Agriculture, Food and Natural Resources: Natural Resources Systems

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

*This Career Pathway Plan of Study (based on the Natural Resources 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 Natural Resources 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 requirements and college entrance requirements. Supervised Agricultural Experience (SAE) and participation in appropriate FFA activities support and reinforce classroom and laboratory learning and should be a requirement for all students.	• Introduction to Agriculture, Food and Natural Resources	**Occupations Requiring Postsecondary Education** ▶ Commercial Fisherman ▶ Fisheries Technician ▶ Forest Technician ▶ Geology Technician ▶ Log Grader ▶ Logger ▶ Park Manager ▶ Pulp and Paper Manager ▶ Range Technician ▶ Water Monitoring Technician ▶ Wildlife Manager
SECONDARY	10	English/ Language Arts II	Geometry	Biology	U.S. History		• Introduction to Natural Resources and the Environment	
SECONDARY	11	English/ Language Arts III	Algebra II or other math course	Chemistry or other science course	World History		• Advanced Natural Resources and Environmental Systems	
	College Placement Assessments-Academic/Career Advisement Provided							
SECONDARY	12	English/ Language Arts IV	Trigonometry or other math course	Physics or other science course			• Research in Natural Resources and Biotechnology • Internship in Natural Resources	
	Articulation/Dual Credit Transcripted-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 required degrees, licenses, certifications or journey worker status. Certain local student organization activities may also be important to include.	• Management of Natural Resource Systems • Principles of Natural Resource Conservation	**Occupations Requiring Baccalaureate Degree** ▶ Agricultural Educator ▶ Ecologist ▶ Fish and Game Officer ▶ Geologist ▶ Hydrologist ▶ Mining Engineer
POSTSECONDARY	Year 14	Speech/ Oral Communication	Calculus	Biological Science Botany	American History Geography		• Protecting Natural Resources • Disease Management	
POSTSECONDARY	Year 15	Technical Writing	Statistics	Organic Chemistry Microbiology	Political Science		• Continue Courses in the Area of Specialization	
POSTSECONDARY	Year 16	Continue courses in the area of specialization.					• Complete Natural Resources Systems Major (4-Year Degree Program)	

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SAMPLE

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=5**) 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. Below 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=5. These skills are reinforced through participation in FFA.

#2

Introduction to Natural Resources and the Environment: This course provides an opportunity for students to increase awareness of the close ties among living organisms as well as natural and environmental concerns with the interrelationships of living organisms and the world around us. Students are exposed to careers related to natural resources systems.

The following courses expose students to Pathway Knowledge and Skills found at http://www.careerclusters.org/goto.cfm?id=5 and should include an appropriate Supervised Agricultural Experience (SAE) and FFA activities that support classroom/laboratory and SAE learnings.

#3

Advanced Natural Resources and Environmental Systems: Content of this course includes the use of renewable and non-renewable natural resources, including water and air quality, waste management, land use regulations, soils, meteorology, fisheries, forestry and wildlife habitat. Students will identify issues and potential solutions of resource management.

#4

Research in Natural Resources and Biotechnology: This course provides instruction in the management activities of natural resources and environmental sciences. Students are exposed to the latest techniques and advances in natural resources systems, methods of environmental monitoring and conservation, natural resource related regulations, resource protection, sampling methodologies, prescribing management techniques in wildlife, range and forestry management with a strong emphasis on hands-on activities, and research experiments in biotechnology.

#5

Internship in Natural Resources: This course is designed for work-site learning experiences in a career related to natural resources. Students have the opportunity to practice specific skills, including record keeping, and receive credit for time spent in the workplace.

#6

Management of Natural Resource Systems: Students will recognize the importance of resource management components; describe how natural resource products are produced, harvested, processed and used; apply cartographic skills; monitor resource status to obtain planning data; apply environmental and wildlife knowledge; examine weather and other dangers related to work in an outdoor environment; and learn applicable rules or laws to demonstrate natural resource mitigation techniques.

#7

Principles of Natural Resource Conservation: This course studies the different components of soil, soil forming factors, soil erosion and soil conservation, and introduces surveying techniques and use of soil survey reports. Students will examine biological and physical characteristics to identify and classify natural resources, ecologic concepts and principles; develop a research/monitoring plan related to a natural resource topic; and produce a technical report of findings to communicate natural resource information to the general public.

#8

Protecting Natural Resources: Students will safely use techniques and equipment needed to manage and prevent wildfires while working in natural environments and use wildfire suppression techniques that meet industry standards. Students will describe and demonstrate law enforcement procedures used to manage public gatherings and to gain entry into secure, closed or restricted areas.

#9

Disease Management: This course provides instruction on the symptoms of animal and plant diseases and the use of appropriate techniques to prevent their spread. Students will recognize insect types, damage, and available controls to prevent insect infestations and learn principles of acceptable pesticide application.

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Notes