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Curriculum for Beekeeping Science

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Developing a Curriculum for Beekeeping Science
Valley Head High School and Valley Head Community

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MASTER OF SCIENCE

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Chapter 1

Introduction

When thinking of a professional need to focus my creative component toward, I suddenly thought of a Honeybee Apiary for the Valley Head Agriculture Department. Since I started the agriculture teaching profession back in 2012, I have had the privilege to serve four different high schools and communities across the state of Alabama. Each school and community had its quality attributes as well as owning its own faults.

The two essential influences that all four agriculture departments needed in order to work properly were funding sources and community support. Funding allows students to participate in hands on learning activities, as well as being competitive in FFA activities at the state and national levels. In many cases, the funding sources comes from community support. If the community is active in your program, funding sources will miraculously appear. The most successful agriculture departments are the ones that have the ability to be self-sustained, allowing agriculture to bridge the department with the community. With an understanding of the community desires, small town agriculture departments are better able to serve the community, permitting returning support.

One mutual need that all four communities I served was to acquire knowledge in beekeeping and honeybee conservation. The majority of the agriculture educators here in the state of Alabama will agree that Honeybee Conservation has become popular. However, the resources used to educate our students on Honeybee Conservation is limited to non-existent.

Background Information

Prior to the creative component, I understood very little about honeybees nor did I have any honeybee equipment, and possessed limited educational resources for curriculum development. One of my former students conducted a beekeeping supervised agriculture experience project, which led to placing third within agriculture processing proficiency area at the state level. This single project inspired me to examine the subject matter in depth and construct a curriculum. I have invested in resources needed to practice beekeeping.

I wanted to design my curriculum to be used within the secondary school system and based off the Alabama CTE State Standards for the agriculture classroom. I also designed the honeybee curriculum to be tailored for intended use in continuing education for adult learners. Prerequisite to this course is basic Agri science and shop safety.

Purpose

This creative component will serve as a guideline for instructing students ages youth to adults in honeybee conservation and also beekeeping production and management within the Valley Head School and community. The focus for the curriculum is to assist students to become knowledgeable and accomplished in beekeeping principles so they can educate patrons after receiving qualifications. The honeybee conservation program will also serve as a source of funding. Students will have the ability to develop and manage a Honeybee Apiary, as well as harvesting and selling honeybee products such as honey and wax for fundraisers.

Objectives

The following objectives are to be obtained through this creative component:

1. Serve as an instructional guide for the Beekeeping Curriculum.
2. Assist students in becoming successful beekeepers in the development of a Beekeeping Apiary.
3. Introduce students to Honeybee Conservation and Careers in Beekeeping.

Chapter 2

Literature Review

During my eight years of teaching AgriScience, my views of content have changed due to community and student needs and wants. Our expectations have greatly increased for the students and also the community of Valley Head. Through the study and management of beekeeping, students will eventually be considered program successful and be able to obtain an education and formal job training. While working to prepare this Honeybee Curriculum, I wanted to guarantee I would be teaching what my students need in order to be successful in the field of Honeybee Conservation.

According to the Alabama State Standards for Specialty Animal Production, students will “Identify economically important specialty animals and animal products” as well as “Compare requirements for specialty animals production with traditional animal production.” Using the Honeybee Curriculum provided, students will be able to describe the economic importance of

honeybees and their products, as well as study management skills used in the Honeybee Industry through formative assessments. These skills consist of honeybee history, honeybee origin, honeybee life cycle and reproduction cycle, honeybee habitat, honeybee routine care and management, honey – wax – propolis processing. Students will be able to transfer honeybee knowledge into entrepreneurship opportunities, as well as earning the credential of Master Beekeeper through the Alabama Beekeepers Association after graduation.

Chapter Three

Methods and Procedures

When planning my honeybee conservation curriculum, my goal is to create and develop lesson plans with visual aids, worksheets, and multiple formative assessments to influence every students' understanding for progressive knowledge and skill within beekeeping. Teachers can easily track students' progress as they are guided through the learning modules concerning each honeybee topic with further dissection within the lessons the modules provides .

I set lead to the honeybee curriculum by incorporating the first standard for Specialty Animal Production with **Module 1: You Meet Honeybee**. This module is conducted within the agriculture classroom setting.

Lesson 1- *American Honey*: Students learn Beekeeping careers and the economic importance honey and bee products bring to the United States Economy, as well as the leading States that drive American honey production. This lesson also educates students on Alabama honey production and the regulations that are required for beekeepers to follow. Students are involved in Honeybee Activities such as “Why bees are disappearing?” and “A Real Buzz” worksheets.

Lesson 2- *The History of the Honeybee*: Students will discover where bees come from and how honeybees evolved. Students discuss topics such as honeybee mythology, symbols, as well as early human and honeybee interaction.

Lesson 3- *Honeybee Origin*: Students discover the different classifications of bees, where they originated from, and nest characteristics. Students are involved with a “Types of Bees” learning worksheet throughout the process.

The second component **Module 2: About Honeybees** discusses topics such as: honeybee anatomy, duties, ways honeybees communicate, life cycle, reproduction cycle and life stages of worker bees. Students are engaged in fun worksheet activities and dissection labs.

Lesson 4- *Honeybee Anatomy*: Students examine the anatomy of the honeybee. Students are guided through the dissection process of a worker bee. After dissection, students participate in the “Honeybee Anatomy” and “External Honeybee Anatomy” worksheets.

Lesson 5- *Members of the Honeybee Colony*: Students learn the different members of the honeybee colony, their gestation periods, duties, and what sets them apart.

Lesson 6- *Honeybee Communication*: Like humans, honeybees have the ability to communicate. Students learn about the different parahormones a honey bee colony can produce, as well as different ways to communicate food sources.

Lesson 7- *Life Cycle of Honeybees*: Students discover the amazing transformation honeybees undergo within its lifespan. During the lesson students produce data by conducting “Life Cycle of a Honeybee” worksheet.

Lesson 8- *Reproduction Cycle*: Students study how a honeybee colony reproduces by examining the five steps needed to carry on the species into tomorrow.

Lesson 9- *Social Life of the Hive*: This lesson is designed to engage students in learning the different life stages of the worker bee. As the worker bee grows older, she gets promoted to different task within the colony. Students will also discover the difference between spring honeybees and autumn honeybees.

The third component, **Module 3: Honeybee Environment** educates students on honeybee conservation. Learners are engaged in fun shop activities such as learning to build a Langstroth hive in the wood working shop. Students also get to plant a honeybee flower bed with perennial flowers. Students can spend a great deal of time in this lesson, due to the lengthy projects.

Lesson 10- *The Honeybee Hive*: Students learn the different parts of the popular model bee hive, the Langstroth Hive. After students finish studying the Langstroth Hive, students are sent to the woodworking shop to build a Langstroth hive.

Lesson 11- *Honey – Wax – Propolis*: Students learn about flower and honeybee interaction, as well as the resources the honeybees produce from these plants..

Lesson 12- *Honeybee Habitat*: educates students in Honeybee Conservation. Students discover ways to attract honeybees to their property, while enhancing knowledge in plant identification. Students are engaged in constructing bee houses within the woodworking shop and community garden setting..

Lesson 13- *Honeybee Pest and Disease*: Students learn the different pest and disease that affect the honeybee colony. Students will discover different actions to help combat these diseases and pest.

The fourth component, **Module 4: Beekeeping** educates students on how to develop a honeybee apiary (farm). Students are engaged in honeybee tool and equipment identification, apiary environment, installing bees, routine care and maintenance.

Lesson 14- *Beekeeping Tools*: Educates students on tools and equipment needed to provide proper honeybee husbandry skill. Tools discussed are tools needed for routine care, robbing, and extracting.

Lesson 15- *Starting the Apiary*: Learners construct knowledge in the development for the proper site to build a honeybee apiary. Students are exposed to the different ways to obtain a honey bee colony.

Lesson 16- *Installing Bees*: Educates learners the proper ways to install packaged bees, NUC, and complete hives into the beehive. Students also learn other uses for NUC hives and how they allow beekeepers to manage more closely.

Lesson 17- *Feeding and Routine Care*: Discusses the proper care and management of a honeybee colony. Students learn how to make bee feed, as well as when to feed bees. Students discover the steps in the process of routine inspections.

Lesson 18- *Understanding Swarms*: Students discover the how and why for honeybee swarms, and how to handle a wild swarm.

Lesson 19- *Winter Survival*: Discuss how bees survive during the winter.

The fifth component **Module 5: Liquid Gold** offers students knowledge and skills in robbing an honeybee hive, extracting honey, and properly packaging honey bee colonies.

Lesson 20- *Extracting Honey*: Educates learners in the proper steps needed to rob a honeybee hive. Students learn how to establish an extracting lab and how to extract honey from the comb. Students are exposed to further honey and wax processing methods such as bottling, cut-comb, and wax dispensation.

Lesson 21- *Selling Hive Products*: Discusses the many different types of products you can make with honey, wax, propolis, and pollen. Students learn how these different products can benefit their personal daily lives.

Chapter 4

Valley Head High School Agriculture Department

The creative component is designed to offer students the opportunity in establishing a solid foundation in honeybee conservation and beekeeping practices. Students gain scientific knowledge within the classroom setting, later applying the knowledge to hands on construction projects within the woodworking laboratory and beekeeping management activities at the Valley Head FFA Apiary. Some modules are more lengthy than others. The majority of the lessons can be taught within a 50 minute time range. Some laboratory activities may take weeks to finish (the beehive). Honeybee Conservation and beekeeping formative assessments will be graded on a pass/fail basis. Students can also use beekeeping knowledge and skill in the practice of their own personal supervised agriculture experience project, which will be used in proficiency applications for the Valley Head FFA Chapter. After graduation, students can use the experiences towards the credential of Masters Beekeeper with the Alabama Beekeepers Association.

The creative component is also designed toward educating adults in the community who are interested in beekeeping. The instructor can tailor lessons, cull lessons, or even add to lessons if needed; depending on the audience. My creative component could be presented within a weekend beginner beekeeping course, or a unit incorporated in with the Alabama Master Gardener Program.

Chapter Five

Summary

Upon completion of the creative component, I was able to create a curriculum that is nonexistent in both my school and our county school system. Through my designs, there is now a resource for other Agri science teachers. This component is going to open the door for another outlet of learning and discovery in the Dekalb County School System. The system Career Tech Director has already asked me to present this component with other agriculture teachers in our system in Spring 2020.

Reflection on Creative Component

Creating the Honeybee Conservation Curriculum for my creative component has been nothing short of an amazing experience. Prior to the creative component, I had never created a curriculum from scratch, nor had I ever kept honeybees. The experience created a wonderful network within the honeybee community. I met beekeepers who were happy to help with my honeybee mission. Rachell Holt provided me the opportunity to intern at Hill City Honey Apiary this summer; we extracted 40 gallons of honey from 29 honey supers. Hill City Honey supported my mission with a colony of bees for the Valley Head Apiary. This is the beginning of the “Tiger Honey.” I joined local honeybee clubs where I met professors from the University of Kentucky who educated club members on Varroa Destructor and its connection to Colony Collapse Disorder. I truly found a passion for educational field work.

The creative component gives me the confidence and ability to create any curriculum I desire to produce. A lot of schooling started happening all at once. The experience allowed me to size up a situation, construct a blueprint, organizing objectives, set strategies, conduct study, and develop evidence. I can use these skills and focus them toward other educational interests

within my discipline. I am inspired to motivate other agriculture teachers to incorporate beekeeping within their programs, and possibly producing a recognizable industrial credential students can obtain before graduating high school.

Viewing my creative curriculum objectives in Chapter 1, I am confident to say those objectives were fulfilled.

1. Serve an instructional guide for the Beekeeping Curriculum:

This objective was met by establishing a course syllabus in checklist form. Students and instructors can track the course assuring lesson objectives are met.

2. Assist students in becoming successful beekeepers in the development of a beekeeping apiary. This objective was met by developing the Valley Head FFA Apiary. Students developed beekeeping skills in the classroom, then put the skills in motion in the Valley Head FFA Apiary. Module three offers students the opportunity to build a Langstroth Honeybee Hive in the woodworking laboratory to take home for continuing education.

3. Introduce students to Honeybee Conservation and careers in beekeeping.

Students were introduced to careers within completing the first module. Learners become inspired to pursue careers as they are guided through each module. Honeybee Conservation was expressed in module four. Students are engaged in construction projects such as developing honeybee gardens and developing bee houses and sod communities for solitary bees.

Reflection on Graduate Degree Program

For me, the graduate degree program at Iowa State has been a wonderful experience. I was challenged on a daily basis by professors who inspired me to complete every job and task

through care, understanding, leadership and motivations. After eight years of teaching agriculture science in a secondary school system, I thought I knew everything about agriculture education. However, come to find out, Iowa State allowed me to see the bigger picture of our discipline.

The course I found most valuable at Iowa State University was AgEd 510: Research in Agricultural Education. I quickly found that I was not knowledgeable in the areas of citing within the research. I struggled. The class was challenging. I had to enlist the help of colleagues in the English Department. I know now, that it's ok to admit and recognize my own weaknesses and work toward becoming better. The research class built a solid foundation towards the start of my creative component.

AgEd550, Foundations of AG ED, was taken during my first semester of graduate school. I was extremely nervous on how the communication factor would work out. I was extremally impressed on how it has not been an issue. The discussion questions were helpful in ways that allowed me to understand a deeper meaning behind the content, as well as sparking ideas. The course material was challenging and the reading material was interesting.

Overall, my experience at Iowa State University was top notch and exceeded my expectations as both a learner and a professional. I have gained a deeper understanding in my field of expertise. The program has challenged me in areas such as research, planning, presentations, writing, my philosophical beliefs, and my approach in day to day classroom teaching.

References

Module 1: When, Where, and Why Honeybees

1. American Honey: PowerPoint created by Cameron Mitchell
2. Learning Activity: A Buzz Kill Reading, Ted Talks Why Bees are Disappearing and Why Bees are Disappearing Worksheet.
3. The History of the Honeybee: Exam and PowerPoint created by Cameron Mitchell
4. Honeybee Origin: PowerPoint created by Cameron Mitchell
5. Learning Activity: Types of Bees Worksheet

Module 2: About Honeybees

1. Honeybee Anatomy: PowerPoint created by Cameron Mitchell
2. Learning Activity: Anatomy of a Honeybee Worksheet.
3. Members of the Honeybee Colony: PowerPoint created by Cameron Mitchell
4. Learning Activity: Honeybees Worksheet
5. Honeybee Communication: PowerPoint created by Cameron Mitchell
6. Learning Activity: Honey Bee Communication Worksheet.
7. Life Cycle of the Honeybee: PowerPoint created by Cameron Mitchell
8. Learning Activity: Life Cycle of the Bee Worksheet
9. Reproduction Cycle of the Honeybee: PowerPoint created by Cameron Mitchell
10. Life Stages of the Worker: PowerPoint created by Cameron Mitchell
11. Learning Activity: Roles of Bees in the Hive

Module 3

1. The Beehive: PowerPoint created by Cameron Mitchell
2. Honey – Wax – Propolis: PowerPoint created by Cameron Mitchell
3. Honeybee Habitat: PowerPoint created by Cameron Mitchell
4. Honeybee Pest and Diseases : PowerPoint created by Cameron Mitchell
5. Learning Activity: Honey Bee Parasite Worksheet

Module 4

1. Beekeeping Tools and Equipment: PowerPoint created by Cameron Mitchell
2. Starting your Apiary: PowerPoint created by Cameron Mitchell
3. Installing Honeybees: PowerPoint created by Cameron Mitchell
4. Feeding and Routine Care: PowerPoint created by Cameron Mitchell
5. Understanding Swarms: PowerPoint created by Cameron Mitchell
6. Winter Survival: PowerPoint created by Cameron Mitchell

Module 5

1. Extracting Honey: PowerPoint created by Cameron Mitchell
2. Honeybee Products : PowerPoint created by Cameron Mitchell