



# Environmental Science and Natural Resources

## Study Guide

**Assessment:**

**6329 Environmental Science and  
Natural Resources**

career **tech** ✓  
**Testing**  
*The Provider of Online Testing Solutions*

Aligned with the National  
Agriculture, Food and  
Natural Resources (AFNR)

  
**OKLAHOMA  
WORKS**

## Overview

This study guide is designed to help students prepare for the Environmental Science and Natural Resources assessment. It not only includes information about the assessment, but also the skills standards upon which the assessment is based and test taking strategies.

Each of the four sections in this guide provides useful information for students preparing for the Environmental Science and Natural Resources assessment.

- CareerTech and Competency-Based Education: A Winning Combination
- Environmental Science and Natural Resources assessment
  - ▶ Assessment Information
  - ▶ Standards and Test Content
  - ▶ Sample Questions
  - ▶ Abbreviations, Symbols, and Acronyms
- Strategies for Test Taking Success
- Notes

This assessment's standards are aligned with those of the Agriculture, Food and Natural Resources (AFNR). AFNR standards were developed by the National Council for Agricultural Education (The Council). The Council's vision is to be the premier leadership organization for shaping and strengthening school-based agricultural education (SBAE) at all levels in the United States. Its mission is to proactively identify current and emerging issues of national concern, provide innovative solutions in response to current and emerging issues, coordinate the efforts of appropriate entities in strengthening programs, and serve as a national advocate for school-based agricultural education.

For more information about these standards, go to: [www.ffa.org/thecouncil/Documents/finalafnrstandsv324609withisbn\\_000.pdf](http://www.ffa.org/thecouncil/Documents/finalafnrstandsv324609withisbn_000.pdf)

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## CareerTech and Competency-Based Education: A Winning Combination

Competency-based education uses learning outcomes that emphasize both the application and creation of knowledge and the mastery of skills critical for success. In a competency-based education system, students advance upon mastery of competencies, which are measurable, transferable outcomes that empower students.

Career and technology education uses industry professionals and certification standards to identify the knowledge and skills needed to master an occupation. This input provides the foundation for development of curriculum, assessments and other instructional materials needed to prepare students for wealth-generating occupations and produce comprehensively trained, highly skilled employees demanded by the work force.

### Tools for Success

CareerTech education relies on three basic instructional components to deliver competency-based instruction: skills standards, curriculum materials, and competency assessments.

**Skills standards** provide the foundation for competency-based instruction and outline the knowledge and skills that must be mastered in order to perform related jobs within an industry. Skills standards are aligned with national skills standards and/or industry certification requirements; therefore, a student trained to the skills standards is equally employable in local, state and national job markets.

**Curriculum materials and textbooks** contain information and activities that teach students the knowledge and skills outlined in the skills standards. In addition to complementing classroom instruction, curriculum resources include supplemental activities that enhance learning by providing opportunities to apply knowledge and demonstrate skills.

**Certification Assessments** test the student over material outlined in the skills standards and taught using the curriculum materials and textbooks. When used with classroom performance evaluations, certification assessments provide a means of measuring occupational readiness.

Each of these components satisfies a unique purpose in competency-based education and reinforces the knowledge and skills students need to gain employment and succeed on the job.

### Measuring Success

Evaluation is an important component of competency-based education. Pre-training assessments measure the student's existing knowledge prior to receiving instruction and ensure the student's training builds upon this knowledge base. Formative assessments administered throughout the training process provide a means of continuously monitoring the student's progress towards mastery.

Certification assessments provide a means of evaluating the student's mastery of knowledge and skills. Coaching reports communicate assessment scores to students and provide a breakdown of assessment results by standard area. The coaching report also shows how well the student has mastered skills needed to perform major job functions and identifies areas of job responsibility that may require additional instruction and/or training.

# Environmental Science and Natural Resources Assessment Information

## What is the Environmental Science and Natural Resources assessment?

The Environmental Science and Natural Resources assessment is an end-of-course assessment for students in Environmental Science and Natural Resources programs. The assessment provides an indication of student mastery of basic knowledge and concepts necessary for success in this area.

## How was the assessment developed?

The assessment was developed by the CareerTech Testing Center. The assessment and standards align with the Agriculture, Food and Natural Resources (AFNR) standards. Items were developed and reviewed by a committee of subject matter experts.

## What does the assessment cover?

Specifically, the tests includes multiple-choice test items over the following areas:

### Environmental Science and Natural Resources (75 questions)

Life Knowledge and Cluster Skills	4%
Environmental Service Systems	48%
Natural Resource Systems	48%

## What is the benefit of using this assessment?

Students receive a certificate for each assessment that he/she passes. This certificate may be included in his/her portfolio and used to communicate the student's mastery of the subject matter to potential employers.

## When should the assessment be taken?

The CareerTech Testing Center recommends that students take the assessments as soon as possible after receiving all standards-related instruction, rather than waiting until the end of the school year.

## Is the assessment timed?

No. However, most students finish the assessment within one hour.

## What resources can students use on these assessments?

Students are allowed to use calculators and scratch paper on CTTC assessments; however, these items must be provided by the testing proctor and returned to the proctor before the student's exam is submitted for scoring. Calculator apps on cell phones and other devices may not be used on these assessments.

## What accommodations can be made for students with Individualized Education Plans (IEPs)?

Accommodations are allowed for students with an Individualized Education Plan. Examples of allowable accommodations include:

- Extended time — This assessment is not timed; therefore, students may take as much time as needed to finish. The assessment must be completed in one testing session.
- Readers — A reader may be used to read the assessment to a student who has been identified as needing this accommodation.
- Enlarged text — Students needing this accommodation can activate this feature by clicking the **AA** icon in the upper right corner of the screen.

## What can students expect on Test Day?

All CTTC assessments are web-based and delivered exclusively by a proctor in the school's assessment center. The proctor **cannot** be an instructor or anyone who was involved with the student during instruction.

Assessments are delivered in a question-by-question format. When a question is presented, the student can select a response or leave the question unanswered and advance to the next question. Students may also flag questions to revisit before the test is scored. All questions must be answered before the test can be submitted for scoring.

After the assessment is scored, the student will receive a score report that not only shows the student's score on the assessment, but also how the student performed in each standard area.

## Can students retake the test?

Students may retake the test unless their school or state testing policies prohibit retesting. Students who can retest must wait at least three days between test attempts.



# Standards and Test Content

## Environmental Science and Natural Resources

### Life Knowledge and Cluster Skills (3 questions)

1. Handle chemicals and equipment in a safe and appropriate manner:
  - fire extinguishers
  - biohazard waste/trash

### Environmental Service Systems (36 questions)

1. Identify laws associated with environmental service systems.
2. Identify the purposes of laws associated with environmental service systems
3. Identify components and structural layers of the earth's atmosphere.
4. Differentiate the types of weather systems and weather patterns.
5. Explain how meteorological conditions influence air quality.
6. Illustrate the formation of acid precipitation and explain its impact on the environment.
7. Explain climate change and recognize signs of climate change.
8. Explain the earth's balance of energy.
9. Explain the process of soil formation through weathering.
10. Differentiate rock types and relate the chemical composition of mineral matter in soils to the parent material.
11. Describe the biodiversity found in soil and the contribution of biodiversity to the physical and chemical characteristics of soil.
12. Explain how the physical qualities of the soil influence the infiltration and percolation of water.
13. Conduct tests of soil to determine its use for environmental service systems.
14. Describe the world's water supplies and discuss the many uses of water.
15. Describe characteristics of water that influence the biosphere and sustain life.
16. Demonstrate knowledge of hydrogeology by differentiating between groundwater and surface water.
17. Describe interactions between groundwater and surface water.
18. Identify environmental hazards associated with groundwater supplies.
19. Describe precautions taken to prevent/reduce contamination of groundwater supplies.
20. Describe the functions of wetlands and differentiate types of wetlands.
21. Explain the criteria for classifying wetlands.
22. Identify the major types of living organisms that inhabit wetlands.



23. Explain the importance of wetland management, creation, enhancement and restoration programs.
24. Identify types of pollution and distinguish between point source and nonpoint source pollution.
25. Give examples of how industrial and nonindustrial pollution has damaged the environment.
26. Describe ways in which pollution can be managed and prevented.
27. Explain the importance of recycling.
28. Describe different types of solid waste.
29. Evaluate environmental hazards created by different types of solid waste, solid waste accumulation and solid waste disposal.
30. Discuss practical management options for treating solid waste.
31. Define compost and composting.
32. Define source water quality.
33. Identify conventional energy sources and list conservation measures to reduce energy consumption.
34. Identify advantages and disadvantages to conventional energy sources.
35. Evaluate the impact the burning of fossil fuels has on the environment.
36. Identify alternative energy sources.
37. Identify advantages and disadvantages to alternative energy sources.
38. Evaluate the impact of alternative energy sources

## Natural Resource Systems (36 questions)

1. Identify natural resources.
2. Differentiate between renewable and nonrenewable natural resources.
3. Research and debate one or more current issues related to the conservation or preservation of natural resources.
4. Define ecosystem and related terms.
5. Describe the interdependence of organisms within an ecosystem.
6. Describe morphological characteristics used to identify trees and other woody plants.
7. Identify trees and other woody plants.
8. Describe morphological characteristics used to identify herbaceous plants.
9. Describe morphological characteristics used to identify wildlife species.
10. Describe morphological characteristics used to identify aquatic species.
11. Demonstrate techniques used to identify rock, mineral and soil types.
12. Identify rock, mineral and soil types.
13. Identify hazards associated with the outdoor environment.
14. Demonstrate safety practices when working in an outdoor environment.
15. Recognize biohazards associated with natural resources.
16. Identify the different kinds of streams.



17. Identify indicators of the biological health of a stream.
18. Identify characteristics of a healthy forest.
19. Identify characteristics of a healthy wildlife habitat.
20. Identify methods of wildlife habitat improvement.
21. Identify characteristics of healthy rangeland.
22. Identify methods of rangeland improvement.
23. Identify natural resource characteristics desirable for recreational purposes.
24. Identify natural resource management techniques for improving recreation opportunities.
25. Identify laws associated with natural resource systems.
26. Identify the purposes of laws associated with natural resource systems.
27. Define mitigation.
28. Identify issues involving mitigation of natural resources.
29. Identify biogeochemical cycles.
30. Diagram biogeochemical cycles and explain the processes.
31. Describe properties of watersheds and identify the boundaries of local watersheds.
32. Relate the function of watersheds to natural resources.
33. Define riparian zones and riparian buffers, and explain their functions.
34. Describe the processes associated with ecological succession.
35. Give examples of primary succession and secondary succession species in a community of organisms.
36. Explain population ecology, population density and population dispersion.
37. Define invasive species.
38. Describe sources of pollution and delineate between point and nonpoint source pollution.
39. Describe the impact of pollution on natural resources.
40. Describe forest harvesting methods.
41. Identify wildlife species that can be sustainably harvested.
42. Identify products obtained from wildlife species.
43. Describe the value of minerals and ores to the economy.
44. Describe the value of fossil fuels to the economy.
45. Describe the benefits of hydroelectric generation.
46. Identify recreational uses of natural resources.
47. Differentiate between desirable and undesirable fires and prepare a report on the role fire plays in a healthy ecosystem.
48. Describe techniques used to suppress wildfires and manage prescribed fires.
49. Identify causes of diseases in plants.
50. Identify causes of diseases in wildlife.
51. Identify harmful and beneficial insects and signs of insect damage to natural resources.





## Sample Questions

- \_\_\_\_\_ 1. Which of the following topographical factors affects vegetation?
- a. altitude or elevation of the land
  - b. global species responses to the area
  - c. indigenous use of the land
  - d. tropics between latitude lines
- \_\_\_\_\_ 2. Which type of water is found in lakes, rivers and oceans?
- a. surface water
  - b. groundwater
  - c. fresh water
  - d. salt water
- \_\_\_\_\_ 3. What is the main purpose of wetlands restoration programs?
- a. construction
  - b. enhancement
  - c. protection
  - d. maintenance
- \_\_\_\_\_ 4. An individual purchased a refrigerator with an energy star rating. This individual is concerned about:
- a. conservation.
  - b. efficiency.
  - c. technology.
  - d. price.
- \_\_\_\_\_ 5. Which of the following types of energy describes electrical, radiant, thermal, motion and sound?
- a. kinetic
  - b. potential
  - c. mechanical
  - d. chemical
- \_\_\_\_\_ 6. Hydroelectric power is beneficial to the environment because it uses the natural flow of water to turn large:
- a. turbines.
  - b. generators
  - c. dams.
  - d. locks.

- \_\_\_\_\_ 7. What is the first step in the shelterwood harvesting method?
- a. removal of mature timber
  - b. injection of herbicide
  - c. making a cut into the cambium
  - d. various girdling
- \_\_\_\_\_ 8. What method of controlling invasive trees is expensive but allows for selective removal of trees?
- a. biological
  - b. chemical
  - c. mechanical
  - d. physical
- \_\_\_\_\_ 9. Species that are not native and tend to outcompete native species for resources are described as:
- a. invasive.
  - b. predatory.
  - c. complementary.
  - d. indigenous.
- \_\_\_\_\_ 10. Which common range site has coarse textured soil that absorbs water well?
- a. deep sand
  - b. rough breaks
  - c. bottomland
  - d. claypan prairie



## Sample Questions — Key

1. Which of the following topographical factors affects vegetation?

- a. altitude or elevation of the land Correct
- b. global species responses to the area Incorrect
- c. indigenous use of the land Incorrect
- d. tropics between latitude lines Incorrect

2. Which type of water is found in lakes, rivers and oceans?

- a. surface water Correct
- b. groundwater Incorrect
- c. fresh water Incorrect
- d. salt water Incorrect

3. What is the main purpose of wetlands restoration programs?

- a. construction Incorrect
- b. enhancement Incorrect
- c. protection Correct
- d. maintenance Incorrect

4. An individual purchased a refrigerator with an energy star rating. This individual is concerned about:

- a. conservation. Incorrect
- b. efficiency. Correct
- c. technology. Incorrect
- d. price. Incorrect

5. Which of the following types of energy describes electrical, radiant, thermal, motion and sound?

- a. kinetic Correct
- b. potential Incorrect
- c. mechanical Incorrect
- d. chemical Incorrect

6. Hydroelectric power is beneficial to the environment because it uses the natural flow of water to turn large:

- a. turbines. Correct
- b. generators Incorrect
- c. dams. Incorrect
- d. locks. Incorrect

7. What is the first step in the shelterwood harvesting method?

- a. removal of mature timber Correct
- b. injection of herbicide Incorrect
- c. making a cut into the cambium Incorrect
- d. various girdling Incorrect

8. What method of controlling invasive trees is expensive but allows for selective removal of trees?

- a. biological Incorrect
- b. chemical Incorrect
- c. mechanical Correct
- d. physical Incorrect

9. Species that are not native and tend to outcompete native species for resources are described as:

- a. invasive. Correct
- b. predatory. Incorrect
- c. complementary. Incorrect
- d. indigenous. Incorrect

10. Which common range site has coarse textured soil that absorbs water well?

- a. deep sand Correct
- b. rough breaks Incorrect
- c. bottomland Incorrect
- d. claypan prairie Incorrect

## Abbreviations, Symbols and Acronyms

The following is a list of abbreviations, symbols, and acronyms used in the Environmental Science and Natural Resources study guide and on the Environmental Science and Natural Resources assessment.

AFNR	Agriculture, Food and Natural Resources
CEQ	Council on Environmental Quality
DOE	Department of Education
EPA	Environmental Protection Agency
HIV	Human Immunodeficiency Virus
IEP	Individualized Education Plan
MSDS	Material Safety Data Sheet
NAMFWC	North American Model of Fish and Wildlife Conservation
NRCS	National Resources Conservation Service
NWS	National Weather Service
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
SBAE	School-based agricultural education
The Council	National Council for Agricultural Education
USDA	United States Department of Agriculture

## Test Taking Strategies

This section of the study guide contains valuable information for testing success and provides a common-sense approach for preparing for and performing well on any test.

### General Testing Advice

1. Get a good night's rest the night before the test — eight hours of sleep is recommended.
2. Avoid junk food and “eat right” several days before the test.
3. Do not drink a lot or eat a large meal prior to testing.
4. Be confident in your knowledge and skills!
5. Relax and try to ignore distractions during the test.
6. Focus on the task at hand — taking the test and doing your best!
7. Listen carefully to the instructions provided by the exam proctor. If the instructions are not clear, ask for clarification.

### Testing Tips

1. Read the entire question before attempting to answer it.
2. Try to answer the question before reading the choices. Then, read the choices to determine if one matches, or is similar, to your answer.
3. Do not change your answer unless you misread the question or are certain that your first answer is in.
4. Answer questions you know first, so you can spend additional time on the more difficult questions.
5. Check to make sure you have answered every question before you submit the assessment for scoring — unanswered questions are marked in.





