Field Trip: U.S. Meat Animal Research Center

Media Type: DVD
Duration: 35 min.

Goal: To view the research center and learn the impact it has on the agricultural community.

Description:
Travel with us to the most advanced research center in the nation: the U.S. Meat Animal Research Center in Clay Center, Neb. Students will be introduced to world renowned researchers who work every day to make sure the food we consume is safe. From pasture-based management systems to E. coli to livestock germ plasma evaluation, meet the scientists and technicians who develop, conduct and maintain the research projects which help livestock producers raise the highest quality product in the safest and most efficient way. Collaborators: Mohammad Koohmaraie, Ph.D., U.S. MARC Director; Steven Shackelford, Ph.D., Research Scientist; John Rieckman, Farm Operations Manager and Brian Woodbury, Ph.D., Agricultural Engineer.

Objectives:
1. To explore different research projects conducted by the center.
2. To become familiar with job opportunities available at the center.
3. To explore breeding technology available for producers.

Common Core Standards

Agriculture, Food & Natural Resources Career Cluster (AG)

Cluster	Standard
	Analyze how issues, trends, technologies and public policies impact systems in the Agriculture, Food & Natural Resources Career Cluster™.
	Evaluate the nature and scope of the Agriculture, Food & Natural Resources Career Cluster™ and the role of agriculture, food and natural resources (AFNR) in society and the economy.
	Examine and summarize the importance of health, safety and environmental management systems in AFNR businesses.
	Demonstrate stewardship of natural resources in AFNR activities.
	Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources Career Pathways.
	Analyze the interaction among AFNR systems in the production, processing and management of food, fiber and fuel and the sustainable use of natural resources.
Animal Systems Career Pathway (AG-ANI)	Analyze historic and current trends impacting the animal systems industry.
	Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare.
	Design and provide proper animal nutrition to achieve desired outcomes for performance, development, reproduction and/or economic production.
	Apply principles of animal reproduction to achieve desired outcomes for performance, development and/or economic production.
	Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.
	Classify, evaluate and select animals based on anatomical and physiological characteristics.
	Apply principles of effective animal health care.

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Common Core Standards

Agriculture, Food & Natural Resources Career Cluster (AG)

Cluster	Standard
Environmental Service Systems Career Pathway (AG-ENV)	Use analytical procedures and instruments to manage environmental service systems.
	Evaluate the impact of public policies and regulations on environmental service system operations.
	Develop proposed solutions to environmental issues, problems and applications using scientific principles of meteorology, soil science, hydrology, microbiology, chemistry and ecology.
	Demonstrate the operation of environmental service systems (e.g., pollution control, water treatment, wastewater treatment, solid waste management and energy conservation).
	Use tools, equipment, machinery and technology common to tasks in environmental service systems.
Food Products & Processing Systems Career Pathway (AG-FD)	Develop and implement procedures to ensure safety, sanitation and quality in food product and processing facilities.
	Apply principles of nutrition, biology, microbiology, chemistry and human behavior to the development of food products.
	Explain the scope of the food industry and the historical and current developments of food products and processing.

College & Career Readiness Anchor Standards for Reading

Reading Standards for Literacy in Science & Technical Subjects		
Key Ideas & Details	Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.	
	9-10.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
Craft & Structure	Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.	
	9-10.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
	11-12.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.
Integration of Knowledge & Ideas	Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.	
	Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.	
	9-10.7	Translate quantitative or technical information expressed in words in a text into visual form and translate information expressed visually or mathematically into words.
	9-10.8	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.

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Common Core Standards

College & Career Readiness Anchor Standards for Writing

Writing Standards for Literacy in History/Social Studies & Technical Subjects		
Text Types & Purposes	Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.	
	9-10.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
Production & Distribution of Writing	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	
	9-10.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
Research to Build & Present Knowledge	Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.	
	Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.	
	9-10.7	Conduct short as well as more sustained research projects to answer a question or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
	9-10.8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

College & Career Readiness Anchor Standards for Speaking and Listening

Speaking & Listening Standards		
Comprehension & Collaboration	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.	
	Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.	
	9-10.1	Initiate and participate effectively in a range of collaborative discussions with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
	9-10.2	Integrate multiple sources of information presented in diverse media or formats evaluating the credibility and accuracy of each source.
Presentation of Knowledge & Ideas	Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.	
	9-10.4	Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

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Lesson Plan

Class 1: Distribute the *KWL Activity* and allow students to fill out the *What I Know* and *What I Want to Know* portions. Distribute the *Field Trip: U.S. Meat Animal Research Center Worksheet* to be completed during the presentation. Show the *Field Trip: U.S. Meat Animal Research Center (Part 1), Field Trip: U.S. Meat Animal Research Center (Part 2), Field Trip: U.S. Meat Animal Research Center (Part 3), Field Trip: U.S. Meat Animal Research Center (Part 4), Field Trip: U.S. Meat Animal Research Center (Part 5), Field Trip: U.S. Meat Animal Research Center (Part 6), Field Trip: U.S. Meat Animal Research Center (Part 7), Field Trip: U.S. Meat Animal Research Center (Part 8), Field Trip: U.S. Meat Animal Research Center (Part 9), Field Trip: U.S. Meat Animal Research Center (Part 10)* and *Field Trip: U.S. Meat Animal Research Center (Part 11)* segments. Allow students to fill in the *What I Learned* portion of the *KWL Activity.*

35 min.

Class 2: Complete the *Field Trip: U.S. Meat Animal Research Center Assessment.* Distribute the *Scientific Method Activity.* Using the *KWL Teacher Instruction Sheet,* instruct students to begin researching to complete the *KWL Project.*

Class 3: Allow students to complete the *KWL Project.* The *KWL Project* should be turned in by the end of class.

Class 4: Students will present their *KWL Project* and should be prepared to answer any questions classmates have about their presentation.

Lesson Links

Agricultural Research Service

- http://www.marc.usda.gov

Career & Technical Student Organizations

FFA

- Agricultural Communications
- Agricultural Issues Forum
- Extemporaneous Public Speaking
- Livestock Evaluation
- Meats Evaluation and Technology
- Prepared Public Speaking

Career Connections

- iCEV50816, Wendy Woerner, Research & Development Lab Technician, Swift & Company
- iCEV50037, Michael Heaton, Ph.D., Molecular Genomics Livestock Researcher, U.S. Meat Animal Research Center
- iCEV50045, Jim Keen, Ph.D., D.V.M., Veterinary Medical Officer, U.S. Meat Animal Research Center
- iCEV50049, Mohammad Koohmaraie, Ph.D., Director, U.S. Meat Animal Research Center, Ag Research Service, USDA
- iCEV50077, Steven Shackelford, Ph.D., Meat Scientist, U.S. Meat Animal Research Center
- iCEV50097, Brian Woodbury, Agricultural Engineer, U.S. Meat Animal Research Center

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KWL Activity

Directions:

Students will use the *KWL Activity* to list what they know about meat research by completing the *What I KNOW* section of the *Activity*. They will then develop a list of any questions they have to be written in the *What I WANT to Know* portion. After viewing the presentation students will complete the activity by providing the answers to their questions by completing the *What I LEARNED* portion. Any new unanswered questions may be added to *What I WANT to Know*. This *Activity* will be used later in a student project.

Scientific Method

Directions:

Students will select one of the species discussed in the presentation. Have the students determine an experiment they would like to conduct with the species they selected. Students will use the scientific method — observe, hypothesize, predict, verify, publish — to describe how they would conduct their experiment.

KWL Project

Directions:

Follow instructions listed on the *KWL Teacher Instruction Sheet.* Students will use the information they filled in on the *KWL Activity* to begin researching any unanswered questions they may have about meat research. Students should use the Internet or the school library for their research. After completing their research, students will compile the information from the activity, the presentation and their research into a brochure or a multimedia presentation. The project should be presented to the class after completion. At the conclusion of each student's project, the class may ask questions they may have and allow the presenter to answer.