Teacher Work Sample

Madison Hall
A02046651
Agricultural Education
1/3/2018-4/20/2018
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</table>
Learning Context

Rigby High School

School District

Jefferson School District (Idaho)

Name of School

Rigby High School

Title 1 School

No

Demographics of School

There are approximately 1,561 students enrolled at Rigby High School, and is made up of about 51% male and 49% female. According to schooldata.com, the race of the student body is predominately white; 86% of the student body classify themselves as white/Caucasian. The remainder of Rigby High School’s racial distribution is 12% Hispanic, 1% Native American, and the remaining 1% is classified as “other”.

The average household income of students is ranked as medium – high and is amounted to $55,000 – $59,000. However, 38% of the students at Rigby High School qualify for free or reduced lunch.
There are currently 61 teachers that are employed by the Jefferson County School district, approximately 61% female and 39% male. This allows for a 1:26 student to teacher ratio according to schooldata.com. However, there are many classes in the Agriculture department that are filled much beyond the “max” capacity of 30 students.

**Gender Distribution**

- Male: 39%
- Female: 61%

<table>
<thead>
<tr>
<th>Student Teacher Ratio: 1:26</th>
<th>Teachers Number: 61</th>
<th>Avg Teacher Lifecycle: 6 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Counselor Ratio: 1:520</td>
<td>Avg Experience: 14 years</td>
<td></td>
</tr>
</tbody>
</table>

**Description of School Climate**

Located in Rigby, Idaho (population 4,062 as of 2016) Rigby High School serves students from all different walks of life. There are many students that come from an agricultural background, however, there are even more that are only vaguely familiar with the concept. While Rigby is a very small rural town, the student body is unusually large compared to other places in Idaho. Rigby sits in between two larger towns in Idaho, Rexburg and Idaho Falls, this location provides that opportunity for many parents to commute to the other towns for work and school. This effect of Rigby becoming a bedroom community has impacted the community of Rigby in both economic factors and personal relationships. Even though there are weak personal relationships between parents and school faculty, they both have a strong desire for student’s academic success.
Rigby High School’s motto is “Every Student Career or College Ready”, this feeling definitely resonates within the students and faculty at the high school. Every student meets with a counselor during their first year of high school where they discuss short and long term goals, they then set up a plan for courses the student should be taking to get help them reach those goals. Ways that the Agriculture Education Teachers assist students in achieving their goals are Experiential Learning and Career/Leadership Development Events. Every student that is enrolled in an Agriculture class must have an Experiential Learning project. This project allows students to explore potential careers in agriculture that interest them, as well as showcase their current ties to agriculture. The Career/Leadership Development Events that students are able to participate in provide a way to make real life applications from the material that is being taught in class. A main reason behind both of these things is to help students be prepared for life after high school, whether that is college or a career.

Rigby High School is a Professional Learning Community (PLC) school. This means that decisions are made by the body of teachers and faculty rather than just administration. The school is made up of different committees that work together to make decisions in different areas of concern. These committees work together to come up with a plan of action that is present to all department heads, they in turn report to each department where it can be discussed in more detail. The use of committees allows communication to come from all areas of the school. The administration understands that teachers know the students best and they should be able to teach in a way that is most beneficial to the individual student. This understanding allows teachers to have a great deal of freedom in their classrooms.
Introduction to Veterinary Science

Grade Level of Students in Focus Class:

11th – 12th

Learning Environment of Focus Class:

Many of the students that are enrolled in the Introduction to Veterinary Science are very self-disciplined and make it a point to be present in class every day and to stay engaged throughout the whole class period. However, it is very rare that every student is in class, most days there are two or three students missing with about 84% – 89% attendance. This is an upper level course that is available only for juniors and seniors, and this makes classroom management easy most of the time. However, because the only requirement to get into the class is that you take 3 prerequisite classes, there are a couple of students that try to become disengaged and not pay attention.

When students become disengaged they start asking to leave class, act out, or sleep. Once these things begin to happen I find new ways to reengage them in the material. One classroom management strategy that I use frequently is randomly calling on students to answer questions, and they aren’t allowed to say “I don’t know”. Alternative responses to “I don’t know” are “I haven’t learned that yet” “Can so and so help me” or can I look at my notes. This method encourages students to stay focused and engaged on the material that is being taught and not get off track. Another classroom management strategy that I use is only allowing one student out to the bathroom at a time. By doing this I am able to limit students wasting time in the hallways by just talking to their friends.
In the Introduction to Veterinary Science course there are many times where we preform dissections, sutures, and injections, so safety is a major concern in the classroom. Each time we use any of the tools for the first time we go over how to properly handle them, and then if any student is caught misusing them we stop the whole class to re-learn how to properly handle them. Another thing that plays a large part in safety is classroom set up and knowing where things are kept or disposed at. Below is a layout of my classroom. The lab materials are all kept in boxes in the lab, and depending on the procedure being performed we may use our wet lab that is located in another area of the Agriculture Department.

Subject Matter of Lessons:

Animal Systems – Animal Digestion

Total Number of Students in Focus Class:

19
Students with special needs and short explanation of the needs

IEPs: 2

These students receive some or all of the following accommodations:

1. Shortened assignments
2. Limited multiple-choice tests
3. Extra time on tests and assignments
4. Individual/rephrased instructions
5. Take tests in a separate location
6. Peer tutoring
7. Preferential seating
8. Provided with study guides and guided notes
9. Class material read orally
10. No cumulative final

504: 0

Speech/Language services: 0

English Language Learners: 0

Gifted and Talented: 0

Students’ Prior Knowledge for These Lessons

The Introduction to Veterinary Science class is an upper level course, and students are required to take at least 2 animal science and 1 general ag courses before they can enroll in the course. The unit of digestion should be a review unit for the students as this information was covered in all of the animal science prerequisite courses. By this point, they should have a basic understanding of animal anatomy and the different
functions each system plays in animals. Prior to starting the unit I asked students the following question:

“On a scale of 1 to 10, how much are you able to remember about the digestion system? If your number is low, what do you need the most help on? (i.e. Organs, functions, locations, etc.)”

The feedback was given orally and I took note of the students that had a lower number and what they felt like they need the most help on. As a whole the class agreed that they could remember which organs are part of the digestive system, but they couldn’t necessarily remember what each of their individual functions were or where they were located at.

**Students’ Background and Interest for These Lessons**

Most of the students in the Introduction to Veterinary Science class are in this class because they are interested in pursuing a career in animal science; at least 3 students want to pursue a career in Veterinary Science. One student is currently completing an internship at a local veterinary clinic. Three of the students in the class are currently on the rodeo team and work with animals on a daily basis. There are five students that are only enrolled in the course because it is the next step up in the agriculture classes that are offered at Rigby High School. However, all of the students that are enrolled in Introduction to Veterinary Science are interested in learning more about animals and how to properly care for them.

**How did your knowledge of students and their prior knowledge inform lesson planning?**

Since many of the students want to pursue a future career in some type of animal science, I knew that it would be easy to help them see the importance of the material.
Also, knowing that many of the students have had interaction with animals at some point or another, I planned on using their experiences to make real life applications. After asking students how much they remembered about the digestive system and which parts they needed the biggest review on, I was able to plan my lessons accordingly. Most of the students agreed that they could remember what organs are part of the digestive system, but not necessarily what all of their functions are or what order they come in. This knowledge helped me to know that I didn’t need to focus so much on names, but rather functions and order.
Focus Student 1: S.W.

S.W. is a young man that has taken at least one agriculture related class every year that he has been in high school. The prerequisite courses that he took are: Introduction to Agriculture, Animal Nutrition, and Animal Reproduction. Both animal science courses go into great detail of the different body systems in animals, knowing that S.W. has taken these courses lets me know that he has at least come across the terms and content once before.

S.W. enjoys being in class, he keeps to himself, and doesn’t talk much to other students unless it is for a group project. He has an IEP with accommodations that he has, however, there are no notes on his file regarding why he has the accommodations. His accommodations include: shortened assignments, limited multiple choice test, class material is read orally, preferential seating, and taking tests in a separate location. S.W. generally performs very well on course work without his accommodations, but he does use them regularly.

S.W. is someone who enjoys outdoors and participating in recreational opportunities related to wildlife. He wants to pursue a career in wildlife studies of some sort which is why he is enrolled in the Introduction to Veterinary Science course.

When I took these characteristics into consideration I was able to determine that it would be best to chunk the information and break it up with different activities. I knew that I was going to have to break up learning key terms and their functions which helped me determine which readings we would do and which supplemental materials I would use with them. It also helped me to decide to do the playdough digestive system project to help solidify the information.
**Focus Student 2: A.K.**

A.K. has taken several agriculture classes during high school. Specifically related to animal science, she has taken Introduction to the Livestock Industry, Animal Reproduction, Animal Nutrition, Equine Science, and Introduction to Vet Science one other time. She is very familiar with the concepts that are talked about in this class and is taking it for a second time so she can get a better handle on the concepts.

A.K. performs very well in school and has a strong desire to succeed. She puts forth her best effort in all of her classes and averages A’s and B’s in all of her classes. Because of her existing understanding of the concepts she is able to assist other students who are struggling with different concepts.

As she has taken all of the animal science course offered by our program, A.K. has decided that she wants to go to school to become a Veterinarian. This desire has led her to obtain an internship at a local vet clinic where she is able to see real life application of the material that is being taught in class. She also raises several species of animals at her home where she is able to practice the material that is taught in class. A.K. is a very quiet student who doesn’t tend to offer her opinion unless she is asked. However, when she is asked, she can be a very valuable resource to myself as well as to other students.

Knowing these things about A.K. made me contemplate how I could make my lessons challenging. Where A.K. had taken this course before I knew that she would be ahead of other students, and so it was a bit of a challenge for me to think of ways to push her. I decided to use assigned partners for the playdough project so she would have to use her knowledge to teach someone else. I also used a writing piece in the project so students would have to think through their understanding of the different organs.
**Course:** Veterinary Science  
**Grade Level/Period:** 11th / 12th – 1st Period  
**Unit Title:** Digestive Systems

**Instructor:** Mrs. Madison Hall  
**Alignment State Strand/Standard/CIP:** Strand 4 / Standard 4-6 / 30.02.00.00.090

**Unit Objectives:**
*After completion of this UNIT of instruction, students will be able to:*

<table>
<thead>
<tr>
<th>Objective</th>
<th>Amount of time needed to teach the objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Analyze 10 key terms related to the digestive system</td>
<td>1 Day</td>
</tr>
<tr>
<td>B. Correctly explain the steps in the monogastric digestion process to a classmate using notes</td>
<td>1 Day</td>
</tr>
<tr>
<td>C. Correctly explain the steps in the ruminant digestion process to a classmate using notes</td>
<td>1 Day</td>
</tr>
<tr>
<td>D. Correctly explain the steps in the pseudo ruminant digestion process to a classmate using notes</td>
<td>20 minutes</td>
</tr>
<tr>
<td>E. Correctly explain the steps in the avian digestion process to a classmate using notes</td>
<td>50 minutes</td>
</tr>
<tr>
<td>F. Model the 4 main types of digestive systems using playdough with 100% accuracy</td>
<td>2 Days</td>
</tr>
<tr>
<td>G.</td>
<td></td>
</tr>
<tr>
<td>H.</td>
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</tr>
<tr>
<td>I.</td>
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</tbody>
</table>

**Total Days for the Unit of Instruction:** 6 Days

**Interest approach for the UNIT** (how will you motivate students to engage in the unit topic?):
Digestive track demonstration

**Student Assessment of the UNIT** (how will you evaluate student learning?):
Digestive System Booklets, digestive track modeling, unit test
<table>
<thead>
<tr>
<th>Day 1/Date: 3/16</th>
<th>Day 2/Date: 3/26</th>
<th>Day 3/Date: 3/27</th>
<th>Day 4/Date: 3/28</th>
<th>Day 5 &amp; 6/Date: 3/29-3/30</th>
<th>Objective(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective(s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Key Terms</td>
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</tr>
<tr>
<td>Assessment/Evaluation</td>
<td>Assessment/Evaluation</td>
<td>Assessment/Evaluation</td>
<td>Assessment/Evaluation</td>
<td>Assessment/Evaluation</td>
<td></td>
</tr>
<tr>
<td>• Matching portion on test</td>
<td>• Written test</td>
<td>• Written test</td>
<td>• Written test</td>
<td>• Written test</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Completed notes</td>
<td>• Labeled pig</td>
<td>• Labeled Cow</td>
<td>• Labeled Horse &amp; Chicken</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Telling a partner</td>
<td>• Telling a partner</td>
<td>• Telling a partner</td>
<td></td>
</tr>
<tr>
<td>Interest Approach</td>
<td>Interest Approach</td>
<td>Interest Approach</td>
<td>Interest Approach</td>
<td>Interest Approach</td>
<td></td>
</tr>
<tr>
<td>Discussion: Why is it important to understand digestion in vet science?</td>
<td>Demonstration: How the digestion track works</td>
<td>What did we talk about yesterday?</td>
<td>What did we talk about yesterday?</td>
<td>Have playdough setting out on the table</td>
<td></td>
</tr>
<tr>
<td>Instruction/Learning Events</td>
<td>Instruction/Learning Events</td>
<td>Instruction/Learning Events</td>
<td>Instruction/Learning Events</td>
<td>Instruction/Learning Events</td>
<td></td>
</tr>
<tr>
<td>• Reading: D.S. Physiology</td>
<td>• PPT on digestion process/types of digestive systems</td>
<td>• PPT on digestion process/types of digestive systems</td>
<td>• PPT on digestion process/types of digestive systems</td>
<td>• Assign groups of 2</td>
<td></td>
</tr>
<tr>
<td>• Reading: Types of Animal D.S.</td>
<td>• Booklet on a monogastric digestive system</td>
<td>• Booklet on a Ruminant digestive system</td>
<td>• Booklet on a pseudo-ruminant &amp; avian digestive systems</td>
<td>• Model lab worksheet</td>
<td></td>
</tr>
<tr>
<td>• Vocabulary Worksheet: Vocab Overview Guide</td>
<td>• Class discussion</td>
<td>• Ruminant digestive system video</td>
<td>• Booklet on a pseudo-ruminant &amp; avian digestive systems</td>
<td>• Have students make the digestive systems and label them</td>
<td></td>
</tr>
<tr>
<td>• Class discussion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Closure</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>• Snowball moment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Tell A Friend</td>
<td></td>
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</tbody>
</table>
Lesson Plan 1 Rational

I started this unit using researched backed by Dough Buehl in “Classroom Strategies for Interactive Learning” on pages 217-219. The Vocabulary Overview Guide assists students in creating a system to study key terms and concepts that are addressed by specific academic disciplines. The study system creates a way for students to commit words to memory over time through writing and repeated exposure to the words.

The main focus of the first lesson was to be able to have students become familiar with the terms that are used by professionals in the Veterinary Science industry. In order to do this, I knew I needed to give them several different exposers to the words. I selected the readings “Types of Digestion Systems” and “Physiology of Digestion Systems” because students would be exposed to the same words several times and would be able to see the words used in multiple ways. Once students completed, the readings they should be able to complete the vocabulary guide by identifying clues to help them remember the word, identify a sentence from the text where the word is used, and use the word in a sentence using their own words.

The end goal of using the vocabulary overview guide is to use a gradual release of responsibility method and have students pick their own key words out of a reading. By starting now, at the beginning of a trimester, with a completely guided vocabulary overview guide, students will get use to what the expectations are for the guides. By the end of the trimester I want students to be able to pick out their own key terms that they feel are important in a text.
<table>
<thead>
<tr>
<th>State Measurement Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>State Strand/Standard:</strong> Strand 4 – Standard 6</td>
</tr>
</tbody>
</table>

**Today’s Learning Objective(s):**
- Students will be able to analyze 10 key terms related to the digestive system

<table>
<thead>
<tr>
<th>Student Assessment/Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Students will complete a vocabulary overview guide that has 10 key terms that are found in 2 different readings.</strong></td>
</tr>
<tr>
<td><strong>Time:</strong> 20 minutes</td>
</tr>
<tr>
<td><strong>Materials:</strong> Vocabulary Overview guide</td>
</tr>
</tbody>
</table>

**Introduction/Anticipatory Set/ Interest Approach (Motivation)**

**Discussion**
1. On a scale of 1 to 10 how much do you remember from your previous classes about the digestive system? 1 being you can’t remember anything and 10 being you could tell me all about it.

2. What do we need to focus on the most – parts? Functions?

3. Why is it important that we understand the digestive system in vet science?

<p>| Time: 5 Minutes |
| Materials: None |</p>
<table>
<thead>
<tr>
<th>Curriculum and Instruction: Objective 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content (What):</strong></td>
</tr>
<tr>
<td>Types of Digestion Systems <em>(Reading)</em></td>
</tr>
<tr>
<td>- Monogastric (Digestion)</td>
</tr>
<tr>
<td>- Avian</td>
</tr>
<tr>
<td>- Ruminant (Cud)</td>
</tr>
<tr>
<td>- Pseudo-ruminant</td>
</tr>
<tr>
<td>Physiology of Digestion Systems <em>(Reading)</em></td>
</tr>
<tr>
<td>- Mouth (Mastication)</td>
</tr>
<tr>
<td>- Esophagus (Peristalsis)</td>
</tr>
<tr>
<td>- Stomach/rumen (Enzyme)</td>
</tr>
<tr>
<td>- Small intestine/live/pancreas (Duodenum, Jejunum, Ileum, Bile)</td>
</tr>
<tr>
<td>- Large Intestine/rectum/anus (Absorption)</td>
</tr>
</tbody>
</table>

**Words in parenthesis are key vocabulary words that students should be able to identify**

Once we have completed the reading we will move on to the vocabulary exercise.

I have preselected the words that are important to understand the digestive system. The clue should be 1-5 words that helps you remember what the meaning of the word is. The explain box is where you will put the definition. You can use the reading, context clues, and the internet to determine a definition. In the example box you will need to use the vocabulary word in a sentence.

Mastication was used as an example:

<table>
<thead>
<tr>
<th>Mastication</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clue</strong></td>
</tr>
<tr>
<td>Chewing</td>
</tr>
<tr>
<td><strong>Explain</strong></td>
</tr>
<tr>
<td>The chewing action that breaks, cuts, and tears up feed.</td>
</tr>
<tr>
<td><strong>Use</strong></td>
</tr>
<tr>
<td>Mastication occurs in an animal’s mouth.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teaching Method (How):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Popcorn reading and ask processing questions throughout the reading. Check for understanding for key vocabulary words.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time: 50 minutes</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Materials:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laptops</td>
</tr>
<tr>
<td>Mycaert</td>
</tr>
<tr>
<td>Types of digestion systems Vocabulary Guide</td>
</tr>
</tbody>
</table>
Process Questions and Answers/Formative Assessments:

- Why don’t monogastrics have cud?
- What is mastication?
- How does peristalsis work?
- Why are enzymes important in the digestion process?
- Where is the duodenum located? What purpose does it serve?
- Where is the jejunum located? What purpose does it serve?
- Where is the ileum located? What purpose does it serve?
- Where is bile produced?
- Where does absorption take place?

Consideration of Instructional Modifications for Special Populations (ELLs, IEPs, etc.):

None of the students in the class require additional materials for this lesson.

- Copies of readings for each student
- Modeled responses on the vocabulary guide for digestive systems
- Preselected vocab words

Literacy Strategies and Key Terminology:

Vocabulary Guide for Digestive Systems

- Mastication
- Digestion
- Peristalsis
- Ileum
- Bile
- Jejunum
- Enzyme
- Duodenum
- Absorption
- Pseudo-ruminant

Transition:

Once you finish your vocab guide staple it into your notebook and put your notebook back in the cupboard

Closure/Summary

Now that we have practiced using all of the key vocabulary words, I want everyone to take out a half sheet of paper and use two of the words in a sentence. Once you have your sentence written crumple up you paper and throw it across the room. Pick up a new piece of paper and read the sentence. Be prepared to share the sentence you pick up with the class.

<table>
<thead>
<tr>
<th>Time: 10 minutes</th>
<th>Materials: Half sheet of paper</th>
</tr>
</thead>
</table>

Enrichment/ Experiential Learning/ Connection to CTSO, Leadership, or Career

Veterinary Science CDE

Materials:
Student Learning

Student 1 Performance
While working on this lesson, S.W. participated in the readings and was actively engaged in the readings and the vocabulary guide worksheet. He was able to complete all 10 of the vocabulary words, however it did take him a majority of the class period to complete it. S.W. had a few questions on the assignment about what the difference was between the clue section and the explain section. After answering his questions, I was under the impression that he understood the assignment; however, the worksheet that he handed in was not completed correctly. Next time I do this assignment I will make sure I also have typed directions on the worksheet to go along with verbally saying them and having the example. Also, if I do end up splitting the assignment up into 2 different vocabulary guides, I could still use this simpler version for students who need accommodations. (Please see page 31 for an attachment of S.W.’s vocabulary guide.) At this point S.W. has met the objective of being able to define 10 key terms.

Student 2 Performance
A.K. did very well with this assignment. She did not have any questions on the assignment and was able to complete the assignment rather quickly. Her vocabulary guide was completed with precise uses of the words, and she completed the assignment exactly the way I wanted it. Adding a second vocabulary guide for students like A.K. would allow them to delve deeper into the readings and focus on more words so they are able to gain a deeper understanding of the texts. (Please see page 33 for an attachment of A.K.’s vocabulary guide.) At this point A.K. has met the objective of being able to define 10 key terms.

Teaching Reflection

What was the best part of this lesson?
I had originally planned on doing the second reading on the laptops and each student doing their own reading, however, the laptops were in use in a different class when we needed them. I used the projector to display the reading to the whole class and we read the reading using popcorn reading. Doing the reading in a popcorn style forced students to read through the whole thing and not just skim for the words. It also gave students a good base to be prepared for the remainder of the lessons.

What changes do I need to make for the next time I teach this lesson?
Next time I teach this lesson I will break the readings into two separate vocabulary guides, so we are able to focus on more vocab words spread out in a better way. Also, I would recommend doing both reading out loud so I can ask guided questions throughout the reading rather than at the end.
For this particular lesson I think that the vocabulary guide was a good resource for all students. It made it easier for all students to participate in the discussions that followed this lesson and they were able to use the table to recall terms if they forgot them.
<table>
<thead>
<tr>
<th>Vocabulary Guide for Digestive System Physiology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name:</strong>____________________________________</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Mastication</strong></th>
<th><strong>Peristalsis</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clue</strong></td>
<td>Chewing</td>
</tr>
<tr>
<td><strong>Explain</strong></td>
<td>The chewing action that breaks, cuts, and tears up feed.</td>
</tr>
<tr>
<td><strong>Use</strong></td>
<td>Mastication occurs in an animal’s mouth.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Digestion</strong></th>
<th><strong>Duodenum</strong></th>
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<td><strong>Clue</strong></td>
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<tr>
<td><strong>Explain</strong></td>
<td></td>
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<tr>
<td><strong>Use</strong></td>
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</table>

<table>
<thead>
<tr>
<th><strong>Enzyme</strong></th>
<th><strong>Jejunum</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clue</strong></td>
<td></td>
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<tr>
<td><strong>Explain</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Use</strong></td>
<td></td>
</tr>
</tbody>
</table>
Ileum

Clue

Explain

Use

Absorption

Clue

Explain

Use

Bile

Clue

Explain

Use

Pseudo-ruminant

Clue

Explain

Use
Types of Animal Digestive Systems

MONOGASTRIC, avian, ruminant, and pseudo-ruminant are the four basic types of digestive systems in animals. To select the proper type of feed for animals, knowledge of these four different types of digestive systems is critical.

Objective:

Identify and describe the various types of digestive systems in animals.

Key Terms:

- abomasum
- absorption
- concentrates
- crop
- cud
- digestion
- digestive system
- gizzard
- omasum
- proventriculus
- pseudo-ruminant
- reticulum
- roughages
- rumen

Various Types of Digestive Systems

Digestion is the process of breaking down feed into simple substances that can be absorbed by the body. Absorption is the taking of the digested parts of the feed into the bloodstream.

The digestive system consists of the parts of the body involved in chewing and digesting feed. This system also moves the digested feed through the animal’s body and absorbs the products of digestion. Different species of animals are better able to digest certain types of feeds than others. This difference occurs because of the various types of digestive systems found in animals. There are four basic types of digestive systems: monogastric, avian, ruminant, and pseudo-ruminant.
A monogastric digestive system has one simple stomach. The stomach secretes acid, resulting in a low pH of 1.5 to 2.5. The low pH destroys most bacteria and begins to break down the feed materials. Animals with this type of digestive system are better adapted to eat rations high in concentrates. Concentrates are highly digestible feedstuffs that are high in energy and low in fiber. Concentrates are typically 80 to 90 percent digestible. Common concentrates are cereal grains and oil meals. Cereal grains include corn, wheat, barley, and oats. Oil meals include soybean meal, linseed meal, and cottonseed meal. Examples of monogastric animals are hogs, cats, dogs, and humans.

![Diagram of the digestive system of a hog](image)

**AVIAN DIGESTIVE SYSTEM**

The avian digestive system is found in poultry. This system differs greatly from any other type. Since poultry do not have teeth, there is no chewing. Poultry break their feed into pieces small enough to swallow by pecking with their beaks or scratching with their feet. Feed enters the mouth, travels to the esophagus, and empties directly into the crop. The crop is where the food is stored and soaked. Food then moves from the crop to the proventriculus. The proventriculus is the stomach in a bird, where gastric enzymes and hydrochloric acid are secreted. From the proventriculus, the food makes its way to the gizzard. The gizzard is a very muscular organ, which normally contains grit or stones that function like teeth to grind the food. The food then moves from the gizzard to the small intestine and then to the large intestine. The nondigestible food components then travel into the cloaca. Urine is also emptied into the cloaca. The material is then passed out of the body through the vent. Digestion in the avian system is very rapid.
RUMINANT DIGESTIVE SYSTEM

The ruminant digestive system has a large stomach divided into four compartments—the rumen, the reticulum, the omasum, and the abomasum. The ruminant digestive system is found in cattle, sheep, goats, and deer. Ruminant animals eat feed rations that are high in roughages and low in concentrates. Roughages are feedstuffs that are high in fiber, low in energy, and typically only 50 to 65 percent digestible. Roughages include hay, straw, grazed forages, and silage. Ruminants are different from monogastric animals in that they swallow their food in large quantities with little chewing. Later they will ruminate, or belch up the feed, chew, and swallow it again. The regurgitated feed is called a cud. A cud is a ball-like mass of feed brought up from the stomach to be rechewed. On average, cattle chew their cuds about six to eight times per day.

Rumen

The first and largest section of the stomach is the rumen. In the rumen, solid feed is mixed and partially broken down. The rumen contains millions of bacteria and other microbes that promote fermentation, which breaks down roughages. The rumen also contains microorganisms that synthesize amino acids and B-complex vitamins. Amino acids are the building blocks of proteins and are essential for the growth and maintenance of cells.

Reticulum

The reticulum is the second segment of the stomach. The reticulum is a small pouch on the side of the rumen that traps foreign materials, such as wire, nails, and so forth. Since ruminants do not chew their food before swallowing, they will occasionally swallow foreign objects.
Omasum

The omasum is the third compartment of the stomach. The omasum produces a grinding action on the feed and removes some of the water from the feed. Hydrochloric acid and digestive enzymes are mixed with feed in the omasum.

Abomasum

The abomasum is the fourth compartment of the stomach. The abomasum is also referred to as the true stomach because it is similar to the stomach in monogastric animals.

Rumen Microorganisms

Ruminants rely on microorganisms for the digestion of roughages. The rumen microorganisms are very diverse and consist of bacteria, protozoa, and fungi.

Bacteria are the most numerous rumen microorganisms, at approximately 1 billion bacteria per milliliter of rumen fluid. Bacteria are responsible for most feed digestion in the rumen. They break down cellulose to form volatile fatty acids (VFAs). The VFAs provide the ruminant with 60 to 80 percent of its energy needs. Protozoa are typically responsible for about 25 percent of the fiber digestion in the rumen, even though a ruminant can survive without any protozoa in the rumen. Fungi contribute up to 8 percent of the total rumen microorganisms. Fungi are responsible for the digestion of cellulose and lignin in more resistant forages, such as barley straw.
Feed conversion and rate of gain in a ruminant are strongly affected by the type and number of microorganisms in the rumen. The rumen must contain the appropriate proportions of certain types of microorganisms to maximize productivity. For example, it is believed that protozoa can have a negative impact on protein utilization. The number of protozoa in the rumen is inversely proportionate to the number of bacteria. Therefore, if a ruminant is fed in a manner that is most conducive to bacteria in the rumen, protein utilization will be maximized by eliminating or reducing the number of protozoa in the rumen. To illustrate, feeding yeast culture to cattle could help to ensure a healthy population of rumen bacteria.

**PSEUDO-RUMINANT DIGESTIVE SYSTEM**

A pseudo-ruminant is an animal that eats large amounts of roughage but does not have a stomach with several compartments. The digestive system does some of the same functions as those of ruminants. For example, in the horse, the cecum ferments forages. An animal with a pseudo-ruminant digestive system can utilize large amounts of roughages because of the greatly enlarged cecum and large intestine, which provide areas for microbial digestion of fiber. Pseudo-ruminants often eat forages as well as grains and other concentrated feeds. Besides horses, examples of pseudo-ruminants are rabbits, guinea pigs, and hamsters.

**Summary:**

Digestion is the process of breaking down feed into simple substances that can be absorbed into the bloodstream. The four basic types of digestive systems in animals are monogastric, avian, ruminant, and pseudo-ruminant. Monogastric animals, such as swine, eat rations high in concentrates. The avian digestive system, found in poultry, is completely different from the other three types of digestive systems. A poultry animal does not teeth but has a crop, a proventriculus, a gizzard, and a cloaca. The ruminant digestive system is found cattle, sheep, and goats. Ruminants eat feed rations that are high in roughages. The ruminant digestive system has a large stomach divided into four compartments—the rumen, the reticulum, the omasum, and the abomasum. A pseudo-ruminant is an animal that eats large amounts of roughages but does not have a four-compartment stomach. A pseudo-ruminant animal can utilize roughages because of an enlarged cecum and large intestine.

**Checking Your Knowledge:**

1. Name the four basic types of digestive systems.
2. What type of feedstuff is high in energy and low in fiber?
3. What type of feedstuff is low in energy and high in fiber?
4. Name three examples of monogastric animals.
5. How do poultry break their food into smaller pieces?
6. List the four compartments of the ruminant stomach.
7. Name three examples of ruminant animals.
8. What are amino acids?
9. What is the most prevalent microorganism found in the rumen?
10. Name three examples of pseudo-ruminant animals.
Understanding the chemical and physical changes that occur during the digestive process leads to more efficient livestock feeding. Although there are four types of digestive systems, the digestive systems of most livestock are very similar in terms of the organs they contain.

Objective:
Describe the functions of the major parts of the digestive system.

Key Terms:
- amylase
- anus
- bile
- cecum
- chyme
- duodenum
- enzymes
- feces
- ileum
- jejunum
- lactase
- large intestine
- lipase
- maltase
- mastication
- peristalsis
- pepsin
- salivary glands
- stomach
- sucrase
- trypsin

Major Parts of the Digestive System

Digestion includes physical and chemical action that breaks food down into simple substances that can be absorbed by the body. The digestive system is made up of a number of organs. The system begins at the mouth, where food enters the body, and ends at the anus, where undigested material exits the body. The basic digestive system consists of the following: mouth, salivary glands, esophagus, stomach, small intestine, liver, pancreas, cecum, large intestine, and anus.
MOUTH, SALIVARY GLANDS, AND ESOPHAGUS

Food enters the digestive system through the mouth, where partial digestion occurs. The mouth is the place of **mastication**, or chewing. The chewing action of the mouth and teeth breaks, cuts, and tears up the feed. This reduces food particle size and increases the surface area of food particles, aiding in swallowing and the remaining digestive process.

The **salivary glands** secrete saliva to moisten feed so that it can be swallowed. Saliva also begins the breakdown of simple carbohydrates. Saliva contains the salivary amylase and salivary maltase enzymes. **Enzymes** are organic catalysts that speed up chemical reactions in the body without being altered by the reactions. Salivary amylase changes starch to maltose, or malt sugar. Salivary maltase changes maltose to glucose. Food moves from the mouth to the stomach via the esophagus. Food moves through the esophagus by involuntary smooth muscle contractions called **peristalsis**.

STOMACH

The **stomach** is a muscular organ that stores food and moves it to the small intestine. Its primary function is to advance the breakdown of food by mixing it with hydrochloric acid (HCl) and other enzymes. When feed enters the stomach of a monogastric animal or the abomasum of a ruminant, gastric juices begin to flow.

The fluid comes from glands in the wall of the stomach. The juices contain from 0.2 to 0.5 percent hydrochloric acid and the enzymes pepsin, rennin, and gastric lipase. Hydrochloric acid breaks proteins down into shorter chains of amino acids. To prevent infections of the lower digestive tract, the HCl creates a low pH in the stomach, which kills any bacteria ingested with the feed. **Pepsin** breaks the proteins in the feed into polypeptides.

The actions that occur in the stomach result in a partially digested material called **chyme**. The muscular walls of the stomach churn and squeeze the stomach’s contents, and the chyme
is pushed into the small intestine. The chyme is an acidic, semifluid, gray, pulpy mass. The gastric juices then act on the solids that remain in the stomach.

**SMALL INTESTINE, LIVER, AND PANCREAS**

The small intestine is composed of three parts: the duodenum, the jejunum, and the ileum. The **duodenum** is the first segment of the small intestine and is where most digestion occurs in a monogastric animal. The **jejunum** is the second segment of the small intestine and is where nutrient absorption begins. The **ileum** is the third segment of the small intestine and is where most nutrient absorption occurs.

In the small intestine, the chyme is mixed with three digestive juices: pancreatic juice, bile, and intestinal juice.

The pancreatic juice is produced by the pancreas and is secreted into the duodenum. The pancreatic juice includes the enzymes trypsin, amylase, and lipase. **Trypsin** breaks down proteins and polypeptides to reduce them to small peptides. The peptides are then broken down by chymotrypsin to produce amino acids. **Amylase** changes starch into disaccharides. The disaccharides are maltose, lactose, and sucrose. **Lipase**, along with bile, breaks up fat molecules into a form that can be absorbed. Lipase changes fat molecules into fatty acids and glycerol.

**Bile** is a yellowish-green, alkaline, bitter liquid produced in the liver. Bile is stored in the gall bladder in every animal except the horse and is secreted as necessary into the duodenum.

Glands in the walls of the small intestine produce intestinal juice. This fluid contains peptidase, maltase, lactase, and sucrase, which are all enzymes used in digestion. Peptidase breaks down peptides into amino acids. Maltase, lactase, and sucrase break down disaccharides into monosaccharides, or simple sugars. The monosaccharides are glucose, galactose, and fructose. **Maltase** converts maltose into two molecules of glucose. **Lactase** converts lactose into one molecule of glucose and one molecule of galactose. **Sucrase** converts sucrose into one molecule of glucose and one molecule of fructose.

**FURTHER EXPLORATION...**

ONLINE CONNECTION: Colic in Horses

The cecum in a horse is odd in design because its entrance and exit are both at the top of the organ. Feed enters and exits at the top of the cecum. This could cause problems if an animal eats a lot of dry feeds without adequate water or if a rapid change of diet occurs. Either may cause a compaction in the lower end of the cecum, in turn producing pain or colic. Colic is a serious condition in horses. In fact, it is the number one killer of horses.

Visit the links below to understand the causes of colic, to learn how to prevent colic, to recognize the signs of colic, and to learn how to treat colic.

http://www.yourhorseshealth.com/health_care/colic.html

http://equisearch.com/horses_care/health/illnesses_injuries/colic905/
The cecum, or “blind gut,” is found where the small intestine joins the large intestine. It is a small organ and has little function in some animals. In the horse, the cecum can be 4 feet long and 1 foot in diameter and can hold 25 to 30 liters. In a ruminant, feed is fermented and digested by bacterial action in the cecum. Nutrient absorption also occurs in the cecum. In a nonruminant animal, the cecum and the colon are extremely large and provide areas for microbial digestion of fiber.

**FIGURE 2.** In a horse’s digestive system, the cecum can hold up to 30 liters.

**LARGE INTESTINE AND ANUS**

Feed not digested in the small intestine moves to the large intestine. The large intestine stores indigestible feed, forms feces, and absorbs water. The main function of this organ is to absorb water. Feed materials not digested or absorbed are called feces. These materials are moved through the large intestine by muscles in the intestinal walls. Feces are passed through the rectum and out the body through the anus, the opening at the end of the large intestine.
Summary:
The basic digestive system consists of the following: mouth, salivary glands, esophagus, stomach, small intestine, liver, pancreas, cecum, large intestine, and anus. The mouth is the place of mastication and is where food particle size decreases. Food moves from the mouth to the stomach via the esophagus. The stomach stores and breaks down food material and moves it to the small intestine. The small intestine is composed of the duo- denum, the jejunum, and the ileum. The small intestine is where most digestion occurs. Feed then moves to the cecum or large intestine. The cecum is very important to pseudo-ruminants, as it is the location for microbial digestion of fiber. The large intestine stores indigestible feed, forms feces, and absorbs water.

Checking Your Knowledge:

1. Define peristalsis.
2. What are the two functions of hydrochloric acid in the stomach?
3. List the three parts of the small intestine.
4. Name the three disaccharides.
5. What is the function of lipase?
6. What is the role of the pancreas in the digestive process?
7. Name the three monosaccharides.
8. Name two functions of saliva.
9. What role does the liver have in the digestive process?
10. What is the function of peptidase?

Expanding Your Knowledge:

Interview a local horse owner or veterinarian and discuss the function of the cecum in the digestive system of a horse. Discuss colic and determine the causes, preventive measures, signs, and treatment.

Web Links:

The Merck Veterinary Manual

The Horse’s Digestive System
http://ohioline.osu.edu/b762/b762_5.html

Agricultural Career Profiles
http://www.mycaert.com/career-profiles
### S.W. Vocabulary Overview Guide

<table>
<thead>
<tr>
<th>Term</th>
<th>Clue</th>
<th>Explain</th>
<th>Use</th>
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<tbody>
<tr>
<td><strong>Mastication</strong></td>
<td></td>
<td><strong>Chewing</strong>&lt;br&gt;The chewing action that breaks, cuts, and tears up feed.</td>
<td><strong>Mastication occurs in an animal’s mouth.</strong></td>
</tr>
<tr>
<td><strong>Peristalsis</strong></td>
<td></td>
<td><strong>Contraction</strong>&lt;br&gt;Voluntary contraction and relaxation of muscles.</td>
<td><strong>Evening wave like movements</strong>.</td>
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<td><strong>Digestion</strong></td>
<td></td>
<td><strong>Breaking down</strong>&lt;br&gt;Breaking down food</td>
<td><strong>Get nutrition</strong></td>
</tr>
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<td><strong>Duodenum</strong></td>
<td></td>
<td><strong>In Tube</strong>&lt;br&gt;Small intestines &lt;br&gt;First Part</td>
<td><strong>Mix with bile &lt;br&gt;made from gallbladder</strong></td>
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<td><strong>Enzyme</strong></td>
<td></td>
<td><strong>Substances</strong>&lt;br&gt;Catalyze&lt;br&gt;Substance produces&lt;br&gt;Enzyme &lt;br&gt;Speeds up the rate of digestion</td>
<td><strong>Absorbs nutrients</strong></td>
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<tr>
<td><strong>Jejunum</strong></td>
<td></td>
<td><strong>Small Intestine</strong>&lt;br&gt;Between duodenum and ileum</td>
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**Ileum**

<table>
<thead>
<tr>
<th>Clue</th>
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<tr>
<td>Explain</td>
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<td>Use</td>
<td>Between the Jejunum and the Cecum</td>
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**Absorption**

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<thead>
<tr>
<th>Clue</th>
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<tbody>
<tr>
<td>Explain</td>
<td>Digest breaks down food and puts it into the Blood Stream</td>
</tr>
<tr>
<td>Use</td>
<td>Food enters the Blood Stream</td>
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**Bile**

<table>
<thead>
<tr>
<th>Clue</th>
<th>Fluid</th>
</tr>
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<tbody>
<tr>
<td>Explain</td>
<td>By the organism (bile aids in digestion)</td>
</tr>
<tr>
<td>Use</td>
<td>Fluid in the Liver</td>
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**Pseudo-ruminant**

<table>
<thead>
<tr>
<th>Clue</th>
<th>Roughage</th>
</tr>
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<tbody>
<tr>
<td>Explain</td>
<td>An animal that eats large amounts of Roughage</td>
</tr>
<tr>
<td>Use</td>
<td>It doesn't have a stomach</td>
</tr>
</tbody>
</table>
# A.K. Vocabulary Overview Guide

## Mastication

<table>
<thead>
<tr>
<th>Clue</th>
<th>Chewing</th>
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<tbody>
<tr>
<td>Explain</td>
<td>The chewing action that breaks, cuts, and tears up food.</td>
</tr>
<tr>
<td>Use</td>
<td>Mastication occurs in an animal’s mouth.</td>
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</table>

## Peristalsis

<table>
<thead>
<tr>
<th>Clue</th>
<th>involuntary muscle contractions</th>
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</thead>
<tbody>
<tr>
<td>Explain</td>
<td>involuntary muscle contractions that move food through the esophagus</td>
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<tr>
<td>Use</td>
<td>Peristalsis moves food through the esophagus</td>
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## Digestion

<table>
<thead>
<tr>
<th>Clue</th>
<th>break down of food</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain</td>
<td>physical &amp; chemical action that breaks down food into usable substance</td>
</tr>
<tr>
<td>Use</td>
<td>Digestion is the physical and chemical break down of food.</td>
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</table>

## Duodenum

<table>
<thead>
<tr>
<th>Clue</th>
<th>1st segment; most digestion</th>
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</thead>
<tbody>
<tr>
<td>Explain</td>
<td>2nd segment of small intestine where most digestion occurs</td>
</tr>
<tr>
<td>Use</td>
<td>Most digestion occurs in the duodenum</td>
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</table>

## Enzyme

<table>
<thead>
<tr>
<th>Clue</th>
<th>organic catalysts</th>
</tr>
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<tr>
<td>Explain</td>
<td>organic catalysts that speed up chemical reactions</td>
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<tr>
<td>Use</td>
<td>Enzymes speed up chemical reactions in the body</td>
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## Jejunum

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<thead>
<tr>
<th>Clue</th>
<th>2nd segment; nutrient absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain</td>
<td>3rd segment of small intestine where nutrient absorption begins</td>
</tr>
<tr>
<td>Use</td>
<td>Nutrient absorption begins in the Jejunum</td>
</tr>
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</table>
Name: [Signature]

Date: 3/16/18

**Ileum**

**Absorption**

**Clue:** bringing into bloodstream

**Explain:** the process of getting nutrients into the bloodstream

**Use:** Nutrient absorption mostly occurs in the ileum.

---

**Bile**

**Pseudo-ruminant**

**Clue:** w/out lots of roughage

**Explain:** an animal that eats lots of roughage but does not have a stomach with several compartments

**Use:** Horses are pseudo-ruminants.

---

**Clue:** liver liquid

**Explain:** yellowish-green alkaline, bitter liquid produced in the liver

**Use:** Bile is produced in the liver.
Lesson Plan 2 Rational

For this portion of the unit I wanted to take a more hands on approach to get students to apply the material. I came up with the idea of digestion booklets by combining interactive notebooks with the schema theory. Students had to be actively engaged in the note taking in order to complete the booklets correctly, and each booklet built off of the previous booklet. The lesson plan below shows the first of the 4 booklets that were completed. If organs and functions were the same as the previous booklet that were not listed in subsequent booklets in order for students to see how the systems were different from one another. While I explicitly taught the material as we went through it, students were responsible for making the booklets understandable.

Using this system from the beginning of the unit also developed a procedural knowledge which made the rest of the unit easier to progress through. In “The Art and Science of Teaching” by Robert J. Marzano it is stated that “When fully developed, procedural knowledge can be performed at a level of controlled processing.” By the end of the unit, I no longer had to specifically tell students what need to be on each page, and they understood that what was important for them to remember and what was less important.

Another concept that I wanted to implement into my lesson was choral response. After we review one organ I would ask for a choral response of the organ and what its main function was. In the same “The Art and Science of Teaching” it explained that this method worked best with information that is stated in short phrases. Using this information I tried to keep the information in short phrases so that way when I asked for the response it would be easy for students to recite back to me.
**Daily Lesson Plan**

<table>
<thead>
<tr>
<th>Instructor:</th>
<th>Mrs. Hall</th>
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<tbody>
<tr>
<td>Course:</td>
<td>Introduction to Vet Science</td>
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<tr>
<td>Grade Level/Period:</td>
<td>11&lt;sup&gt;th&lt;/sup&gt; &amp; 12&lt;sup&gt;th&lt;/sup&gt; grade – 1&lt;sup&gt;st&lt;/sup&gt; Period</td>
</tr>
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<td>Monogastric Digestive System</td>
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<td>Total Estimated Time:</td>
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**State Measurement Criteria**

| State Strand/Standard: | Strand 4 – Standard 4,5,6 |

**Today’s Learning Objective(s):**
- Correctly explain the steps in the monogastric digestion process to a classmate using notes

**Student Assessment/Evaluation**

On the unit test students will have to explain the difference between two different types of digestive systems. Students will need to have a complete understanding of all of the types of digestive systems so they are able to answer the question depending on which two systems are presented.

To check for understanding at the end of this lesson, students will pair up to and explain the monogastric digestion processes to each other. They will take turns telling their partner about one of the organs in the monogastric digestion systems. They will be required to discuss the following points:
1. The name of the organ found in the digestion system
2. What function that organ performs
3. The correct order of the organs

**Introduction/Anticipatory Set/ Interest Approach (Motivation)**

Digestive System Demonstration

<table>
<thead>
<tr>
<th>Time: 10 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials:</td>
</tr>
<tr>
<td>Small Dish</td>
</tr>
<tr>
<td>PB&amp;J sandwich</td>
</tr>
<tr>
<td>Water</td>
</tr>
<tr>
<td>Milk</td>
</tr>
<tr>
<td>Scissors</td>
</tr>
<tr>
<td>Masher</td>
</tr>
<tr>
<td>Quart size ziplock</td>
</tr>
<tr>
<td>Coke</td>
</tr>
<tr>
<td>Pantyhose</td>
</tr>
<tr>
<td>Large bowl</td>
</tr>
<tr>
<td>Tray w/ paper towel</td>
</tr>
</tbody>
</table>

1. Cut the peanut butter and jelly sandwich into bite size pieces. -> The dish is your mouth.
   The scissors are the front teeth which are designed for cutting.
2. Pour is a small amount of water. -> the water represents saliva
3. Add milk (you can’t eat a peanut butter sandwich without milk!)
4. Use the masher to mash everything up. -> the masher is the back teeth which are designed for grinding up the food
5. Empty the bowl into a quart size bag. -> bag is the stomach
6. Add a little bit of coke -> coke represents stomach acids that aid in digestion
7. Mix the contents of the bag with your hands -> this represents the stomach muscles mixing everything together.
8. Pour the bag into nylon over the empty bowl. -> the nylon represents the intestines.
   The liquid that is coming out is the nutrients that the small intestine is removing
9. Roll the nylon up in paper towels and squeeze out the remaining liquid -> this represents the large intestine drawing out any available water out of the food.
Curriculum and Instruction: Monogastric Digestive System

**Content (What):**

**Mouth**
- Food enters the digestive system through the mouth, where **mastication** occurs.
- The salivary glands
  - Secrete saliva
  - To allow swallowing
  - Break down simple carbohydrates
- Saliva contains two **enzymes**
  - **Salivary amylase**
    - Starch to maltose
  - **Salivary maltase**
    - Maltose to glucose

**Esophagus**
- The esophagus connects the mouth and the stomach.
- It moves food from the mouth through the stomach through **peristalsis**

**Stomach**
- The stomach is a muscle
  - Stores food
  - Secretes fluids and enzymes
    - Function to break down food
- The stomach secretes a fluid called gastric juice
  - Aids in digestion
  - Contains
    - Hydrochloric acid
    - Pepsin
    - Rennin
    - Gastric lipase
- **Hydrochloric acid**
  - A digestive fluid that breaks down proteins
  - Lowers the pH in the stomach
  - Kills bacteria ingested with feed
  - **Pepsin**
  - An enzyme that breaks down proteins into shorter chains of amino acids
- The stomach acts mechanically by using muscle contractions to mix food.
  - **Chyme**
    - The pulpy mass that is passed from the stomach to the small intestine
  - Chyme is mixed with Bile, Pancreatic Juice, Intestinal Juice
  - Three segments of the small intestine

**Teaching Method (How):**
Before starting the powerpoint, students will put together a pig book. The cover will be a picture of a pig and then behind it will be notebook paper that is cut out in the shape of a pig and stapled to the cover.

**Pig Digestive book**
- Have students color the cover then staple (6) pages behind it. Each page will be a different organ.

Digestive Systems PPT Slides 2-19

Each page will have at least one of the organs on the diagram below

**Materials:**
- Pig Outlines
- Digestion PPT

**Time:** 40
Liver
❖ Produces **Bile**
✓ *Yellowish-green, alkaline, bitter liquid*
✓ Bile helps digest fats and fatty acids.

Gallbladder
❖ Stores Bile

Pancreas
❖ Produces juice/enzymes that are released into the small intestine to aid in digestion
✓ **Trypsin**
✓ **Amylase**
✓ **Lipase**

Small Intestine
❖ Most absorption occurs in the small intestine.
✓ The longest organ of the digestive system
✓ Chyme is mixed with Bile, Pancreatic Juice, Intestinal Juice
✓ Three segments of the small intestine
✓ **Villi**
❖ The first segment of the small intestine
✓ **Duodenum**
   ❖ First segment of the small intestine and is where most digestion occurs in a monogastric animal
❖ The second segment of the small intestine
✓ **Jejunum**
   ❖ Second segment of the small intestine and is where nutrient absorption begins.
❖ The third segment of the small intestine
✓ **Ileum**
   ❖ Third segment of the small intestine and is where most nutrient absorption occurs

Large Intestine
❖ The large intestine is shorter than the small intestine but larger in diameter.
❖ Main function - to absorb water and electrolytes
❖ The second function of the large intestine
✓ To store indigestible food until it is ready to be expelled from the body
❖ The third function of the large intestine is to form **feces** (define)
✓ Feces pass through the rectum
✓ Feces exit the body through the anus

Other Monogastrics
❖ Cats
❖ Dogs
❖ Humans
### Process Questions and Answers/Formative Assessments:

1. What is the main function of the mouth? – Begin breaking down food
2. What is the main function of the esophagus? – Transport food to the stomach
3. What comes after the stomach? – Break down food using stomach acids
4. What are the segments of the small intestine? – Absorb water
5. What is the function of the large intestine? – Absorb water and enzymes

### Consideration of Instructional Modifications for Special Populations (ELLs, IEPs, etc.):

- Tell students what needs to be in their notes

### Literacy Strategies and Key Terminology:

Vocabulary Guide was completed in the prior lesson. As the terms as they come up I will ask students to recall the definitions. Words that are not on the vocabulary overview guide that are important to the different organs will be defined and students will write them in their digestive system books.

- Mastication
- Enzymes
- Peristalsis
- Chyme
- Bile
- Duodenum
- Jejunum
- Ileum
- Villi
- Peristalsis

### Transition:

When I say “digestion” everyone is going to lineup along the back wall according to your shoe size. The small size will be by the door to the hallway and the biggest size will be by the door to the shop. Make sure you take your pig book with you! Are there any questions? Digestion!

### Closure/Summary

Once all of the students have lined up on the back wall I will put them into pairs with the people they are next to. They will then each take a turn telling their partner about one of the organs in the monogastric digestion systems. They will be required to discuss the following points:

1. The name of the organ found in the digestion system
2. What function that organ performs
3. The correct order of the organs

### Time: 10 minutes

### Materials: Half sheet of paper

### Enrichment/ Experiential Learning/ Connection to CTSO, Leadership, or Career

Veterinary Science CDE

### Materials:
### Student Learning

#### Student 1 Performance
As I listened to S.W. talk through the ruminant digestive system I could tell that he wasn’t completely clear on what all of the function of each organ was. When I prompted him to use his booklet to help him with his explanations he told me he hadn’t been filling it out. I looked through his booklet and I noticed he had drawn most of the pictures, but he didn’t have any of the functions written down. He told me that he just didn’t want to do it, and so I had him work with his partner to get the rest of it filled out. One thing that I did think that may have helped him was to give him what needed to be in the booklet on a separate piece of paper so he could work through the book at his own pace. I struggled with this because I was worried if I did it this way then he wouldn’t be focused on the discussion that the rest of the class was having. (See page 45 for a copy of S.W.’s booklet)
At this point I would say that S.W. was at a basic level in terms of this objective.

#### Student 2 Performance
A.K. was able to execute the explaining to a partner perfectly. She had only 1 question about the pancreas which was something I didn’t go into much detail about. As I compared these two student’s booklets in particular, I noticed that A.K.’s was much more organized and detail oriented. I think that in order to help more students have a similarly detailed book it would help to have an example book for students to look at. (See page 46 for a copy of A.K.’s booklet)
I feel confident in assuming that A.K. is proficient in this objective.

### Teaching Reflection

#### What was the best part of this lesson?
I had a lot of positive feedback from several students about how much they enjoyed using the booklets to help organize their notes. Many students said that it helped to have something to focus on while they were taking notes to help them pick out what was most important. Something I did differently than I originally planned was that the students put together all of their books before we started taking any notes. While this did take over half the class period, I would definitely do it this way again. I decided to do this because I didn’t want to lose student focus as we switched from one system to the next. Having all the books completed beforehand made it easy to just have students get out the next booklet and keep taking notes without breaking concentration.

#### What changes do I need to make for the next time I teach this lesson?
Something that didn’t work that I’m not sure what exactly to do about it is that there were a couple of students, S.W. included that were not interested in the booklets at all and would have rather just taken notes traditionally. I think that it is good for students to branch out of their comfort zone in class, however, I do need to find someway to keep those students engaged. Maybe some things would be to have them draw the animal in their notes and label all of the organs that way or have them take more responsibility for their learning and ask them what they feel is the most important information based on what we talked about.
**Mouth**
- Food enters the digestive system through the mouth, where *mastication* occurs.
- The salivary glands
  - Secrete saliva
  - To allow swallowing
  - Break down simple carbohydrates

**Salivary Glands**
- Saliva contains two *enzymes*
  - *Salivary amylase*
    - Converts starch to maltose
  - *Salivary maltase*
    - Converts maltose to glucose

**Esophagus**
- The esophagus connects the mouth and the stomach.
- It moves food from the mouth through the stomach through *peristalsis*

**Stomach**
- The stomach is a muscle
  - Stores food
  - Secretes fluids and enzymes
    - Function to break down food

**What are the functions of the stomach?**
- The stomach secretes a fluid called gastric juice
  - Aids in digestion
  - Contains
    - Hydrochloric acid
    - Pepsin
    - Rennin
    - Gastric lipase
What are the functions of the substances and enzymes present in the stomach?

- **Hydrochloric acid**
  - A digestive fluid that breaks down proteins
  - Lowers the pH in the stomach
  - Kills bacteria ingested with feed

- **Pepsin**
  - An enzyme that breaks down proteins into shorter chains of amino acids

What are the functions of the stomach?

- The stomach acts mechanically by using muscle contractions to mix food.
  - **Chyme**
    - The pulpy mass that is passed from the stomach to the small intestine

Liver & Gallbladder

**Liver**
- Produces **Bile**
  - Yellowish-green, alkaline, bitter liquid
  - Bile helps digest fats and fatty acids.

**Gallbladder**
- Stores Bile

Pancreas

- Produces juice/enzymes that are released into the small intestine to aid in digestion
  - **Trypsin**
  - **Amylase**
  - **Lipase**

Small Intestine

- Most absorption occurs in the small intestine.
  - The longest organ of the digestive system
  - Chyme is mixed with Bile, Pancreatic Juice, Intestinal Juice
  - Three segments of the small intestine

- **Villi**

What are the functions of each of the three segments of the small intestine?

- The first segment of the small intestine
  - **Duodenum**
    - First segment of the small intestine and is where most digestion occurs in a monogastric animal

- The second segment of the small intestine
  - **Jejunum**
    - Second segment of the small intestine and is where nutrient absorption begins.
What are the functions of each of the three segments of the small intestine?

- The third segment of the small intestine
  - Ileum
    - Third segment of the small intestine and is where most nutrient absorption occurs

Large Intestine

- The large intestine is shorter than the small intestine but larger in diameter.
- Main function - to absorb water and electrolytes

What are the functions of the large intestine?

- The second function of the large intestine
  - To store indigestible food until it is ready to be expelled from the body

What are the functions of the large intestine?

- The third function of the large intestine is to form **feces** (define)
  - Feces pass through the rectum
  - Feces exit the body through the anus

Other Monogastrics

- Cats
- Dogs
- Humans
Monogastric Digestive System Booklet

To keep track of your notes and help you remember the order of the monogastric digestive system you will be completing a monogastric digestive system booklet. Follow the directions below to assemble your book.

Directions:

1. Cut on the line below so you have a half sheet of paper with a pig on it.
2. Color in the pig picture however you desire
3. Once the pig is colored, right on it “Monogastric”
4. Take 4 pieces of note book paper and fold them in half. Staple the papers to the pig with the staple near the top center of the pig’s back.
5. Cut out all of the papers out in the outline of the pig. You do not need to cut it out exactly on the black line but keep it close.
Lesson Plan 3 Rational

For the final lesson of the unit I wanted to implement something that would stick in the student’s mind. I decided to use a mix of modeling and labeling to incorporate several different learning modalities. I used the playdough to incorporate kinesthetic learners, labeling to help auditory learners, and had students tell me about their models to incorporate auditory learners. By including all of the modalities in the same lesson I am able to reach more students all at the same time.

I wanted students to learn how to answer their own questions, so when students were ready to pass off their models if they were missing things I only told them that they were missing something and they had to figure out what it was. I am trying to teach students to have ownership of their own work and by allowing them to justify what they have and find out what is wrong they are taking responsibility for the work they have completed.
### State Measurement Criteria

**State Strand/Standard:** Strand 4 – Standard 5

**Today's Learning Objective(s):**
1. Model the 4 types of digestive systems using playdough with 100% accuracy

### Student Assessment/Evaluation

On the written end of unit test there will be a labeling section where students will have to label one of the digestive systems that we have talked about in class.

In order to see how well students are meeting the objective I will have them model each of the 4 types of digestive systems. At this point the objective is either pass or fail. Students will not be able to move onto the next system until I have passed off the system they are currently working on first.

### Introduction/Anticipatory Set/ Interest Approach (Motivation)

Have all of the playdough and instruction sheets out on the table when students walk into the class.

Now that we have talked about all of the different organs in the digestive system and their functions/role they play in the digestion process, you will have the opportunity to model each of the different systems.
### Curriculum and Instruction: Objective 1

<table>
<thead>
<tr>
<th>Content (What):</th>
<th>Teaching Method (How):</th>
<th>Time: 140 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will be creating digestive system models using playdough. Students will need to complete all 4 of the different types of digestive systems. Students will not be able to move onto the next digestive system until I have passed it off. They will be given a list of terms that will be used. All the words will be used at least once; they may be used more than once. Things that need to be labeled on each system:</td>
<td>Playdough Digestive Systems</td>
<td></td>
</tr>
<tr>
<td><strong>Monogastric</strong></td>
<td></td>
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</tr>
<tr>
<td>• Mouth</td>
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<tr>
<td>• Esophagus</td>
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<tr>
<td>• Stomach</td>
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<tr>
<td>• Small Intestine</td>
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<tr>
<td>• Liver / Gall Bladder</td>
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<tr>
<td>• Pancreas</td>
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<tr>
<td>• Large Intestine</td>
<td></td>
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<tr>
<td>• Rectum</td>
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<tr>
<td><strong>Ruminant</strong></td>
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<tr>
<td>• Mouth</td>
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<td>• Esophagus</td>
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<td>• Rumen</td>
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<tr>
<td>• Reticulum</td>
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<td>• Omasum</td>
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<td>• Large Intestine</td>
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<tr>
<td>• Rectum</td>
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<tr>
<td><strong>Pseudo-Ruminant</strong></td>
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<tr>
<td>• Large Intestine</td>
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<tr>
<td>• Cecum</td>
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<tr>
<td>• Rectum</td>
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<tr>
<td><strong>Avian</strong></td>
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<tr>
<td>• Mouth/Esophagus</td>
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</tr>
<tr>
<td>• Crop</td>
<td></td>
<td></td>
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<tr>
<td>• Proventriculus</td>
<td></td>
<td></td>
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<tr>
<td>• Gizzard</td>
<td></td>
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</tr>
<tr>
<td>• Small / Large Intestine</td>
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<tr>
<td>• Ceca</td>
<td></td>
<td></td>
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<tr>
<td>• Cloaca</td>
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</tbody>
</table>
### Process Questions and Answers/Formative Assessments:

1. Where are the liver and gallbladder located at? – Along the small intestine  
2. Does every digestive system have a liver gallbladder? – yes  
3. What compartment of the ruminant stomach does food enter into first? – Rumen  
4. What is another name for the proventriculus? – True Stomach  
5. What is another name for the gizzard? – Ventriculus  
6. What was similar between the chicken and the horse? – ceca

### Consideration of Instructional Modifications for Special Populations (ELLs, IEPs, etc.):

This lesson did not require any modifications for this current class. However, if it was needed in the future you could simply limit the number of systems the students would need to complete.

### Literacy Strategies and Key Terminology:

This activity is used to reinforce the vocab that has been discussed throughout the whole unit. By this point, there should be no new terms that the students have never seen or used before. All of the parts that are to be labeled that are listed above are the key terms for this lesson.

### Transition:

Everyone will have 3 minutes to pick up their area and return the playdough to the front of the class. Once everything is picked up we will move on.

### Closure/Summary

While students are cleaning up, I will pass out 2 sticky notes to every student and I will write on the board “Something I have Learned” and “A Question I Still Have”.

Alright, now that everything is picked up, I want everyone to write on one of the sticky notes that I passed out something that you learned in this unit and write your name on it. On the other sticky note, I want you to write a question that you still have (this can be about anything we have talked about in this unit). You will have 2 minutes to work on this, once you have them done come and stick them on the board. Are there any questions? Go!

Once all of the students have put their sticky notes on the board I will go over the things the wrote down. Depending on time I will go over all of them or just focus on the questions.

### Enrichment/ Experiential Learning/ Connection to CTSO, Leadership, or Career

| Vet Science | Materials: Sticky Notes | Time: 5+ minutes |
Student Learning

Student 1 Performance
S.W. enjoyed this assignment more than I had originally thought that he would. His group was able to get through 3 of the 4 digestive systems and they included all of the organs that are part of the digestion process in each of the systems. There were a few times when S.W. was unsure where the organs were supposed to go as they were incorrectly placed on the model, however, after giving him some clues and prompting him about their functions he was able to correctly place the organs. While his work was somewhat sloppy, it was well done for the quality he normally hands in.

I would say that S.W. is proficient in meeting the objective for this lesson, other than not completing the final system.

Student 2 Performance
A.K. was only able to get through 2 of the 4 digestive systems in the class period. This is the pace that I had hoped most students would go at, however there were many groups that ended up going much faster. Her group payed extreme attention to detail, which was almost too much compared to other groups that I watched work through the project. However, the digestive systems that she was able to get through were very well done and she was able to perfectly explain to me what the name of each organ was and its function.

I would say that A.K. is proficient in meeting the objective, however she was unable to complete all four models and for this reason I would place here at a basic level.

Teaching Reflection

What was the best part of this lesson?
The best part of this lesson was seeing students get creative who normally are quite and keep to themselves. Students were very excited that they were going to be able to use playdough to create something. I also think that it helped students have a more concrete representation of the different digestive systems. Using the list of words to choose from gave students a place to start looking when I told them that they did not have all of the pieces that they needed in order to pass off their models.

What changes do I need to make for the next time I teach this lesson?
Find ways to make sure everyone is doing something. In some of the groups there were people that were not participating because the other people in the group were doing most of the work. I tried coaxing them into working, but they were uninterested and would not help. I had originally planned to assign groups, but then decided against it. I think that it would be best to assign groups in the future. This would allow students the opportunity to be more involved in the activity by putting them into smaller groups with people they are pushed by.

I also had planned on the lesson taking place over the space of 2 days, however, most students were completed with all four at the end of the first day. Because of this I made the decision to not make the lesson go out into a second class period. In the future I will give students a time limit for each system so they will be able to better pace themselves and plan for only 1 day on this lesson.
**Digestive System Models**

You will be creating a digestion system model using playdough. You will be responsible for creating a model for each of the four digestive systems we have discussed in class. Follow the direction below to get full points. If you do not follow the steps exactly, you will lose points!

**Directions:**

1. Get into groups of 2 or 3
2. One person in your group needs to draw an outline of a pig – the bigger the better
3. Use playdough to make a model of the digestive system represented by the pig. Use different colors of playdough to represent each of the different organs.
4. Label each of the organs that you have included in your model – The list provided below contains the words that you will be using to label your models. All of the words will be used once, some may be used more than once.
5. Have Mrs. Hall Pass off your model
6. Repeat steps 1-5 with the horse, cow, and chicken

**Word Bank**

<table>
<thead>
<tr>
<th>Mouth</th>
<th>Rectum</th>
<th>Crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Intestine</td>
<td>Rumen</td>
<td>Proventriculus</td>
</tr>
<tr>
<td>Liver</td>
<td>Reticulum</td>
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<td>Omasum</td>
<td>Ceca</td>
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<td>Pancreas</td>
<td>Abomasum</td>
<td>Cloaca</td>
</tr>
<tr>
<td>Large Intestine</td>
<td>Cecum</td>
<td></td>
</tr>
</tbody>
</table>
S.W. Digestive System Models
At A.K. Digestive System Models
Name: ____________________________ (2 pts) Date: ____________ Score: _____/100

**Digestive System Unit Test**

**Matching Directions:** Read each definition in the left column carefully then select the term from the right column that best fits each definition. The terms in the right hand column may be used once, more than once, or not at all. **(2 pts each/20 pts total)**

_____1. Bitter liquid produced by the liver

   A. Absorption

_____2. Catalyst that speeds up chemical reactions in the body

   B. Bile

_____3. Animal that eats large amounts of roughage and uses a cecum to break it down

   C. Digestion

_____4. Breaking down feed into simple substances that the body can absorb

   D. Duodenum

_____5. First segment of the small intestine – majority of digestion occurs

   E. Enzyme

_____6. Involuntary muscle contractions

   F. Ileum

_____7. Second segment of small intestine – nutrient absorption begins

   G. Jejunum

_____8. Taking of the digested parts of the feed into the bloodstream

   H. Mastication


   I. Peristalsis

_____10. Third segment of small intestine – majority of nutrient absorption

   J. Proventriculus

   K. Pseudo-

   Ruminant

   L. Villi
**Fill in the Blank Directions:** Fill in each blank with the word that best fits the sentence. Read each statement all the way through before answering. There should only be one word per blank.

(3 pts per blank / 39 pts total)

11. The three compartments of the ruminant stomach are ________________,
______________, ________________, and _________________. (4 blanks)

12. Bile is produced by the _______________ and is then stored in the _______________. (2 Blanks)

13. The “true stomach” of the avian digestive system is the ________________________.

(1 blank)

14. The majority of electrolytes occurs in the ________________ _________________.

(2 blanks)

15. Food begins breaking down in the _____________________ of the avian digestive system.

(1 blank)

16. Chyme is the pulpy mass that is passed from the ________________ to the ____________
_______________. (3 blanks)

**Free Response Directions:** In the space provided answer the question to the best of your ability. Be sure to use complete sentences or you will lose points. **(10 points)**

17. Explain the difference between a ruminant and a pseudo-ruminant digestive system.
Labeling Directions: Using the diagram provided, label the avian digestion system using proper terminology as discussed in class. (3 points each / 24 points total)