the crosswalks in steps 1 and 2, determine which existing programs/courses would adequately align to (cover) the knowledge and skills. These programs/courses would be revised to tighten up any alignment weaknesses and would become a part of a sequence of courses to address this pathway.
- 4** Based on the crosswalks in steps 1 and 2, determine what new courses need to be added to address any alignment weaknesses.
- 5** Sequence the **content** and **learner outcomes** of the existing programs/courses identified in step 3 and new courses identified in step 4 into a course sequence leading to preparation for all occupations within this pathway. (See list of occupations on page 1 of this document.)
- 6** The goal of this process would be a series of courses and their descriptions. The names of these courses would be inserted into the *Career and Technical Courses* column on the Plan of Study on page 1 of this document.
- 7** The SAMPLE on page 4 is a **sample result** of steps 1-6, and these course titles are inserted into the Plan of Study on page 1 of this document.
- 8** Crosswalk your state academic standards and applicable national standards (e.g., for mathematics, science, history, language arts, etc.) to the sequence of courses formulated in step 6.

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SAMPLE Sequence of Courses for ► Instructional Leaders ► Administrators ► Counselors ► Teachers/Faculty

SAMPLE

Below are suggested courses that could result from steps 1-6 above. However, as an educational institution, course titles, descriptions and the sequence will be your own. This is a good model of courses for you to use as an example and to help you jump-start your process. Course content may be taught as concepts within other courses, or as modules or units of instruction.

The following course is based on the Cluster Foundation Knowledge and Skills found at <http://www.careerclusters.org/goto.cfm?id=82>. These skills are reinforced through Supervised Agricultural Experience (SAE) programs including entrepreneurial, work-based, research or service learning. Skills are also reinforced and the SAE supported through participation in appropriate FFA activities.

#1

Introduction to Agriculture, Food and Natural Resources: This is a core course for the Agriculture, Food and Natural Resources Career Cluster that builds a knowledge base and technical skills in all aspects of the industry. Learners will be exposed to a broad range of agriculture, food and natural resources careers and Cluster Foundation Knowledge and Skills. This may be taught as a career exploration course in conjunction with other foundation Career Cluster courses.

The following course is based on the Cluster Foundation Knowledge and Skills as well as the Pathway Knowledge and Skills found at <http://www.careerclusters.org/goto.cfm?id=2>. These skills are reinforced through participation in FFA.

#2

Introduction to Plant and Soil Science: This course focuses on knowledge, information and skills related to the science of plant production and agronomy. The curriculum is carried out through lecture, application and experience to provide the necessary basic skills for careers in horticulture, agricultural production and management, and science. The content includes plant growth and reproduction, biotechnology and research, fertilizers, plant and tree identification, controlling weeds and pests, and safe and proper use of agricultural chemicals.

The following courses expose students to Pathway Knowledge and Skills found at <http://www.careerclusters.org/goto.cfm?id=2> and should include an appropriate Supervised Agricultural Experience (SAE) and FFA activities that support classroom/laboratory and SAE learnings.

#3

Advanced Plant and Soil Science: Focusing on agronomy, forestry and range science or horticulture, this course includes advanced scientific principles and communication skills that build on knowledge and skills learned in Introduction to Plant Systems. Topics include plant science economics, decision making, global concerns in the industry including marketing, genetics modification, and breeding. Work-based learning strategies are used to reinforce content, including but not limited to internships, agriscience projects, apprenticeships and supervised agriculture experiences.

#4

Biotechnology and Agricultural Science Research: This course provides instruction in the technologically advanced world of agricultural systems and life sciences, with exposure to the latest techniques and advances in biotechnology with a strong emphasis on hands-on and work-based activities.

#5

Horticulture: Focusing on areas of specialization such as greenhouse management, turf management, nursery operations, floriculture and landscaping, this course emphasizes the scientific and technical knowledge for a career in horticulture. Topics in this course include plant growth and development, genetics, plant nutrition, media selection, basic plant identification, pest management, chemical disposal, customer relations, career opportunities and leadership development.

#6

Forestry and Range Science: This course focuses on the broad field of forest and range plants, with a basic orientation to native plants and ecosystems. Instructional units include plant identification, forest and range ecology, planting, and pests and diseases.

#7

Agronomy: This course focuses on various physical and biological factors including soil management, tillage, crop rotation, breeding, weed control and climate related to crop production.

#8

Principles of Plant Systems: This introductory course applies the principles of anatomy and physiology to produce and manage plants in both a domesticated and natural environment. Specific topics include nutritional requirements, soil/media nutrients, basic methods of reproducing and propagating plants, pest management, plant properties and plant classifications.

#9

Fundamentals of Plant Production and Management: This course focuses on the application of fundamentals of production and harvesting to produce plants. Students will complete a production, marketing and distribution plan, and demonstrate knowledge of fundamentals of plant management to produce, harvest, handle and store crops.

#10

Various courses will be selected that relate to the student's area of specialization such as agronomy, forestry or horticulture.

