CTE Standards Unpacking
Fundamental Animal Science

Course: Fundamental Animal Science
Course Description: Fundamental Animal Science will address the basic knowledge and skills necessary to care for and meet the needs of animals, along with soft skills necessary for careers in the Agriculture, Food and Natural Resources sector. Topics addressed in the course include: animal anatomy and physiology, animal health, safely working with animals, animal nutrition, reproductive systems, animal performance, animal industry issues, and employability. Utilizing appropriate equipment and technology should enhance classroom and laboratory content. Algebra, English, Biology and human relations skills will be reinforced in the course. Work-based learning strategies appropriate for this course are school-based enterprises and field trips. This class is reinforced through the FFA and Supervised Agricultural Experience (SAE) activities such as the Livestock Evaluation Career Development Event and related Proficiency Awards. Each student will be expected to maintain a SAE.
Career Cluster: Agriculture, Food and Natural Resources
Prerequisites: Recommended: Introduction to AFNR
Program of Study Application: Fundamental Animal Science is a first pathway course in the Agriculture, Food and Natural Resources Program of Study, Animal Systems pathway. Fundamental Animal Science is preceded by a Cluster course and is recommended to be taken prior to participation in Advanced Animal Science or Ag Biotechnology.

<table>
<thead>
<tr>
<th>INDICATOR #AN 1: Examine animal anatomy and physiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUB-INDICATOR 1.1 (Webb Level: 1 Recall): Recognize animals by species, gender or use.</td>
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<tr>
<td>SUB-INDICATOR 1.2 (Webb Level: 1 Recall): Identify the parts of an animal’s anatomy.</td>
</tr>
<tr>
<td>Knowledge (Factual): -Types, species, genders of animals</td>
</tr>
<tr>
<td>-Livestock breeds</td>
</tr>
<tr>
<td>-Animal anatomy</td>
</tr>
<tr>
<td>Understand (Conceptual): -The importance of the relationships between body systems</td>
</tr>
<tr>
<td>Do (Application):</td>
</tr>
<tr>
<td>-Dissect a fetal pig</td>
</tr>
<tr>
<td>-Dissect animal organs</td>
</tr>
<tr>
<td>-Compare and contrast animal body systems</td>
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<tr>
<td>-Compare and contrast milk animals versus meat animals</td>
</tr>
</tbody>
</table>
**Benchmarks:**
*Students will be assessed on their ability to:*
- Label anatomical parts related to animal body systems.
- Identify wholesale and retail meat cuts.
- Compare and contrast animal body systems.
- Compare and contrast milk animals versus meat animals.

**Academic Connections**

<table>
<thead>
<tr>
<th>ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):</th>
<th>Sample Performance Task Aligned to the Academic Standard(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 9-12 W.4 - Produce writing that is appropriate for the task or audience.</td>
<td>-Write a compare and contrast essay on the differences between animal breeds, types of animals, uses for animals, etcetera.</td>
</tr>
</tbody>
</table>

**INDICATOR #AN 2: Examine animal health**

**SUB-INDICATOR 2.1 (Webb Level: 2 Skill/Concept):** Evaluate a subject animal to determine the nature of its health.

**SUB-INDICATOR 2.2 (Webb Level: 1 Recall):** Understand proper usage and effects of animal health products.

<table>
<thead>
<tr>
<th>Knowledge (Factual):</th>
<th>Understand (Conceptual):</th>
<th>Do (Application):</th>
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<tbody>
<tr>
<td>- Animal diseases and ailments</td>
<td>- Understand that vitals are different between animal species</td>
<td>- Compare and contrast treatment options</td>
</tr>
<tr>
<td>- Vitals of specific animals</td>
<td>- Withdrawal times for meat animals</td>
<td>- Check an animal’s vitals</td>
</tr>
<tr>
<td>- Withdrawal times for specific medications</td>
<td></td>
<td>- Compare and contrast needle sizes and gauges</td>
</tr>
</tbody>
</table>

**Benchmarks:**
*Students will be assessed on their ability to:*
- Correctly administer a vaccination or antibiotic.
- Calculate proper doses of medications.
- Read animal health cases and discuss treatment options.
### Academic Connections

**ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):**

**English:**
1) 9-12 W.4 - Produce writing that is appropriate for the task or audience.

**Math:**
2) HSN.Q.A.3 - Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

**Sample Performance Task Aligned to the Academic Standard(s):**

- Complete an animal health statement after examining an animal.
- Fill a syringe with the appropriate amount of medication and calculate dosage.

**INDICATOR #AN 3: Describe practices for safely working with animals**

| **SUB-INDICATOR 3.1 (Webb Level: 1 Recall):** | Judge an animal's behavior to safely work with it. |
| **SUB-INDICATOR 3.2 (Webb Level: 2 Skill/Concept):** | Examine animal housing, equipment and handling facilities for the safety of animals and handlers. |
| **SUB-INDICATOR 3.3 (Webb Level: 2 Skill/Concept):** | Select management practices to reduce the effects of animal production on the environment. |

**Knowledge (Factual):**
- Flight zone, point of balance
- Restraint techniques
- Living requirements for various species
- Zoning regulations
- Animal behavior
- Animal needs for space, feed, water, etc.

**Understand (Conceptual):**
- Effects of animal production on the environment
- How to use a flight zone to move livestock
- Signs of animal behavior and reactions

**Do (Application):**
- Create a life size flight zone
- Compare and contrast facilities for species
- Compare manure handling techniques
- Visit an overgrazed pasture
**Benchmarks:**
*Students will be assessed on their ability to:*
- Demonstrate how a flight zone works.
- Design an animal facility.
- Develop a waste management plan.
- Read a study on the effects of animal produced methane on the environment.
- Develop a grazing program to reduce the effects of over grazing.

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<tr>
<td>English: 1) 9-12 W.4 - Produce writing that is appropriate for the task or audience.</td>
<td>-Create an informational flyer about the behavior of a given animal species</td>
</tr>
<tr>
<td>Math: HSN.Q.A.2 - Define appropriate quantities for the purpose of descriptive modeling.</td>
<td>-Design an animal facility to scale. Demonstrate that the design is a scale model of the final animal facility.</td>
</tr>
</tbody>
</table>

**INDICATOR #AN 4: Distinguish elements of proper animal nutrition.**

**SUB-INDICATOR 4.1 (Webb Level: 2 Skill/Concept):** Compare an animal’s differing nutritional needs throughout its life cycle.

**SUB-INDICATOR 4.2 (Webb Level: 1 Recall):** Prepare a feed ration to fulfill a given animal's nutrient requirements.

<table>
<thead>
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<th>Knowledge (Factual):</th>
<th>Understand (Conceptual):</th>
<th>Do (Application):</th>
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</table>
| -Developmental stages of animals  
-Feedstuff classifications  
-Types of digestive systems | -Nutritional needs of animals based on developmental stages  
-How climate affects nutritional needs  
-Nutritional needs based on digestive systems | -Evaluate a nutrition label  
-Compare and contrast digestive systems |
Benchmarks: 
*Students will be assessed on their ability to:*
- Create diagram of different phases of animal life cycles.
- Develop a ration using a Pearson’s Square.
- Categorize nutrients.
- Develop a ration that meets the nutritional needs of an animal.
- Create a total mixed ration for a feed lot.
- Create a model digestive system.

### Academic Connections

**ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):**

**English:**
1) 9-12 R1.1 – Interpreting a text explicitly and drawing inferences.

2) 9-12 W.4 - Produce writing that is appropriate for the task or audience.

**Math:**
HSA.REI.C.6 - Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

**Sample Performance Task Aligned to the Academic Standard(s):**

- Determine the nutritive quality of a feed label
- Compose a research paper about a nutrition-related illness
- Determine the proper mix of feedstuffs in a ration using a Pearson’s Square as an algorithm.

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**INDICATOR #AN 5: Study the reproductive system of animals.**

**SUB-INDICATOR 5.1 (Webb Level: 1 Recall):** Examine male and female reproductive systems.

**SUB-INDICATOR 5.2 (Webb Level: 1 Recall):** Discuss reproductive cycles and breeding techniques.

**SUB-INDICATOR 5.3 (Webb Level: 2 Skill/Concept):** Evaluate an animal to determine breeding soundness and readiness.

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<thead>
<tr>
<th>Knowledge (Factual):</th>
<th>Understand (Conceptual):</th>
<th>Do (Application):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reproductive anatomy</td>
<td>Benefits of various breeding methods</td>
<td>Graph gestational periods of animals by species</td>
</tr>
<tr>
<td>Estrous cycles</td>
<td>Structural correctness</td>
<td>Research estrous cycles and synchronization methods</td>
</tr>
<tr>
<td>Breeding methods</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Benchmarks:**
*Students will be assessed on their ability to:*
- Develop a breeding plan for a herd of animals.
- Analyze the results of semen tests.

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<tr>
<td>English: 9-12 RI.3 – Analyzing sequence and interaction.</td>
<td>-Analyze the graph of bovine estrous cycles.</td>
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</table>

**INDICATOR #AN 6: Identify factors that affect an animal’s performance.**

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<th>Understand (Conceptual):</th>
<th>Do (Application):</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Genotype, phenotype</td>
<td>- Implications of genetic variation</td>
<td>- Complete a Punnett Square</td>
</tr>
<tr>
<td>- Dominant, recessive traits</td>
<td>- Ideal animal qualifications</td>
<td>- Compare and contrast animals</td>
</tr>
<tr>
<td>- External animal anatomy</td>
<td>- Understand components of a pedigree</td>
<td>- Read an EPD</td>
</tr>
<tr>
<td>- Expected progeny difference (EPD)</td>
<td></td>
<td>- Evaluate sire performance records</td>
</tr>
<tr>
<td>- Pedigree</td>
<td></td>
<td>- Use EPD to select ideal animals</td>
</tr>
</tbody>
</table>
**Benchmarks:**

*Students will be assessed on their ability to:*

- Use a Punnett Square to determine genetic inheritance.
- Rank a group of animals and write a report defending your decision.
- Rank animals based on EPD.
- Assess a livestock herd for keep/cull.
- Read a pedigree.

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<tr>
<td>Science: HS-LS3-2 - Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.</td>
<td>-Read a pedigree and discuss genetic variation through generations</td>
</tr>
<tr>
<td>Math: HSS.IC.B.6 - Evaluate reports based on data.</td>
<td>-Interpret an EPD, using the contained data to determine the ideal bull for a herd.</td>
</tr>
<tr>
<td>English: 9-12 W.4 - Produce writing that is appropriate for the task or audience.</td>
<td>-Write an explanation on how to read EPD reports</td>
</tr>
</tbody>
</table>

**INDICATOR #AN 7:** Examine animal industry issues.

**SUB-INDICATOR 7.1 (Webb Level: 2 Skill/Concept):** Compare and contrast consumer concerns related to animal food products.

**SUB-INDICATOR 7.2 (Webb Level: 2 Skill/Concept):** Analyze consumer concern related to animal welfare.
<table>
<thead>
<tr>
<th>Knowledge (Factual):</th>
<th>Understand (Conceptual):</th>
<th>Do (Application):</th>
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<tbody>
<tr>
<td>- HACCP</td>
<td>- Hormone level affects on humans</td>
<td>- Compare and contrast animal rights vs. Welfare</td>
</tr>
<tr>
<td>- Processing techniques</td>
<td>- Labels on food products (natural, anti-biotic free, etc.)</td>
<td>- Compare and contrast hormone levels of foods</td>
</tr>
<tr>
<td>- Food labeling</td>
<td>- Common humane animal processing practices</td>
<td>- Compare and contrast animal welfare groups</td>
</tr>
<tr>
<td>- Welfare groups</td>
<td></td>
<td></td>
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<tr>
<td>- Humane Society of United States vs. Local humane society</td>
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</tbody>
</table>

**Benchmarks:**
*Students will be assessed on their ability to:*
- Create a brochure on humane processing practices
- Research the meanings of various food labels (all natural, antibiotic free, raised without antibiotics, gluten free, etc.)

**Academic Connections**

**ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):**

**English:**
1) 9-12 W.4 - Produce writing that is appropriate for the task or audience.
2) 9-12 W.6 – Use technology, including the internet, to produce an individual writing product.

**Sample Performance Task Aligned to the Academic Standard(s):**
- Write a letter to an animal welfare group defending humane animal practices
- Use computer software to research humane animal practice. Then create an infographic defending humane animal practices

**INDICATOR #AN 8:** Develop employability skills related to the Animal Systems Pathway.

**SUB-INDICATOR 8.1 (Webb Level: 2 Skill/Concept):** Develop soft skills to enhance employability.
**Knowledge (Factual):**
- Proper communication etiquette
- Proper interview apparel
- How to give a proper handshake
- How to tie a tie

**Understand (Conceptual):**
- Importance of employability skills in careers
- The dos and don'ts of job interviews

**Do (Application):**
- Job shadow
- Tour industries
- Write e-mails to industry professionals

**Benchmarks:**
*Students will be assessed on their ability to:*
- Perform mock interview.
- Compose a cover letter and resume.
- Develop questions for an industry tour.

**Academic Connections**

**ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):**

- English:
  - 9-12 W.4 - Produce writing that is appropriate for the task or audience.

**Sample Performance Task Aligned to the Academic Standard(s):**

- Write a thank-you or follow up letter after conducting an interview

**Additional Resources**

- Text: Modern Livestock and Poultry Production, Gillespie and Flanders
  [http://www.ansi.okstate.edu/breeds](http://www.ansi.okstate.edu/breeds)
- 4D Vision Animal Models
- Temple Grandin movie and worksheet in Communities of Practice. Also visit [www.Grandin.com](http://www.Grandin.com)
- Youth for the Quality Care of Animals training: [http://yqca.org/](http://yqca.org/)