

Agricultural Education

Study Guide

Assessments:

6001 Introduction to Agriscience (Ag I)

6002 Agriscience II (Ag II)

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



Overview

This study guide is designed to help students prepare for the Introduction to Agriscience (Ag I) and Agriscience II (Ag II) assessments. It not only includes information about the assessments, but also the skills standards upon which the assessments are based and test taking strategies. The assessments measure a student's ability to apply basic knowledge of the skills necessary for success in the agriculture field.

Each of the four sections in this guide provides useful information for students preparing for the Agricultural Education assessments.

- CareerTech and Competency-Based Education: A Winning Combination
- Agricultural Education assessments
 - ▶ Assessment Information
 - ▶ Standards and Test Content
 - ▶ Sample Questions
 - ▶ Abbreviations, Symbols, and Acronyms
- Strategies for Test Taking Success
- Notes

The standards for these assessments are aligned with the Agriculture, Food and Natural Resources (AFNR) standards. The 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 the AFNR standards, go to:

<https://thecouncil.ffa.org/afnr/>

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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.

Agricultural Education Assessment Information

What are the Agricultural Education assessments?

The Agricultural Education assessments are end-of-course assessments for students in Agricultural Education programs. The assessments provide an indication of student mastery of basic knowledge and concepts necessary for success in careers in this area.

How were the assessments developed?

The assessments were developed by the CareerTech Testing Center. The assessments and standards align with those of the Agriculture, Food and Natural Resources (AFNR) Career Cluster Content Standards. Items were developed and reviewed by a committee of subject matter experts.

What do the assessments cover?

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

Introduction to Agriscience (Ag I) (55 questions)

Life Knowledge and Cluster Skills	6%
Agribusiness Systems	8%
Animal Systems	35%
Environmental Service Systems	1%
Food Products and Processing Systems	15%
Plant Systems	13%
Power Structural and Technical Systems	22%

Agriscience II (Ag II) (55 questions)

Life Knowledge and Cluster Skills	10%
Agribusiness Systems	11%
Animal Systems	19%
Biotechnology Systems	10%
Environmental Service Systems	1%
Food Products and Processing Systems	10%
Natural Resource Systems	11%
Plant Systems	17%
Power Structural and Technical Systems	11%

What are the benefits of using these assessments?

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 assessments 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.

Are the assessments 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  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

Introduction to Agriscience (Ag I)

Duty A: Life Knowledge and Cluster Skills (3 questions)

CODE	TASK
A.01	Define the sciences that involve aspects of agriculture.
A.02	Explore various career interests/options. <ul style="list-style-type: none"> • career clusters and pathways • personal career interests and skills
A.03	Identify the skills required for various careers. <ul style="list-style-type: none"> • steps to setting career goals • degree requirements, salary and job availability for agricultural careers

Duty B: Agribusiness Systems (4 questions)

CODE	TASK
B.01	Describe the meaning, importance and economic importance of entrepreneurship. <ul style="list-style-type: none"> • types of SAEs
B.02	Maintain production and agribusiness records. <ul style="list-style-type: none"> • inventory assets • closing records • record keeping transactions
B.03	Identify financial concepts associated with production and profit. <ul style="list-style-type: none"> • sales and income • liabilities • expenses
B.04	Identify accounting information in AFNR business reporting and management. <ul style="list-style-type: none"> • types of records kept • recording transactions

Duty C: Animal Systems (19 questions)

CODE	TASK
C.01	Identify the origin, significance, distribution and domestication of animal species. <ul style="list-style-type: none"> • history of beef cattle, dairy cattle, swine, sheep, goats, horses, poultry, small animals
C.02	Define major components of the animal industry. <ul style="list-style-type: none"> • specie breeds and characteristics • economic importance
C.03	Outline the development of the animal industry and the resulting products, services and careers. <ul style="list-style-type: none"> • consumer products • animals for work and recreation • phases of production • types and uses of small animals
C.04	Identify major animal species by common and scientific names.

C.05	Describe the functions of the animal body systems and system components. <ul style="list-style-type: none"> • anatomy/parts of beef cattle, dairy cattle, swine, sheep, goats, horses, poultry • milk production • egg development and incubation
C.06	Describe how animal identification systems can track an animal's location, nutrition requirements, production progress and changes in health. <ul style="list-style-type: none"> • swine universal ear notching system • advances in the dairy industry

Duty D: Environmental Service Systems (2 questions)

CODE	TASK
D.01	Explain the process of soil formation through weathering.
D.02	Explain how the physical qualities of the soil influence the infiltration and percolation of water. <ul style="list-style-type: none"> • sand, silt, clay • textural triangle

Duty E: Food Products and Processing Systems (8 questions)

CODE	TASK
E.01	Discuss the history and describe and explain the components (e.g., processing, distribution, byproducts) of the food products and processing industry
E.02	Explain the purposes of organizations that are part of or regulated the food products and processing industry. <ul style="list-style-type: none"> • quality assurance • government regulations
E.03	Identify and describe foods derived from meat, egg, poultry, fish and dairy products.
E.04	Discover the different cultures that exist in one's community. <ul style="list-style-type: none"> • food customs of major world populations
E.05	Identify and describe products derived from fruits and vegetables.
E.06	Identify and describe products derived from grains, legumes and oilseeds.

Duty F: Plant Systems (7 questions)

CODE	TASK
F.01	Explain systems used to classify plants. <ul style="list-style-type: none"> • taxonomy • life cycles • structures
F.02	Describe the morphological characteristics used to identify agricultural plants. <ul style="list-style-type: none"> • structures • monocot and dicot
F.03	Explain the basic process of photosynthesis and its importance to life on Earth.
F.04	Explain cellular respiration and its importance to plant life.
F.05	Describe the qualities of light that affect plant growth.
F.06	Describe the effects air, temperature and water have on plant metabolism and growth.

F.07	Identify the major components of growing media and describe how growing media support plant growth.
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Duty G: Power and Structural Technical Systems (12 questions)

CODE	TASK
G.01	Distinguish welding processes, positions and materials preparation. <ul style="list-style-type: none"> welding methods and equipment striking an arc running a bead cutting equipment, gasses and process
G.02	Use proper safety practices/personal protective equipment.
G.03	Demonstrate the importance of safety, health, and environmental practices in the workplace. <ul style="list-style-type: none"> maintaining shop safety
G.04	Handle chemicals and equipment in a safe and appropriate manner. <ul style="list-style-type: none"> common hazards welding safety
G.05	Identify standard tools, equipment, and safety procedures related to a specific task. <ul style="list-style-type: none"> welding tools and equipment cutting tools and equipment fire classes and extinguishers
G.06	Follow operating instructions related to specific tools and equipment needed to complete a task. <ul style="list-style-type: none"> operating a welder and cutting torch
G.07	Use the appropriate procedures for the use and operation of specific tools and equipment. <ul style="list-style-type: none"> operating a welder and cutting torch



Standards and Test Content Agriscience II (Ag II)

Duty A: Life Knowledge and Cluster Skills (5 questions)

CODE	TASK
A.01	Use basic technical and business writing skills. <ul style="list-style-type: none"> • topic selection • manuscript parts and outline • researching • bibliography
A.02	Deliver a business presentation for a peer group (e.g. class presentation). <ul style="list-style-type: none"> • visual aids • presentation techniques • answering questions
A.03	Use proper safety practices/personal protective equipment.
A.04	Demonstrate the importance of safety, health, and environmental practices in the workplace. <ul style="list-style-type: none"> • shop rules • fire prevention
A.05	Handle chemicals and equipment in a safe and appropriate manner. <ul style="list-style-type: none"> • common hazards • welding safety
A.06	Identify standard tools, equipment, and safety procedures related to a specific task. <ul style="list-style-type: none"> • welding tools and equipment • cutting tools and equipment
A.07	Follow operating instructions related to specific tools and equipment needed to complete a task. <ul style="list-style-type: none"> • operating a welder and cutting torch
A.08	Use the appropriate procedures for the use and operation of specific tools and equipment. <ul style="list-style-type: none"> • operating a welder and cutting torch

Duty B: Agribusiness Systems (6 questions)

CODE	TASK
B.01	Maintain production and agribusiness records. <ul style="list-style-type: none"> • checkbooks and financial accounts
B.02	Budget resources, as applied to the AFNR business, including capital, human, financial, and time. <ul style="list-style-type: none"> • income and budgets • taxes
B.03	Manage assets, including credit, for agribusiness goal achievement. <ul style="list-style-type: none"> • banks financial services • savings and investments • borrowing money • using credit
B.04	Identify financial concepts associated with production and profit. <ul style="list-style-type: none"> • income and budgets
B.05	Determine the meaning and importance of risk and uncertainty with AFNR enterprises. <ul style="list-style-type: none"> • insurance and managing risk
B.06	Describe alternative approaches to reducing risk, including the use of insurance for product liability, property, production or income loss and for personnel life and health. <ul style="list-style-type: none"> • insurance and managing risk • bankruptcy

Duty C: Animal Systems (11 questions)

CODE	TASK
C.01	Appointment management and scheduling <ul style="list-style-type: none"> • Schedule and monitor patient and visitor appointments • Address cancellations and missed appointments • Prepare information for referrals and preauthorization • Arrange hospital admissions and surgery, and schedule patients for out-patient diagnostic tests • Manage recall system and file
C.02	Reception <ul style="list-style-type: none"> • Receive and process patients and visitors • Screen visitors and vendors requesting to see physician • Coordinate patient flow into examining rooms
C.03	Communication <ul style="list-style-type: none"> • Employ effective written and oral communication • Address and process incoming telephone calls from outside providers, pharmacies, and vendors • Employ appropriate telephone etiquette when screening patient calls and addressing office business • Recognize, and employ proper protocols for telephone emergencies • Format business documents and correspondence appropriately • Process incoming and outgoing mail
C.04	Patient information and community resources <ul style="list-style-type: none"> • Order and organize patient informational materials • Maintain list of community referral resources

Duty D: Biotechnology Systems (5 questions)

CODE	TASK
D.01	Explain the structures of DNA and RNA and how genotype influences phenotype.
D.02	Explain biological, social, agronomic and economic reasons for genetic modification of eukaryotes.
D.03	Describe the selective plant breeding process. <ul style="list-style-type: none"> • hybridization
D.04	Describe biotechnology processes applicable to animal health. <ul style="list-style-type: none"> • EPDs • heritability

Duty E: Environmental Service Systems (1 question)

CODE	TASK
E.01	Identify the physical qualities of the soil that determine its use for environmental service systems.
E.02	Explain the importance of recycling.
E.03	Explain the importance of surveying and mapping for environmental service systems. <ul style="list-style-type: none">determining land arealegal land descriptions

Duty F: Food Products and Processing Systems (5 questions)

CODE	TASK
F.01	Discuss the history and describe and explain the components (e.g., processing, distribution, byproducts) of the food products and processing industry.
F.02	Evaluate changes and trends in the food products and processing industry.
F.03	Identify and explain environmental and safety concerns about the food supply.
F.04	Explain techniques and procedures for safe handling of food products.
F.05	Identify quality and yield grades of food products.
F.06	Discuss factors that affect quality and yield grades of food products.
F.07	Explain methods and materials for processing foods for sale as fresh-food products.

Duty G: Natural Resource Systems (6 questions)

CODE	TASK
G.01	Identify natural resources. <ul style="list-style-type: none">historytypes/classificationsnatural and man disturbances
G.02	Differentiate between renewable and nonrenewable natural resources. <ul style="list-style-type: none">conservation vs. preservationnational and global issues
G.03	Locate natural resources using a land survey and geographic coordinate system. <ul style="list-style-type: none">determining land areaGPS and GIS

Duty H: Plant Systems (10 questions)

CODE	TASK
H.01	Diagram a typical plant cell and identify plant cell organelles and their functions.
H.02	Identify the components, the types and the functions of plant roots.
H.03	Identify root tissues and explain the pathway of water and nutrients into and through the root tissues.
H.04	Identify the components and functions of plant stems.
H.05	Discuss leaf morphology and the functions of leaves.
H.06	Identify the components of a flower, the functions of a flower and the functions of flower components.

H.07	Explain the functions and components of seeds and fruit.
H.08	Explain the basic process of photosynthesis and its importance to life on Earth.
H.09	Identify the five groups of naturally occurring plant hormones and synthetic plant growth regulators.
H.10	Identify the plant responses to plant growth regulators and different forms of tropism.
H.11	Identify the essential nutrients for plant growth and development and their major functions.
H.12	Discuss the influence of pH and cation exchange capacity on the availability of nutrients.
H.13	Identify fertilizer sources of essential plant nutrients, explain fertilizer formulations and describe different methods of fertilizer application.
H.14	Explain pollination, cross-pollination and self-pollination of flowering plants.
H.15	Diagram the process of plant fertilization.
H.16	Identify types of plant pests and disorders.
H.17	Identify major local weeds, insect pests and infectious and noninfectious plant diseases.
H.18	Describe damage caused by plant pests and diseases.
H.19	Describe pest control strategies associated with integrated pest management.
H.20	Describe types of pesticide controls and formulations.
H.21	Explain risks and benefits associated with the use of pesticides, insecticides, herbicides, and other chemicals.

Duty I: Power Structural and Technical Systems (6 questions)

CODE	TASK
I.01	Identify kinds and characteristics of metal materials.
I.02	Distinguish welding processes, positions and materials preparation. <ul style="list-style-type: none"> welding methods and equipment cutting equipment, gasses and process



Sample Questions

- _____ 1. Which types of medications are used to block pain in specific areas and can be used to sedate animals before surgery?
- a. anesthetics
 - b. anthelmintics
 - c. antibiotics
 - d. biologics
- _____ 2. What term refers to the feed an animal receives over a 24-hour period?
- a. diet
 - b. feedstuffs
 - c. maintenance
 - d. ration
- _____ 3. Which of the following systems contains the heart, arteries, capillaries and veins?
- a. endocrine
 - b. circulatory
 - c. nervous
 - d. respiratory
- _____ 4. An example of a dry-heat method of cooking is:
- a. braising.
 - b. broiling.
 - c. slow cooking.
 - d. stewing.
- _____ 5. The body of meat that remains after all non-meat materials have been removed is the:
- a. carcass.
 - b. offal.
 - c. slaughter cut.
 - d. viscera.
- _____ 6. A castrated male hog is called a:
- a. boar.
 - b. barrow.
 - c. wether.
 - d. ram.

- _____ 7. Which type of plant is eaten first by grazing animals?
- a. decreaseers
 - b. increasers
 - c. invaders
 - d. sustainers
- _____ 8. The male organ of the flower that includes the anther and filament is the:
- a. petal.
 - b. pistil.
 - c. stamen.
 - d. stigma.
- _____ 9. What category of insects causes damage that is often hard to detect?
- a. chewing
 - b. pecking
 - c. boring
 - d. sucking
- _____ 10. What letter in welding wire classification indicates a bare solid electrode or rod?
- a. E
 - b. F
 - c. R
 - d. S

Sample Questions — Key

1. Which types of medications are used to block pain in specific areas and can be used to sedate animals before surgery?
 - a. anesthetics Correct
 - b. anthelmintics Incorrect
 - c. antibiotics Incorrect
 - d. biologics Incorrect
2. What term refers to the feed an animal receives over a 24-hour period?
 - a. diet Incorrect
 - b. feedstuffs Incorrect
 - c. maintenance Incorrect
 - d. ration Correct
3. Which of the following systems contains the heart, arteries, capillaries and veins?
 - a. endocrine Incorrect
 - b. circulatory Correct
 - c. nervous Incorrect
 - d. respiratory Incorrect
4. An example of a dry-heat method of cooking is:
 - a. braising. Incorrect
 - b. broiling. Correct
 - c. slow cooking. Incorrect
 - d. stewing. Incorrect
5. The body of meat that remains after all non-meat materials have been removed is the:
 - a. carcass. Correct
 - b. offal. Incorrect
 - c. slaughter cut. Incorrect
 - d. viscera. Incorrect
6. A castrated male hog is called a:
 - a. boar. Incorrect
 - b. barrow. Correct
 - c. wether. Incorrect
 - d. ram. Incorrect

7. Which type of plant is eaten first by grazing animals?

- a. decreaseers Correct
- b. increasers Incorrect
- c. invaders Incorrect
- d. sustainers Incorrect

8. The male organ of the flower that includes the anther and filament is the:

- a. petal. Incorrect
- b. pistil. Incorrect
- c. stamen. Correct
- d. stigma. Incorrect

9. What category of insects causes damage that is often hard to detect?

- a. chewing Incorrect
- b. pecking Incorrect
- c. boring Correct
- d. sucking Incorrect

10. What letter in welding wire classification indicates a bare solid electrode or rod?

- a. E Incorrect
- b. F Incorrect
- c. R Incorrect
- d. S Correct



Abbreviations, Symbols and Acronyms

The following is a list of abbreviations, symbols, and acronyms used in the Agricultural Education study guide and on the Introduction to Agriscience (Ag I) and Agriscience II (Ag II) assessments.

\$	Dollar
%	Percent
pH	Measure of acidity
Ag	Agriculture
AFNR	Agriculture, Food and Natural Resources
DNA	Deoxyribonucleic acid
EPA	Environmental Protection Agency
EPD	Expected Progeny Differences
GIS	Geographic Information System
GMP	Good Manufacturing Practice
GPS	Global Positioning System
GTAW	Gas Tungsten Arc Welding
IEP	Individualized Education Plan
MIG	Metal Inert Gas Welding
OSHA	Occupational and Safety Health Administration
RNA	Ribonucleic acid
SBAE	School-Based Agricultural Education
SMAW	Shielded Metal Arc Welding
TIG	Tungsten Inert Gas Welding
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 incorrect.
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 incorrect.



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