

Natural Resource Science 2

Exam Information	Description
Exam number 173 Items 43 National Career Cluster Agriculture Energy & Natural Resources Certification available Yes	The Natural Resource Science 2 industry certification exam assesses knowledge and skills related to the biological, environmental, and economic importance of renewable natural resources. Learners demonstrate their understanding of forest and range products and their benefits, with an emphasis on field and laboratory experiences.

Exam Blueprint and Performance Skills

Standard	Percentage of exam score
1. Student Organizations in Agricultural Education (Optional)*	0%
2. Supervised Agricultural Experience Programs*	6%
3. Effective Methods of Communication*	6%
4. Interrelationships Between Natural Resources and Humans*	22%
5. Natural Resource Management*	55%
6. Basic Economic Principles	10%

*Includes performance skill evaluation

Standard 1 - Student Organizations in Agricultural Education (Optional) (0% of exam score)

Candidates will explain the role of student organizations in agricultural education.

Objective 1 Assess the role of student organization participation in developing career skills.

1. List and describe proficiency awards appropriate for natural resources.
2. List and describe career development events appropriate for natural resources.
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.

Optional: Standard performance evaluations on the final page of this document

Standard 2 - Supervised Agricultural Experience Programs (6%)

Candidates will explain the maintenance and expansion of supervised agricultural experience (SAE) programs in agricultural education.

Objective 1 Maintain and use SAE records.

1. Explain the importance of keeping records on an SAE program.
2. Explain how SAE records are organized.
3. Follow approved procedures to make entries in SAE records.

Objective 2 Devise long-range plans for expanding SAE programs.

1. Evaluate the overall quality of a current SAE and determine how to make it more productive or profitable.
2. Explain factors that should be considered in expanding an SAE program.
3. Explain how placement and ownership of SAE programs may be expanded.

Optional: Standard performance evaluations on the final page of this document

Standard 3 - Effective Methods of Communication (6%)

Candidates will use effective methods and venues to communicate natural resource processes to the public.

Objective 1 Communicate natural resource information to the public.

1. Describe the characteristics and importance of active and passive listening.
2. Demonstrate public speaking skills.
3. Read, comprehend, and interpret technical materials/publications.
4. Produce a technical report/research paper.

5. Identify ways a message regarding natural resources may be communicated to the public; such as printed publications, public hearings, media outlets, etc.
6. Design and construct a display that communicates a natural resource topic.
7. Prepare and present a natural resources issues forum for the local community.

Optional: Standard performance evaluations on the final page of this document

Standard 4 - Interrelationships Between Natural Resources and Humans (22%)

Candidates will explain the interrelationships between natural resources and humans in managing natural environments.

Objective 1 Identify and evaluate natural resources.

1. Select and assess a natural resource issue with regional/local impact; research its history and discuss its impact
2. Explain the effects and/or trade-off of population growth, greater energy consumption, and increased technology and development on natural resources and the environment.

Objective 2 Describe biological, physical, and chemical properties of soil.

1. Assess the responsibility of individuals in stewardship of the environment.
2. Describe procedures and laws for public involvement in natural resource management.
3. Examine the principles of risk assessment and how they are applied to decision-making and adaptive management.
4. Describe the effects of technology and biotechnology on the environment.
5. Research and debate one or more current issues related to the conservation or preservation of natural resources.
6. Identify issues involving the mitigation of natural resources

Objective 3 Compare and contrast the impact of conventional and alternative energy sources on the environment.

1. Identify conventional and alternative energy sources.
2. Compare and contrast baseload versus intermittent energy sources.
3. Identify the advantages and disadvantages of conventional and alternative energy sources.
4. Compare and contrast various energy resources in terms of their reserves, uses, and impacts on the environment.

Optional: Standard performance evaluations on the final page of this document

Standard 5 - Natural Resource Management (56%)

Candidates will explain practices in natural resource management.

Objective 1 Apply soil science principles to natural resource management.

1. Describe soil degradation
2. Identify causes of soil erosion
3. Apply management practices to mitigate soil erosion.

Objective 2 Relate the function of watersheds and water resources to natural resources.

1. Describe the properties of watersheds and identify the boundaries of local watersheds.
2. Compare watershed management methods.
3. Examine the impact of watershed management on local communities.
4. Explain the potential water-holding/runoff capacity of a watershed.
5. Identify water sources and quality standards. Terms: potable water, brackish water, marine water, gray water, etc.
6. Conduct water quality tests.
7. Identify sources of groundwater contamination such as effluent, etc.
8. Describe the functions of wetlands and differentiate types of wetlands.
9. Explain the importance of wetland management, creation, enhancement, and restoration programs.
10. Explain the importance of water distribution.

Objective 3 Analyze wildlife/aquatic resources and management.

1. Describe characteristics of a healthy wildlife habitat.
2. Explain methods of wildlife habitat improvement.
3. Identify wildlife species that can be sustainably harvested.
4. Describe techniques used in managing wildlife.
5. Identify characteristics of a healthy aquatic habitat.
6. Describe techniques used in managing fish populations.
7. Identify and manage fish diseases.
8. Describe the difference between consumptive use and non-consumptive use

Objective 4 Examine forest resources and management.

1. Identify local forestry species by common and scientific names.
2. Describe forest ecology and identify characteristics of a healthy forest.
3. Recognize the importance of forests.
4. Describe the growth and decline of forest trees.
5. Identify ways in which forest stands may be improved.
6. Measure trees and timber stands.
7. Explain the role of fire in forest management.
8. Examine reforestation practices.
9. Identify forest products and uses.
10. Define urban forestry.

Objective 5 Examine mineral resources and management.

1. Identify local mineral resources.
2. Describe the importance of mineral resources to society.
3. Explain the various practices for obtaining mineral resources.
4. Describe the impact of mining practices on the environment.
5. Identify processes for reclaiming areas where minerals have been extracted.

Objective 6 Explain the management of natural resources for recreational purposes.

1. Identify natural resource characteristics desirable for recreational purposes.

2. Identify outdoor recreational enterprises.
3. Describe natural resource management techniques for improving recreation opportunities.
4. Compare various recreational uses of the region.

Objective 7 Explain inventory and monitoring methods.

1. Identify the components of a monitoring plan; objectives, process, and evaluation.
2. Compare and contrast the various inventory/sampling methodologies. (e.g., population estimation)
3. Develop a basic plan for monitoring a natural resource project.

Optional: Standard performance evaluations on the final page of this document

Standard 6 - Basic Economic Principles (10%)

Candidates will apply basic economic principles in natural resource business and management.

Objective 1 Apply basic economic principles in natural resource business and management.

1. Monitor monthly financial statements.
2. Apply tax strategies and estate planning to natural resource management.
3. Explain how economic principles contribute to land management through conservation easements and land swaps.
4. Evaluate the economic impact of natural resources on a community..

Optional: Standard performance evaluations on the final page of this document

Performance Skills Evaluation

Exam name: Natural Resource Science 1

Candidate Name: _____

Performance assessments may be completed and evaluated any time before the certification is issued. The following performance skills can be used in connection with the associated standards and exam. The evaluator will function as the subject matter expert to determine if the candidate meets the skills requirements with a Yes/No for passing.

Standard 1 - Student Organizations in Agricultural Education Attend a student organization meeting.	Pass:
Standard 2 - Agricultural Experience in Agricultural Education Participate in an SAE as part of an integral system approach to Agricultural Education.	Pass:
Standard 3 - Natural Resource Science Management Participate in a conflict management activity in an SAE as part of an integral system approach to Agricultural Education.	Pass:
Standard 4 - Ecological Concepts and Science Principles - Test and analyze water quality. - Demonstrate air-monitoring techniques. - Collect and interpret weather data.	Pass:
Standard 5 - Range Resources and Management - Test and analyze water quality. - Demonstrate air-monitoring techniques. - Collect and interpret weather data.	Pass:
Standard 7 - Land Classification/Resource Inventories/ Monitoring Method - Survey a site to determine potential land use. - Analyze a current local Environmental Impact Statement (EIS) and determine the preferred alternative.	Pass:

Evaluator Name: _____

Date: _____