Education Poster Exhibit

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The Use of Computerized Scanning in Meat Science Education

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The Animal Science and Industry Department at KSU uses computer-scannable forms for a wide variety of applications in teaching. This has resulted in greater speed and accuracy in grading of large numbers of assignments, test or judging contest scores. Currently, scannable forms are used in the classroom for livestock evaluation, multiple choice and true/false tests and course evaluations. In addition, scorecards have been developed for the FFA meat judging retail cut identification and beef grading classes, poultry judging and dairy foods judging. These applications have reduced the amount of labor required to score and tabulate all of these activities. Furthermore, students are able to get feedback on their performance in a much more timely manner and instructors can spend more time teaching rather than grading. Another important advantage to testing with these materials is the ability to numerically determine the difficulty and reliability of a test, specific questions or specific multiple-choice items. After start-up costs, the cost-per-page of scannable forms is comparable to photocopy costs. The forms that Kansas State uses were all designed by faculty and staff in the Animal Science and Industry department, using a template provided by the company that supplies the forms and scanners. It is relatively easy to adapt existing scorecards and forms to the scannable format. Recently, the Intercollegiate Meat Judging Coaches Association approved the development of scannable forms for their contests. Relatively few changes in the format of the scorecards were required to produce the scannable versions. Scanning technologies can be a practical, time-saving enhancement to a variety of educational programs.

"Beef Magic": An Interactive Computer Program for Teaching Youth about Beef

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The popularity of computer-assisted instruction (CAI) is growing as programs become increasingly sophisticated and easier to use. CAI has three basic methods of instruction: tutorial, drill and practice, and simulation. Tutorial programs guide the user through a series of questions without a predetermined sequence and the user controls the speed at which he learns the material. Drill and practice programs are very structured programs which use the computer to practice an already-learned skill.They control behavior performance with reward structures for right and wrong answers. This program is also good for beginning to learn a skill. Simulations take a real life situation and allow a student to control the situation. A problem with simulations is that they are limited to objective, quantitative and procedural problems.

There are over 8,000 livestock projects and 10,000 foods 4-H projects in Pennsylvania. Computer-assisted instruction is a method of increasing the effectiveness of instruction by county extension agents. The purpose of this program is to provide an interactive method of instruction for youths ages 12 to 15 to identify various primal, subprimal and retail cuts of beef, to learn the basic muscular and skeletal anatomy as it relates to the location of various meat cuts, to learn the cooking methods of these cuts and to learn the important nutrients contained in beef. The program combines tutorial and drill and practice types of learning and is intended to provide youth with a greater appreciation of meat science and the meat industry to make them more informed consumers.

"Beef Magic" utilizes HyperCard® version 1.0.1 and operates on an Apple MacIntosh "Plus" or larger computer. This program operates on a card system using "buttons" to either move to the next card or answer a specific question. The program will tell the user if the answer chosen is correct or not before moving to the next card. An incorrect response will effect a return to the question card; a correct answer will move to the next card in the sequence. The program also makes use of animation. The program gives the user five choices of areas to study. Each category builds on the one before it, but any can be chosen in any sequence independently. Taken in the given sequence, "Where Does Beef Come From" begins with a beef carcass with the primal cuts indicated. Clicking on a primal cut gives more information about that cut. The next card shows the retail cuts found in that primal. "WHY WE SHOULD EAT BEEF" provides the user with information about nutrients found in beef by taking a tour through a steak. "BONES THAT HELP IDENTIFY" shows how the specific shape of bones helps indicate the anatomical location of the cuts. "HOW DO I COOK IT" builds on knowing where cuts come from and teaches about dry vs. moist cooking methods. "LET'S IDENTIFY" shows the user ten cuts which must be identified. If the wrong answer is selected, the program goes back to the question.

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Learning to select and identify meat cuts can be a valuable experience for 4-Hers. Few county agents, extension volunteers or Vocational Agriculture teachers have the knowledge to teach 4-H youth identification, evaluation and cooking methods of various meat cuts. Therfore, an interactive computer program containing pertinent information about meats will allow youth to learn the elementary aspects of meat identification which may stimulate interest in learning more about meat science.

Meat Science Educational Videotapes

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Sales of video cassette recorders grew expotentially during the 1980's, with purchases of VCR's leading the way in the home appliance market. The VCR has become a staple not only in the household but also in the classroom, with 94% of all schools listing them in their audio-visual equipment inventories. Rapid growth in VCR sales led to production of educational videotapes covering a broad range of subject matter. The meat science discipline benefited from this expanded growth with production of a substantial number of educational videotapes.

A total of 76 edited titles (17-60 min.), covering a variety of topics are as follows: slaughter (3), carcass fabrication (4), beef grading (4), carcass and cut judging (4), retail cut identification (5), practice judging (15), market animal evaluation (14), meat animal evaluation (14), meat animal abnormalities (6), anatomy (2), career planning (7), and production animal/meat science (12). Educational video is an economical teaching alternative when product or instructional preparation time is a limiting factor and is an excellent supplement to classroom instruction.

Conducting Successful Sausage and Meats Manufacturing Workshops

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Transferring newly-developed technologies associated with principles related to manufacturing high-quality, cost-efficient, nutritious, safe and wholesome meat products has always been and will always be a high priority at Iowa State University. The Sausage and Processed Meats Short Course was first held in 1979 and has become an annual event at the ISU Meat Laboratory. In 1989, a second course was added in Spanish to better serve Mexico, the Caribbean and Latin America. Conference attendees from many different backgrounds participate in hands-on workshops and listen to meat specialists and industry representatives from all over the world. The course provides information on areas such as:

Basic Science & Technology	Quality Control
Manufacturing Practices	Ingredients
Physical Facilities	Casings
Processing Equipment	Formulations

Since the initial 1979 shortcourse, improvements have been made which reflect the sentiments of past participants' evaluations. Careful planning and consideration must be given to transportation, lodging, meals, meat laboratory physical facilities, labor requirements and raw materials and resources essential to conducting successful workshops. Hosting short courses requires a large effort on the part of many. However, the benefits far outweigh the drawbacks. Having a diverse group of industry personnel in our facility for a week provides an excellent environment for interaction. Also, learning about unique products/processes used by those in attendance helps keep us current and generally leads to creative research applications.

Communicating Value: Use of Various Equations With the Fat-O-Meter to Predict Lean Yield and Value of Pork Carcasses in Commercial Situations

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Teaching students or others the use and interpretation of prediction equations presents unique limitations and opportunities. Equations that have commercial application are often the simplest to use. As the industry has already accepted their use, students likewise readily accept their use. The validity and interpretation of the equation then remains the only function that must be explained. To explain a function such as a prediction equation, distributions of real and predicted values must be evaluated. This is often best illustrated graphically in a form that can be understood by all rather than by statistical terms that scientists are comfortable with. Distributions of populations, such as those shown here, illustrate both the predictive ability of the equation and the true nature of the population being predicted. Standard deviations of the population are more easily explained and a greater understanding of what is being demonstrated is accomplished. Likewise, when actual and predicted values are compared graphically, an understanding of the ability of the equation to predict an individual within a population becomes obvious. Each component of a prediction equation should likewise be evaluated. In this presentation, carcass weight is compared to fat and loin depth in a manner that indicates very little relationship between weight and readings from the Fat-O-Meter. As data collection and processing become simpler, prediction equations will become more important. Pay equations such as those examined here are useful and more accurate than current purchasing procedures, both of which make them easy to teach.

Extension Meat Science and Food Safety Educational Materials

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The food supply in the United States is considered by most experts to be the safest and most abundant in the

world. However, several unresolved issues must be addressed to assure the safety of the food supply. These issues, including microbial contamination, natural toxins, and inferior quality must be investigated and resolved to maintain a safe food supply. The Food and Drug Administration (FDA) and the Centers for Disease Control (CDC) estimate that at least 33 to 90 million cases of foodborne illness occur annually from bacteria in foods. Over 77% of the foodborne illness cases are reported to originate from foods served in food service establishments. Alabama has over 680,000 home gardeners and food preservers, which is not surprising when the poverty level is almost 20%. Even though reported cases of food poisoning in Alabama as related to food preservation are low, the use of improper food preservation methods is common. In addition, the number of individuals who hunt, harvest and process wild game meat is increasing as evidenced by the number of hunting and fishing licenses purchased (over 785,000 combined). Many of these individuals are unaware of proper harvesting and processing procedures and thus put themselves and their families at risk to foodborne illness. As today's population continues to age at an increasing rate, more and more cases of foodborne illness are being reported in nursing homes and also in day care centers for the young. Food handlers and the elderly themselves must become more aware of the fact that certain groups such as the elderly, young children, pregnant women and those already sick are more at risk. Extension programs and materials that address the importance of proper food handling practices and attempt to dispel myths concerning the safety of the food supply have proven valuable and useful to consumers across the state and nation. These programs have been varied in nature and directed toward many groups of varying age, educational level and occupation. Extension specialists at Auburn have received over $60,000 in state and national grants to develop educational programs in meat science and food safety. Thirty publications, over 650 mass media items (radio tapes, television spots, and newspaper articles) and 6 educational videos have been produced. Program opportunities have included workshops and seminars for: Food service workers, home economists, agricultural and 4-H agents, retail food handlers, beef cattle producers, swine producers, custom meat processors, hunters, tailgaters and a varied audience of consumers. Over three million consumers, food handlers, food processors and producers have been reached with accurate research-based information.

Meat Science Youth Education Program

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As part of the integrated programs supported by beef, pork, lamb and veal checkoff dollars, The National Live Stock and Meat Board has developed an extensive youth education program. Individual program elements address youth needs from pre-school to college.

This educational exhibit presents a selection of materials from several educational levels prepared by the Education Department and the Meat Science Department. Each program has been developed in consultation with recognized experts in the targeted area, and is subjected to the peer review process and field testing. Typically, each program element is authored by a recognized specialist in the area, and critically reviewed by that specialist's peers.

The method of presentation varies. In school programs, the setting is typically the classroom; however, many of the elements may be adaptable to 4-H, FFA/FHA, or other youth group activities. Other programs are specifically designed for a "club" setting, or, in the case of The Intercollegiate Meat Judging Program, as a "hands-on" learning experience.

The method of distribution of the program elements also varies. In the school program area, materials are often provided to the schools by state livestock organizations. In other cases, materials may be purchased directly from the Meat Board by the user.

This exhibit provides sample materials for review, along with Meat Board catalogs for attendees.

The Meat Board's education program extends beyond youth activities, addressing the needs of health care professionals, the retail and food service industries, and consumers.

Group Discussion and Writing Projects to Improve Communication Skills

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The objectives of implementing written and oral communication assignments in meat science are to help students become more conversant in the subject and to develop communication skills that will help them succeed academically and professionally. Several learning objectives that can be accomplished using specific written and oral assignments are application of knowledge gained in class, development of critical thinking skills, and improvement of grammar, spelling and punctuation. Writing exercises can be identified in two broad classes: 1) Informal exercises give the student an opportunity to use writing as a mode of thinking and learning as well as a time to sharpen writing skills. Assignments are evaluated on relevance and responsiveness with less emphasis on spelling, punctuation and syntax. 2) Formal writing exercises provide an opportunity for the student to go through the process of planning, draft preparation, revision, editing, proofreading and final draft submission. Exercises are graded according to depth and range of ideas, organization, style and tone, mechanics and surface features. Along with the development of good writing and oral communication skills, students have an opportunity to develop critical thinking skills; to adequately share ideas with an audience, highly focused thinking on the subject matter is required. Writing and oral communication skills also help the instructor to know how much the class has learned and can act as a basis for teacher planning. Some students have found it hard to adjust to assignments graded for grammar in a "non-English class" but most have found it helpful in understanding the subject matter, and have generally felt the assignments were worthwhile.

Computer-Assisted Retail Decision Support: Communicating Cutability

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In 1986, retail cuts in the United States began to be trimmed to a maximum fat thickness of 1/4 inch, based on findings of the National Consumer Retail Beef Study. Today, the average fat thickness on meat cuts in retails cases is about 1/8 inch; however, most of the removal of fat is occurring in the backrooms of retail stores, rather than not being produced in the first place.

We have been working on helping retailers understand the price/value relationship for beef so that they can pay more for wholesale cuts that have less fat on them while maintaining their profit level. This project is called "Communicating Cutability to the Retailer." The research has led to the development of a software package called CARDS, Computer-Assisted Retail Decision Support.

Currently, scientists from the Texas Agricultural Experiment Station and meat specialists from the Texas Agricultural Extension Service are working with the National Live Stock and Meat Board and the Beef Industry Council to disseminate the CARDS program and teach people to use it. At present, approximately 480 copies of the software have been distributed to retailers and associated industries with an estimated impact on approximately 15,000 retail outlets.

The bottom line for the beef industry is that if retailers will pay for superior cutability (less fat, more lean), beef producers with leaner cattle will receive more money. Excess fat production costs the beef industry $4 billion dollars per year: $2 billion to put fat on and $2 billion to take it off.

We are currently distributing Beef CARDS 2, a new version that operates using Microsoft Windows alone. If you are interested in receiving a copy of the software, along with the accompanying written information, please sign up on the sheet provided at the exhibit. The cost of development and distribution is being underwritten by a grant from the Beef Industry Council of the National Live Stock and Meat Board on behalf of the Cattlemen's Beef Board.

The Process of Learning Through Experimentation

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The purpose of this project was to objectively determine if learning retention could be enhanced by providing students opportunities to conduct experiments in meat science. A class of 16 students was divided as equally as possible according to GPA, first hour exam and pre-test scores. For all students, two lectures were provided on factors related to pork carcass composition including; bilateral symmetry, specific gravity, muscle-to-bone ratio (M/B), fat thickness, USDA Grade and tissue proportionality, Control students were excused from the experiment whereas the treatment group examined 12 pelvic limbs that represented four combinations of muscling-fatness: [(low-low), (low-high), (high-low) and (high-high)]. Two of the three limbs of each cell originated from right and left sides of the same carcass so that bilateral symmetry could be tested. Each limb was measured for specific gravity and then dissected into skin, subcutaneous and intermuscular fat, four major muscles and four major bones. After dissection of the limbs, students completed composition calculations. Results of the project were reviewed for all students. One month later, the entire class was tested on their knowledge of the subject. Results indicated that students exposed to the laboratory experiments scored six points higher ($p < .10$). For more valid interpretation of the hypothesis, such a test must be repeated and larger numbers of students included, but this preliminary exercise suggests that experiments improve learning retention.