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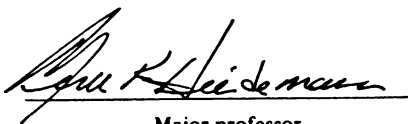
MEETING THE NEEDS OF STUDENTS IN A
MIDDLE SCHOOL EXPLORATORY CLASS

presented by

SUSANN M. YOUNG

has been accepted towards fulfillment
of the requirements for

M.S. degree in Physical Science



Major professor

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By

Susann M. Young

A THESIS

Submitted to
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ABSTRACT

MEETING THE NEEDS OF STUDENTS IN A MIDDLE SCHOOL EXPLORATORY CLASS

By

Susann M. Young

Successful teaching strategies for middle school students in an exploratory class are quite different than those used at the high school level. I had not taught at the middle school and was unprepared for the challenges of young adolescents. I experimented with various teaching strategies to determine the most effective method to satisfy the students' social needs for belonging, freedom, power and fun, and teach them science. Quizzes and writing assignments were used to determine the validity and effectiveness of each teaching strategy. "Hands on" activities with animals proved to be the most well rounded method and the most motivational for the students. Repetition strategies using games, graphs, drawings and listings, worked well for teaching scientific knowledge and were satisfactory in meeting the students' needs. Field trips and videos were fun for the students; completing questions from the textbook was not. All three methods did not meet enough of the students' needs to make them motivated to learn. Lecture was the least effective of all the teaching strategies.

DEDICATION

To the noblest of all teachers, Mother Theresa.

ACKNOWLEDGMENTS

A special thank you to my husband, Matt, for his patience and creativity while editing this thesis.

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INTRODUCTION

On June 4, 1999, my last day of school at Ionia High School, I began my new job in the neighboring town of Saranac. Saranac is a small rural community with 1130 students in grades K-12. About 23% of the students receive free or reduced cost lunch. My job duties would require me to teach science at the high school and exploratory classes at the middle school. With seven years of educational experience, I felt I was ready for the challenge of traveling between two buildings, working in four classrooms, and preparing four lesson plans. However, I was a little apprehensive of the exploratory classes at the middle school. I had no experience outside of a high school, and I had not taught students who didn't have to pass my class to graduate. Would my teaching ability and lessons be motivating enough to hold my students' interest? The exploratory classes proved to be my greatest challenge.

I chose animal agriculture to be the topic of one of my exploratory classes, because Saranac is located in Ionia County with ten percent of the population working in animal agriculture. I felt it was necessary to show this business to the seventh and eighth grade students I would teach. But, how could I do this confined to a classroom and a storage room?

I began researching answers to my problem of bringing animal agriculture into an exploratory class the summer of 1999 as part of my masters degree program. After discussions with Sam Varghese, Poultry Science Professor, basing a series of lessons on Japanese Quail seemed just the right solution. They are small birds, (small enough that two birds can fit in your hand), the eggs take 16 days to hatch and within another seven weeks, they reach maturity and could start producing their own eggs. The incubator and quail pens could easily fit into the storage room. The students should be able to raise quail and compare their needs to those of other farm animals. Along with hatching quail chicks that summer, I developed an outline of lessons to learn about these birds (APPENDIX A - Original Course Outline). I also incorporated the following Michigan Essential Goals and Objectives for Science Education, (MEGOSE, 1991), objectives into this unit:

1. How are groups of living things classified?
2. How do life cycles of living things differ?
3. How do living things obtain and use energy?
4. How are parts of living things adapted to carry out specific functions.

I felt ready to teach this exploratory class by the end of my research time at MSU. Once the new school year started, I knew within a few weeks that my "great" idea wouldn't work. The students were uncooperative in the classroom and

they were not interested in the quail. I became frustrated and wondered what I had done wrong?

First, I had misinterpreted my students. A classroom of middle school students is definitely a different audience than a group of high school students. Middle school students are not young adults and they are not "old" children, either. They are in the "middle" or an early adolescent. Farris (1990) identifies their four basic social needs as: the need to belong, the need for freedom, the need for power and the need for fun. To meet their social needs a middle school should "teach academic content in the context of adolescent traits." (Gerrick, 1999)

Secondly, I misunderstood the role of an exploratory class. A middle school student's schedule consists of "core" classes such as math, writing, social studies and science. Effective middle schools integrate "subject area content through selected themes." (Gerrick, 1999) At each grade level, teachers work together and develop units that are enhanced by each subject. Exploratory classes then complete the schedule by adding "spice and flavor to engage the natural interests of young adolescents." (George, Lawrence & Bushnell, 1998)

Exploratory classes are a "time for students to explore careers, general interests, hobbies, learner interests and physical fitness." (Allen, Splittgerber & Manning, 1993)

The exploratory class does not integrate the similar themes as in the core classes. My school did not require a certain level of achievement in the exploratory class for participation in sports, special activities or even for the advancement into the next grade. For these reasons, the middle school student perceives the exploratory class as a chance "for "fun" and a break from the "routine" without understanding their purpose." (Messick, 1991) Since an exploratory class doesn't connect with the core classes and has the student perception of being just for "fun", the exploratory class "has taken a "back seat" to other aspects of education." (Gill, 1995)

Not meeting the students' social needs and not understanding the purpose of an exploratory class, the course did not motivate students. My original plan was to have students work with the quail and use the birds as the theme to learn science. Since the quails and storage room were quite small, only 4 to 5 students were needed to care for the birds at the beginning of each day. The remaining students sat and socialized for fifteen minutes until chores were completed. Getting the entire class to work together for the remaining part of the hour was quite difficult. Henson (1988) states that all students should be actively involved in each lesson. If a student wasn't needed to care for the birds then they didn't feel it was necessary to

participate in the rest of class. During the remainder of the hour, students generally completed paper and pencil activities while sitting in a chair. The students just had no interest in sitting or using a pencil, (even if they still had one) during the last hour of the day. Consequently, the students were left feeling like they didn't belong, and had little power or freedom. They simply were not having fun and were unmotivated. I needed more involved activities that would include the whole class.

The exploratory class became very frustrating. The class needed to meet my students' social needs for belonging, freedom, power and fun to motivate the students to do well. I still had the problem of teaching animal agriculture within a classroom and storage room. About this time, the school decided to have the exploratory classes continue for a full eighteen weeks rather than nine weeks as previously planned. How would I keep the students going for another nine weeks? Discouraged but not defeated, I began looking outside my room for community resources.

I wanted to take my students to a real farm to care for a variety of farm animals. My principal suggested farmers near the school that would might have available space. The Searfoss Farm was only 2 miles from the school, a school bus passed their house at 2 p.m. and 2:35 p.m. each day, and they had a 22' by 30' barn they were willing to let me use

for six months. It was perfect! I began rounding up farm animals throughout the community. The barn accommodated a donkey, a sheep, 20 quail, 16 chickens, a calf, and 4 rabbits.

The students were excited to get the quails out of the storage room and move them to the farm. I used these students to determine the format of my "new" Agriculture Exploratory Class. Students who were uncooperative at the beginning of the course were now interested in the class. I knew I was on the right track. The evolution of the class was and continues to be amazing.

IMPLEMENTATION

The "new" Agriculture Exploratory Class started the second semester, (1999-2000 school year) with 20 seventh and eighth grade students. The class was separated into two nine-week quarters. The first quarter involved working on a farm and reading a textbook. The second half was dedicated to farm visits and classroom activities.

Students went to a working farm two miles from the middle school. Conveniently, a school bus was already passing this farm to pick up high school students at the vocational center. When class started, I took attendance and made announcements for the day. The students were then excused to use the restroom and gather their belongings, since they would not be returning to the building. They went directly to their buses to take them home. We arrived at the farm shortly after 2:00 p.m. and had 30 minutes to do chores before the bus returned. We worked on the farm on Mondays, Wednesdays and Fridays.

Once at the farm, each student in the six groups had specific duties to perform. There were six different stations in the barn. Every station for each type of animal had a notebook that listed the three to four activities for each of the three students in the group. Every group had four days at a station so that each member could rotate

through the activities (APPENDIX B - Student Activity Sheets). Students spent around 10 to 15 minutes doing their chores. Sometimes they needed to wait for shared equipment, but they all had extra time to examine the animals, help out other members or just sit on a bale of hay.

Because my students are from a rural community, they knew about farm animals but they hadn't actually taken care of many of them. When attending to the animals, the students supplied them with food and water, cleaned their pens and groomed them. Stevens (1970) stated that animals being observed by students must always be maintained in the maximum possible condition of health, comfort, and well being. Most classrooms make these duties the responsibility of the teacher but I made them the responsibility of the students.

The groups spent one week at each station. They recorded the amount of feed consumed by the animals in their station over that one week period. Students weighed their initial amount of feed at the beginning of the week and then weighed how much was left before they did their last feeding. They calculated total feed consumption and the cost to raise that animal for a week, a month and a year (APPENDIX C - Activity Summary Sheet).

Experiments were not performed on the animals. A single week at each station per group was not sufficient

time for any type of experimentation. Besides, "junior high projects are not likely to produce new findings that would justify injuring an animal." (Fox & Ward, 1977) This fact is also proven by Mayer, (1973), who states that the attempt to confirm already existing knowledge by inadequately prepared and technically untrained people can only result in frustration and cruelty.

When the students were not at the farm on Tuesdays and Thursdays, they remained in the classroom for the entire hour. The groups were assigned the particular chapter from the textbook: Livestock and Companion Animals to read that related to the type of animal they were caring for at the farm (APPENDIX D - Textbook Vocabulary & Questions). The week rotation in the barn allowed for three days in the classroom. (Monday, Wednesday, Friday and Monday at the farm. Tuesday, Thursday and Tuesday in the classroom.) The first day was for defining the vocabulary in the chapter. During each of the second and third days, the students worked in their groups to answer five, lengthy questions about their animals.

During the first nine weeks, students also watched a video and were given a lecture about different animals that were not at the farm. Students watched an hour long video tape about the raising of pigs. They also completed the textbook vocabulary and questions about swine production.

Finally, a class lecture was given on guinea pigs. The students had already completed vocabulary and questions about this animal in a previous chapter.

During the following nine weeks, the class traveled to other working farms. With only a 10 to 15 minute bus ride, we could easily be at a specific type of farm and talk to a farmer about their operation. Students were able to see larger groups of animals rather than the handful we raised. They were also able to see the different types of equipment needed to care for the animals. Visiting the farms gave the students a better picture of how to raise farm animals as a profitable business.

When the class was not visiting a farm, they discussed the chapters they completed the previous nine weeks. The first day was spent playing a game, like bingo or making crossword puzzles with vocabulary words. The remaining days were spent covering the relevant MEGOSE objectives. To emphasize these objectives, I used similar activities with each animal so the students could review basic vocabulary and compare it to each animal. I named this system of repeating the repetition teaching strategy. Students listed the complete scientific classification of each animal and recognized the similarities and differences in classifications between the animals. Students graphed the life cycles of each animal and explained why the animals had

different lengths of time for gestation, and to maturity. Finally, they drew and labeled pictures of the digestive systems of each of the animals. The students defined the monogastric and ruminant digestive systems with all their parts and determined which animals had each type of system and why.

A quiz with basic questions about the eight different animals was given at the end of each nine weeks (APPENDIX E - Quizzes). Students were asked if they had ever raised each kind of animal at home or in a different class. If the student had previous experience with a certain animal the data from that portion of the quiz was not part of the overall results. Data was collected to determine the effectiveness of each teaching strategy: "hands on" farm activities, reading the textbook, taking field trips, completing repetition activities, (games, graphs, drawings and classifications), watching a video, or listening during lecture. Students were also asked to respond in a writing assignment about which of the activities they enjoyed the most and from which activity they felt they had learned the most (APPENDIX F - Writing Assignments).

EVALUATION

Data was collected from eighteen out of twenty students who agreed to take part in the study (APPENDIX G - Consent Form). The students were given two quizzes, one at the end of each nine weeks (APPENDIX E - Quizzes). Data from the quizzes was used to determine the effectiveness of each teaching strategy. The students were also given two writing assignments to evaluate which teaching strategy was the most motivational (APPENDIX F - Writing Assignments). I did not want to assume that if a strategy was "fun" for the students that they actually learned from their experience. Sometimes a "fun" activity does not translate to knowledge. Also, an activity that they learned from may not have been all that "fun".

Upon examination of the first quiz, the teaching strategy that was the most effective was the "hands on" experience acquired at the farm. The average quiz grade, when asked to correctly determine what each animal ate, that was cared for at the farm, was 51%. In comparison, when responding to what the animal ate that was lectured about in class, the average quiz grade was only 17%. Finally, when asked what the animal ate after watching an hour long video, the average quiz grade was only 8%. Interestingly, the lecture and video were done in the same week as the quiz was

given. Some students hadn't taken care of certain animals for almost two months but they could easily remember what the animal ate.

Another question on the first quiz was used to determine the effectiveness of the textbook. When asked to recall the vocabulary that they had defined and read numerous times throughout the text, the average quiz grade was 26%. This percentage was significantly lower than I had expected.

From the writing assignment, most students chose the farm to be the most fun, learning experience. The first part of the assignment asked the students to determine in which activity, (answering textbook questions, taking notes during lecture, watching the video or working on the farm), did they learn the most. 59% of the students felt they had learned the most from working on the farm. Students responded:

"The activity that made me learn the most was working on the farm. The reason why is because it was real life. You worked with the actual thing."

"I learned the most from going to the farm. Hands-on experience is a lot easier for me to learn from. Seeing what you've learned is also a lot better than doing it on paper. I forget things a lot any other way."

I found it interesting that 24% of the students felt they learned the most from answering textbook questions and that was similar to the average quiz grade. A student said:

"I learned the most with the textbook questions. With those, you have a chance to actually put the things in your own words to where you could understand the subject. It also lets you explore more, than just what you're required to learn on your own."

Another 17% believed that they learned the most from watching the video.

The second question asked them to determine which of the same four activities in question one they believed to be the most "fun". 59% of the students responded with working on the farm. Answering questions out of the book had only 6%, while, 35% of the students thought watching the video was the most fun. Student responses included:

"I had the most fun doing the farm. I wasn't bored and it was pretty easy. It was a lot better than sitting in the classroom and doing a bunch of book work."

"I had the most fun watching the video because you didn't have to do anything, all you had to do was watch. Another reason is because you learned stuff about pigs."

Finally, no student chose the lecture for either question.

During the second nine weeks, the average quiz grade ranged from 0% to 63% on questions about material taught using repetition strategies, (playing vocabulary games, making graphs, drawing systems and listing classifications). The material that was only repeated for two animals and on the final review sheet was not learned. The average quiz grade was 63% on the material that was discussed for every animal and on the review sheet as well. Finally, the average quiz grade was only 13% when students were asked to

recall information that was lectured about in class the day before the quiz. The farm visits did not increase the students' knowledge of material tested in class due to the unstructured nature of the visits.

The second writing assignment was similar to the first assignment but the type of teaching strategies used to present relevant material was different. The students were asked in which activity, (visiting farms, listening during lectures, playing vocabulary games, making graphs, drawing digestive systems, or listing classifications), did they learn the most. 60% of the students responded that they had learned the most using the repetition strategies. All types of repetition activities were equally effective.

Explanations included:

"Making the graphs helped me to get to know the animals better. I learned how they lived and called them by their actual names."

"Listing the classification helped me learn about the animal and the different aspect about it."

20% of the students believed they gained the most knowledge from field trips and the remaining 20% said it was from the lectures.

"I learn better by listening to the teacher. The lectures repeated the information and compared all the animals."

The second question asked them to determine which of the same six activities in question one they believed to be the most "fun". Even though only 20% of the students

thought they learned the most from the field trips, 60% felt they were the most fun. The students responded:

" The field trips let me experience the animals in real life. I got to see them small and big and pet them."

" I got to see big horses and learned how to mate them without a stallion. I got to see a big mean sheep. I liked to eat the ice cream we got from the dairy farm."

The remaining 40% said they liked the repetition strategies, specifically, playing vocabulary games. A student said:

"When I played BINGO I got to do stuff. I was learning but having fun all at the same time. I liked the candy."

DISCUSSION AND CONCLUSION

The collected information is useful in analyzing which teaching strategy met Farris's four basic social needs of the middle school students. Once their needs for belonging, freedom, power and fun are met, the students are motivated to learn about the class material. This motivation is essential to a successful exploratory class.

For the first nine weeks of the "new" Agriculture Exploratory Class, the "hands on" experience at the farm was the most successful teaching strategy. The farm experience satisfied all their basic needs. The students worked together in groups for a sense of belonging. The groups had the freedom to move about the farm. The students had the power to determine their chores for the day. Finally, working on the farm was a new experience for most of the students and they enjoyed getting out of the classroom to see the animals. The farm was a beneficial method for students to gain knowledge. This was proved through the average quiz grades. The farm was also chosen by the most students to be a fun, learning experience.

In comparison to working on the farm, the textbook and video did not address some of the four basic needs. When completing work from the textbook, students had the sense of belonging in their groups, but they had to sit around tables

and complete everything on their dittos. Completing textbook questions lacked freedom, power and fun. Videos were fun to watch due to the detailed information about animal birth. However, the students were unable to communicate with their group members and they felt isolated and powerless.

The second nine weeks of class proved fun experiences may not be very educational. The students especially enjoyed the freedom and fun of the farm visits but they didn't think they learned the most from them. The students were correct in that they learned the most from the repetition teaching strategies. These activities were introduced at the beginning of class and then the students could find a group to work with and complete the assignment. The students found belonging in their chosen groups, felt freedom while moving about the room to get supplies, had the power to work at their own pace, and had fun being creative with the assignment.

The lectures during both nine weeks were the least effective in satisfying the basic social needs of middle school students. The students just didn't want to sit and listen. This is also why, I believe, the students didn't feel they learned a lot from the farm visits. Once at the farm, the students would stand and listen to the farmer

explain things. To meet their needs, students want to be more actively involved.

The "new" Agriculture Exploratory Class was much more effective compared to the original class during the first semester in meeting the students' needs and teaching science objectives. However, the number of days spent in class was still too long. Allen, Splittgerber and Manning (1993) suggest that exploratory class be short periods of six to eight weeks. My Agriculture Exploratory Class was 18 weeks. Those students who just didn't like agriculture, became unbearable by the end of this time. These four students negatively affected the average quiz grades by up to 20%, since they simply turned in blank quizzes. Grades were also lowered because students didn't feel the need to study for the quizzes. Their grade in the exploratory class had no effect on other activities in school such as sports or special events. I used all eighteen students when calculating average grades to get an overall feel for the class. I hope that the average grades will increase dramatically with the additional changes to the class.

The Agriculture Exploratory Class is still evolving for next school year. The first change will be condensing the class to only nine weeks. The other exploratory teachers wanted to decrease the number of days their classes were taught. They also saw a lack of motivation after such a

long period of time. This shorter class will allow me to use only the best teaching strategies as determined from this project.

The best teaching strategy was the hands on experience while working on the farm. I know that the success of the Agriculture Exploratory Class is dependent upon having the students care for farm animals. Watching the students at the farm was incredible. They were actively involved, they were learning, and they were having fun. It allowed me to see a different side of my students. However, I knew the class could not return to the same farm because the farmer needed his facilities. To tackle this problem, I went to my FFA Alumni and talked about the need for our own barn if the agriculture program was to succeed. On June 16, 2000, the school superintendent asked me when I would be available to order the materials for a 24' by 32' barn to be built on school property and maintained by students. I was ecstatic.

With our new barn next to the school, students will be able to do their chores every day, rather than on just Monday, Wednesday and Friday. Less time will be spent waiting for and traveling on a school bus. 30 minutes of each day will be spent working with the animals. During the remainder of class, students will complete a workbook.

Student workbooks will allow for a smooth transition back to classroom activities. The workbooks will include

the same repetition strategies I developed for last years class, (1999 -2000). Crossword puzzles, word searches or matching exercises will be used to practice vocabulary. Students will determine and explain the classification of each animal. They will also explore the different breeds within a species. Graphs will be made to show the life cycles of each animal. Students will draw the digestive systems, label all the parts and explain why each animal has that specific system. I also want to repeat the type of nutrients in each kind of animal feed.

Other teaching strategies will be used on a limited basis. Textbooks will be necessary for a resource, but the students will not complete any textbook questions. Farm visits and videos are a fun break from the everyday class schedule. When they are used, the students will answers questions to compare the different farms or materials covered in the videos. Finally, if I am going to lecture, I must be animated, get group interaction and use visual aids.

I am very proud of the evolution of the Agriculture Exploratory Class and am excited by the even "newer" edition to come. Upon completion of my master program, I will begin coordinating efforts to build the school barn, and develop a student workbook. In addition, I will be developing a Marketing Exploratory Class that will also make use of the barn through the raising and selling of meat animals. I

hope the students in this class will have their four basic social needs met and be motivated to succeed.

APPENDIX A - Original Course Outline

The Science and Agriculture of Japanese Quail

day outline

1 * Visit & feed the adult quail

Introduction

- * Start the fertilized eggs
- * Facts about Japanese Quail
- * Write in journals: What are your initial feelings about Japanese Quail?

2 * Mass one day old embryos & feed adults

Incubation

- * List the factors needed for successful incubation
- * Write in journals: What do eggs need, (and why do they need it), to become chicks?

3 * Mass two day old embryos & feed adults

Embryology

- * View pictures of 1 & 2 day old embryos
- * Explain gastrulation using a balloon
- * Determine the number of cells present after each division

4 * Mass 3 day old embryos & feed adults

Embryology

- * View pictures & specimens of 3 day old embryos
- * View embryos of different animals
- * Color the different cell layers and list what they will form
- * Write in journals: Describe three interesting things about the beginnings of life?

5 * Mass 4 day old embryos & feed adults

* View specimen

Eggs - Parts

- * Eat hard boiled quail eggs
- * Dissect an egg
- * Draw and identify the different parts of an egg

6 * Mass 7 day old embryos & feed adults

* View specimen

* Practice placing dye in eggs

Eggs - Parts

- * Determine the proper names of each egg part
- * List the functions of each egg part

7 * Mass 8 day old embryos & feed adults

* View specimen

* Place dye in incubated eggs

- Eggs - Nutrition
- * Examine a food label
 - * Explain the importance of each part of the food label
 - * Discuss the nutritional value of an egg using its food label
 - * Bring in own food labels
- 8 * Mass 9 day old embryos & feed adults
- * View specimen
- Eggs - Nutrition
- * Compare the nutritional value of the yolk and white
 - * Compare the food labels of eggs to other foods using sand and cylinders
- 9 * Mass 10 day old embryos & feed adults
- * View specimen
- Eggs - Nutrition
- * Student presentations
 - * Write in journals: Should you eat eggs? Should you eat every part of the egg? Explain.
- 10 * Mass 11 day old embryos & feed adults
- * View specimen
- Eggs - Chemistry
- * Spin a hard and raw egg
 - * Determine the volume of the egg - water displacement
 - * Start the Diffusion Experiment
- 11 * Mass 14 day old embryos & feed adults
- Egg - Chemistry
- * Determine the new volume of the egg from the Diffusion Experiment
 - * Use the enlarged egg for the Shrinking Experiment
 - * Determine the pH of a fresh egg
 - * Examine the yolk of a fresh egg
- 12 * Mass 15 day old embryos & feed adults
- Egg - Chemistry
- * Examine the egg in the Shrinking Experiment
 - * Determine the pH of an old egg
 - * Examine the yolk of an old egg
 - * Float an egg in water (old, new, with salt)
 - * Write in journals: What new facts did you learn about eggs?
- 13 * Mass 16 day old embryos & feed adults
- Handling
- * Assign adult birds to groups to handle daily
 - * Handle with Care ditto

- 14 * Mass CHICKS & feed adults. Handle birds
Classification
* Organize a bunch of school supplies
* Make a definition for classification
* Look at the six kingdoms of organisms
- 15 * Mass chicks & feed all birds. Handle birds
* Place chicks in brooder and begin feeding
Classification
* Diagram the complete classification of chickens
* Poultry classification: Pickin' Poultry Ditto
* Write in journals: Why are there so many different kinds of poultry?
- 16 * Mass chicks & feed all birds. Handle birds
* Vaccinate chicks
Bird systems - digestion
* Determine the amount of feed needed for meat or eggs
* Discuss the structures in the digestive system
* In One End ditto
- 17 * Mass chicks & feed all birds. Handle birds
Bird systems - digestion
* Definition/ Spelling Bee of Digestion game
* Write in journals: Would you rather have a chicken's digestive system? Explain
- 18 * Mass chicks & feed all birds. Handle birds
Nutrition of feed
* Examine feed tags for chicks and adult birds
* Explain the differences in the chick and adult feed
* Write in journals: Can feed affect the growth of birds? Explain
- 19 * Mass chicks & feed all birds. Handle birds
Bird systems - bones
* Explain the difference in bird and human bones
* Bony Bird ditto
- 20 * Mass chicks & feed all birds. Handle birds
Bird systems - bones
* Team bone ID game
* Write in journals: What are some advantages of a bird's bone structure?
- 21 * Mass chicks & feed all birds. Handle birds
Bird systems - female egg production
* Demonstrate formation of egg (marble in stocking)
* Yolk's on You ditto

- 22 * Mass chicks & feed all birds. Handle birds
Bird systems - female egg production
* Female Reproduction Parts - matching game
* Write in journals: What are some amazing things about a chickens reproductive tract?
- 23 * Mass chicks & feed all birds. Handle birds
Egg grading
* Review scoring cards
* Grade eggs using a candler
- 24 * Mass chick & feed all birds. Handle birds
Egg grading
* Grade eggs quiz
* Write in journals: What can a candler tell you about an egg?
- 25 * Mass chicks & feed all birds. Handle birds
External anatomy
* Point out the all the parts of the adult quail
* Beaks and Bills ditto
- 26 * Mass chicks & feed all birds. Handle birds
External anatomy
* Name That Part game
* Write in journals: Name three features of birds and explain why they have them?
- 27 * Mass chicks & feed all birds. Handle birds
Feathers
* Egg in a Bottle & Bernoulli's principle of flight demos
* Light as a Feather ditto
- 28 * Mass chicks & feed all birds. Handle birds
Feathers
* Feather Bingo
* Write in journals: Why are there so many different kinds of feathers?
- 29 * Mass chicks & feed all birds. Handle birds
Feathers
* Bird Baths ditto
* Wash birds
- 30 * Mass chicks & feed all birds. Handle birds
* Move chicks into growing pens
Showmanship
* Discuss the purpose of showing poultry
* Demonstrate steps in showing poultry

- * Student practice
- 31 * Mass growing birds & feed all birds. Handle birds
Showmanship
 - * Showmanship contest
 - * Write in journals: How important is the first impression?
- 32 * Mass growing birds & feed all birds.
Judging
 - * Compare 4 different qualities of eggs
 - * Discuss the purpose of ranking eggs or animals
 - * Big, Bigger, Biggest ditto
- 33 * Mass growing birds & feed all birds.
Judging
 - * Explain how ranking can be used in meats too
 - * 1 - 2 - 3 You're It ditto
- 34 * Mass growing birds & feed all birds.
Judging
 - * Judge adult birds and write reasons
 - * Judge meat carcasses and write reasons
- 35 * Mass growing birds & feed all birds.
Judging
 - * Present oral reasons to class
 - * Write in journals: Why weren't everyone's reasons the same?
- 36 * Mass growing birds & feed all birds.
Poultry Industry
 - * Compare the production of poultry/eggs in various countries
 - * List numerous products made from poultry/eggs
 - * Analyze the increase in egg & meat consumption in US
 - * Examine the possibilities for the future of the poultry industry
 - * Writing in journal: What do you believe is the future of the poultry industry?
- 37 * Mass growing birds & feed all birds
Poultry Industry
 - * Tour Herbrucks packaging plant
- 38 * Mass growing birds & feed all birds
Poultry Careers
 - * Examine all the career possibilities in the poultry industry

- * Write in journals: What poultry career seems interesting and why?
- 39 * Mass growing birds & feed all birds
- FFA * Discuss the vastness of the FFA organization
- * Explore the FFA Poultry Contest
- 40 * Mass growing birds & feed all birds
- * Move growing birds into breeding pens
- FFA * FFA student presentation
- * Write in journals: What do find the most interesting about the FFA?
- 41 * Feed all birds
- * Use computer to graph growth of birds
- 42 * Feed all birds
- * Determine the cost per pound of quail raised
- 43 * Feed all birds
- * Prepare for quiz bowl
- 44 * Feed all birds
- * COLLECT EGGS
- * Quiz Bowl Contest
- 45 * Feed all birds
- * COLLECT EGGS
- * Write in journals: Now that you know about Japanese Quail, what are your feelings about them?

APPENDIX B - Student Activity Sheets

HORSE

1 _____

_____ Take donkey outside
right away!

_____ Water - 2 full buckets

_____ Put new straw in pen

_____ Clean out front feet

2 _____

_____ Give 2 chunks of hay

_____ Get wheel barrow and
take manure out

_____ Brush left side of
donkey

_____ Put donkey back in pen
at 2:35pm

3 _____

_____ Shovel out manure

_____ Brush right side of
donkey

_____ Clean back feet

OVERALL

How did the day go?

SHEEP

1 _____

2 _____

_____ Take sheep outside right _____ Give 1 chunk of hay
away!

_____ Water - 1 full bucket _____ Get wheel barrow and
take manure out

_____ Brush left side of sheep _____ Brush right side of
sheep

3 _____

OVERALL

How did the day go?

_____ Shovel out all wet or
dirty straw

_____ Put sheep back in pen at
2:35 p.m.

DAIRY

1 _____

2 _____

_____ Take calf outside right
away!

_____ Weigh bag of feed before
calf is fed!!

_____ Water - 2 full buckets

_____ Get wheel barrow and
take manure out

_____ Put new straw in pen

_____ Brush right side of calf

_____ Brush left side of calf

_____ Put calf back in pen at
2:35pm

3 _____

OVERALL

_____ Shovel out manure and
all wet straw

Weight of feed bag

_____ Feed calf 3/4 bucket
full

How did the day go?

CHICKENS

1 _____

_____ Sweep out chicken pen
first!!

_____ Water - fill red dish

_____ Get wheel barrow and
remove manure

2 _____

_____ Weigh bag of feed before
feeding!!

_____ Put new bag of corn cob
under roast area.

_____ Fill metal feeder and $\frac{1}{2}$
fill red dish

3 _____

OVERALL

_____ Collect eggs

_____ Shovel manure into wheel
barrow

_____ Weigh bag of oyster
shell

_____ Put oyster shell in
small feeder

Weight of feed bag

Weight of oyster
shell _____

Number of eggs
collected _____

How did the day go?

Quail

1 _____

2 _____

_____ Weigh bag of feed before
feeding!!

_____ Let two roosters out for
a stroll

_____ Water quail

_____ Watch that roosters
don't get outside

_____ Feed quail

_____ Sweep west end of barn

_____ Clean trays under quail

_____ Put roosters back into
pens

3 _____

OVERALL

_____ Feed roosters

Weight of feed bag

_____ Water roosters

How did the day go?

_____ Clean trays under
roosters

RABBITS

1 _____

2 _____

_____ Water red rabbits

_____ Weigh bag of feed before feeding!!

_____ Feed red rabbits

_____ Give pellets (only $\frac{1}{2}$ cup!) to the four rabbits

_____ Remove manure under red rabbit pens

_____ Help weigh four rabbits

_____ Sweep floor on east side of barn

_____ Get wheel barrow and remove manure for all rabbits

3 _____

OVERALL

_____ Water and give hay to four rabbits

_____ Weight of feed bag

_____ Help weigh four rabbits

_____ Weight of rabbit 1

_____ Remove manure under pens

_____ Weight of rabbit 2

_____ Weight of rabbit 3

How did the day go?

APPENDIX C - Activity Summary Sheet

NAME

CARED FOR THE:

CARE WAS GIVEN ON:

AMOUNT OF FEED GIVEN:

COST OF ONE UNIT OF FEED (bale/bag)

COST OF FEED FOR ONE WEEK

COST OF FEED FOR MONTH

COST OF FEED FOR YEAR

How will the cost of feed change over the year? Explain

Describe three things that you learned when you cared for this animal.

1.

2.

3.

APPENDIX D - Textbook Vocabulary & Questions

HORSES

Name _____

TERMS - Define the terms. They are in the same order as in the text. Read the chapter while finding their definitions.

Equitation

Mare

Stallion

Foaling

Foal

Gelding

Filly

Stud Horse

Plug

Hand

Light horse

Pony

Draft horse

Riding horse

Gait

Stock horse

Palo mount

Hunting and jumping horse

Racehorse

Driving horse

Floating

Frog

Farrier

Horsemanship

Walk

Jog

Lope

6. How should teeth and hooves be cared for?
7. Describe the size and care requirements of a horse stall.
8. List and describe the four methods controlling a horse.
9. List and explain what you do during the 5 types of horse movements

SHEEP AND GOAT PRODUCTION

Name _____

TERMS - Define the terms. They are in the same order as in the text. Read the chapter while finding their definitions.

Lamb

Mutton

Wool

Chammy

Browse

Ewe

Ram

Wether

Nanny

Buck

Billy

Kid

Kidding

Purebred flock

Farm flock method

Range band method

Confinement method

Lamb feeding

Lambing

Orphaned lamb

Docking

Drenching

NAME _____

- 45

6. List the many things you should consider before selecting a sheep.
7. Name the 5 types of production systems and describe each.
8. How should rams and ewes be fed?
9. How do sheep get proper amounts of carbohydrates, proteins, minerals, vitamins and water?
10. Describe three diseases of sheep.
11. List the types of housing, fencing and equipment needed for sheep or goats.

DAIRY PRODUCTION

Name_____

TERMS - Define the terms. They are in the same order as in the text. Read the chapter while finding their definitions.

Nutrient dense

Pasteurization

Homogenization

Dry cow

Udder

Alveoli

Selection

Culling

Dairy Herd Improvement

Progeny

Predicted transmitting ability

Animal model

Functional type

Linear evaluation

Type production index

Total mixed ration

Immunoglobulins

Metabolic disorder

Milk fever

Ketosis

Cold housing

Warm housing

Milking parlor

Management intensive grazing

NAME _____

- 49

6. What are the components of a ration for a dairy cow?
7. Describe how a calf should be feed from the time it is born to a month of age.
8. What climate factors affect dairy cattle and how does it affect them?
9. Describe three diseases of dairy cattle.
10. What are the functions of a well-designed manure disposal/handling systems?
11. List and describe the three types of manure disposal/handling systems.

POULTRY PRODUCTION

Name_____

TERMS - Define the terms. They are in the same order as in the text. Read the chapter while finding their definitions.
Broiler

Roaster

Capon

Spent hen

Layer

Pullet

Cock

Cockerel

Poult

Tom

Down

Duckling

Drake

Gosling

Gander

Gaggle

Peacock

Peahen

Ratite

Poultry Science

Vertical Integration

Debeaking

Gizzard

Litter

Albumen

Yolk

Candling

Molting

Egg injection

Incinerator

NAME _____

- 53

6. Poultry houses have controlled environments. What 5 things must be controlled?
7. Draw and label the four parts of an egg and list the percentages of nutrients found in an egg.
8. Describe two methods of vaccinating chicks.
9. Describe three methods of disposing of dead birds.
10. Describe three diseases of chickens.
11. What is the scientific name of a chicken and turkey?

TERMS - Define the terms. They are in the same order as in the text. Read the chapter while finding their definitions.

Nutrient

Balanced ration

Carbohydrates

Fiber

Fat

Protein

Amino Acids

Mineral

Vitamin

Herbivore

Carnivore

Omnivore

Stomach

Rumen

Reticulum

Omasum

Abomasum

Maintenance

Growth

Reproduction ration

Lactation ration

Feedstuff

Feed

Palatability

Roughage

Forage

Permanent pasture

Temporary pasture

Concentrate

Supplement

Diet

Free access

Scheduled feeding

Calorie

Pearson Square method

ANIMAL NUTRITION AND FEEDING NAME _____

1. Why is proper nutrition important and what happens if an animal doesn't get a proper diet?
2. Explain why water is important for animal health.
3. List the three types of carbohydrates, describe them and give examples of the foods that animals eat for each type of carbohydrate.
4. List 5 uses of fat in the body and give examples of the foods that animals eat for fat.
5. List many parts of the body that protein is in and the sources that animals use for protein.
6. Why don't ruminants have as many essential amino acids?

7. List 6 minerals and their use in the body.
8. Give 3 reasons why vitamins are important in the body and explain the difference between fat soluble or water soluble.
9. Explain the monogastric digestive system and list the animals that have this system.
10. Explain the ruminant digestive system and list the animals that have this system.
11. Explain the pseudoruminant digestive system and list the animals that have this system.
12. Describe the three class of feeds and the type of nutrients they provide.

Birds, Rodents, and Reptiles

Name _____

TERMS - Define the terms. They are in the same order as in the text. Read the chapter while finding their definitions

Bird

Birdkeeping

Fledgling

Greenfood

Grit

Birdcage

Aviary

Rodent

Diurnal

Nocturnal

Reptile

Amphibian

Hutch

Quill

Solitary

6. Give example of amphibian pets and explain their cages.
7. Describe the characteristics of a rabbit and give its scientific name.
8. List the 5 categories of rabbits and give examples of breeds in each.
9. How long is gestation? What care must be taken for the female and how many babies are born?
10. What type of food should a rabbit be fed?
11. Describe the body of a ferret and hedgehog.

SWINE PRODUCTION

NAME _____

Terms - Define the terms. They are in the same order as in the text. Read the chapter while finding their definitions.

Prolific

Piglet

Barrow

Gilt

Boar

Meat-type hog

Type

Pedigree

Probe

Ultrasonics

Porcine stress syndrome

Specific pathogen free

Feeder pig

Contract production

Farrowing

Needle teeth

Tail docking

Additive

Porcine Somatotropin

Withdrawal

NAME _____

- 65

6. Explain three things that should be done to increase the survival rate during farrowing.
7. Explain the six things that should be done when piglets are born and why are they done?
8. What five things do pigs need for proper nutrition? What type of feeds are given to meet these needs?
9. Name and describe three common diseases of swine.
10. Explain the three types of production facilities used to raise hogs.

APPENDIX E - Quizzes

QUIZ 1

NAME _____

Please check which animals you have cared for at home or in a different class besides Agriculture

Calf	_____	Horse	_____
Chickens	_____	Rabbits	_____
Quail	_____	Sheep	_____
Guinea Pig	_____	Swine	_____

Type of Animal	Type of food eaten by animal (be specific - hay?)	Name of adult male and female
----------------	--	-------------------------------

Horse

Chicken

Rabbits

Quail

Sheep

Guinea
Pig

Calf

Swine

QUIZ 2

NAME _____

Please check which animals you have cared for at home or in a different class besides Agriculture

Calf	_____	Horse	_____
Chickens	_____	Rabbits	_____
Quail	_____	Sheep	_____
Guinea Pig	_____	Swine	_____

Type of Animal	Classification (Class Name)	Digestive system (Ruminant/Monogastric)	Name (Adult Female)	Name (Fixed Male)
----------------	--------------------------------	--	------------------------	----------------------

Horse

Chicken

Rabbits

Quail

Sheep

Guinea
Pig

Calf

Swine

Define the word Chordate.

What two animals have the most similar classifications?
Explain why?

Why would an animal have a large cecum? Which animals have a large cecum?

List is the order of stomachs that food passes through in a ruminant stomach?

List is the order of organs that food passes through in a pig's digestive system.

APPENDIX F - Writing Assignments

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WRITING ASSIGNMENT 1

NAME _____

Journal 1: From what type of activity (textbook questions, taking notes during lecture, watching the video, or working on the farm) did you learn the most? Explain why in at least three sentences.

Journal 2: What type of activity (textbook questions, taking notes during lecture, watching the video, or working on the farm) did you have the most fun doing? Explain why in at least three sentences.

WRITING ASSIGNMENT 2

NAME _____

Journal 1: From what type of activity (visiting farms, listening during lectures, playing vocabulary games, making graphs, drawing digestive systems, or listing classifications) did you learn the most? Explain why in at least three sentences.

Journal 2: What type of activity (visiting farms, listening during lectures, playing vocabulary games, making graphs, drawing digestive systems, or listing classifications) did you have the most fun doing? Explain why in at least three sentences.

APPENDIX G - Consent Form

January 20, 2000

To: The parents/guardians of students in the Agriculture
Exploratory

From: Mrs. S. Young

Re: Requesting permission to use student's work in a
Master's Thesis

_____ is a member of my Agriculture
Exploratory Class. This class will be raising farm animals
and visiting farms to learn about classification, body
systems, adaptations, nutrition, and health. This
exploratory was designed to complete my Master's at Michigan
State University.

I am requesting permission to use your student's scores
on tests and other measures such as journal writing, student
interviews, drawings, graphs, projects, and demonstrations
in my Master's Thesis. These measures will be used
anonymously as an evaluation of the effectiveness of using
animals to teach science and agriculture. The data
collection process will be virtually unnoticeable and will
not effect the students in any way. Choosing not to
participate does not exempt the student from doing the same
work as everyone else, it just means that I will not use
their data.

Please fill out the bottom portion of this letter. I
need both the consent of the student and parent/guardian.
If you have any questions at any time during this
exploratory, please feel free to contact me. Thank you for
your consideration in this matter.

_____ I give Mrs. Young permission to collect data
from my work. I understand that my name will not be used
and that I will remain anonymous.

_____ I do not wish for Mrs. Young to use data from
my work. I understand I will not be penalized for choosing
not to participate.

Student Signature

Date

Parent/Guardian Signature

Date

BIBLIOGRAPHY

- Allen, H. A., Splittgerber, F. L. and Manning, M. L. 1993. *Teaching and Learning in the Middle Level School*. New York: Macmillan Publishing Company.
- Farris, R. A. 1990. Meeting their needs: Motivating middle level learners. In *Middle School Journal*, 22(2): 22-26.
- Fox, Michael W., and Ward, M. Andrea. 1977 (September). Are Science Fairs Fair To Animals? In *Science Teacher*. 44: 31-33.
- George, P., Lawrence, G., and Bushness, D. 1998. *Handbook for Middle School Teaching*, 2nd. ed. New York: Addison-Wesley Educational Publishers Inc.
- Gill, Jim. 1995. Exploratory Curriculum in the Middle Level. In *Educating Young Adolescents, Life in the Middle*. Michael J. Wavering, eds. New York: Garland Publishing, Inc.
- Henson, Kenneth T. 1988. *Methods and Strategies for Teaching in Secondary and Middle Schools*. New York: Longman Inc.
- Lee, J. S., Hutter, J., Rudd, R., Westrom, L., Bull, A. M., Mohr, C., and Pollock, J. 1998. *Introduction to Livestock and Companion Animals*, 2nd ed. Dansville: Interstate Publishers, Inc.
- Mayer, William V. 1973 (January). Biology: Study of the Living or the Dead? In *American Biology Teacher*. 35: 27-30.
- Messick, Rosemary G., and Reynolds, Karen E. 1992. *Middle Level Curriculum in Action*. New York: Longman Publishing Group.
- Michigan State Board of Education. 1991. *Michigan Essential Goals and Objectives for Science Education (K-12)*. East Lansing: The Michigan Center for Career and Technical Education.
- Stevens, Christine. 1970 (January). Attitudes Toward Animals. In *American Biology Teacher*. 32: 77-79.
- Swine Management Practices, Part 1*. 1985. Texas: Creative Education Video, Incorporated.

Varghese, Sam K. 1980. *Embryological Development of Coturnix*. Department of Poultry Science: Michigan State University.

Varghese, Sam K. 1975. *E1069 Japanese Quail, Cortunix*. Michigan State University Ag FACTS.

4-H Cooperative Curriculum System. 1994. *Poultry Project Activity Guides 1-3 & Project Helper's Guide*. University of Minnesota.

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