

Principles of **Agriculture, Food, and Natural Resources**

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Travis D. Park • D. Barry Croom

SECOND EDITION



Publisher
The Goodheart-Willcox Company, Inc.
Tinley Park, IL
www.g-w.com

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ISBN 978-1-63776-096-3

1 2 3 4 5 6 7 8 9 – 23 – 26 25 24 23 22 21

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Preface

Principles of Agriculture, Food, and Natural Resources is a modern, user-friendly, highly visual introductory text for next generation agriculture students. Today's agriculture students must understand basic information about food, fiber, and natural resources and be able to apply it to real-world situations. Students need to know where and how this information may be used to address the grand challenges of feeding the planet, addressing global climate change, and ensuring a high quality of life for all. With a text written for current agriculture students, complete with hundreds of high-quality images, pedagogical tools designed for learner success, and extensive student and instructor supplements delivered online or in print, our integrated learning solution helps learners engage with all aspects of agriculture.

Why is a comprehensive approach to an introductory agriculture textbook needed? Clearly, the world of agriculture continues to change. Sometimes, a fresh approach to organizing and presenting information is warranted. This is one of those times. Today, fewer of our students live on farms. Consequently, these students have fewer direct experiences with agriculture, and the agriculture that they do know often begins with food and not the land.

Our presentation covers the most relevant topics with sufficient detail for novice agricultural education students. Our goals are twofold: (1) to allow for a solid understanding of agriculture and (2) to entice students to study agricultural topics in greater detail with subsequent courses.

Finally, we have drawn upon modern research to create a learning design that helps students process and retain information. We know that a logical progression of information is important for learning. Educators, educational researchers, and instructional designers also tell us that providing information in small chunks aids our working memory when processing that information. In addition, providing students with opportunities to process bits of information and interact with them—in reviews and assessments that foster comprehension, application, analysis, synthesis, evaluation, and creation—is critical for learning success. These learning principles helped guide the design of *Principles of Agriculture, Food, and Natural Resources* (National Council for Agricultural Education, 2015).

Our text is organized and written with the National Council's Agriculture, Food, and Natural Resources Content Standards at the forefront, ensuring necessary content is covered. Our organization was given much thought. A panel of expert reviewers in agricultural education provided insight, information, debate, and ultimately validation of our content, organization, and approach. Each chapter contains multiple, focused, logically grouped lessons supported by features designed to help students acquire knowledge and demonstrate mastery. In addition, each lesson begins with an academic literacy integration activity designed to help students engage more deeply with the agricultural content. Our aim is to present information in each lesson that could be easily handled in a one- or two-week period over the course of the academic year. Certainly, expert teachers can add additional information for content that is more expansive or relevant to a certain area. Novice teachers will find our presentation of agricultural content easy to navigate and helpful for outlining the academic year. Further, each lesson contains many ideas for critical thinking, STEM engagement, career profiles, FFA activities, SAE engagement, and communicating about agriculture. These areas challenge students to engage with the content at a deeper level than most traditional texts on agriculture.

As our educational systems incorporate virtual learning and instruction, we know it is important to provide the content you need in the formats you want. The student textbook and lab workbook are available in print or digital format and are supported with professional, user-friendly online resources such as a student Online Learning Suite that includes online vocabulary games, animations, and additional interactive activities. Quite simply, teachers have a full-service resource at their disposal to engage students in their classroom and online. Instructor support is provided in the form of teaching resources, visual presentation, and an assessment suite in a variety of digital and online formats. A video library also enhances the text and numerous supplements by bringing concepts to life. We hope you enjoy our presentation of the most important aspects of agriculture and welcome you to join us on our journey of enlightening young minds to the opportunities and challenges of feeding a growing planet.

About the Authors

Dr. John Rayfield is a professor and serves as the Program Coordinator for Agricultural Education in the Department of Agricultural Education and Communications at Texas Tech University. Dr. Rayfield earned his bachelor's degree in agricultural education from Auburn University, his master's degree in agricultural extension from the University of Georgia, and his doctorate of education in agricultural education from Texas Tech University. In 2001, his school's FFA chapter was recognized as the Outstanding Middle School Program in the nation by National FFA. Dr. Rayfield has been recognized at many levels for his teaching, research, and service to agricultural education. He is a Texas Tech Integrated Scholar, Auburn University College of Education Outstanding Alumni, and Journal of Agricultural Education Author of the Year. Dr. Rayfield is actively involved in livestock showing and judging. He serves as superintendent for the National 4-H Livestock Judging Contest and judges junior and open livestock shows across the United States.

Dr. Kasee Smith is an assistant professor in the Department of Agricultural Education, Leadership, and Communications at the University of Idaho, where she instructs undergraduate and graduate level courses related to training secondary high school agricultural educators and connecting people to agriculture. Dr. Smith earned her bachelor's degree in agricultural education at Utah State University in 2002 and taught high school agriculture for 11 years. Dr. Smith's high school program was focused on the integration of all portions of the three-component model of agricultural education. Her program, which was recognized as a National FFA Model of Innovation chapter, produced numerous CDE, LDE, and Proficiency winners. Dr. Smith was recognized as the Region I Ideas Unlimited winner and Teacher Turn the Key Winner through the National Association of Agricultural Education, and served as an officer within the Utah Association of Agricultural Educators. Dr. Smith served on the Utah State Department of Education Instructional Materials Review Committee, was recognized as an outstanding teacher, and completed numerous curriculum development projects for agricultural education classes. Dr. Smith completed her PhD at Texas A&M University in 2016 and began working at the University of Idaho. Since that time, she has been preparing agricultural educators in the Pacific Northwest and has a small flock of club lambs and an equine operation in Northern Idaho.

Dr. Travis Park is a professor of agricultural education at North Carolina State University, where he instructs the teaching methods course and coordinates student teaching.

He also co-leads *Developing Educational Leaders and Teachers of Agriculture (DELTA)*, the alternative licensure professional development program for agriculture teachers in North Carolina. Dr. Park earned his bachelor's and master's degrees from Purdue University in agricultural education. Upon graduation, he was named the 1996 G. A. Ross Award winner, which recognizes the outstanding male student in the graduating class. After graduating from Purdue, Dr. Park taught agriculture at Tri-County High School in Wolcott, Indiana, for five years. His agriculture program was recognized as one of the top agriculture programs in the nation. Dr. Park earned his doctoral degree at the University of Florida in 2005. He is the Director of Undergraduate Programs for Agricultural and Human Sciences, a Fellow of the American Association for Agricultural Education, and past President of the National Council for Agricultural Education. His research includes agricultural literacy, teacher professional development, and engagement with agriculture. In his spare time, Dr. Park is an avid backpacker, gardener, and beekeeper.

Dr. Barry Croom has more than 34 years of experience in agricultural and extension education. His career interest developed as a high school junior, when he coached his first dairy judging team for the local junior high school FFA program. Dr. Croom began his professional career as a high school agricultural education teacher. While teaching full-time, he earned a Master of Education Degree in Agricultural Education. While a high school teacher, Dr. Croom was selected by the National FFA Organization to develop and present in-service workshops to teachers across the United States. His students earned state and national recognition for academic achievement. He has earned both the American FFA Degree and the Honorary American FFA Degree from the National FFA Organization. In 1996, Dr. Croom became an extension associate responsible for the statewide FFA Program at North Carolina State University.

After completing his doctoral degree in 1999, Dr. Croom worked through the ranks to become an Alumni Distinguished Undergraduate Professor at North Carolina State University. He has served as an agriculture teacher, teacher educator, extension associate, state education staff member, professor, and university administrator.

Dr. Croom has taught courses in leadership, information technology, experiential learning, instructional methodology, educational program planning, and youth development. He maintains a research program that focuses on effective teaching, career and technical education policy, and diversity in agricultural and extension education.

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Acknowledgments

The authors and publisher would like to thank the following companies, organizations, and individuals for their contribution of resource material, images, or other support in the development of *Principles of Agriculture, Food, and Natural Resources*.

American Angus Association
American Berkshire Association
American Brahman Breeders Association
American Chianina Association
American Corriedale Association
American Dorper Sheep Breeders Society, Inc.
American Gelbvieh Association
American Hampshire Sheep Association
American Hereford Association
American Maine Anjou Association
American Morgan Horse Association/Jeanne Mellin
American Pet Products Association (APPA)
American Simmental Association, www.simmental.org
American Southdown Association
APHA/Paint Horse Journal
Arabian Horse Association, Gladys Brown
Ariel Swinson
BOSS Beauty 84M
Brylee Ferre
Certified Pedigreed Swine
Chase Holt
CIMMYT (International Maize and Wheat Improvement Center)
Clark Rassi Quarter Horses
Clayton Zwilling
Continental Dorset Club
Critter Haven Farms/Diane Hildebrand
Darrell Dodds, the Appaloosa Horse Club
DeWALT Industrial Tool Co.
Diamond K Ranch, Hempstead TX
DMCC Limited Edition
Doug Andrews Photography
Dr. Delphinium Designs in Dallas
Dr. Jim Connors
Elgin Veterinary Hospital, Bovine Division, Elgin, Texas
Elliotte Rusty Harold
Emmons Ranch Beefmasters
Forbes & Rabel Rambouillet, Kaycee, Wyoming
G and L Showpigs
Hoard's Dairyman
Hyjak Legacy Lady – Hyjak—Legacy's Supreme Lady, M124671, Registered Belgian mare shown by Oak Haven Belgians, DOB: 3/10/2001
Jake Tobin
Jarvis Sheep Company
Jason McKibben
Jeannette Beranger/The Livestock Conservancy
Jenson Shires, 2014 National Grand Champion Shire Mare, Blair, NE
John and Marc Metzger, Metzger Farms
J.P. Hancock, Texas A&M University
Kami Holt
Karley Rayfield
KMR Herefords
Kyle Hale
La Muneca Ranch, Linn TX
Les Farms, Canada
Lesleigh Bagley
Leslie Trimble
Luke Burris
Maggie Elliot
Matt Collins
Michael Beaton, Presidio of Monterey
Mississippi Agriculture and Forestry Experiment Station
MJ Ironwater Acres
Morgan Frederick, Three Mill Ranch
Nathan Kindall
National FFA Organization
National Swine Registry
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NPS Dandelion Demolition in Denali National Park and Preserve
Oak Haven Belfians
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Pony of the Americas Club, Inc./Impulse Photography
Poultry CRC
Rachelsie Farm, Inc.

R Bar T Quarter Horses
Red Angus Association of America
Redwood Hill Farm
Roger Hanagriff, The AET Record Book
Santa Gertrudis Breeders International, Kingsville, Texas
Shelle Lenssen
Smith Family Angoras & Erbstruck Ranch
Spanish Fork FFA Chapter
Stanley Tools
Stephanie Lastovica
Sunrise Tradition, P Bar T Fox Trotters,
Independence, MN

Susan Martin, Jockey Club
TAMU Livestock Judging
Telasecret, AQHA World Champion Producer, Courtesy
Clark Rassi Quarter Horses
Texas Longhorn Breeders Association of America
and Star Creek Ranch
The Jockey Club/Susan Martin
Thomas Ranch, Harrold, South Dakota
Underwood and Underwood/Library of Congress
United Braford Breeders, Inc.
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SAMPLE

TOOLS FOR STUDENT AND INSTRUCTOR SUCCESS

Student Tools

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The *Principles of Agriculture, Food, and Natural Resources* textbook provides an exciting, full-color, and highly illustrated learning resource. The textbook is available in a print or online version.

Lab Workbook

The Lab Workbook that accompanies *Principles of Agriculture, Food, and Natural Resources* includes instructor-created activities to help students recall, review, and apply concepts introduced in the textbook.

Online Learning Suite

The Online Learning Suite provides the foundation of instruction and learning for digital and blended classrooms. An easy-to-manage shared classroom subscription makes it a hassle-free solution for both students and instructors. An online student text and a lab workbook, along with rich supplemental content, bring digital learning to the classroom. All instructional materials are found on a convenient online bookshelf and accessible at home, at school, or on the go.

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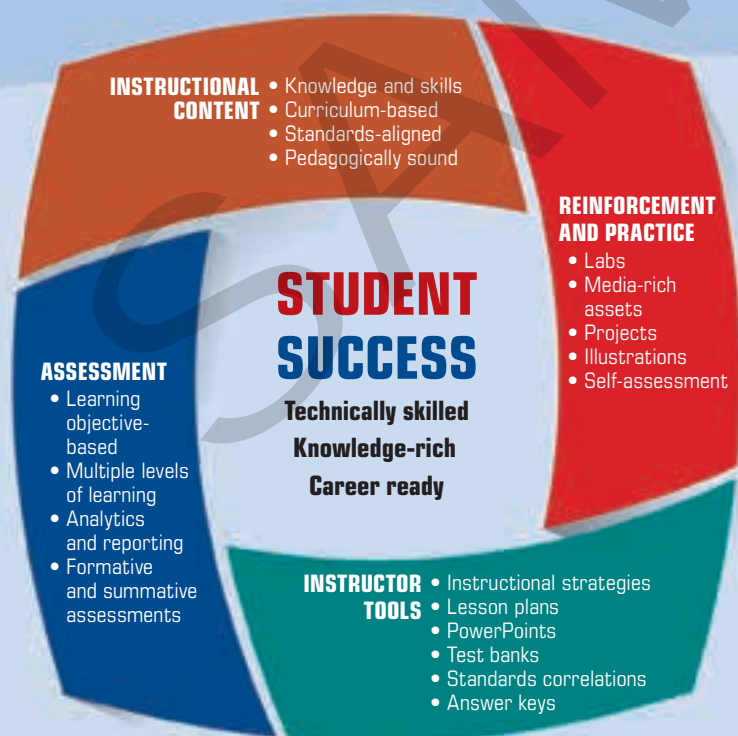
Instructor Resources One resource provides instructors with time-saving preparation tools such as answer keys, editable lesson plans, and other teaching aids.

Instructor's Presentations for PowerPoint® These fully customizable, richly illustrated slides help you teach and visually reinforce the key concepts from each chapter.

ExamView® Assessment Suite Administer and manage assessments to meet your classroom needs. The ExamView® Assessment Suite allows you to quickly and easily create, administer, and score paper and online tests. Included in the assessment suite are the ExamView® Test Generator, ExamView® Test Manager, and ExamView® Test Player. G-W test banks are installed simultaneously with the software. Using ExamView simplifies the process of creating, managing, administering, and grading tests. You can have the software generate a test for you with randomly selected questions. You may also choose specific questions from the question banks and, if you wish, add your own questions to create customized tests to meet your classroom needs.



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The G-W Integrated Learning Solution offers easy-to-use resources that help students and instructors achieve success.

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- ▶ TRUSTED REVIEWERS
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Features of the Textbook

The instructional design includes student-focused learning tools to help students succeed. This visual guide highlights the features designed for the textbook.

Essential Questions provoke deep thought, lively discussion, and new understanding.

Words to Know list the key terms to be learned in the lesson.



Lesson Objectives clearly identify the knowledge and skills to be obtained when the lesson is completed.

Before You Read literacy integration activities at the beginning of each lesson encourage development of confidence and skill in literacy and learning.



SAE for ALL Profiles open every chapter and provide relevant examples and insight into opportunities made possible with successful student SAE projects.

Safety First notes indicate potentially dangerous materials and practices and promote safe practices.



Career Connection features introduce a wide range of careers in the agriculture industry.



Hands-On Agriculture features are highlighted throughout the textbook to provide clear instructions for hands-on service activities.



Caption questions help connect the text to the artwork, while encouraging active reading and critical thinking.

Did You Know? features point out interesting and helpful facts about the agricultural industry.

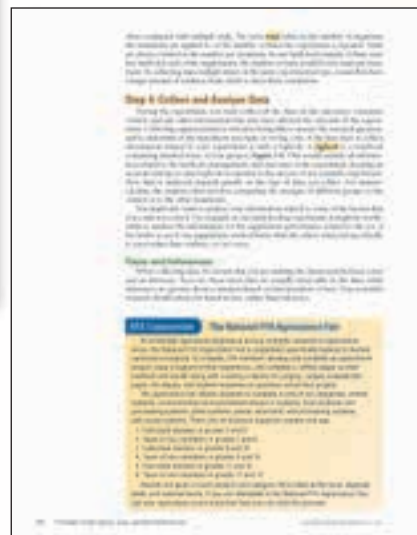


AG ED Connection features introduce the exciting world of leadership and personal development opportunities, including career development events in a variety of areas.

Illustrations clearly and simply communicate the specific topic.



SAE Connections help students make real-life connections to a variety of new and interesting SAE opportunities.



STEM Connection features integrate all four components of STEM education, as well the social sciences and language arts.

FFA Connection features introduce students to the exciting world of FFA opportunities, including Career Development Events in a variety of agricultural areas.

Full-color illustrations of animal breeds present a means of studying small and large livestock animals for the identification portion of FFA CDEs.

Duck Breeds

Muscovy, Cayuga, and White are three distinct duck breeds. The Muscovy duck is characterized by its dark, iridescent feathers and a prominent red face. The Cayuga duck has a unique black, iridescent plumage. The White duck is a classic breed with pure white feathers and a yellow beak.

Turkey Breeds

White and Black are two common turkey breeds. The White turkey has a large, upright tail and a clean white body. The Black turkey has a similar body structure but with dark, iridescent feathers.

Chicken Breeds

Game and Game-Red are two chicken breeds. The Game chicken is a small, upright breed with a distinctive tail. The Game-Red chicken is similar in appearance but has reddish-brown feathers.

Angus Cattle Breeds

Black and Red are two Angus cattle breeds. The Black Angus is a well-known breed with solid black coloring. The Red Angus is a similar breed with solid red coloring.

Dairy Cattle Breeds

Holstein and Jersey are two dairy cattle breeds. The Holstein is a large breed with distinctive black and white markings. The Jersey is a smaller breed with a rich, reddish-brown color.

Frog Breeds

American and English are two frog breeds. The American frog is a large, muscular breed with a distinctive white blaze on its face. The English frog is a smaller breed with a more refined appearance.

Sheep Breeds

Fine-Wool and Meat are two sheep breeds. The Fine-Wool breed is characterized by its long, curly wool. The Meat breed is a larger, more muscular breed.

Goat Breeds

Dairy and Meat are two goat breeds. The Dairy goat is a smaller breed with a distinctive beard. The Meat goat is a larger, more muscular breed.

Swine Breeds

Yorkshire and Duroc are two swine breeds. The Yorkshire pig is a large, white breed with a distinctive curly tail. The Duroc pig is a smaller breed with a reddish-brown color.

Swine Breeds

Hampshire and Berkshire are two swine breeds. The Hampshire pig is a smaller breed with a distinctive black and white color. The Berkshire pig is a larger breed with a black and white color.

Swine Breeds

Chester White and Spotted are two swine breeds. The Chester White pig is a large, white breed. The Spotted pig is a smaller breed with a distinctive black and white color.

Swine Breeds

Poland China and Tamworth are two swine breeds. The Poland China pig is a large, black breed. The Tamworth pig is a smaller breed with a reddish-brown color.

Swine Breeds

Large Black and Small Black are two swine breeds. The Large Black pig is a large, black breed. The Small Black pig is a smaller, black breed.

Swine Breeds

Landrace and Pietrain are two swine breeds. The Landrace pig is a long, black breed. The Pietrain pig is a smaller breed with a distinctive black and white color.

Swine Breeds

Meishan and Miniature are two swine breeds. The Meishan pig is a small breed with a distinctive curly tail. The Miniature pig is a very small breed.

Swine Breeds

Kunming and Chinese Black are two swine breeds. The Kunming pig is a small breed with a distinctive curly tail. The Chinese Black pig is a small, black breed.

Lesson Summary feature provides an additional review tool and reinforces key learning objectives.

Vocabulary Review matching activities reinforce vocabulary development and retention.



Know and Understand review questions allow the demonstration of knowledge and comprehension of lesson material.

Analyze and Apply questions and activities allow the transfer of concept comprehension to new applications both in and out of the agricultural field.



STEM and Academic Activities are provided in the areas of science, technology, engineering, math, social science, and language arts to extend learning and aid the application of knowledge.

Thinking Critically questions develop higher-order thinking, problem solving, and personal and work-place skills.

SAE for ALL Opportunities help students make real-life connections to a variety of new and interesting SAE opportunities.



SAE for ALL Check-In reminds students to review and record progress on their SAEs.



Communicating about Agriculture questions and activities help integrate reading, writing, listening, and speaking skills.

Extending Your Knowledge provides additional activities for exploring and deepening understanding of key concepts from each chapter.

Credentialing Partners and Support

Goodheart-Willcox appreciates the value of industry credentials, certifications, and accreditation. We are pleased to partner with leading organizations to support students and programs in achieving credentials. Integrating industry-recognized credentialing into a career and technical education (CTE) program provides many benefits for the student and for the institution. By earning third-party certificates, students gain confidence, have proof of a measurable level of knowledge and skills, and earn a valuable achievement to include in their résumés. For educators and administrators, industry-recognized credentials and accreditation validate learning, enhance the credibility of programs, and provide valuable data to measure student performance and help guide continuous program improvement.

Principles of Agriculture, Food, and Natural Resources is correlated to the *Agricultural Biotechnology* pathway credential offered by NOCTI and to the *Agricultural Science I* and *Agricultural Science II* certifications offered by Precision Exams by YouScience.

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To see how *Principles of Agriculture, Food, and Natural Resources* correlates to credentialing and certification standards, visit the Correlations tab at www.g-w.com/principles-agriculture-food-natural-resources-2023.

New to This Edition

Goodheart-Willcox understands the importance of the three-circle model of instruction used in agriculture education, and we know the value of supervised agricultural experiences (SAEs). During the revision of this title, we spoke with agriculture educators and students across the country—asking how we can better support their SAE for ALL efforts. As a result, SAE for ALL Profiles are featured at the beginning of every chapter, providing students with SAE inspiration and a glimpse into their exciting potential future in the agriculture industry. With this feature, we highlight current and former students of agriculture education, as well as industry icons.

In addition to the new SAE for ALL Profiles and an exciting new design, the second edition of *Principles of Agriculture, Food, and Natural Resources* has new and updated Career Connections that include salaries and job outlooks for the next decade. The revised text also includes new hands-on activities, hundreds of new images and illustrations, and additional animal breed images. The new edition of *Principles of Agriculture, Food, and Natural Resources* features new review materials and activities, including the Know and Understand questions, Thinking Critically questions, and STEM and Academic Activities. There are also new SAE for ALL Opportunities to provide students with creative ideas for all types of SAE projects and SAE for ALL Check-Ins to help students monitor progress on their SAEs.



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