

Natural Resources – 03.0299/CIP				
Content Area	Standard	Standard Title	Benchmark	Description
Animal Science	12	Housing and Sanitation	12.3	Research the various water and waste management systems and analyze their limitations
Animal Science	15	Consumer Safety and Concerns	15.1	Research and describe current consumer food trends
Biotechnology	4	Basic Biotechnology Concepts	4.2	Demonstrate the steps in the scientific method
Biotechnology	5	Genetics and Genetic Engineering	5.2	Identify basic cell structures
Biotechnology	5	Genetics and Genetic Engineering	5.3	Recognize the types of cell reproduction
Biotechnology	9	Biotechnology and the Environment	9.1	Identify and describe techniques used for detecting environmental pollutants
Biotechnology	9	Biotechnology and the Environment	9.3	Describe how natural and genetically engineered plants clean up toxic wastes
Biotechnology	9	Biotechnology and the Environment	9.4	Describe how microbes can be used to clean up the environment
Biotechnology	10	Resource Recovery	10.1	Define and describe biomass conversion, as it relates to fuels and energy
Biotechnology	10	Resource Recovery	10.4	Describe the use of genetically altered bacteria in human and animal waste management
Food Science	1	Trends in Food Science	1.1	Identify emerging technologies and their impact on food products and processing
Food Science	1	Trends in Food Science	1.2	Define trends in food production, world population and supply and demand for food products
Food Science	5	Food Chemistry, Biology and Nutrition	5.1	Explain the food nutrition pyramid guide
Forestry	1	Introduction to Forestry	1.1	Describe the history of Pennsylvania's forests
Forestry	1	Introduction to Forestry	1.2	Describe the varied and multiple uses of forests
Forestry	1	Introduction to Forestry	1.3	Identify current issues and policies in forest management
Forestry	2	Safety	2.5	Understand the forest fire danger rating system
Forestry	3	Careers in Forestry	3.1	Examine career pathways in forestry
Forestry	3	Careers in Forestry	3.2	Identify advance training and postsecondary education in forestry
Forestry	4	Economics in Forestry	4.1	Describe the role of forestry in the local, state, national and international economy

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Forestry	4	Economics in Forestry	4.2	Discuss issues related to full-cycle utilization of products (e.g., raw to manufactured)
Forestry	5	Forest Ecology and Conservation	5.1	Describe basic concepts of forest ecology and conservation
Forestry	4	Economics in Forestry	4.3	Understand the role of trade and regulatory pressures on forest businesses
Forestry	4	Economics in Forestry	4.5	Describe the impact of local policies (e.g., noise, no trucks, etc.) on forest economics
Forestry	5	Forest Ecology and Conservation	5.2	Describe sources of forest ecosystem variability and diversity
Forestry	5	Forest Ecology and Conservation	5.3	Describe the effects of temperature, moisture, soil and solar radiation on tree growth
Forestry	5	Forest Ecology and Conservation	5.4	Describe competition and successions role in forest ecology
Forestry	5	Forest Ecology and Conservation	5.5	Describe basic forest conservation policies and practices that lead to sustainability
Forestry	6	Dendrology	6.1	List and describe the U.S. forest types
Forestry	6	Dendrology	6.2	Identify trees and shrubs
Forestry	6	Dendrology	6.3	Identify range, tolerance and site requirements for major forest species
Forestry	7	Forest Measurement	7.1	Scale and grade logs
Forestry	7	Forest Measurement	7.2	Measure tree diameter and height
Forestry	7	Forest Measurement	7.3	Perform a timber cruise (inventory), and describe its purpose
Forestry	7	Forest Measurement	7.4	Determine a tree's age and health
Forestry	7	Forest Measurement	7.5	Demonstrate surveying techniques
Forestry	7	Forest Measurement	7.6	Calculate elevation, slope and acreage
Forestry	7	Forest Measurement	7.7	Interpret map scales and symbols
Forestry	8	Silviculture	8.1	Describe methods of planting trees
Forestry	8	Silviculture	8.2	Perform thinning and pruning techniques
Forestry	8	Silviculture	8.3	Describe situations utilizing prescribed burns
Forestry	8	Silviculture	8.4	Describe the methods used for natural and planted forest regeneration
Forestry	8	Silviculture	8.5	Identify tree stand cultivation, growth and management practices
Forestry	8	Silviculture	8.6	Identify forest pests, diseases and their management
Forestry	9	Harvesting	9.1	Describe various harvesting methods, as well as when and why they are appropriate
Forestry	10	Manufacturing Lumber	10.8	List basic lumber sizes
Forestry	10	Manufacturing Lumber	10.9	Compare manufacturing and marketing of hardwoods and softwoods
Forestry	11	Forest Products	11.1	Recognize, name and describe the processing of the major forest products
Forestry	11	Forest Products	11.2	Describe species utilization

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Forestry	12	Urban Forestry	12.1	Describe the benefits and roles of urban forestry
Forestry	12	Urban Forestry	12.2	Identify and select proper trees and shrubs for urban setting
Forestry	12	Urban Forestry	12.3	Plant, fertilize and trim trees and shrubs
Leadership and Career Development	4	Citizenship	4.4	Describe how public policy and laws are developed at the local, state and national level
Leadership and Career Development	7	Communication and Public Speaking	7.6	Demonstrate the use of current and emerging technologies as a tool for increasing effective communication
Leadership and Career Development	8	Information Research Skills	8.2	Identify techniques used for conducting market research, including surveys and studies
Leadership and Career Development	8	Information Research Skills	8.3	Develop alternative solution scenarios for a problem using sound research methods
Management, Economics and Marketing	1	Impact of Agribusiness on the Economy	1.2	Identify and describe agribusiness in the community and its importance/role in the local economy
Management, Economics and Marketing	15	International Agribusiness	15.3	Describe the impact global markets have on agricultural production and pricing
Natural Resources Management	1	Natural Resource Conservation and Preservation	1.1	Describe the history of conservation in the United States through the present time
Natural Resources Management	1	Natural Resource Conservation and Preservation	1.3	Demonstrate conservation and preservation practices
Natural Resources Management	1	Natural Resource Conservation and Preservation	1.4	Explain the relationships among organisms, populations, habitats, ecosystems and the impact of human activities on these relationships
Natural Resources Management	1	Natural Resource Conservation and Preservation	1.6	Describe current issues and public concerns in natural resource conservation
Natural Resources Management	2	Safety	2.1	Demonstrate outdoor safety techniques
Natural Resources Management	2	Safety	2.3	Demonstrate the safe use of natural resource tools
Natural Resources Management	3	Careers in Natural Resource Management	3.1	Examine career pathways in natural resource management
Natural Resources Management	3	Careers in Natural Resource Management	3.2	Identify advanced training and postsecondary education in natural resource management
Natural Resources Management	3	Careers in Natural Resource Management	3.3	Demonstrate technological awareness and computer competence, as it relates to careers in natural resources
Natural Resources Management	4	Environmental Protection	4.1	Identify natural resources and how they are protected both voluntarily and by law
Natural Resources Management	4	Environmental Protection	4.2	Define and identify pollutants, toxins and safe environmental practices
Natural Resources Management	4	Environmental Protection	4.3	Know the roles of conservation, protection and preservation organizations
Natural Resources Management	4	Environmental Protection	4.4	Understand the effect of economics and social trends on the implementation of environmental protection
Natural Resources Management	5	Forests and Vegetated Areas	5.1	Describe the history of human impact on forestry resources

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Natural Resources Management	5	Forests and Vegetated Areas	5.2	Identify non-consumptive uses of forests and vegetated areas
Natural Resources Management	5	Forests and Vegetated Areas	5.3	Describe conservation practices for forests and vegetated areas
Natural Resources Management	6	Fish and Wildlife	6.2	Identify fish and wildlife found in Pennsylvania
Natural Resources Management	6	Fish and Wildlife	6.3	Explain and identify fish and wildlife management techniques
Natural Resources Management	6	Fish and Wildlife	6.4	Understand the impact of land use on fisheries and wildlife
Natural Resources Management	6	Fish and Wildlife	6.5	Plan and install a habitat improvement project
Natural Resources Management	7	Soils and Soil Conservation	7.2	Describe the major soil characteristics and how they affect soil usage
Natural Resources Management	7	Soils and Soil Conservation	7.4	Explain how to control farm and non-farm soil erosion
Natural Resources Management	7	Soils and Soil Conservation	7.5	Describe soil health and soil fertility
Natural Resources Management	8	Water	8.2	Investigate water pollution and ways to control and prevent it
Natural Resources Management	8	Water	8.3	Explain the importance of water use planning
Natural Resources Management	8	Water	8.4	Examine water quantity use and trends
Natural Resources Management	8	Water	8.5	Identify alternative water collection methods (rainwater, greywater, etc.)
Natural Resources Management	8	Water	8.6	Examine stormwater impact and management in rural, suburban and urban settings
Natural Resources Management	9	Air	9.1	Identify basic chemical components of air
Natural Resources Management	9	Air	9.2	Identify sources of air pollution
Natural Resources Management	9	Air	9.3	Analyze air pollution's affect on the environment and humans
Natural Resources Management	9	Air	9.4	Describe air quality improvements and pollution prevention practices
Natural Resources Management	10	Land Use	10.3	Describe land use planning and growth management methods, and stress importance of land use planning to allow for agriculture, residential, commercial, etc. usage
Natural Resources Management	10	Land Use	10.4	Explain the history of land use in Pennsylvania
Natural Resources Management	10	Land Use	10.5	Explain the effects of technology on land use in urban and rural settings
Natural Resources Management	10	Land Use	10.6	Describe the various programs used to deal with the preservation of valuable agricultural land, such as tax breaks, agricultural security areas, nuisance law protection, sale or transfer of development rights, etc.
Natural Resources Management	11	Energy and Minerals	11.2	Develop working models of, and compare alternative energy sources, such as biofuels, biomass, solar, geothermal and wind
Natural Resources Management	11	Energy and Minerals	11.5	Describe the impacts of resource extraction and best management practices used in recovery/remediation of these sites
Natural Resources Management	12	Outdoor Recreational Systems	12.1	Identify and describe the federal, state and local recreational structure and facilities
Natural Resources Management	12	Outdoor Recreational Systems	12.3	Analyze recreational uses and their impact on the environment
Natural Resources Management	12	Outdoor Recreational Systems	12.4	Discuss competition for resources and the impact on private property rights and responsibilities

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Natural Resources Management	13	Laws, Statues and Regulations	13.1	Identify and analyze legislation that affects natural resources
Natural Resources Management	13	Laws, Statues and Regulations	13.2	Defend an opinion on a natural resource issue in a simulated county, state or federal political setting
Natural Resources Management	13	Laws, Statues and Regulations	13.3	Demonstrate an understanding of the legislative process
Natural Resources Management	14	Sustainability	14.1	Define the multiple and various definitions of sustainability
Natural Resources Management	14	Sustainability	14.2	Identify ethical issues in the sustainability of natural resources
Plant and Soil Science	2	Safety	2.1	Identify dangerous plants
Plant and Soil Science	4	Botany and Physiology	4.2	Identify cell structure, organization and function
Plant and Soil Science	4	Botany and Physiology	4.3	Identify plant structures, and explain their functions
Plant and Soil Science	4	Botany and Physiology	4.4	Identify flower structure, and describe the events in pollination
Plant and Soil Science	4	Botany and Physiology	4.5	Identify seeds and seed structures, and explain their functions
Plant and Soil Science	4	Botany and Physiology	4.6	Identify elements essential for germination
Plant and Soil Science	4	Botany and Physiology	4.7	Explain the environmental factors that affect the growth and development of a plant
Plant and Soil Science	4	Botany and Physiology	4.8	Demonstrate the use and affects of plant regulators
Plant and Soil Science	6	Plant Nutrition	6.1	Identify plant nutrient requirements
Plant and Soil Science	7	Managing Agricultural Soils	7.1	Identify and describe soil characteristics
Plant and Soil Science	7	Managing Agricultural Soils	7.2	Analyze and interpret soil surveys
Plant and Soil Science	7	Managing Agricultural Soils	7.3	Identify soil nutrients
Plant and Soil Science	7	Managing Agricultural Soils	7.4	Conduct basic soil testing
Plant and Soil Science	7	Managing Agricultural Soils	7.5	Interpret commercial soil test reports
Plant and Soil Science	7	Managing Agricultural Soils	7.6	Identify physical limitations of soils using soil profiles
Plant and Soil Science	7	Managing Agricultural Soils	7.7	Describe criteria for selecting fertilizers and other soil amendments
Plant and Soil Science	7	Managing Agricultural Soils	7.8	Describe factors influencing fertilizer application
Plant and Soil Science	7	Managing Agricultural Soils	7.9	Identify potential land use based on soil limitations
Plant and Soil Science	8	Environmental Factors	8.1	Identify environmental factors that affect plant growth
Plant and Soil Science	8	Environmental Factors	8.2	Describe techniques used to control environmental factors
Plant and Soil Science	10	Entomology	10.2	Identify insect classifications
Plant and Soil Science	11	Integrated Pest Management	11.1	Identify and differentiate pests and diseases as variables in plant production
Plant and Soil Science	11	Integrated Pest Management	11.3	Analyze various techniques which serve to reduce pest and disease problems
Plant and Soil Science	13	Field Crop and Specialty Crop Production (Corn, Forages, Soybeans, Small Grains, Grapes, Potatoes, Mushrooms and Tobacco)	13.6	Identify weed control options
Power Systems Technology	6	Engine Systems	6.1	Identify principles of small engine operation
Power Systems Technology	6	Engine Systems	6.5	Troubleshoot an engine and adjust to industry specifications

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Power Systems Technology	6	Engine Systems	6.6	Maintain a small engine
Power Systems Technology	11	Environmental and Natural Resource Systems	11.2	Use various map types and aerial photos for land use, soil, watershed, wildlife, natural resource management and conservation