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Poultry Skills for Improving Rural Livelihoods:

A Manual for Teaching Poultry Skills to Primary and Secondary Students

2016

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Poultry Skills for Improving Rural Livelihoods:

A Manual for Teaching Poultry Skills to Primary and Secondary Students

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Foreword

Rural families and small-scale farmers raise chickens and eggs for food and for income. Agricultural extension programs, farmer groups, nutrition and family health organizations have implemented many approaches to improving the production of scavenging or semi-scavenging chickens. These efforts include training programs for agricultural and animal health advisors, training of women farmer organizations, and trainings for village leadership. Some programs have developed the value chain for veterinary supplies and for the sale of chickens and eggs. Other programs have trained veterinary and agricultural suppliers and established demonstration farms. All of these activities can have a positive impact on improving poultry production at the farm or household level. Usually the best results are achieved when multiple approaches are implemented, such as training farmers and farm suppliers. A Team from Sokoine University of Agriculture in Tanzania, Heifer Project Nepal and the University of California at Davis implemented an additional approach to extending knowledge to small-scale farmers and rural households -- training primary school children in rural communities as part of their vocational studies. We piloted the poultry skills school program in Tanzania and Nepal. Our results indicate that training primary school children should be considered as one method, in conjunction with other outreach activities, to distribute new knowledge and build capacity in rural communities.

This Teacher's Manual is a product of that pilot project. This manual provides all of the technical background and lesson plans for primary school administrators and teachers to implement a program to teach poultry skills to children. The lessons cover both classroom and school yard activities. We wish you the best in your efforts to improve the production of chickens and eggs -- a very important source of family nutrition and income throughout the world.

Acknowledgements

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Section 1

Poultry Skills School Program Background

Why Poultry Skills School Program is Important

Homestead and small-scale poultry production provides income and food for the family. In developing countries, women and children often raise chickens and other poultry. Women in rural households raise poultry primarily to sell the eggs and an occasional chicken. The income from poultry is often one of the few significant sources of income for women. Maintaining a poultry flock is also an important food-security strategy for people living in stressed environments and changing climatic conditions. When livestock are in decline in drought years, poultry production can be particularly important for household income and as a source of nutrition. However, poor animal health and husbandry practices limit animal production, and related economic growth and public health benefits throughout Africa and Asia. Diseases and predation typically destroy most village poultry flocks. Newcastle disease is the most difficult challenge, often causing 80% mortality among village chicken flocks.

There are husbandry practices, cheap vaccines and other disease prevention and control measures that can reduce mortality and increase poultry production in homestead or small scale flocks. Poor rural communities that need disease prevention and animal husbandry information lack access to extension services. Generally, extension programs do not have adequate capacity to disseminate technical information or to deliver training programs to remote rural communities. However, primary schools exist in most rural communities. The schools represent potential sites for extension education in village communities for health & livelihood skills such as poultry production.

Importance of Nutrition and Income

Homestead and small-scale poultry production contribute to meeting the essential nutritional needs of families, especially for children, nursing mothers, and people who are ill. Chicken and eggs provide a readily available, high-quality and inexpensive source of proteins, vitamins, and micronutrients. Homestead poultry also increases food security for vulnerable families. Homestead poultry can provide a ready source of cash. Chickens and eggs can be sold or bartered to meet needs such as staple foods, school fees and supplies, medicine, clothing, as well as emergencies. Simple changes in poultry management can increase production considerably and improve the living standard of many families.

Role of Children in Poultry Production at Home

Typically, women, with the assistance of children, are the primary caretakers of poultry in villages. Children feed the chickens, collect the eggs, and put the chickens in the coop at night. The school is a good site for training. The children can learn in a demonstration coop built at or near the school. The children can be encouraged to apply and share what they learned with their family at home.

Background on Poultry Skills School Program

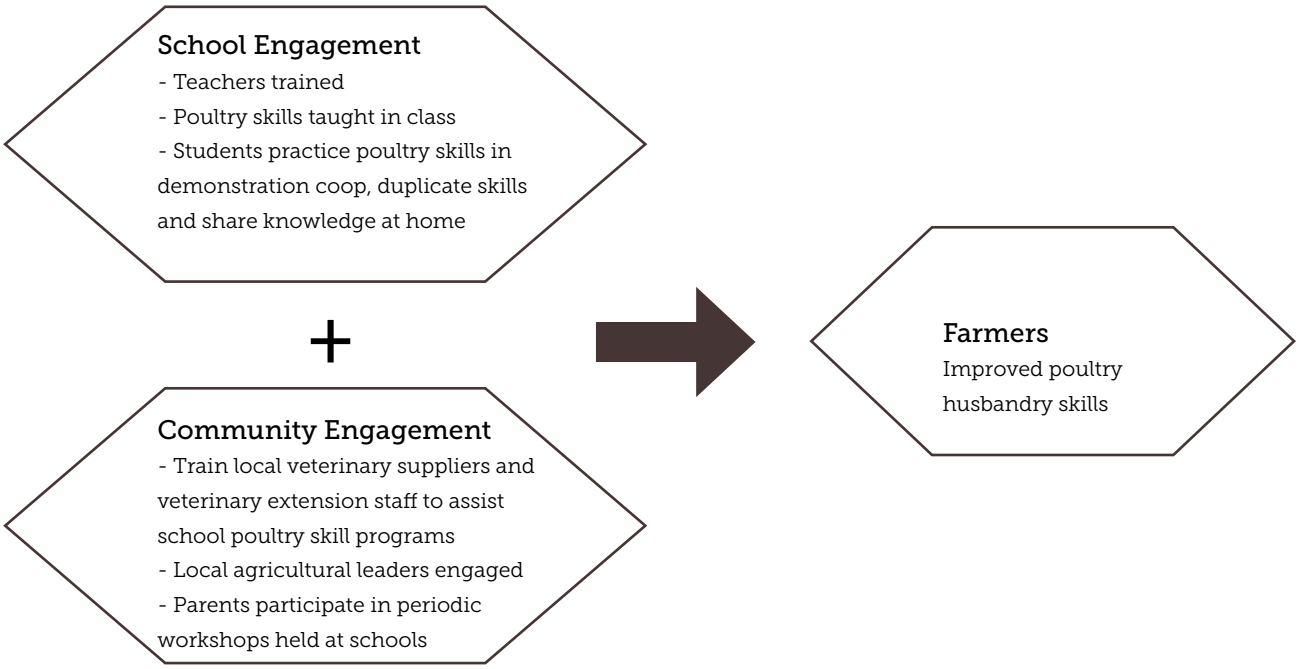
The purpose of the Poultry Skills School Program is to teach primary school children poultry husbandry fundamentals so they can share information with their families and help to improve poultry production, and family nutrition in rural communities. Teachers are trained on poultry husbandry practices and lesson ideas for each learning point. They are also trained to involve parents and poultry resource persons in the community. The program will also link veterinary extension advisors with rural grade schools to provide assistance to teachers.

Section 2

Guidance to Implement a Poultry Skills School Program

Program Goals

The Poultry Skills School Program aims to increase the poultry husbandry skills of farmers and households through engagement with primary schools and training of primary school children in coordination with community extension.



The success of the program is dependent on strong and continuous collaboration with school administrators and teachers, parents, local veterinary suppliers and agricultural extension staff.

Interaction With Parents

For effective implementation of project, parents should be informed and encouraged to be engaged in the program. Orientation and coordination of the program should involve head teachers, teachers, the school management committee, students, and partner organizations. It is a good idea to invite parents to periodic workshops held at the primary schools implementing the program. The project coordinator should share with parents the benefits and components of the program.

Parents of the students can play an important role in establishing and maintaining a demonstration chicken coop on the school grounds. It is a good idea to have one parent participate on the school demonstration coop committee that oversees management of the coop. Parents can be organized to volunteer in the construction and maintenance of the demonstration coop, and caring for the flock on weekends and holidays.

Skills for Children to Share With Their Families

Children living in villages are responsible for a variety of chores related to livestock keeping. The interventions provided by the poultry skills school program are simple techniques that don't require high skills or high cost. By educating students about poultry health and management using the provided curriculum and a school demonstration coop, students learn very practical skills. Students then share the newly gained knowledge with their family, and practice the skills when doing their chores. This provides large coverage of the interventions at little to no cost. The school demonstration coop and regular interaction with parents further encourage the families to adopt poultry skills and increase production.

Demonstration Coop

The primary purpose for establishing a schoolyard demonstration chicken coop and range area is to provide hands-on experience for school children to learn chicken husbandry. Teaching activities at the demonstration coop compliment the classroom lessons and enhance the learning experience. Maintaining a schoolyard demonstration coop requires a significant commitment from teachers and school administrators. Teachers and school administrators should consider the issues discussed below when planning to establish a schoolyard chicken coop:

Location-- The space for constructing a coop and a range area should be away from classrooms and in a safe place for the chickens; where it will not flood, there is shade, and there are no other hazards.

Weekend/Holiday Care -- Arrangements will need to be made to have the flock taken care of on holidays and weekends. This can be done by parent volunteers or incenting the coop caretaker. If this is not possible, consider building the coop at a home close to the school.

Demonstration Coop Flock Size -- The decision on flock size will depend on several factors. Primarily, what is the objective of the demonstration coop? If it is for learning purposes only, 4-6 hens and 1 cock is sufficient. If it is dual purpose for demonstration and income generation the following must be considered: economic feasibility, demonstration coop space, and access to markets. Questions to answer include:

1. Will all chickens find enough nourishment in the grazing area?
2. Is the coop big enough to house the whole flock at night?
3. Does the coop caretaker have time to care for a larger flock?
4. Is there a local market for surplus eggs?

Overall, no more than 10 – 12 hens and 1 cock are recommended. However, an additional cock can reduce inbreeding.

Budget -- Program teachers and administrators should prepare a budget before proceeding with the demonstration coop project. The income and expenses associated with maintaining a chicken coop must be carefully estimated. Maintaining a coop will not be sustainable if income and expenses are not managed. Below are some of the key components that should be included in a budget:

DEOMONSTRATION COOP BUDGET OUTLINE

EXPENSES

i. One-time expenses

- coop and fencing construction -- materials and labor expenses (construction could be done by parents and volunteers or the labor could be hired)
- purchase of hens and rooster for starting flock

ii. Monthly on-going maintenance expenses

- feed and water
- vaccines, medicines and veterinary consultations
- caretaker expenses -- for weekend and holiday care of the chickens (this might be done by volunteers)
- coop maintenance and repairs

INCOME

- From sale of eggs (sale price x estimate number of eggs sold per month)
- From sale of birds (sale price x estimate number of birds sold per month)
- From sale of manure (sale price x number of kilos of manure sold per month)

Creating and Maintaining High Quality Products

If the demonstration coop is going to be used for income generation, the products (eggs, chickens and manure) must be of good quality. The eggs and chickens sold from the demonstration coop must be clean and healthy. The manure must be well composted and suitably packed.

Program Management

It is important to form an official committee to manage the demonstration coop. The primary role of the committee is to monitor coop activity, make financial and administrative decisions about the coop, resolve problems related to the coop, and ensure lessons and trainings are being delivered effectively. The committee should be made up of at least 3 members, including the principal/head teacher, trained teachers, coop/school caretaker, and a minimum of one parent representative of the school management committee.

If the demonstration coop generates income the coop management committee should be responsible for deciding how to spend the funds. If anyone used their own money to purchase anything related to the demonstration coop they should be reimbursed first. Any remaining fundsshould be used tocover expenses related to maintaining the coop, and re-investment if the committee decides to expand the coop. Any profits should be used for scholarships for disabled and poor students, school improvements, teaching aids, or to compensate coop caretaker if appropriate. Opening a bank account should be considered as early as income starts flowing.

The coop caretaker is responsible for the daily care taking of the coop and flock. This involves the following:

- ✓ Counting chickens and recording data
- ✓ Collecting eggs, marking them, and recording data
- ✓ Cleaning the coop 2-3 times/week
- ✓ Supplemental feeding twice a day and cleaning the feeders
- ✓ Refreshing water daily and cleaning the drinker
- ✓ Letting chickens out of coop in the morning and putting them back in the evening
- ✓ Collecting forage daily

To increase student participation, it is suggested to assign a group of students these responsibilities under the supervision of the coop caretaker. Groups should be rotated regularly to ensure all students have the opportunity for this hands-on experience. Additionally, student feedback on the learning outcomes and the day to day management of the demonstration coop can be obtained by inviting a student representative to share a report with the coop management committee.

Recordkeeping

To track the progress of the coop it is important to maintain records. The information recorded will be used to make decisions regarding the flock and to determine the sustainability of the program. Two types of data should be recorded. One type of data is financial. This tracks all expenditures related to the poultry skills program and should be documented by the school management committee. The other type of data is flock health/production. The information can be tracked by individual hen or by the flock ***(see Appendix III for examples of recordkeeping forms)*** and should be recorded by the coop caretaker or a student.

Incentives for Principals, Teachers, and Stakeholders

Implementing the poultry skills school program creates a home-school connection. Parents will have the opportunity to visit the school for trainings on poultry husbandry, de-worming and vaccinations, and observation of the coop. This provides a bridge to discuss their child's classroom performance, behavior, and examination results, as well as inform them of school activities.

Parents will also directly benefit from the knowledge their children gain from the poultry skills school program. Children will replicate the skills from the program in their homes and share with extended family members and neighbors. This supports the relevance of education in rural villages.

The demonstration coop also has the potential to generate income for the school. Funds could be used for sustainability of the demonstration coop and activities related to it, school supplies, and scholarships.

Linking Stakeholders and Community to Program

Homestead poultry from different household mix together and interbreed when free-ranging. This increases the spread of disease. It is important to engage poultry farmers in the community to encourage working together and learning from each other to improve hygienic practices throughout the village. The project can link stakeholders and the community by inviting them to attend workshops that inform poultry farmers about poultry husbandry practices, poultry diseases, and prevention of diseases. This will limit the spread of poultry diseases in the community, and increase poultry production.

Linkages to Livestock and Animal Health Extension

Low homestead poultry production is related to a lack of information and organization. Local inputs such as feed, medication, veterinary services, and training are rarely available in rural areas. Inadequate access to these inputs and little opportunity for skill improvement creates an environment that limits the potential of homestead poultry. Farmers, mostly women, receive very little support from extension workers. This causes homestead poultry production to remain undeveloped in most places.

Establishing a link with district livestock offices and animal health extension workers is very important. The project can link stakeholders by organizing workshops to inform poultry farmers about Newcastle Disease and its control benefits. Through collaboration with the district livestock offices and health extension workers disease prevention campaigns can then be organized.

Access to Newcastle Vaccine and Other Veterinary Supplies

Schools implementing poultry skills school program should establish a relationship with the veterinary officer and local veterinary supplier. Both can provide technical guidance regarding maintaining a healthy flock at the school, and assist schools with providing training to parents.

The school will need to purchase Newcastle vaccine and other veterinary supplies. Newcastle Disease (ND) is the most devastating poultry disease. The disease may cause 50-80% mortality in village chickens once or twice per year.

The demonstration coop committee needs to determine where to access ND vaccine for the schoolyard demonstration flock and to let parents know where to get the vaccine in their community. Teachers and school program staff should be trained on the benefits of the ND vaccine, how to ensure the vaccine is refrigerated until use, and how and when to apply the vaccine.

Section 3

Training

Training - Teachers

To effectively implement the program training teachers is essential. Training should cover technical content on village poultry health, husbandry skills and sale of chickens and eggs. The knowledge gained will help teachers prepare village poultry skills lessons and give them the confidence to implement the new lessons. Having teachers develop their own lessons, using this guide as a tool, is a good activity for a teacher-training workshop. However, the provided lesson plans are sufficient to cover the essential information to improve poultry skills. The teacher training can also cover how to use poultry topics to teach science, mathematics, art or vocational topics. It is useful to consult the District Livestock Office and local paravets or agricultural extension staff when implementing this program. They can provide the technical information for the training and give support on disease prevention campaigns in the community.

A training schedule may look like the following:

Day 1- present the project introduction, its objectives, goals, and begin covering technical content

Day 2- Continue training on technical content including homestead poultry production, husbandry, management, health, ND vaccination, record keeping and economics.

Day 3 - Teachers work together with the trainer to use the technical information to adapt/develop lesson plans about homestead poultry appropriate to teach at the primary level. Teachers should also develop a timeline implementing the program and for teaching the skills throughout the school year.

Training - Students

Because students are the key to transfer the skills from school to home, creating a good environment for learning homestead poultry skills is critical. The elements necessary to do this are: training of teachers, development of interactive lessons, construction of a demonstration coop and conducting hands-on training in the school yard chicken coop. Students will be instrumental in improving the poultry management in their homes by sharing the information and skills with their families.

The Heifer Project Nepal Case: *After completion of teacher's training and the development of the Homestead Poultry Skills lessons, students were taught village poultry skills during vocational training classes. Three teachers divided the teaching of the 8 topics among themselves. Two classes were taught each week for forty minutes. Teachers modeled the practical skills in the demonstration coop. The students then practiced their skills at home and shared the knowledge with their parents. The school was a hub for practical training, and the demonstration coop provided a good learning environment.*

Engaging Parents and Schools

Ongoing interaction with parents is necessary to link families to the project goals – to enhance the poultry skills of village farmers. Hosting an orientation about the project will raise awareness about the goals and activities related to the program. It will also provide an opportunity to impress the importance of learning by doing. Additionally, inviting families to observe the demonstration coop will encourage families to adopt the poultry skills and expand their farms. Workshops for parents hosted at the school will raise awareness on village poultry skills.

***Heifer Project Nepal Case**: Homestead poultry training was conducted for parents while students learned the skills during school. This had synergetic outcomes in the villages. Twenty-four workshops were conducted over the school year. Several parents from each of the six schools were invited to attend. Topics included the program goals and objectives, disease prevention, poultry nutrition, and coop construction. Additionally, posters of 9 key poultry management practices were distributed to households. The posters reinforced what the students learned in school, and were a visual reminder of the improved habits to practice.*

Section 4

Poultry Skills Teaching Guidelines

Poultry Skills Teaching Guidelines

Learning Point	Learning Objective **Learner will...**	Basic Competencies **Learner will be able to...**	Output **Learner will produce...**
Learning Point 1: Homestead Chicken and Egg Production Can Be Improved at Little Cost	Understand homestead chicken and egg production can be improved at little cost.	• List the 4 areas of improvement to increase production. • Explain how each of these areas can decrease production. • State the primary causes of early mortality for homestead chickens. • Discuss simple low/no cost interventions.	Lesson #1: 4 square matrix with areas to improve and how production is decreased. Written paragraph on areas of improvement. Lesson #2: 4 square matrix continued with low to no cost intervention with visual representation. Written paragraph on simple intervention. Lesson #3: Coop observation of interventions – Scavenger Hunt.
Learning Point 2: Raising Homestead Poultry is Important For Communities	Understand the value of raising chickens.	• List the 4 benefits of raising chickens. • Explain each benefit and provide an example of personal use for each benefit.	Lesson #4: Word web with 4 benefits and uses of chickens. Written paragraph on benefits and uses. Extension activity: Skit.
Learning Point 3: Important Differences Between Chicken Breeds	Understand local versus commercial breeds of chickens are kept for different purposes.	• Name and identify the local breeds of chickens in the village. • Compare local and commercial breeds. • Share 3 reasons why local breeds are the best choice for homestead poultry production.	Lesson #5: Venn Diagram comparing local and commercial breeds. Written letter persuading someone to use local breeds for homestead production. Lesson #6: Coop observation of habits of local breeds.
Learning Point 4: How to Keep Chickens Healthy	Understand the cause/origin of disease. Understand the transmission of poultry disease. Understand how diseases, parasites and predators can affect poultry.	• Explain diseases come from microorganisms. • Explain how poultry diseases are transmitted. • List the 2 serious diseases that affect chickens. • Identify the signs that a chicken has been affected by Newcastle Disease.	Lesson #7: Diagram illustrating how poultry diseases are transmitted and a newspaper article. Lesson #8: Brochure about Newcastle and Fowl Pox, symptoms, and prevention.

Learning Point	Learning Objective **Learner will...**	Basic Competencies **Learner will be able to...**	Output **Learner will produce...**
	Understand how to prevent diseases and parasite infestation in poultry. Understand how to reduce predation of poultry.	• Identify the signs that a chicken has Fowl Pox. • Recall the vaccination timeline for ND. • Suggest how the outbreak of diseases should be communicated to the government authorities.	
		• List the 2 types of parasites that attack chickens and give an example of each. • Identify the signs that a chicken has internal parasites. • Identify the signs a chicken has external parasites. • Discuss the natural anti-parasitic remedies. • Recall the de-worming timeline intervals.	Lesson #9: Fact sheet and game about internal and external parasites. Lesson #10: Coop observation for flock's health.
		• Explain the 5 ways to prevent diseases and parasites. • Discuss how the costs of controlling diseases, pests and predators could be minimized through good management.	Lesson #11: Foldable booklet on disease and parasite prevention.
		• Name predators of chickens. • Explain 3 actions that reduce the risk of predation.	Lesson #12: Foldable booklet on predation and directions on how to stop a predator. Lesson #13: Coop observation of predation prevention.
Learning Point 5: Connecting to Trusted Veterinary Resources	Understand that access to veterinary medicine and advice is critical for maintaining a healthy flock.	• Explain why it is important for poultry keepers to establish links with veterinary suppliers and livestock extension officers. • Explain how veterinary suppliers and livestock officers can help farmers keep their flocks healthy.	Lesson #14: Venn Diagram comparing veterinary supplier and livestock extension office. Public Service Announcement for radio or SMS.

Learning Point	Learning Objective **Learner will...**	Basic Competencies **Learner will be able to...**	Output **Learner will produce...**
Learning Point 6: Carefully Managing the Flock	**HOUSING** Understand the importance of providing night housing for chickens.	**HOUSING** • Explain how night housing helps manage chickens. • Identify different types of night coops. • Specify requirements of good housing in terms of access, space, necessary fittings, and ventilation. • Construct a simple night coop using local material.	Lesson #15: Diagram of a chicken house with all the required elements.
	NUTRITION Realize chickens need food and water in order to grow, produce and reproduce.	**NUTRTION**. • Explain why chickens need food and water regularly. • Know when and how much water and supplemental feed to give chickens. • Describe different containers that can be used to feed and water chickens. • Explain chickens need to eat proteins, carbohydrates, minerals and vitamins, and list sources of them. • Know the difference between scavenging and supplemental feeding. • Identify symptoms of nutritional deficiency in chickens.	Lesson #16: Informational article for a poultry magazine on supplemental feeding.
	MANAGEMENT Understand the importance of keeping records in poultry production.	• Know what information is important to record. • Practice keeping records on flock behavior and egg production.	Lesson #17: Poultry production recording sheet. Coop observation to record poultry production.
Learning Point 7: Special Care For Chicks and Eggs is Important	Realize eggs and chicks need special care.	• Demonstrate how to determine if an egg is fertile (candling). • Demonstrate how to determine if an egg has gone bad. • Describe the use of day baskets for young chicks. • Discuss the importance of extra protection for chicks. • Explain why numbering laid eggs is important. • Explain which eggs should be used for incubation.	Lesson #18: Flip booklet on chick management using the basket system and categorizing game. Coop observation to see basket system. Lesson #19: Candling an egg and "Good Egg" test.

Learning Point	Learning Objective **Learner will...**	Basic Competencies **Learner will be able to...**	Output **Learner will produce...**
		• Know the incubation period for eggs. • Describe where eggs should be stored. • Explain why only 1 egg is left in the nest. • Discuss the best clutch size.	
Learning Point 8: Careful Selection of Hens and Cocks Improves Flock	Understand special selection must be given to breeding cocks and hens.	• Describe the characteristics of a good cock for breeding. • Discuss when a new breeding cock should be selected. • Describe what qualities make the best hen for breeding. • Discuss when new breeding hens should be selected. • State the ideal cock to hen ratio.	Lesson #20: Panel booklet cock and hen selection and management.
Learning Point 9: Getting Good Prices For Chickens and Eggs	Understand that poultry provides food and income for families. Understand entrepreneurial skills and knowledge are needed for the management of poultry production to generate income.	• Identify ways people can earn money through poultry production. • Describe the working habits of a successful poultry entrepreneur. • Explain the factors that need to be considered when deciding to consume or sell poultry products (first 5 eggs). • Practice keeping record of poultry product sales. • Calculate the expenditure and income from the sales of poultry products.	Lesson #21: "Help wanted" advertisement for a poultry keeper/coop caretaker. Lesson #22: Recordkeeping worksheet – income and expenses. Coop Visit: Recordkeeping worksheets.
Learning Point 10: Eating Chicken and Eggs are Good For Family Nutrition and Health	Understand the nutritional value of poultry products and how nutrition affects human health.	• Describe how nutrition affects human health. • List the key nutrients poultry products provide. • Explain how each key nutrient benefits the human body.	Lesson #23: Design a poster/ flier indicating the benefits of consuming poultry products.

How To Use Manual

There are **10 Learning Points** in the Poultry Skills School Program Guidelines.

Each Learning Point has 1 or more Lessons that teach the key information needed to understand the Learning Point. There are a total of 23 Lessons in the Poultry Skills School Program.

The **Learning Objectives** *(what the learner will understand)* and **Basic Competencies** *(what the learner will be able to do as a result of understanding)* are stated at the beginning of each Learning Point.

This is followed by **"Words to Know"**. These are key vocabulary words with the definitions needed to understand the Learning Point. These words are in bold when they first appear in the text of **"Background Information Needed for Teaching"**.

The **"Background Information Needed for Teaching"** provides the technical information needed to understand the Learning Point, and to teach the Lesson(s) to students for that Learning Point.

This is followed by the **Lesson Plan**(s). An explanation of the Lesson Plan framework is on the next page. An example of each student output can be found in **Appendix I**. An explanation of the different ***types of writing*** used in the Lesson Plans can be found in **Appendix II**.

Lesson Plan
Framework

Objective: *WHAT THE STUDENT WILL UNDERSTAND BY THE END OF THE LESSON*

Outcomes: *WHAT THE STUDENT WILL BE ABLE TO DO AS A RESULT OF UNDERSTANDING*

Output: *WHAT THE STUDENT WILL CREATE*

Key Vocabulary:	**Materials Needed:**
IMPORTANT WORDS FOR STUDENTS TO KNOW BEFORE TEACHING THE LESSON	*WHAT IS NEEDED TO TEACH THE LESSON*

LESSON

Anticipatory Set:
THESE ARE QUESTIONS THE TEACHERS ASKS TO GET THE STUDENTS THINKING ABOUT THE LESSON. THE QUESTIONS EITHER STIMULATE INTEREST AND EXCITEMENT, CONNECT THE TOPIC TO REAL LIFE, OR CONNECT TO PRIOR KNOWLEDGE.

Direct Instruction:
DURING THIS TIME OF THE LESSON THE INFORMATION IS EXPLICITLY TAUGHT OR DEMONSTRATED TO THE STUDENTS BY THE TEACHER. STUDENTS ARE LISTENING, OBSERVING, ASKING QUESTIONS, AND TAKING NOTES.

Guided Practice:
IN THIS PART OF THE LESSON, THE STUDENTS ARE PRACTICING WHAT THEY HAVE BEEN TAUGHT DURING THE DIRECT INSTRUCTION, AND THE TEACHER IS PROVIDING SUPPORT, GIVING FEEDBACK, CHECKING FOR UNDERSTANDING, AND RETEACHING IF NECESSARY.

Independent Practice:
AT THIS POINT OF THE LESSON, STUDENTS ARE WORKING ON THEIR OWN (ALONE, IN PAIRS, OR GROUPS) TO APPLY THE NEW LEARNING.

Closure:
THE KEY POINTS OF THE LESSON ARE RESTATED AND QUESTIONS ARE ASKED TO GET STUDENTS TO COMMUNICATE WHAT THEY LEARNED.

Home – School Connection:
THE GOAL OF THE POULTRY SKILLS SCHOOL PROGRAM IS TO TRANSFER THE NEW LEARNING FROM THE SCHOOL TO THE HOME WHERE IT CAN BE APPLIED ON A DAILY BASIS. AT THIS POINT IN THE LESSON, STUDENTS ARE ASKED TO TAKE THE NEW LEARNING HOME AND SHARE IT WITH THEIR FAMILIES.

NOTE: The provided lesson plans are a suggested way to present the Learning Points to students. However, teachers are encouraged to add their own creativity, experience, and local knowledge to the lessons to enhance them. Lessons can also be revised or recreated to adapt to the local reality. Teachers are also encouraged to add lessons to deepen the knowledge of students. The critical factor is to **present the Learning Point information to students**, and then ***request students to share the new learning with their families*** so the knowledge is transferred from school to the home.

Section 5

Learning Points & Lesson Plans

LEARNING POINT 1:
HOMESTEAD CHICKEN AND EGG PRODUCTION CAN BE IMPROVED AT LITTLE COST

Topic	Learning Objective **Learner will...**	Basic Competencies **Learner will be able to...**
Chicken and Egg Production	Understand why homestead chicken production is low. Understand simple steps can be taken to increase production.	• List the 4 areas of improvement to increase production. • Explain how each of these areas can decrease production. • State the primary causes of early mortality for homestead chickens. • Discuss simple low/no cost solutions.

This topic will be covered in 2 lessons. Lesson 1 focuses on causes of low production, covering basic competencies 1-3 (this lesson can be taught over more than 1 class period if necessary). Lesson 2 focuses on simple solutions, covering basic competency 4.

WORDS TO KNOW:

Broody – *a hen that is ready to lay and sit on eggs*
Mortality – *the death of a human or animal*
Nutrients – *what humans, animals, and plants need to grow and survive*
Production – *to produce something as a result of time, effort, or work*
Scavenging – *to search for food to eat*

BACKGROUND INFORMATION NEEDED FOR TEACHING

Why is homestead poultry production low? There are several reasons. Many homestead poultry keepers give little care to chickens. This causes a severe decrease in the amount of eggs laid by the chickens, and the size of the chickens. Many chickens do not survive because of disease, predators, or poor feeding. There are four activities homestead poultry keepers need to improve. Each area has low or no cost solutions that will increase the number of eggs laid, and the size and survival of their chickens. Working on all four areas at the same time gives the best results.

FOUR AREAS OF IMPROVEMENT

1. Disease Prevention

Problems:

- Chickens are not given vaccines to prevent diseases, and sick chickens are not given medicine. This results in slow growth, fewer eggs and less meat.
- **Scavenging** for food increases the risk of chickens catching diseases.
- Sick chickens are not separated from healthy chickens. If one chicken catches a contagious disease there is a strong chance all the flock will become ill too. The disease will possibly spread to other flocks in the village.

Solutions:

1. Vaccinating against Newcastle Disease and other diseases reduces **mortality**. When the vaccine is obtained from a veterinary supplier in individual doses the cost is low compared to the cost of lost income or production.
2. Washing the feeders and drinkers each day stops the spread of disease.
3. Separating sick chickens from the flock keeps the disease from spreading to other chickens.

Problem: Chickens and chicks can get internal and external parasites. Internal parasites cause the hen to leave the nest often to scratch. As a result many eggs go bad before they hatch from not staying warm. Internal parasites can cause weight loss, diarrhea, and sometime death.

Solutions:

- Daily washing of feeders and drinkers reduces the chance of chickens getting internal parasites.
- Cleaning the night coop and nests regularly will limit parasite infestation.
- Fresh straw or hay should be put on nests weekly.
- Sprinkling a little ash from the home cook stove on the coop floor and on top of nests may help as well.

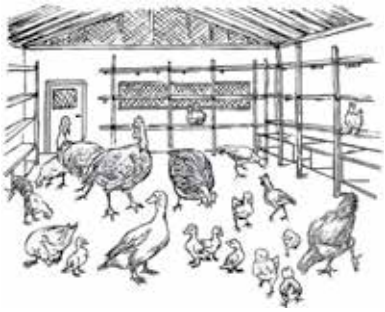
2. Housing

Problem: Chickens are often not given night shelter. Providing a night coop allows for better management of hens and eggs, and protects the flock from the weather, predators, and theft.

Solution: A simple night basket or chicken house made of natural resources or recycled materials will reduce the risk of loss.

3. Flock Management

Problem: Newly purchased chickens from other villages or markets may carry disease that can infect the flock.



Solutions:

- Keeping new chickens in a separate coop for two weeks before introducing them into flock.
- Buy chickens from framers with healthy chickens.
- Never purchase chickens from a live bird market to add to the flock. Live bird markets often have sick birds.

Problem: If nesting boxes or baskets are not provided, chickens will lay eggs on the ground. Eggs laid on the ground are often not found by poultry keepers, or are eaten by predators.

Solution: Providing hens with nests in a simple night coop will make hens feel safe from predators and encourage egg-laying. The newly laid eggs can easily be collected daily. Removing the eggs encourages the broody chickens to lay more eggs. This will increase the number of egg slaid by the hens and make it easy to collect eggs.

4. Feeding

Problems:

- Chickens usually scavenge around the house and village for their food. Chickens must search for insects, grubs, snails, seeds, fallen fruit and berries. Chickens are also fed food waste from the kitchen or harvest. Chickens may not get all the nutrients they need. The flock's resistance to disease will be low if it does not get the necessary nutrients.
- Young chicks also have to compete with adult chickens for their food. Chicks may die of starvation.
- Chickens often do not get enough water, or drink dirty water which can spread diseases.

Solution: Providing chickens with a small amount of supplemental feed twice a day and clean water daily will increase their chance of survival and improve production.

Problems:

- Immediately after hatching chicks are allowed to follow the mother hen. Many chicks die in the first few weeks because of predation by birds of prey and snakes, drowning, and road accidents.
- The newly hatched chicks have limited scavenging ability and can die of starvation. Newly hatched chicks need special care.

Solution: Separating newly hatched chicks from the mother hen for special feeding and drinking for the first 2-3 weeks reduces chick mortality. This can be done with a creep feeder made of natural resources.

Summary: Homestead chicken production is decreased because of little care. The main causes of early death include predation, diseases, starvation, accidents and poor weather conditions. A little extra attention daily can increase production and decrease mortality. The most important areas to improve are: housing, feeding, disease prevention, and flock management. For best results all 4 areas must be improved at the same time.

Lesson #1 | CHICKEN PRODUCTION

Objective: To understand why homestead chicken production is low.

Outcomes:
1. Students will be able to list the 4 areas for improvement in backyard poultry.
2. Students will be able to explain how neglect of these areas decreases chicken production.
3. Students will be able to list the primary causes of early mortality for chickens.

Ouput: Students will create a 4 square matrix showing the reasons for low poultry production and write a paragraph about low production ***(a student example can be found in the Appendix I)***.

Key Vocabulary:	**Materials Needed:**
Production	Chalkboard
Mortality	Piece of paper for each student
	Student note books

LESSON

**This lesson can be taught during several class sessions.*

Anticipatory Set:
Ask students the following.
- What do people need to survive? List answers on the chalkboard ***(possible answers: air, water, food, sheler, care/love/attention, medicine).***
- What happens if one or more of these needs is not being met? ***(possible answers: hunger, illness, dehydration, sadness/lonely/depression).***

Have students discuss with a partner or small group:
- What happens to a person's body and abilities when they are hungry, dehydrated, ill or don't have shelter ?

Give students time to discuss with their partner or in groups. If students are having difficulty coming up with ideas, give them hints by asking:
- What happens to your body if you are not eating enough food?
- What happens to your ability to think if you are hungry or dehydrated?
- What happens to a person who is living outside without shelter in bad weather?

Have a member from several groups share their answers ***(possible answers: weight loss/lack of weight gain, skin becomes rough or damaged, become ill, confusion, dizziness, can't think, can't run fast, become tired, death).***

Direct Instruction:
Share with students that the objective of today's lesson is to understand why the production of village chickens is low.

Before beginning, be sure students understand the meaning of "production". To check for understanding ask:
- What do chickens produce? ***(eggs, meat, other chickens)***

Ask students the following questions to stimulate thought and draw out a connection between care of chickens & productions:
- Do they have any chickens at their home?
- How many chickens and cocks do they have?
- How many eggs are being laid and collected each week from their flock?
- Describe the appearance of village chickens in terms of size, weight, condition of feathers and skin?
- How much attention and time do they think is given to the family flock each day?

Ask students to share what causes chickens to become ill or die.

Write the list on one side of the chalkboard ***(possible answers: eaten by predators, stolen, catch a disease, drown, hit by motorcycle or car, starve).***

While students are sharing these examples, push them to share why these situations happen ***(possible answers: they don't have shelter, they are not given food, they don't have medicine, they are not protected).***

Ask students if they see a connection between the needs humans have to be healthy and survive, and the possible needs animals may have. Do they think if more attention was given to their flock it is possible for the chickens to lay more eggs? Gain more weight? Grow bigger? Avoid illness? Live longer?

Based on previous discussion, see if students can suggest the 4 areas that are neglected. Write them on the other side of the chalkboard ***(disease prevention, housing, flock management, feeding)***.
If students are unable to come up with all 4 areas provide the areas they missed.

Using the "Background Information Needed for Teaching" provided, explain to students how each of these areas affects chicken production when neglected. Highlight that a large number of baby chicks die in the first few weeks due to predation, disease, and starvation.

When done, ask students to discuss with a partner/in small groups what they think would happen to chicken production if one area was improved? What if 2 areas were improved?

Have pairs/groups discuss what they think the best solution is to improve production ***(improve all areas at the same time).***

Guided Practice:
It is important for teacher to model folding the paper and filling it out WITH students. It is also useful to keep the teacher example to refer to in the future (modeling to students they have a resource to use if they need to recall something). This example can also be used for students who were not at school the day the lesson was presented. Students can copy it when they return to school ***(a student example can be found in the Appendix I).***

Have students fold a piece of paper into 4 squares (if paper is attached to a notebook, students can create 4 boxes by drawing a vertical line at the midpoint of the page, from top to bottom, and a horizontal line at the middle of the page from the edge to the seam of the notebook).

On the front side of the paper have students write a different area of improvement at the top of each square ***(disease prevention, housing, flock management, feeding).***

Using student participation, call on individuals/partners/groups to share a reason, one at a time, how production is reduced in each area (based on the information teacher shared from "Background Information Needed for Teaching". Have students write down each reason in short format (bullet points) on the front side of the paper, under the "area of improvement" it falls under. Students will use this paper to write a complete paragraph next.

Example:

disease prevention
- chickens get a disease
- chickens get parasites

flock management
- disease can be given to flock from new livestock
- eggs are not laid in nests so they aren't collected regularly
- hens without nests brood for a long period with few eggs

housing
- get sick or die from harsh weather
- get attacked or eaten by predators
- get taken from theft

feeding
- poor nutrition = low resistance to disease
- starvation
- drink contaminated water = get sick
- newly hatched chicks can die will scavenging for food

****Have students keep the paper for reference during the next lesson on "Low/No Cost Interventions".**

Independent Practice:
In their notebooks, have students individually write a short paragraph stating what the 4 areas of improvement are to increase village chicken production. Have students underline each of the 4 areas in the paragraph. Be sure students include at least one supporting example for each reason. Suggest they use the notepaper they wrote on earlier to help recall the areas of improvement and the reasons for low production *(a student example can be found in Appendix I).*

Call on several students to share their paragraph with the class, or have students read their paragraphs to each other in small groups.

Closure:
- Call several students to share 4-5 reasons production is low.
- Have one student share the 4 areas of improvement.
- Ask why is it important to know what areas need improvement?

Home – School Connection:
Ask students to start observing their own flock, or other flocks in the village if they don't have one. Have students see if they notice the areas they discussed today. Tell them to be prepared to share some of their observations for the next lesson, and to begin thinking about what simple things can be done to improve those 4 areas (which will be covered in the next lesson).

Lesson #2 | INTERVENTIONS TO IMPROVE CHICKEN PRODUCTION

Objective: To understand simple measures can be taken to increase poultry production.

Outcomes: Students will be able to discuss low and no cost interventions.

Ouput: Students will add solutions with illustrations to the 4 square matrix and write a paragraph *(a student example can be found in Appendix I).*

Key Vocabulary:	**Materials Needed:**
Production Mortality	Chalkboard Notepaper folded in 4 sections with the 4 areas of improvement written on it (from previous lesson) Student note books

LESSON

*This lesson can be taught during several class sessions.

Anticipatory Set:
Ask students to share some of the observations they noticed about their own flock or flocks in the village after the first lesson.

To stimulate participation ask if they noticed:
- How little attention is paid to the chickens in the village?
- How chickens feed themselves?
- Where do chickens sleep at night?
- How are eggs collected?
- Are they more aware of chickens now?

Direct Instruction:
Share with students that the objective of today's lesson is to understand simple steps can be taken to increase poultry production.

Ask students to recall the 4 areas of improvement (they may refer to the paper they wrote on in the first lesson).

Write each area on the chalkboard ***(disease prevention, housing, flock management, feeding).***

Ask students to take turns coming to the chalkboard and writing under each area how production is reduced in each area.

After each area draw an arrow going outward next to it.

Explain to students they will come up with solutions.

To encourage thought, have students ask themselves: How do you protect from disease, harsh weather and theft, and make sure eggs are found and that chickens eat and drink enough?

Guided Practice:
Have students work in small groups (4-6 students) or partners.

Give students time to brainstorm ways to improve these areas that do not cost money or are low cost.

Call on groups to send a student to the front of the room to share what can be done to improve an area.

Ask students if they agree – allow discussion. If students agree write the suggestion on the chalkboard next to the arrow.

Independent Practice:
Have students draw a picture that represents a solution on the **BACK** side of the notebook paper they wrote on during the first lesson (the front side of the paper has areas of improvement and how production is reduced. The backside has the solutions for each area).

Under the picture have students write in 1-2 words the solution in capital letters ***(see student example in Appendix I).***

FRONT SIDE:	*BACKSIDE:*
disease prevention	*vaccinate and de-worm, clean coop regularly*
housing	*build a night coop*
flock management	*keep chickens separate from other animals, provide nests and collect eggs daily*
feeding	*feeding provide clean water and supplemental feeding, give newly hatched chicks feed*

Have students write a paragraph in their notebook about what interventions can improve poultry production. Ask students to underline each area of improvement in the paragraph ***(see student example in Appendix I)***.

Closure:
Review with students the following:

- Why vaccinate?
- How do you protect chickens from harsh weather?
- How does providing nests increase production?
- What do you do to reduce the chance of theft?
- What can poultry farmers do to help their flock resist illness?
- What would students tell a farmer who was about to bring home new animals from the market?

Home – School Connection:
Ask students to take the 4 square matrix home and explain to their families what needs to be improved in village poultry production and how to do it. Before the next lesson, have students share their family's response to the information.

Encourage students to continue observing chickens in the village and how they are cared for and to notice what simple things can be done to improve the production of chickens.

Lesson #3 | OBSERVATION OF IMPROVEMENTS IN DEMONSTRATION COOP

Objective: To observe simple steps taken to increase poultry production.

Outcomes:
Students will be able to discuss interventions the demonstration coop has in place to improve flock production.

Ouput: Students will check off observations in their notebooks.

Key Vocabulary:	**Materials Needed:**
Production Mortality	Demonstration coop Notepaper folded in 4 sections with the 4 areas of improvement and solutions written on it (from previous lessons)

LESSON

Take students to the demonstration coop for a hands-on activity. If you are working with a livestock extension worker or other poultry professional, you could ask him/her to lead the lesson or assist you.

Share with students that the objective of the coop visit is to observe the simple steps taken to increase poultry production in the demonstration coop.

Have students fold a piece of paper so there are 4 squares, or divide a page in their notebook into 4 squares.

Then ask them share what the 4 areas of improvement are ***(disease prevention, housing, flock management, feeding).***

Students should write these 4 areas at the top of each box on their paper.

Call on students to share examples of steps that can be taken for each area to increase production.

Walk around the coop and point to several things that have been done to improve poultry production.

Each time, ask students what area has been improved ***(disease prevention, or housing, or flock management, or feeding).***

Then ask what steps were taken to improve that area.

Lastly, ask "how does it improve production"?

After this has done a few times, ask students to work in partners or small groups.

Students should discuss in groups what the other steps are that have been taken to improve production in the demonstration coop. Give students a goal of how many observable steps have been taken (for example 10).

Student groups should record what they observe in their paper/notebooks under the correct area.

Students should include in their notes:

- what area was improved ***(disease prevention, or housing, or flock management, or feeding)***
- what was done to improve it
- how does the improvement increase production
- how much time and/or money did it cost to make the improvement

Closure:

- Ask students to review their notes and as a group write a summary statement on the back of their paper about steps that can be taken to improve poultry production and the time and money it would take.
- Have each student group share their group's summary statement with the class.
- Students should take their summary statement home and read it to their families and discuss it.

LEARNING POINT 2:
RAISING VILLAGE POULTRY IS IMPORTANT FOR COMMUNITIES

Topic	Learning Objective **Learner will...**	Basic Competencies **Learner will be able to...**
The Importance of Raising Homestead Poultry	Understand the value of keeping chickens.	• List the 4 benefits of raising chickens. • Explain each benefit and provide an example of personal use for each benefit.

This topic can be taught in one lesson that can be broken into 2 sessions if more time is needed.
An extension activity is provided at the end.

WORDS TO KNOW:

Benefit – *being useful or adding value*
Nutritious – *food that has what is needed to grow properly and have good health*
Micronutrient – *very small amount of a substance that is needed to grow and live*

BACKGROUND INFORMATION NEEDED FOR TEACHING

Raising village poultry has four main **benefits** for families.

1. NUTRITIONAL VALUE AND TASTE

Village chickens can be raised for both meat and eggs. Both are a natural source of good quality protein and micronutrients. Village chickens will find most of their own food by scavenging around the home or village. They will also eat leftover food from households. Chickens change this into high quality protein that can be eaten by people. Raising chickens provides families with low cost, healthy food that is easily available and provides good, nutritious food.

Local chickens are often preferred over commercially raised ones because of the good taste and texture. Chicken and eggs are easy to cook, and are the main ingredient in many common dishes. Chickens provide eggs that are readily available, can be cooked quickly and kept without refrigeration for several days. The small size of chickens can feed a whole family, and not have leftover meat which cannot be stored safely without refrigeration. This is important in areas with no electricity.

The population of most countries has many ethnic groups with different beliefs and religions. Beliefs about eating meat differ among ethnic and religious groups. For example, Muslims and Jews do not eat pork, while Hindus do not eat beef. Chicken is accepted by most cultures and religions.

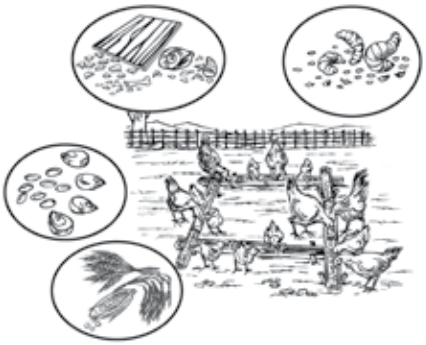
2. INCOME

Raising chickens can provide income for families. Live chickens, chicken meat, or eggs can be sold for cash or traded for other needs. The income can be used for school fees or supplies. The money earned from selling chickens or eggs can also be used to buy medicine, clothes, or necessary food items such as oil and spices. Other animals such as goats or pigs can be bought as well. Very little money is needed to start raising chickens, but the selling of chicken products is a way for families to earn money. If managed well, chickens provide income continually. Eggs are laid

regularly, and hatch in 21 days once the hen begins brooding. Women, children, elderly and sick people can easily raise chickens because they require simple care and little work.

3. NATURAL FERTILIZER AND PEST CONTROL

Chicken manure provides high quality, high nitrogen fertilizer for gardens, crops, and fish farms. The chicken manure makes the soil better for growing crops. Chicken manure is also a source of high quality biogas. When chicken manure is sprinkled on biogas plants, organic gases such as methane are produced. These gases are used for cooking and sources of electricity. Scavenging chickens also reduce the number of pests in the area by eating insects and snails.



4. SOCIAL-CULTURAL AND BELIEF VALUES

Chickens have a high cultural value in many societies. In some cultures chickens are required during special events such as religious festivals, and are needed for many traditional ceremonies. Chickens are also given as special gifts to respected visitors. Chickens can alsobe used as a gift or prepared as food when unexpected guests arrive.

Summary:

Chickens have many important uses in village life. They have high nutritional value. Chickens and eggs can be used to trade for other needed items or sold for income. Chicken manure provides a natural fertilizer for gardens and crops. Chickens are also used for cultural purposes and as gifts. It is important to continue raising chickens to maintain these benefits. Raising chickens has a low cost, but high value for village families.

Lesson #4
THE IMPORTANCE OF RAISING VILLAGE CHICKENS

Objective: To understand the value of raising homestead poultry.

Outcomes:
1. Students will be able to list the 4 benefits of raising chickens.
2. Students will be able to explain each benefit and provide an example of personal use for each benefit.

Output: Students will create a word web to explain the benefits of raising chickens and write a paragraph about the benefits of raising homestead chickens *(a student example can be found in Appendix I)*.

Key Vocabulary:
benefit
microorganism
nutrition

Materials Needed:
- Notepaper
- Student Notebook

LESSON

*This lesson can be taught during several class sessions.

Anticipatory Set:
Ask students the following questions
- Who has eaten an egg in the past week?
- Who has eaten chicken in the past month?
- Who has a garden that has pests (insects, snails) in it?
- What is the next holiday/festival coming up – what is a dish they will prepare or a ceremony that will be performed?

Direct Instruction:
Share with students that the objective of today's lesson is to understand the value of raising poultry.

- Have students brainstorm all the things chickens are used for. Encourage students to give real examples from their personal experience.
- Write their responses on the chalkboard.
- Using the Background Knowledge provide details to the students for each use. If anything is missed, give them hints or provide the missed answers.
- Ask students to discuss in small groups/partners what are 4 categories all the uses could be divided into **(1. nutrition, 2. income, 3. natural fertilizer/pest control, 4. religious/traditional beliefs).**

Guided Practice:
- Explain to students they are going to create a word web that will help them write an organized paragraph about the uses of chickens *(an explanation of word web can be found in Appendix II)*.
- Ask students to draw a chicken's head in the center of a piece of paper/on a page in their student notebook.
- Next, instruct them to draw 4 diagonal lines from the chicken's head out towards each corner of the page, but leaving some room to write in each corner.
- Instruct students to write one of the categories in each corner of the page, at the end of the diagonal line.
- Ask students to work in groups/partners to go through the list on the chalkboard and decide which category each use belongs in.
- Instruct students to write each of the uses along the diagonal line of the category it belongs in *(a student example can be found in Appendix I).*

Independent Practice:

- Have students use the word web they created to write a paragraph in their student notebook about the benefits of raising village chickens.
- Students should underline each of the 4 benefits in the paragraph.
- Students should also provide a personal example for each benefit in the paragraph.
- Ask students to take turns reading their paragraph to a partner ***(a student writing example can be found in Appendix I)***.

Closure:

Share with students that chickens play an important role in daily life. They are a good source of protein and other nutrients. They can be raised and sold for income. Chickens are often used for religious and traditional celebrations. Chickens are also a good source of pest control in crops and gardens. Have several students share a personal use they have for chickens.

Home – School Connection:

Ask students to take the word web about the benefits of raising chickens home and explain it to their parents.

EXTENSION ACTIVITY:

- Divide the class into smaller groups. Assign each group one of the 4 benefits of raising chickens. Have each group create a skit/play to act out the benefit of why village chickens are raised. If you have a large number of students, assign the same benefit to several groups so the groups can be kept smaller.
- The skits can be acted out in front of each the class, or presented to other classes in the school.
- If limited time prevents you from doing this activity, have students who are interested do it on a voluntary basis. They could use their breaks to practice and present it back to the class at another time.
- To help keep students focused, provide some guidelines for the skit.
  For example: The skit must be a 5 minute performance, each person must have a speaking part, some students may be an animal, etc.
- Teacher could also provide a "scene starter" for students to get them focused.

Scene starter examples:

Skit Starter #1: Nutritional Value and Taste – *It is not yet the harvest season. A rural family is sitting outside the family home discussing the food shortage they are experiencing. The daughter shares with the family that the neighbors have a flock of chickens and have been eating the eggs to get by. The family begins discussing how they could raise chickens to supplement the family's food supply during the lean season.*

Be sure students use all the information they learned about this topic in the skit. Students should also use the information from Learning Point 1 (Areas of Poultry Improvement and Interventions) to include in the skit what they would need to do to raise chickens.

Skit Starter #2: Income Generation - *A daughter runs into the family home with a note from school asking for payment of school fees. Shortly after the son comes home and his mother notices his toe sticking out of his torn shoe. His mother is feeling bad that she can't buy him a new pair of shoes. The husband arrives later and keeps coughing. His wife comments she wishes they had some extra money to buy him some medicine. Later at dinner they begin talking about all the financial needs they have at the moment, but no extra income. The mother then shares there are a group of women raising chickens who are selling the eggs and chickens in the market. The family begins discussing how they could raise chickens to sell.*

Be sure students use all the information they learned about this topic in the skit. Students should also include the information from Learning Point 1 (Areas of Poultry Improvement and Interventions) about the 4 areas to improve when raising chickens.

Skit Starter #3: Natural Fertilizer and Pest Control - *A group of farmers have gathered in the market. One farmer complains he has too many snails in his garden. Another comments he is having problems with other insects in the garden as well. Another farmer shares that his crops are not as healthy. Another farmer speaks up and tells the others he is not having any of those problems. He then talks about how his wife keeps chickens and they keep the pests away from the crops. He also adds that sprinkling the manure on his plants has kept the soil healthy so he is growing quality plants. Then he shares with the group that his family is also able to use the methane produced by the biogas plants that he has sprinkled the chicken manure. The other farmers are encouraged as ask him about raising chickens.*

Be sure students use all the information they learned about this topic in the skit. Students should also include the information from Learning Point 1 (Areas of Poultry Improvement and Interventions) about the 4 areas to improve when raising chickens.

Skit Starter #4: Social-Cultural and Belief Value - *A father comes home and in a frustrating manner shares with his wife about needing to purchase another chicken for the upcoming festival. He goes on to complain during the festival time the price of the chicken is even higher due to the demand for chickens. The daughter overhears this and comments that they just bought a chicken a short time ago for another festival. The son reminds them that after this festival, there is another one in a few months. As a family they begin to recall all the festivals and occasions they have had to buy a chicken. The wife reminds the family that when they have honored guests they buy them as well. They start adding the expense up. The mother points out with so many purchases each year, it would be wiser to raise some chickens to use.*

Be sure students use all the information they learned about this topic in the skit. Students should also include the information from Learning Point 1 (Areas of Poultry Improvement and Interventions) about the 4 areas to improve when raising chickens.

LEARNING POINT 3:
IMPORTANT DIFFERENCES BETWEEN CHICKEN BREEDS

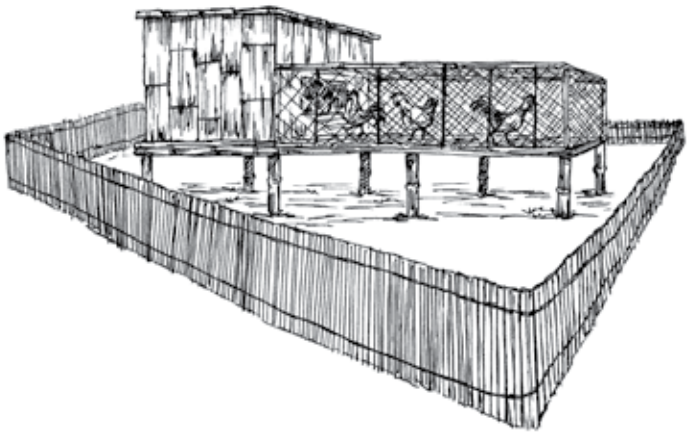
Topic	Learning Objective **Learner will...**	Basic Competencies **Learner will be able to...**
Types of Chickens	Understand local and commercial breeds of chickens are kept for different purposes.	• Name and identify the local breeds of chickens in the village*. • Compare differences between local and commercial breeds. • Share 3 reasons why local breeds may be the best choice for homestead poultry production.

*This will need to be researched based on the country you live in

WORDS TO KNOW:

Brooding – *laying and sitting on eggs*
Incubation – *keeping eggs at a warm temperature so they can develop and hatch*
Scavenging – *searching for food*
Supplemental feed – *food given to chickens in addition to what chickens find scavenging*

BACKGROUND INFORMATION NEEDED FOR TEACHING



Local chickens, also known as"indigenous", are native to the area they are found in. Commercial bred chickens, also known as "improved", are bred to get the best characteristics for producing either eggs or meat. There are many differences between local and commercial breed chickens.

Under highly controlled conditions, commercial chickens may produce more eggs, and grow quicker and fatter than local chickens. However, raising commercial chickens costs more money and requires more time for care.

Also, to raise commercial chickens a great amount of training is needed to learn about:

- poultry diseases and how to prevent them
- the balanced diet commercial chickens need
- good poultry housing
- managing the money needed to raise commercial chickens

Therefore there is greater risk in raising commercial chickens. Commercial breeds are best for raising chickens as a fulltime business.

On the other hand, local breeds require less time to care for and cost less to raise. There is low risk in raising local chickens. Another benefit is local chickens are used to the conditions of the country so they are strong. Local breeds are good for natural incubation and brooding. Some commercial breeds are not good brooders.
After buying the first local hen and eggs, future chickens come from breeding within the flock, which does not require buying more birds.

Local breeds are able to get most of their food by scavenging so only a small amount of supplemental feed is required. Local breeds are raised for both eggs and meat. Because local chickens are easy to care for, children can be given many of the responsibilities for raising them. Local breeds are a better choice for village poultry systems.

Below is a chart comparing local and commercial breeds:

	Local/Indigenous Breeds	Commercial/ Improved Breeds
Size of Flock	Usually 5-15 chickens, but up to 100.	More than 100 chickens.
Feed	Mostly scavenging with a small amount of supplemental feed.	Need to be hand fed a nutritionally balanced diet.
Adaptation	Well adapted to local climate and ecological conditions so they are hardy. They resist diseases and can escape predators more easily.	Not locally adapted so they are not as resistant to disease and are not used to escaping predators.
Production	Higher production relative to low cost and time to raise.	High production, but a large amount of time and money to raise.
Mothering	Naturally hatch and raise chicks.	Not suited for natural incubation and brooding, need brooders and hatchery to raise chicks.
Inputs	-Minimal supplemental feeding -Simple night housing made with local materials -Need little medicine and few vaccinations -Need de-worming -low risk	-Need regular feeding -Need good housing -Need regular vaccinations and medicine to ensure production based on cost to raise. -Need de-worming -high risk
Purpose	Dual purpose - raised for meat and eggs for families to eat and for additional income.	Single purpose – raised for meat OR egg production for resale.
Time needed for care	Usually less than ½ hour each day.	More than 1 hour each day depending on number of chickens.

Summary:
When breeding chickens, village farmers have the choice of raising local indigenous breeds or improved commercial breeds. Local breeds demand less time for care, little money, and few inputs. As a result there is low risk in raising them. For small-scale homestead production, the benefits of local breeds often outweigh those of commercial breeds.

Lesson #5
COMPARISON OF LOCAL AND COMMERCIAL BREED CHICKENS

Objective: To understand local and commercial breed chickens are kept for different purposes.

Outcomes:
1. Students will be able to name and identify the local breeds of chickens in the village.
2. Students will be able to compare local and commercial breeds.
3. Students will share 3 reasons why local breeds are likely the best choice for homestead poultry production.

Output:
1. Students will create a Venn Diagram comparing local and commercial breeds.
2. Students will write a letter persuading someone to use local breeds for homestead poultry systems.

Key Vocabulary:
- Local/Indigenous breed
- Commercial/Improved breed
- Scavenging
- Supplemental feeding

Materials Needed:
- Notepaper or Student Notebook

LESSON

This lesson should be taught over at least 2 sessions. The direct and guided instruction in session 1 and the Independent practice in session 2.

Anticipatory Set:
Ask students some comparison questions that are relevant to the area and conditions they live in.

For example:
- Why build a house out of clay brick instead of thatch – both provide shelter?
- Why own a motorcycle instead of a bicycle – both are forms of transportation?
- Why use a pencil instead of a pen – both write?
- Why send a text message instead of calling someone – both are forms of communication?
- Why raise chickens instead of ducks – both are poultry?

The objective is to get students thinking about how choices are made between things that are similar. Students should realize that choices are made based on what is the best for the situation and use. Students should discuss why one solution would be chosen over the other. There is no correct answer to these questions – it is an exercise for students to understand choices are made based on what things will be used for.

Direct Instruction:
Share with students that the objective of today's lesson is to understand the difference between local and commercial breed chickens and their uses.

If possible, provide pictures of local breed chickens.

- Ask students if they know there are different types of chickens used for breeding?
- Write on the top area of the chalkboard the 2 headings: Local Breeds, Commercial Breeds
- Explain the difference between local (indigenous) and commercial (improved) breeds.
- Ask students to give the names of the local breeds common to the area they live in *(teacher will need to find this information out in advance).*

- Write the following topics down the side of the chalkboard:
  - **flock size**
  - **feed**
  - **adaptability**
  - **production**
  - **inputs**
  - **time**
  - **care**
- Explain to students what each topic means.
- Give students some time to discuss in small groups/partners what they think the differences between local and commercial breeds are for each topic. If students are very familiar with chickens they will be able to have this discussion independently. *However, if they do not have experience with chickens the teacher may have to encourage discussion by asking questions to stimulate discussion.*
- Have student volunteers write on the chalkboard under each breed and topic what they think the differences are. Use the "Background Information Needed for Teaching" to give any missed details or make corrections.

Guided Practice:

Explain to students they will create a Venn diagram to compare the 2 breeds ***(an explanation of a Venn Diagram can be found in Appendix II)****. This diagram will be used later to write a persuasive letter, and can be used to review how the breeds differ* ***(a student example can be found in Appendix I).***

Instruct students to:

- *Draw 2 circles that overlap*
- *Write "local" and "commercial" above each circle where they are not overlapping*
- *Review the information on the chalk board from the direct instruction session to decide what do both breeds have in common (both are: poultry, lay eggs, provide meat, have high production, need to be vaccinated and de-wormed).*
- *Students should write the similarities in the overlapping part of the circles.*
- *Review the differences with students*
- *Write those characteristics under each type of chicken:*

  Local: *5-15 chickens but up to 100, scavenge for feed, well adapted to local conditions and climate, have the ability to escape predators, low cost to raise, good hatching and mothering abilities, simple night housing, free range during the day, little medicine used, easy to care for (women, children, and old people can raise them easily), little time needed to raise them, little risk in raising them*

  Improved: *100 or more chickens, must be hand fed, not adapted to local conditions, can't escape predators, high cost, poor mothering abilities, need to be fully confined, need complex housing, need many vaccinations, poultry keeper must be trained to care for them, lots of time is needed to manage them, higher risk in raising them*

Independent Practice:

Using the Venn diagram, have students write a persuasive letter ***(an explanation of persuasive writing can be found in Appendix II)*** to someone who is going to start raising chickens. The letter should point out the similarities between Local and Commercial breeds of chickens, but persuade the person to use local breeds for homestead production ***(a student example can be found in Appendix I)***.

The letter should have:

- *the date*
- *greeting*
- *introduction paragraph*
- *body of the paragraph*
- *closing*

To challenge students, have them add a paragraph about when a poultry keeper should consider using improved breeds.

Have students read their letters to partners.

Closure:

- Ask students to review the Venn diagram they created and decide what type of breed is best suited for families raising poultry in the village, and give reasons why.
- Ask students what improved breeds should be used for?

Home – School Connection:

Request students to take the letter home and read it to their parents.

Lesson #6
OBSERVATION OF LOCAL AND COMMERCIAL BREED CHICKENS

Objective: to observe the differences between local and commercial breeds.

Outcomes:
1. Students will be able to name and identify the local breeds of chickens in the village.
2. Students will be able to compare local and commercial breeds.
3. Students will share 3 reasons why local breeds are likely the best choice for homestead poultry production.

Key Vocabulary:
- Local/Indigenous breed
- Commercial/Improved breed
- Scavenging
- Supplemental feeding

Materials Needed:
- Demonstration coop

LESSON

Take students to the demonstration coop for a hands-on activity. If you are working with a livestock extension worker or other poultry professional, you could ask him/her to lead the lesson or assist you.

If possible, have a local poultry keeper or extension worker bring a commercial chicken for students to observe. BE SURE NOT TO MIX THE COMMERCIAL AND LOCAL BREEDS. CONSIDER OBSERVING THE COMMERCIAL BRED CHICKEN IN A LOCATION FAR FROM THE DEMONSTRATION COOP, AND BE SURE ANYONE WHO TOUCHES THE COMMERCIAL BRED CHICKEN WASHES THEIR HANDS BEFORE GOING TO DEMONSTRATION COOP. THIS IS TO BE SURE THAT DISEASES DO NOT SPREAD.

Share with students that the objective of the coop visit is to observe the differences between local and commercial breed chickens.

Use the visit to the demonstration coop as an opportunity to point out the similarities and differences between the two breeds. The visit can also be used to show students how to catch chickens, and how to hold them if they are not already familiar.

You can ask students questions from the Venn diagram such as:

Which breed:
-is raised for both meat and eggs? *(local)*
-requires more time to raise? *(commercial)*
-lay eggs? *(both)*
-needs de-worming? *(both)*
-feeds itself by scavenging? *(local)*
-needs more vaccinations and medicine? *(commercial)*
-has a higher risk to raise? *(commercial)*
-why would you choose a local breed chicken for homestead breeding? *(easy care, low risk, can produce meat and eggs for a family, low cost, they are adapted to local conditions)*
-why would you choose a commercial breed chicken? *(for a fulltime business)*

LEARNING POINT 4:
HOW TO KEEP CHICKENS HEALTHY

Topic	Learning Objective **Learner will...**	Basic Competencies **Learner will be able to...**
Disease Prevention and Predation	Understand the origin and transmission of disease. Understand how diseases, parasites and predators can affect poultry. Understand how to prevent diseases and parasite infestation. Understand how to reduce predation.	• Explain diseases come from microorganisms. • Explain how diseases are transmitted. • List the two serious diseases that affect chickens. • Identify the signs that a chicken has Newcastle Disease. • Identify the signs that a chicken has Fowl Pox. • Recall the vaccination timeline for Newcastle Disease. • List the 2 types of parasites that attack chickens and give examples of each. • Identify the signs that a chicken has internal parasites. • Identify the signs a chicken has external parasites. • Discuss the natural anti-parasitic remedies. • Recall the de-worming timeline intervals. • Explain the 5 ways to prevent diseases and parasites. • Discuss how the costs of controlling diseases, pests and predators could be minimized through good management. • Explain why a disease outbreak should be communicated to the local veterinary authorities. • Name predators of chickens. • Explain 3 actions that reduce the risk of predation.

WORDS TO KNOW:

Contaminate – *to make unclean, dirty or infected by contact.*
Disinfection – *cleaning to prevent or destroy disease carrying micro-organisms and parasites.*
Infestation – *quantities large enough to be harmful*
Infectious disease – *capable of moving from one person to another or one animal to another.*
Microorganism – *very small form of life that can not be seen with the eye without a microscope.*
Outbreak – *the sudden start of a disease in a local area, in large numbers*
Predator – *an animal that hunts other animals for food*
Predation – *the capturing and eating of other animals for food*
Prevention – *taking steps to stop something from happening*
Remedy – *something to treat a symptom or cure a disease*
Symptom –*a sign of a disease such as fever, itching, headache*
Vaccine – *a substance given to protect animals or humans from specific disease*
Virus – *a microorganism that causes disease*

BACKGROUND INFORMATION NEEDED FOR TEACHING

CAUSE OF DISEASE

Human bodies are surrounded and inhabited by billions of **microorganisms**. Microorganisms are living **organisms** that are so small they can only be seen with a microscope. Some types of microorganisms are bacteria, viruses, fungi, and parasites. These can enter the body through the air we breathe, the food and drink we consume or through openings in the skin, such as cuts. Most microorganisms are harmless or even beneficial; for example, good bacteria that normally live in the digestive system help to digest food.

Sometimes, a microorganism that is capable of causing a disease enters the body. There are two major kinds of diseases: infectious and non-infectious. **Infectious diseases** are caused by microorganisms that live in human and animals. Infectious diseases can be passed on from person to person, or animal to animal, or animal to person.

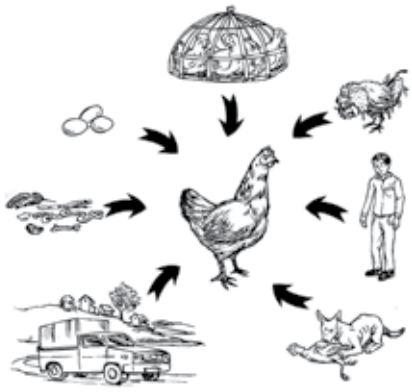
A chicken's body, just like humans, is inhabited by billions of microorganisms. Microorganisms that are capable of causing disease can enter a chicken's body. When harmful microorganisms enter a human or animal body symptoms will appear. Some **symptoms** include fever, rash, weight loss, diarrhea, vomiting, muscle ache, and coughing.

TRANSMISSION OF DISEASES

Infectious diseases can be passed from one chicken to another through:
- body fluids or dropping
- by drinking or eating **contaminated** food or water
- from airborne particles containing the microorganisms

Insect bites are another means of transmission:
- an insect bites an infected chicken
- the insect carries the microorganism in its system
- the insect then passes the disease by biting another chicken

Infections can also be passed on from human interaction:
- a microorganism may be carried on the shoe of a person who visited an infected farm
- the tires of a vehicle or bicycle from people visiting an infected farm



PREVENTING DISEASE

It is the poultry keeper's responsibility to protect the flock from disease. Steps can be taken to reduce the chance of disease-causing germs. Disease **prevention** means doing everything possible to keep diseases out of a flock. *Important tips to prevent disease:*

a. Know the warning signs of infectious bird diseases (details on specific diseases follow).
b. Inform livestock extension agents when many birds die.
c. Protect the flock by keeping the coop and feeders clean, and visitors away from the flock.

Poultry keepers should be very concerned about bird diseases. An outbreak of bird diseases such as Newcastle disease can harm or kill chickens, and it can spread quickly and kill other farmers' birds as well. It is important to inform livestock extension agent or the local veterinarian if many chickens die. They can confirm what the disease is, and put preventative measures in place to limit the spread of the disease.

Husbandry, nutrition, environment, and flock management all have a direct effect on the health and production of chickens. Because village poultry flocks are usually free-ranging during most of the day the chickens roam everywhere. This puts them at greater risk to catch and spread diseases. When one bird has an infectious disease, there is a greater risk that all birds in the village will get it. If the chickens are not

well fed, their resistance against disease will be low. A well-nourished chicken kept under good husbandry conditions can fight diseases better. Disease prevention is less costly than treating diseases with medicine or having to replace chickens that have died. Following 5 habits can help prevent disease.

5 KEY HABITS TO PREVENT DISEASE

The following information is for teachers to share with students so they know what habits poultry keepers should practice for poultry disease prevention and the importance of contacting the livestock extension office, the district veterinary office, and a reliable veterinary supplier. Teachers should encourage students to share this information with their parents. *This information is not suggesting students perform these tasks or use the recommended remedies.*

1. Sanitation

Regular, thorough cleaning and **disinfection** of the chicken coop is important. This prevents bacteria, microorganisms, parasites, and viruses from building up, and discourages mice and rats.

- The coop should be cleaned once a week.
- Droppings should be removed as often as possible.
- Litter should be changed daily if possible, if not then at least once a week.
- Worn and dirty perches should be replaced.
- The coop should be disinfected by sweeping the floor and removing all droppings, then sprinkling wood ash on it. A small amount of wood ash should be sprinkled on nests as well.
- Fumigating the coop with smoke 2-3 times a year is helpful to reduce external parasites.
- Painting the coop walls with lime-wash and using a **disinfectant** also reduces the chance of external parasitess.

Transmission:

External parasites include fleas, ticks, lice, and mites. External parasites lay eggs on the shaft of chicken feathers which then hatch. The chicken becomes infested with the parasite. Infestation can occur at any time, but often are seasonal. Dirty, humid chicken houses have infestations more often.

Signs of External Parasites:

- Adult birds spend a lot of time pecking and polishing feathers
- Birds lose weight
- Damage or loss of feathers
- Puffed up feathers
- Skin irritation
- Pale color in comb or wattle (anemia)
- Drop in egg production

Prevention and Remedies:

To control external parasites BOTH the birds and their environment must be treated. Lice can be seen around eyes and nose, and lay their eggs in clumps at the feather shaft. Fleas can be seen on the belly. Birds should be inspected at least twice a month, spreading the feathers in the vent, breast, and thigh areas, looking for nit clumps or pale, scurrying insects. Consult a veterinary supplier for advice on treating birds. All birds must be treated with a powder or spray insecticide at the same time otherwise untreated birds will spread the parasites back to the treated ones.

Other steps to take include:

- Cleaning the coop regularly
- Fresh straw or hay should be put on nests weekly
- Sprinkling a little wood ash on the coop floor
- Sprinkling wood ash or lemon grass in the nests also helps to repel parasites
- Fumigating the coop with smoke 3-4 times a year
- Only buy healthy birds from a farmer to add to your flock. Do not buy birds from the market

Poultry keepers should learn what other local methods there are to control external parasites. Most rural people know the medicinal value of plants which can be used to treat illness and reduce infestations of external parasites (lice, fleas, mites, ticks).

WARNING: Children should not use pesticides. *Great care must be taken when using any type of insecticide. They can be dangerous to humans and chickens if used improperly. Only safe insecticides should be used if ticks, lice or mites have been a problem. Poultry keepers should check with local veterinary authorities to determine which insecticide to use, and follow their directions carefully.*

2. Isolation of Sick, Newly Introduced, or Returning Chickens

To prevent bringing disease into a flock, new chickens or chicks should be isolated for 14 days before introducing them to the flock. This allows time to observe the newly purchased birds. If any show signs of disease or parasites, do not introduce them into your flock.

Chickens that have been sent to the market and remain unsold should not immediately be returned to the coop. They may have come into contact with disease-carrying birds. If they cannot be eaten, they should be also be isolated for at least 14 days before they are returned to the flock to be sure they are healthy.

Sick chickens should be separated from the rest of the flock. Disease can spread to the flock through direct contact with the sick chicken.

3. Disposal of Dead Chickens

Dead birds should be removed from the flock quickly, and buried deep so other animals cannot dig them up. Flies can be carriers of disease from infected birds. Incorrect disposal of birds can be a source of odor and attract flies. Deep burial reduces the chance of diseases spreading.

4. Vaccination Against Major Diseases

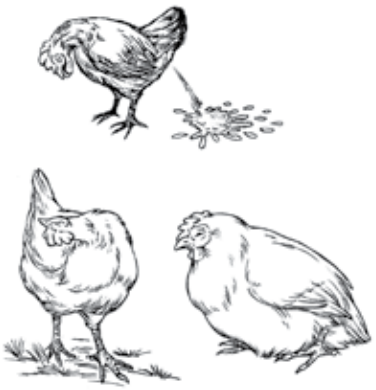
Vaccination against serious poultry disease is important to prevent illness. Newcastle disease (ND) is a major cause of death among village chickens. If a chicken gets it, there is a strong possibility the entire flock will. ND may kill more than half to all of the flock. ND can be controlled by vaccine. ND is highly contagious and there is no cure if birds get it, so it is important to vaccinate. Some vaccines for ND can easily be given by putting 1 drop of the vaccine in the eye of the chicken.

Transmission of Newcastle Disease:

ND is transmitted through bird droppings, litter, and food and water contaminated by bird droppings. The virus can be transmitted on equipment and vehicle tires moving from contaminated to uncontaminated farms. Humans can spread ND to other birds by walking on contaminated farms to uncontaminated areas. But humans can't give it to other humans.

Signs of Newcastle Disease

Poultry with ND often fluff their feathers and seem to "have its coat dragging on the ground". Chickens appear tired, and lack appetite. There may be swelling of the head and neck, and a decrease in egg production. Sometimes deformed eggs may be produced. Other signs include the following:



Other Signs of Newcastle Disease:

- Runny eye and/or nasal
- Wheezing or difficulty breathing
- Green diarrhea
- Spasms
- Twisted necks
- Partial or total paralysis of the wings and legs

Vaccination schedule

Food and income are lost when ND kills chickens. It is important to follow the vaccination schedule to make sure they are protected from ND. If chickens are not vaccinated every 4 months, their protection against ND will become weak and they may not be protected from the virus.

Chicken's Age	Vaccine	Route	Dose
First vaccination = after the chick is 7 days old	**Lasota, I2**	**Ocular (Eye)**	**1 drop**
Repeat every 4 Month	**Lasota, I2**	**Ocular (Eye)**	**1 drop**

The Lasota and I2 vaccines are given by putting a drop in the eye of the chicken. Poultry keepers can contact the local livestock extension office or a reliable veterinary supplier to be trained on how to give the vaccine. Vaccines should be given early in the morning before letting the chickens out of the coop. The chickens will be easier to catch when roosting in the coop. Sick birds should not be vaccinated. If the chicken is already sick the vaccine will not help it.

While ND has a devastating effect on village poultry, there are other diseases that can affect poultry. Once ND has been controlled birds live longer. Another disease called Fowl Pox may infect chickens. Fowl Pox usually does not kill the birds and the birds usually recover. Unlike ND, Fowl Pox spreads slowly in the flock. A bird with Fowl Pox can be eaten.

Transmission of Fowl Pox:

The virus is present in the scab that falls off a chicken that has Fowl Pox. The scab contaminates the air, feed, and water. If a wound or scratch is present on the skin of healthy birds, the virus is able to enter the body. The virus may also enter through the mouth or respiratory tract if there is any infection. Insects transmit this disease by biting an infected chicken and then biting an uninfected chicken.

Signs of Fowl Pox:

- Scabs on the comb, wattle, shank, toes
- Birds eat less
- Weakness
- Weight loss if the mouth or respiratory tract if affected

Control:

- Birds with Fowl Pox should be isolated from the rest of the flock until they recover.
- There is no primary treatment. Only vaccination can prevent the disease. Consult a veterinary supplier if you wish to vaccinate.

It is also very important to be aware of locally known diseases. Consulting with the local veterinary supplier, livestock extension agent, or district veterinary office will provide poultry keepers with the symptoms to be aware of, and steps to follow if a chicken appears ill.

5. De-worm the chickens

Internal parasites live inside the intestines of chickens. Examples are round worms and tapeworms.De-worming is the practice of removing parasites from the chicken's system. It should be done every 3 months. Only adults should use a de-worming medicine. The medicine to remove the parasites can be purchased from a trusted veterinarian supplier for little cost. The veterinarian supplier can also provide information on why it is useful to change de-wormers sometimes. The medicine is put in drinking water or feed.

There are several types of internal parasites common to chickens. They are:

- Roundworms
- Tapeworms
- Gapeworms

Chickens can get internal parasites 2 ways:

Direct Transmission:

» Infected chicken excretes parasite eggs in its droppings.
» Other chicken eats parasite eggs from droppings.
» Parasite lives inside chicken and become infected with worms.
» The newly infected chicken continues the cycle by excreting the parasite eggs.

Indirect Transmission:

» Earthworm eats parasite egg and becomes infected.
» Chicken eats the infected earthworm.
» Parasite lives inside chicken.
» Chicken excretes parasite eggs in its droppings.

Signs of Internal Parasites:

- poor health
- weight loss
- low weight gain
- eating larger amounts of food
- drop in egg production
- bloody diarrhea
- anemia (pale wattle and comb) in severe cases
- gasping for breath or stretching neck in the case of gapeworm

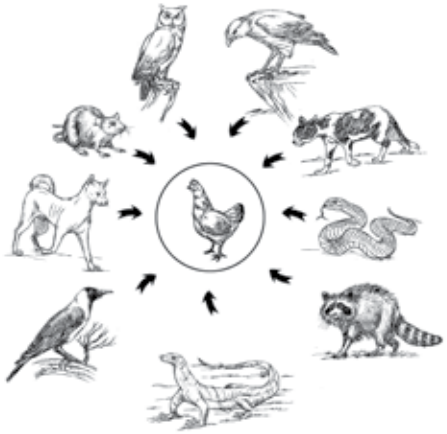
Prevention and Remedies:

Prevention is always easier than curing. Good sanitation practices combined with regular de-worming is the best prevention.

- Cleaning the chicken house and removing droppings every week.
- Cleaning feed and water containers daily.
- Preventing wet and muddy areas around water containers or elsewhere
- De-worming every 3 months.
- Consulting with a veterinary supplier or livestock extension officer to find out local prevention practices.

PREVENTION OF PREDATORS

Predators are a serious problem in village chicken production. Predators of chickens include birds such as hawks, eagles, and owls. Foxes, weasels, mongoose, rats and snakes are also predators. Providing a secure night coop that is lifted well above the ground for night shelter will reduce the risk of predation. A coop located out in the open, close to the home can be watched more easily and responded to quickly if a predator is heard.



To limit predation it is important to use protective measures that prevent how the predators in the area hunt:

- Hawks, eagles, owls and other birds of prey usually circle high in the air and dive unexpectedly on the chickens, especially chicks. Do not provide feed or water in large open areas where chickens can be attacked easily by birds. A simple and effective system to deter birds from diving down to the flock is to tie parallel lines of string across the main scavenging area, the intervals between should measures less than the predator's wingspan. Another method is to attach string or wire from side to side in a crisscross pattern preventing birds from swooping down on scavenging chickens. Also a fishing net supported on poles can be spread across the 2 sides of the run. Hanging shiny objects (old CDs, tin cans, jar lids) which will twirl and twinkle will scare off any flying predators. Keep young chicks protected until their escape skills are developed by using day baskets to keep them safe (see learning point 6 "Breeder Management" for more details).

- *Foxes, jackals, cats and other mammals hide in bushes to remain unnoticed by chickens. Clear the grass and bush around the chicken coop to limit hiding places for predators. Build the night coop near the house where predators will be frightened off by humans. Do not provide feed or water next to dense bushes where cats, foxes, dogs and jackals can wait for the chickens.*

- *Rats, mongooses, weasels, and snakes tend to catch chicks that are confined. Build a chicken coop on poles and put inverted cones around the legs to make it difficult for predators to enter. Rats often come up through the earth floors, and the first signs of a rat attack may be unusually quiet chicks huddled in a corner, or dead chicks with small bloody neck scratches. Snakes will kill chicks if they can get into the coop. Be sure to plug up any holes or cracks in the coop where predators may enter. If the coop is fenced in, a smaller hut can be made outside the coop. Chicks can escape there if the coop is intruded on by a predator. A local practice is to put honey in the coop or the smoke of oil cake. Both are said to repel snakes.*

Traps can be set for large predators. It is not necessary to set traps all around the coop. One trap is enough. If a predator is caught, empty the trap, and then replace the trap where it was. Other predators from the same pack may attack the same coop a second night.

Table: Predator attack modes and control methods

Predator	Attack mode	Control method
Birds like hawk, eagle and owls	Picks up stray birds and weaklings. Attacks chickens so that head and toe marks are visible on back. Often plucks birds.	Small hut can be made outside the coop.
Rat, mongoose	Usually take more than they eat, and stuff chicks in holes for later consumption.	Holes around coop should be plugged.
Snake	Will swallow whole eggs and chicks.	Holes around coop should be plugged.
Dog, cat	General destruction.	Cats can control rats but wild cats and dogs are a problem. Predation can be minimized by building a fence around the coop.
Fox, jackal	General destruction.	Roam in the early morning; Doors and window should be tightly closed. Predation can be minimized by building a fence around the coop.

Summary:
Diseases and predation are the main causes of loss in homestead poultry production. The amount of loss can be reduced if preventative steps are taken. Cleaning the coop and all areas and items related to the flock is a must for disease prevention. Isolating new chickens, sick chicken, or unsold chickens prevent transmission of disease. Dead chickens must be buried deep and quickly. Vaccinating the flock for Newcastle disease and de-worming are also important steps to prevent illness. To protect chickens from predators, secure night coops need to be provided. Small chicks should be kept in day baskets for protection as well.

Lesson #7
ORIGIN OF DISEASE AND TRANSMISSION

Objective: Understand the cause/origin and transmission of disease.

Outcomes:
Students will be able to explain where diseases come from and how they are transmitted among chickens.

Output:
Students will create a diagram showing how diseases are spread among chickens and write a newspaper article about disease transmission and prevention.

Key Vocabulary:
- Disease
- Microorganism
- Transmission
- Contagious
- Symptom

Materials Needed:
- Student Notebook/piece of paper

LESSON

Information for this lesson is covered in "Background Information Needed for Teaching" under the first 3 headings: Cause of Disease, Transmission of Disease, and Prevention of Disease.

This lesson can be broken into 2-3 sessions. Direct and guided instruction in 1 session, the independent practice in the 2nd session.

Anticipatory Set:
Ask students
- Have they ever been ill?
- How do they think they become ill?
- Do they think animals can become ill?
- Have they seen an ill animal?
- Do they think chickens can become ill?

Direct Instruction:
Share with students that the objective of today's lesson is to understand the cause of disease in chickens, and how it is transmitted.

Using the "Background Information Needed for Teaching" explain the origination of disease to students.

If you are able, draw an outline of a human body. Put dots inside of it to represent the microorganisms in the human body that are beneficial. Then add one that is harmful and explain how it can spread through the body and give symptoms of the illness.

As an example, think of a person who has a cold. That person may cough into his or her hand and then touch a doorknob, thus placing the cold virus on that doorknob. The virus may die on the doorknob, but it's also possible that the next person to touch the doorknob will pick it up. If that person then touches food with the unwashed hand and consumes the food, the virus is now inside the body.

Explain that the same can happen to animals, including chickens.

It is important to realize some students may have cultural beliefs about the cause of disease that differs from the scientific view. The object of the lesson is to provide the scientific explanation on cause and transmission of poultry diseases.

Guided Practice:

- Draw a chicken on the chalkboard.
- Have students draw the same in their notebook.
- Restate that animals can become ill from harmful microorganisms entering their bodies, just like humans.

Ask students how they think the disease spreads from one chicken to another. Suggest thinking about the habits of chickens to come up with ideas. Use the diagram of Transmission of Diseases in the "Background Information Needed for Teaching" as a guide.

As students provide ideas, draw a line from the chicken and at the end of the line draw a simple picture to represent how the disease is spread. Be sure students provide an explanation as to "how" the disease is spread.

For example: Disease can by spread by humans if a person walks on a farm where the chickens are infected. The person then leaves the farm and visits another farm where the chickens are not infected. The person has the disease on his shoes and spreads the disease to the second farm.

The following ways should be represented on the diagram: ***body fluids or droppings, by drinking or eating contaminated food or water, airborne particles containing the microorganisms, insect bites, from human shoes or tires of a vehicle***

Students should make the diagram in their notebooks as well. They will need it to complete the next assignment ***(a student example can be found in Appendix I)***.

Using the "Background Information Needed for Teaching" explain "disease prevention" to students.

Ask them why practicing disease prevention is useful for poultry keepers.

Have students discuss in small groups what are the disease prevention steps poultry keepers can practice. Be sure students review how diseases are transmitted, this will give them clues on steps to take to prevent the spread of disease.

Independent Practice:

If possible, bring in a newspaper and read a few articles to students to prepare them to write a story.

Review with students newspaper article are written to inform the public ***(an article description can be found in Appendix II)***.

Point out that good newspaper reporting covers the: who, what, where, when, why, and how in the first few sentences.

Have students brainstorm the reasons why a story about poultry diseases might be printed ***(possible answers: a recent outbreak of disease, to inform the poultry keepers of the steps take, to explain how poultry diseases are spread).***

- Have students work as partners. Using the diagram as a guide, have students write a short newspaper article informing the public about poultry diseases.
- One student should act as the reporter, the other student as the farmer.
- The newspaper article should answer the 5 Ws (who, what, where, when, why, and how).
  Sample questions:
  - » Who is responsible for protecting poultry from disease?
  - » What can poultry keepers do to prevent disease?
  - » Where do poultry diseases come from?
  - » When should a livestock extension office be called about an outbreak?
  - » Why should farmers work on disease prevention?
  - » How are diseases spread?

- The "reporter" should decide why the newspaper story is being written and then create the questions to ask the farmer. The reporter will then interview the "farmer" to get the answers.
- Students need to create an interesting "headline" for the article.
- Students can then write the newspaper article together.
- When finished students can take turns reading their article to 2-3 other sets of partners. When listening to the student read the newspaper story, the other students should be able to identify the 5 Ws (who, what, where, when, why, and how) in the story.

Closure:

Ask students

- Who is responsible for protecting chickens from disease?
- Why it is important to practice preventing diseases?
- Why should livestock extension agents be informed about sick chickens?

Home – School Connection:

Have students take the diagram about disease transmission home to share with their parents. Request students to explain to their parents how poultry diseases originate and how they are transmitted. Have students share with the class any questions their parents had after hearing about disease transmission.

Lesson #8
POULTRY DIESEASES

Objective: Understand how diseases can affect poultry and how to prevent diseases.

Outcomes:
1. Students will be able to list the 2 serious diseases that affect chickens.
2. Students will be able to identify the signs that a chicken has been affected by Newcastle Disease or Fowl Pox.
3. Students will be able to recall the vaccination timeline for Newcastle Disease.
4. Students will be able to explain why a disease outbreak should be communicated to the local veterinary authorities.

Output:
Students will produce a brochure with symptoms of Newcastle and Fowl Pox, how to prevent and who to contact if chicken are infected.

Key Vocabulary:
- Symptoms
- Vaccination
- Outbreak

Materials Needed:
- Student Notebook/piece of paper

LESSON

Information for this lesson is covered in "Background Information Needed for Teaching" under the heading **5 Key Habits to Prevent Disease:** *4) Vaccination Against Major Diseases.*

these diseases may have different local names.

**This lesson can be done over 2-3 sessions depending on how much time is provided to create the brochure.*

Anticipatory Set:
Review with students how diseases are transmitted.

Ask students
- If they have had any chickens in their flocks die?
- Do they know what diseases are common to poultry?
- Why would it be helpful to know about the diseases?

Direct Instruction:
Share with students the objective of the lesson is to learn about the 2 most serious diseases common to village chickens and how to prevent them.

- Using the "Background Information for Teaching" and local knowledge, discuss with students how harmful Newcastle Disease is to poultry.
- Discuss how damaging it can be to a poultry keeper if the flock catches this disease.
- Explain how Newcastle Disease can by controlled by vaccination.
- Explain once Newcastle is controlled chickens will live longer so another serious disease, Fowl Pox becomes a concern.
- Discuss the importance of notifying the government livestock authority about sick or dead chickens in order to confirm the illness so preventative measures can be put in place to limit the spread of the disease.

Guided Practice:
Draw the following chart on the chalkboard and have students copy it into their notebook:

	Newcastle Disease	Fowl Pox
Symptoms:		
Transmission:		
Prevention:		
When vaccine should be given:		
Who should give the vaccine:		

Using student participation and the "Background Information Needed for Teaching" fill in the following details about the 2 Diseases on the chalkboard and students into their notebook.

Draw or show pictures of chickens with each disease.

Independent Practice:
Using the chart from the chalkboard and notebook, students will make a brochure to inform poultry keepers about Newcastle Disease and Fowl Pox ***(a student example can be found in Appendix I)***.

Have students fold a piece of paper into thirds. There should be 6 panels ***(see student example in Appendix I).***

The **front panel** should have a title.
For example: Poultry Diseases or Diseases Poultry Keepers Should Know About

2 panels should be used for <u>each disease</u> (Newcastle and Fowl Pox) to describe the symptoms, an illustration of a chicken with the disease, how the disease is transmitted, vaccination timeline for Newcastle, how the vaccination is given.

The **back panel** should be used to inform the public about who to call if chickens are sick or die, and why it is important to contact the livestock extension agent or government livestock authority.

Closure:
Ask students

- What should poultry keepers do if they find many dead chickens that were not killed by predators ?
- What may be wrong with a chicken if it is coughing, having difficulty breathing, and has green diarrhea ?
- How often is the Newcastle disease vaccine given ?
- Why is it important to give the Newcastle vaccine in regular intervals ?
- Do chickens with Fowl Pox die ?
- What should be done with a chicken that has Fowl Pox ?

Home – School Connection:
Have students take the brochure home to share with their parents. Ask students to share with the class questions their parents had after looking at the brochure.

Lesson #9
PARASITES

Objective: Understand how parasites can affect poultry, and how to prevent infestation.

Outcomes:
1. Students will be able to list the 2 types of parasites that attack chickens and give examples of each.
2. Students will be able to identify the signs that a chicken has internal parasites or external parasites.
3. Students will be able to discuss the natural anti-parasitic remedies.
4. Students will be able to recall the de-worming intervals.

Output:
Parasite Fact Sheet and students will play a game to demonstrate their knowledge about parasites.

Key Vocabulary:
- Parasite
- Remedy

Materials Needed:
Student Notebook/piece of paper

LESSON

Information for this lesson is covered in "Background Information Needed for Teaching" under the heading **5 Actions to Prevent Disease:** *1) Sanitation and 5) De-worming*

**This lesson can be taught during several class sessions. The game should be played after students have had time to review the fact sheet.*

Anticipatory Set:
- Review with students Newcastle Disease and Fowl Pox. Discuss how they are highly contagious diseases that can spread among the flock.
- Share with students there are other types of pests that poultry can have that make them sick, reduce production and spread among the flock.
- Ask students if they know what any of those pests are, and if so, has any of their chickens had parasites before?
- Tell students the good news is there are steps poultry keepers can take to keep the flock from getting these pests.

Direct Instruction:
Share with students the objective of the lesson is to learn the 2 types of parasites that affect chickens and the signs that a chicken has parasites.

- Using the "Background Information Needed for Teaching", explain to students about internal and external parasites and how they reduce the production of chickens.
- Be sure to include how easily both internal and external parasites can spread among the flock.
- Draw the different types of internal parasites on the chalkboard
- Give students the signs that chickens have internal parasites.
- Review direct and indirect transmission of internal parasites and draw both ways of transmission on the chalkboard.
- Ask students what could be done to limit each type of transmission? ***(possible answers: putting feed in a feeder or on a plate, keeping feeders and drinkers clean, cleaning the droppings out of coop regularly, de-worming chickens so they won't spread worms in their droppings)***
- Ask students if they can list the names of external parasites chickens get?

- Give students the signs that a chicken has external parasites.
- Ask students what steps could be taken to reduce external parasites? *(possible answers: keeping to coop and nests clean, changing the straw in the nests, checking for parasite regularly, fumigating the coop and nests, other local remedies)*

Guided Practice:

Students will make a fact sheet about internal and external parasites. *It is important for the teacher to make the factsheet and to demonstrate how it is made, to use it for review and a reminder to students of a resource they have to use. It can also be given to students who were not in school that day so they can duplicate it (a student example can be found in Appendix I).*

- Have students fold a piece of paper in ½.
- Have students cut/gently tear the top sheet in half from the bottom edge to the top where the paper is folded in ½.
- On the front 2 "flaps" write: Internal Parasites and External Parasites.

Internal Parasites	External Parasites
Roundworm	Lice
Tapeworm	Flea
Gapeworm	Ticks
	Mites

- Under each heading, list examples = and draw a picture of each.
- Have students open each flap. On the top inside flap have students label it **"signs of internal parasites" and "signs of external parasites"**, the bottom 2 flaps should be labeled **"transmission of internal parasites"** and **"transmission of external parasites"**, and the back 2 flaps should be labeled **"prevention/remedies of internal parasites"** and **"prevention/remedies of external parasites"**.
- Using the "Background Information Needed for Teaching" and student recall from earlier discussion, fill in all of the flaps for each type of parasite.
- To encourage more participation students could work in small groups together.

Independent Practice:

- Explain to students they will be playing a game to show how much they know about poultry parasites.
- Have students sit together in groups of 4-6.
- Using their factsheets they created, students take turns asking the group questions about both kinds of parasites including: examples of: symptoms, transmission, and prevention of parasites.
- The first student to raise their hand, and then be called on by the person who asked the question gets to answer. The student gets a point if the question is answered correctly, if not, the next person is called on.
- Another option is to have one person in the group ask all the questions while the others answer.

Closure:

Ask students

- Why the night coop should be fumigated every 2-3 months?
- What should a poultry keeper do if a chicken is picking at her feathers often?
- How often should the flock be de-wormed?
- What is the difference between direct and indirect transmission of internal parasites?
- What are 3 good practices a poultry keeper can do to minimize internal and external parasites?

Home-School Connection:

Have students take the fact book home to share with their parents. Encourage students to discuss with parents the signs of both types of parasites, and to start using the prevention remedies.

Lesson #10
DEMONSTARATION COOP OBSERVATION OF FLOCK'S HEALTH

Objective: To recognize signs of illness in a chicken

LESSON

If possible, ask a livestock extension officer or veterinarian to conduct the visit to the demonstration coop with your students.

Take students to the observation coop.

Review with students the following:

A healthy chicken:
- has shiny, tight feather
- a strong beak and claws
- eyes and nostrils are free of discharge
- feathers around the vent are clean
- breast muscles are full the keel bone can barely be felt
- a healthy bird spends much of its day foraging for food, and likes to stay close to the flock
- droppings are green and firm, with a white cap

Then review the following:

Signs of illness:
- include weight loss
- lower egg production
- lower feed intake
- coughing
- diarrhea
- fever
- a sick chicken may isolate itself from the rest of the flock and stand with its feathers ruffled and its neck hunched up

Have students observe the flock for several minutes. Ask them to pay attention to the behaviors of the chickens. Are there any chickens acting differently than the rest?

Choose one bird from the flock and pick it up if possible. Carefully demonstrate examining its feathers, eyes, nostrils, vent and breast muscles. Does it appear healthy or not? Remind students that the chickens need to be checked for external parasites as well. Ask students what are signs you should be looking for when examining the chickens, and disease the sign could be a symptom of? **(for example, coughing and nasal and eye discharge could be Newcastle disease)**

Ask students how will a poultry keeper know if a hen is producing fewer eggs? **(by keeping track of how many eggs each hens lays for each clutch), diarrhea (look at their droppings)**.

If possible have students check the birds too with the assistance of the teacher.

Closure:
Ask students
- What are some signs of a healthy chicken?
- What are signs that a chicken may be sick?
- What can you do to keep chickens healthy?

Lesson #11
5 HABITS TO IMPROVE POULTRY HEALTH

Objective: Understand how to prevent diseases and parasite infestation.

Outcomes:
1. Students will be able to explain the 5 ways to prevent diseases and parasites.
2. Students will be able to discuss how the costs controlling parasites can be minimized through good management.

Output:
Students will create a booklet of the 5 steps to prevent diseases and parasites.

Key Vocabulary:
- Habit

Materials Needed:
- Student Notebook
- piece of paper (can use student notebook page)

LESSON

*This lesson can be taught during several class sessions.

Anticipatory Set:
- Ask students what a habit is?
- Have students turn to a partner and share one habit they have, then have a few share with the entire class (washing hands, brushing teeth...).
- Ask why they practice them (to stay healthy)?
- Explain to students there are actions that can be practiced to keep poultry healthy as well.

Direct Instruction:
Share with students the objective of today's lesson is to learn 5 actions to prevent diseases and parasites, and how practicing these habits will minimize loss of poultry and their products.

Review with students the meaning of "disease prevention".

Ask students
- What happens when poultry become ill (egg production decreases, disease and parasites spread to other chickens, birds die or the entire flock becomes ill or dies, poultry keepers lose their investment/ income/food source)?
- Why is it important to take steps to prevent diseases and parasites?

Using the "Background Information Needed for Teaching" under the heading **5 Actions to Reduce the Risk of Poultry Diseases and Parasites** share with students what the 5 actions are. Be sure they understand that these are disease prevention steps.

Write these topics on the chalkboard:
1. Sanitation
2. Isolation of new, sick, or returning chickens
3. Disposing of Dead Chickens
4. Vaccination
5. Deworming

Explain to students what each topic means. Have students brainstorm explanations for each area based on what they know or previous lessons. If they are unable, then give a brief explanation of what poultry keepers should do for each habit.

Ask students:

- How does each habit help with disease prevention?
- What happens if only one of the habits is practiced?
- Are these habits done in their households?
- What happens if only some poultry keepers practice the 5 habits?

Discuss with students why should steps be taken to prevent disease instead of waiting to manage a disease once a chicken or flock gets sick.

Guided Practice

Students will make an 8 page booklet on "Steps to Prevent Poultry Diseases and Parasites". ***It is important for the teacher to make the booklet, demonstrate how it is made, use it for review and a reminder to students of a resource they have to use. It can also be given to students who were not in school that day so they can duplicate it (a student example and step by step directions of how to fold the booklet can be found in the Appendix I).***

- Instruct students to fold a piece of paper in half
- Then fold it into thirds
- Open it and fold it in half in the opposite direction.
- While it is folded in half, cut or gently tear along the line up to the end of the first square
- Open the paper up and refold it in half, pushing the outside edges together
- On the front of the first booklet page, write a title "5 Steps to Prevent Poultry Diseases and Parasites"
- On the inside flap, page 1, students should write "Sanitation". Sanitation will need 2 pages of the book.
- On page 3 the title should be "Isolate sick, new, or returning chickens"
- Page 4 – "Disposal of Dead Chickens"
- Page 5 – "Vaccinate"
- Page 6 – "Deworming"

Using the information from previous student discussion and lessons, and the "Background Information Needed for Teaching", work with students to fill in a short explanation and a visual representation for each page of the habits. Be sure to include the vaccination and de-worming timelines in the booklet.

Independent Practice/Home School Connection:

Have students take the mini-booklet home and share it with their family. The following day have students write a paragraph about how sharing this information with their families went. If time is limited you can have students orally share their experience in small groups, with a partner, or several students can share with the entire class.

Suggested ideas to include in the paragraph:

- Was this new information to their parents?
- Were their families interested in what they had to share?
- Did their families understand how the habits can improve poultry production?
- Did their families have any questions about what they shared?
- How comfortable were they sharing the information with their families?
- Did their families disagree with any of the habits?
- Did their families have any ideas to include?

Closure:

- Review with students the importance of practicing disease prevention to keep chickens from getting ill or parasites.
- Make it clear that it is less expensive to prevent diseases and parasites than it is to get the money and time back that was spent raising the flock.
- Remind students if a large amount of chickens do become ill, it is important to contact the live-stock extension office in their district to prevent further loss and spread of the disease to other poultry keeper's flocks.

Lesson #12
PREDATION

Objective: Understand how predators can affect poultry and how to limit predation.

Outcomes:
1. Students will be able to name the predators of chickens in their area.
2. Students will be able to explain 3 actions that reduce the risk of predation.

Output:
Students will create a foldable booklet on how to limit predation.

Key Vocabulary:
- Predator
- Predation
- Prevention

Materials Needed:
- piece of paper

LESSON

Teacher may need to do research to find out what the local predators of chickens are.

**This lesson can be taught during several class sessions.*

Anticipatory Set:
Ask students
- How would they feel if something they spent money on and time caring for was taken? ***(possible answers: they'd be frustrated, angry, disappointed)***
- When they feel this way, does it make them want to do something about it?
- Have they ever had that happen?
- Has it ever happened with their livestock?
- Do they think there are steps that can be taken to limit it?

Direct Instruction:
Share with students the objective of the lesson is to learn about predators of chickens and steps that can be taken to reduce predation.

Ask students to think about
- All the predators of chickens.
- Where or how these predators attack chickens and chicks.
- How can you tell which predator attacked the chicken or chicks.

Write all the responses to the above questions on the chalkboard under these headings: ***Predators, Location, Signs.***

Using the "Background Information Needed for Teaching" under the heading **Prevention of Predators** provide students with any information they did not come up with on their own.

Guided Practice:
Students will make a foldable booklet about poultry predators and ways to stop them.
- Have students review the list of predators they came up with.
- Ask students if they can think of ways to put the predators into categories (by animal type, by size, by....).
- Suggest that they group them by how they prey on poultry so that when you make the foldable you can come up with ways to limit the predators based on how they prey on poultry.

The 3 categories would be(predators for each category will depend on what is native to where you live):

	Attack from the Sky	Hide in Bushes or Tall Grass	Get Inside the Coop
Have students list the predators under each category	Hawk	Fox	Snake
	Owl	Cat	Rat
	Eagle	Dog	Mongoose
		Jackal	

Ask students to talk in small groups to come up with ways predation can be avoided or reduced based on how they hunt for their prey. After some time ask groups to have one person from their group report one idea. Write the solutions under each topic. Use the "Background Information Needed for Teaching" to come up with solutions the students did not share.

Have student fold a piece of paper into thirds, and then fold it in the opposite direction into thirds. When the paper is opened up there should be 9 boxes ***(directions on how to fold the paper can be found in the Appendix I)***.

Lay the paper down in the "landscape" direction. Refold it into thirds. Cut, or gently tear the line from the top box to the beginning of the middle box. Cut or gently tear the line from the bottom box to the bottom of the middle box. Repeat this for the last box. There should be 2 "flaps" on each of the 3 center boxes.

Instruct students to write the different ways of attacking on each of the 3 front squares.

On the inside 3 "flaps" have students list what predators attack that way that is written on the front flap.

On the fully opened flaps (so all 3 inside squares are showing) have students write the way predation can be limited or stopped and draw pictures to represent each idea ***(a student example can be found in Appendix I).***

Independent Practice:
Students will write directions on "How To Prevent a Predator" **(an explanation of "How To " writing can be found in Appendix II)**.

- Have students choose a predator.
- The "How To" should have an opening paragraph describing how that predator hunts and explain what method is going to be used to limit its predation.
- After the introduction paragraph students give direction on how to prevent that predator.
- Students may use "step 1", "step 2", etc. or bullet points to give the directions.
- Students should include a diagram of the prevention method they are giving directions to use ***(a student example can be found in Appendix I).***

Have students share their writing in small groups.

Closure:
Ask students

- What is a prevention method to keep predators out of the night coop?
- What does tying string in a crisscross pattern over the feeding area of a flock do?
- Why should grass and bushes near the night coop be cut down regularly?

Home-School Connection:
Have students take their foldable booklet home to share with their parents.
Ask students to share what questions or comments their parents had when they shared the booklet with them.

Lesson #13
DEMONSTRATION COOP OBSERVATION OF PREDATION PREVENTION

Objective: To observe steps taken to limit predators at the demonstration coop.

LESSON

If the group is too large to go into the coop at one time, you can assign the coop observation activity in groups throughout the day.

Ask students to review their notes about predators, the flap book they made, and the paragraph they wrote about how to prevent predators. Explain to students they will visit the coop to observe what steps have been taken to prevent predators.

Have students work in small groups or partners to walk around the coop and observe what has been done to limit predation. Students should include what local predator it stops.

Ask students if they notice any steps that were not taken, and what could be done.

Ask students to brainstorm local resources that could be used to limit predators at their home coops.

Closure:
Have students share one thing they could go home and do to their chicken coop to reduce predation.

LEARNING POINT 5:
CONNECTING TO TRUSTED VETERINARY RESOURES

Topic	Learning Objective **Learner will...**	Basic Competencies **Learner will be able to...**
Veterinary Resources	Understand that access to veterinary medicine and advice is critical for maintaining a healthy flock.	• Explain why it is important for poultry keepers to establish links with veterinary suppliers and livestock extension workers. • Explain how veterinary suppliers and livestock officers can help farmers keep their flocks healthy.

WORDS TO KNOW:

Diagnosis – *finding out what is causing a disease by looking at its signs and symptoms*
Livestock extension officer – *the person responsible for providing knowledge and training to improve rural farmers' animal husbandry skills*
Outbreak – *the sudden start of a disease in a local area, in large numbers*
Vaccine – *a substance given to protect animals or humans from specific disease*
Veterinary supplier – *the person or shop that sells medicine, food, and equipment needed for raising animals*
Virus – *a microorganism that causes disease*

BACKGROUND INFORMATION NEEDED FOR TEACHING

It is important for poultry keepers to know who to contact for the supplies needed to keep chickens healthy. Livestock professionals can help when there is a problem with your school demonstration and home flock, and help you with vaccination of the flocks. They can also help with disease diagnosis, prevention and management. There are two important resources for this.

1. VETERINARY SUPPLIERS

Veterinary suppliers sell veterinary medicine and equipment. It is important to know a reliable veterinary supplier. A good veterinary supplier will properly store vaccines and medicines and not sell products that are too old and ineffective. Trusted veterinary suppliers can also provide advice on how much medicine to give, when to give, and how long to give it. Knowledgeable veterinary suppliers can share information about other local diseases that could be a problem, and their symptoms and treatment. Veterinary suppliers can also support poultry keepers with developing a disease prevention program and provide the necessary vaccines for disease prevention campaigns.

2. LIVESTOCK EXTENSION OFFICERS

Livestock extension officers usually work for the government veterinary authority (the office responsible for animal health in the area). It is important for poultry keepers to interact with livestock extension officers for 3 important reasons.

A. Education and information:
Livestock Extention Officers give talks, advice, and actual demonstrations on husbandry skills, new technology, and disease prevention and treatment. Livestock extension officers assist

farmers by providing the latest information and techniques about poultry. This can help farmers make good decisions about the flock, especially with disease prevention and management. Some infectious poultry diseases such as Newcastle Disease cannot be controlled by good husbandry and flock management practices alone. These diseases are caused by contagious viruses and can lead to high number of deaths in flocks. Poultry keepers need the advice from livestock extension officers on how to prevent diseases

and what to do if there is an outbreak.

B. Reporting purposes:

It is critical for poultry keepers to report to the livestock extension office if many chickens die. Extension officers can identify the disease, and put preventative measures in place to limit the spread of the disease.

Once a diagnosis has been made, if it is an outbreak, it should be reported immediately to the government veterinary authority. Usually the authorities will establish and coordinate control measures to limit the outbreak. This includes informing the public that there is an outbreak so poultry keepers can protect their flock and look for symptoms.

It is also important to report sudden deaths in the chicken flock to the veterinarian authorities in the area. This means if a large amount of chickens die or get sick within 1-5 days.

It is critical to follow the expert veterinary advice on disease management. Not doing so will increase the number of deaths in the flock, and the risk of the disease spreading to other flocks.

Having the contact information for the local veterinarian authority written down is important in preparation for a potential outbreak. This will help limit the potential loss in the flock, and the spread to other flocks.

C. Disease prevention:

Livestock Extention Offices can also help in developing a vaccination program based on diseases occurring in your area, and give access to technical information and extension advice. This helps limit outbreaks, and therefore loss of chickens.

Summary:

A trusted veterinary supplier is necessary to have as a resource for reliable veterinarian medicine and vaccines, advice on flock care and disease, and to help coordinate disease prevention campaigns. Knowing how to contact the local veterinary authority is important for reporting disease outbreaks to limit the loss. The local veterinarian authority can also provide information on known diseases in the area, and can coordinate disease prevention campaigns.

Lesson #14
VETERINARY RESOURCES

Objective: To understand that having access to veterinary advice and medicine reduces flock mortality.

Outcomes:
1. Students will be able to explain why establishing links with veterinary suppliers and livestock officers is important.
2. Students will be able to explain how veterinary suppliers and livestock officers can help farmers keep their flocks healthy.

Output:
Students will create a Venn diagram comparing veterinarian supplier and livestock extension office and a Public Service Announcement for radio or SMS for mobile phones.

Key Vocabulary:
- Vaccination
- Outbreak
- Virus
- Diagnosis
- Veterinary supplier
- Disease
- Livestock extension worker

Materials Needed:
- Student notebook

LESSON

**This lesson can be taught during several class sessions.*

Anticipatory Set:
Ask students
- What do people do when they are really sick?
- What do doctors sometimes give people to get well?
- What do people do when animals are unwell?
- Is there medicine available for sick animals?
- Why would you give sick animals medicine?

Direct Instruction:
Share with students the objective of the lesson is to understand that having access to veterinary professionals and medicine will reduce flock mortality.

Using the "Background Information Needed for Teaching" explain the difference between a veterinary supplier and the local livestock extention office.

List the reasons to go to each on the chalkboard so students can refer to it during the guided practice activity.

Share with students the importance for poultry keepers to have a relationship with a veterinary supplier and to know how to contact the livestock office.

Provide examples of when a poultry keeper would visit a veterinary supplier versus the livestock extension office. Then ask students to think of reasons to go to each.

Guided Practice:
Students will create a Venn Diagram to compare veterinary suppliers and livestock offices. Students will use the diagram to write a public service announcement.

Remind students a Venn Diagram is a way to organize information for comparing how 2 things are similar, and their differences. ***(an explanation of a venn diagram can be found in Appendix II).***

Instruct students to:

- Draw 2 over lapping circles in their notebooks
- Write above one circle "Veterinary Supplier" and "Livestock Extension Office" above the other
- Remind students the overlapping part of the circles is for what the 2 have in common, and outer part of each circle is for what is different about each one.

Ask students to look at the lists written earlier on the chalkboard and identify what the 2 have in common ***(both can provide information about: the care and feed for poultry, local poultry diseases, the dosage and timeline for poultry medicine and vaccination, cold chain guidelines, and both can help with disease prevention programs/campaigns)***. Have students list the similarities in the overlapping part of the circles.

Then have students determine what is different about each and list the differences in each circle.

Veterinary suppliers sell: poultry feed, equipment related to raising poultry, medicine and vaccinations for poultry.

Livestock extension offices provide: poultry training to extension workers, technical advice about poultry, diagnose a poultry disease, receive information from poultry keeper's about sick chickens and advice what to do, put control measures in place to limit the spread of a disease outbreak in the area, inform to public of an outbreak ***(a student example can be found in Appendix I).***

Ask students to

- Review each of the lists of differences.
- Explain why it is important to have a relationship with each.

Possible answers:
veterinarian supplier: to have a reliable person providing the correct information about flock care, to ensure the expiry date on the medicines and vaccines have not passed or been tampered with, to be sure the dosage and timeline for vaccinations is correct, to give your community support for disease prevention.

livestock extension office: to know who to call if there is an outbreak so measures can be put in place quickly to limit the disease outbreak, to have a resource to ask technical questions and to request support and training from extension officers, to get support for disease prevention campaigns)

Independent Practice:
Explain to students what a Public Service Announcement (PSA) is ***(an explanation of a PSA can be found in Appendix II)***.

Have students use the information presented in the lesson and the Venn diagram they made to write a PSA about how to get in contact with livestock extension offices ***(a student example can be found in Appendix I).***

The PSA should:

- be directed at village poultry keepers
- explain what services Livestock extension offices provide
- explain the importance of contacting the livestock extension office when there is an outbreak,
- provide how to contact the livestock extension office (students can make up a phone number or address)

When students are finished, have them share their PSAs in small groups.

Closure:
Ask students

- What is something you would consult both the veterinary supplier and the livestock extension office for?
- Give an example of why you would contact the livestock extension office?
- Where do poultry keepers go to get vaccines and medicine for the flock?
- Explain why it is important to have a relationship with both suppliers and livestock extension office?

Home – School Connection:
Ask students to take home the Venn Diagram and explain the importance of veterinary suppliers and livestock extension officers and the differences between the two.

It would be helpful to provide students with the location and/or phone number of those to contact in the area so they can share it with their parents as well.

Extension Activity:
Invite a livestock extension officer and veterinary supplier to visit the classroom to explain to students what their job is and how it helps poultry keepers.

LEARNING POINT 6:
CAREFULLY MANAGING THE FLOCK

Topic	Learning Objective **Learner will...**	Basic Competencies **Learner will be able to...**
Flock Management	**HOUSING** Understand the importance of providing night housing for chickens.	**HOUSING** • Explain how night housing helps manage chickens. • Identify different types of night coops. • Specify requirements of good night housing in terms of access, space, necessary fittings, and ventilation. • Construct a simple night coop using local material.
	FLOCK NUTRITION Realize chickens need food and water in order to grow, produce and reproduce.	**NUTRTION** • Explain why chickens need food and water regularly. • Know when and how much water and supplemental feed to give chickens. • Describe different containers that can be used to feed and water chickens. • Explain chickens need to eat proteins, carbohydrates, minerals and vitamins, and list sources of them. • Know the difference between scavenging and supplemental feeding. • Identify symptoms of nutritional deficiency in chickens.
	RECORDKEEPING Understand the importance of keeping records in poultry production.	**RECORDKEEPING** • Know what information is important to record. • Practice keeping records on flock behavior and egg production.

WORDS TO KNOW:

Carbohydrate – *an energy source in the diet of animals*
Deficiency – *not enough of something important for health*
Protein –*necessary in the diet of animals for growth*
Supplemental – *extra, or something added to make up for deficiency*
Symptom – *a sign of a disease such as fever, itching, headache*
Ventilation – *replacing bad air with fresh air*
Vitamins – *substances needed in small amounts of the diet to prevent diseases*

BACKGROUND INFORMATION NEEDED FOR TEACHING

HOUSING

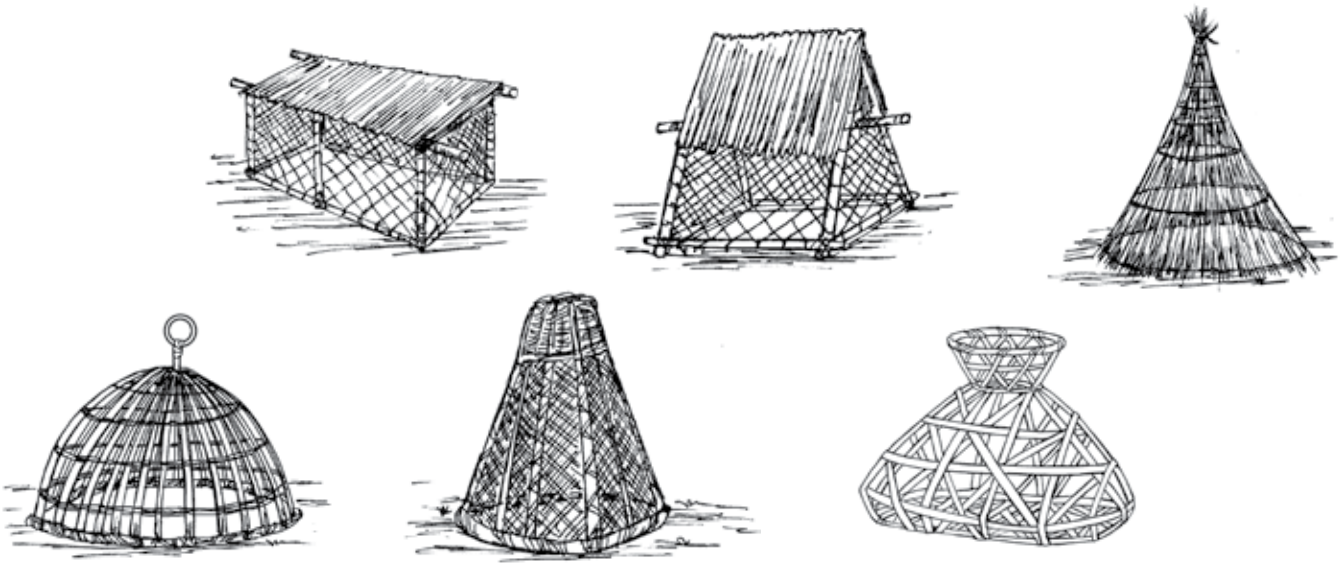
The purpose of providing housing for chickens is to:

- protect chickens from harsh weather, predators, and theft
- make it easier to inspect the flock for injury and illness, and to give vaccinations
- provide shelter for egg laying and broody hens
- provide a place for the flock to roost at night

Farmers have a choice between keeping chickens in cages all the time and night shelter. Full confinement requires the farmer to provide all the nutritional requirements. Full confinement requires more expertise and effort because all parts of nutrition must be provided by the poultry keeper. A major advantage of the homestead poultry system is the ability of chickens to find their own feed. Providing a coop for night shelter and allowing scavenging during the day is often the best system for household or small-scale farms. If possible, fencing in a small area around the coop is useful for supplementary feeding and monitoring chickens.

Types of Coops – Chicken Houses

Coops should be made of inexpensive or free local materials such as wire mesh, reeds, raffia, thatch grass, bamboo, clay bricks, mud, or wood. It is important to keep the floor dry during the rainy season and to limit predation. Building a raised night coop will accomplish this, and can be constructed with bamboo, thatch, or wood. Inverting a cone on the legs of the coop stops predators from entering. A ramp up to the coop will need to be built so chicks can enter easily. If wood is used to construct the coop, all bark should be removed to prevent parasites. The coop should protect the chickens and nests from wind and rain, but also provide fresh air. If using clay or brick to construct the coop, the area must be in a high spot that does not get flooded during the rainy season. Digging a drain around the coop or raising the ground may be necessary. Brick and clay houses should have windows for light and ventilation.



Keeping the coop clean is the best practice against disease and parasites. The coop should be constructed so it is easy to clean, and tall enough for an adult poultry keeper to work in. Raised coops should have slatted floors that drooping can easily fall through, but give chickens enough foot support. Nests and perches should be easily removable for cleaning. The coop needs to have a door that can be locked or tied shut at night to prevent theft.

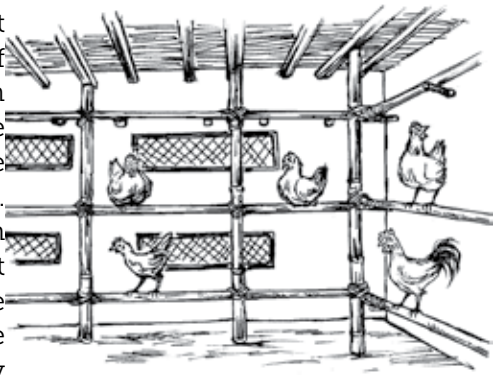
When constructing a night coop, the following must be considered:

Location of the night coop
The night coop needs to be in a shady area on flat dry ground if possible. The area around the coop should be cleared of bushes and tall grass to keep snakes and rats away. About 3 meters of cleared area on each side is good. The coop should be near the house to hear the chickens if they are disturbed by predators or theft. Attaching something to the door or fencing that makes a loud noise, like a bell, will alert home owners if someone is trying to take a chicken.

The movement of the sun and wind needs to be considered when deciding the position of the coop. This will provide natural shade and ventilation at certain times of the day. The coop should face south or east in humid climates. To provide a source of light and warmth in the winter and good ventilation in the summer, place windows on the south side of the coop. If the coop is rectangular in shape the end walls need to face east and west so only these walls are hit by the hot morning and afternoon sun.

Size of the night coop
The size of a night coop will depend on the space and materials available, and the size of the flock. The coop needs to be large enough that the flock is comfortable so they don't peck each other, and so the space does not become filled with humidity and gasses. A recommended size for a flock of 10-15 chickens is 1 meter x 2 meters. It is best if the night coop has 2 rooms. The larger room is for roosting. The smaller room should be used for nesting, and should have laying boxes and nests. This space could also be used as holding area for mother hens and chicks during the first few weeks after hatching while using the basket system *(more details in chick management section)*.

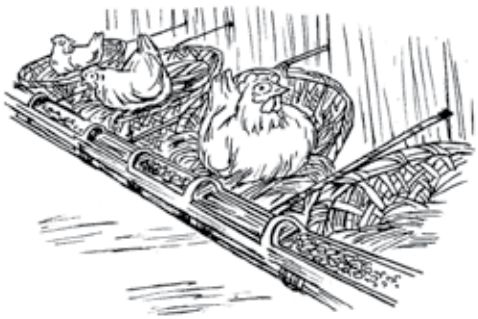
Perches inside the night coop



Perches are necessary because hens need to have a place to rest at night where they feel safe from predators. Perches also minimize the risk of disease. When roosting on perches, chickens have less contact with droppings and parasites because the chickens are off the ground while they sleep. Perching also keeps hens warm at night in cool climates. The perches can be made from bamboo poles or round branches from trees. The bark must be removed to avoid parasites. The ends of the perch (where they meet the wall) may be treated with oil or kerosene to limit parasites. The perches should be placed horizontally, and raised the period goes with .7–1.5 meters off the ground. The perches should be approximately 3 cm in diameter so the chickens' feet can comfortably grip the perch. A 1 meter perch comfortably holds 5 chickens. If more than 1 perch is needed it is better to have them at the same level, about 50 cm apart. This will limit fighting for the highest roost. Perches should be put in the roosting area of the night coop. To limit easy access in case of theft perches should not be near the door.

Nests
There are 2 types of nests needed for raising chickens. Both types should be kept inside the night coop to protect the eggs from theft and predation.

The first type of nest is for laying eggs. A row of nests can be provided where more hens can lay at one time. It is best to have 1 laying nest for every 5 hens. Laying nests makes collecting eggs twice a day easier.

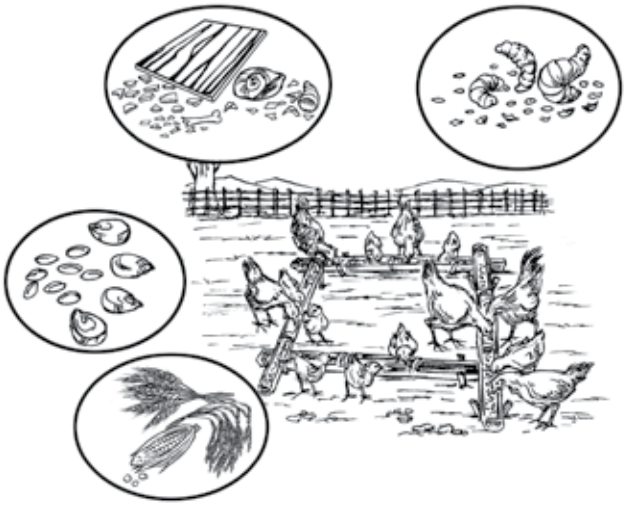


The second type of nest is for brooding. Nests for brooding must be individual nests. These nests need to be placed in a quiet, dark place where the hens feel safe and are not disturbed. Food and water should be placed nearby to limit time away from the nest so the hatchability of the eggs remains high.

Both types of nests may be baskets made of local fiber, cardboard or wooden boxes, or clay pots. The nest should not be too big or the hen will not feel comfortable. Nests need to be padded with clean, dry material such as straw, leaves, old cloth, or sand. This will keep the eggs warm and help prevent damage to the eggs. Nesting material should be changed each week if possible. Mixing ash, tobacco leaves or anti-parasitic products and then sprinkling on nests will reduce the chance of external parasites. Nests should be fumigated with smoke/neem 2-3 times each year. If there has been a serious outbreak of disease or infestation of external parasites, the nests and padding material should be burnt and then replaced using fresh materials.

POULTRY NUTRITION AND WATER

Chickens need a balanced diet to stay healthy. This helps to fight disease, grow new feathers, become larger, and to produce eggs. Just like humans, their diet is made up of nutrients including carbohydrates, protein, fats, fiber, vitamins, minerals and water.



One of the benefits of raising homestead chicken flocks is their ability to get most of their nutrition from scavenging for themselves. However, egg production and growth can be increased by providing supplementary feeding. Supplementary feeding is not meant to replace scavenging. The supplemental feedings should be split into 2 feedings a day, once in the morning and once in the evening before being put in the night coop. This will ensure chickens continue to scavenge during the day. Providing supplementary feed also encourages the flock to return from scavenging each day to roost in the coop for the night. If they are fed at the same time each evening, they will return to the coop each evening to be fed. It is important to give supplementary feeding on a daily basis instead of large amounts during harvest and festivals, and no feed during the lean season. If supplementary feeding becomes too costly, reducing the flock size should be considered instead of reducing or eliminating supplementary feed.

When providing supplementary feed, the cafeteria system works best. Separate plates of carbohydrate, protein, minerals, and fat are given. This allows chickens to choose from feed ingredients according to their nutrtional needs. The cafeteria systems can be made by splitting a bamboo pole into 3-4 compartments. A clay pot with holes could be used as well.

What to feed?

Anything that can be eaten may be used for supplementary feeding, but the best results come if the nutritional needs of the chickens are considered. Scavenging chickens may get a good amount of protein, so they benefit most from supplemental feeding of carbohydrates. Chickens can be fed leftover food from the household as well. Green feed from grass, weeds, and garden plants is beneficial as well. Egg shells are an energy source that can be burnt and crushed up and given to chickens as a feed additive. This helps chickens produce strong egg shells.

Carbohydrate feeds: maize, millet, sorghum, rice, cassava and cooked sweet potato.
Protein feeds: beans, peas, oil cakes, fish, meat, bone meal, maggots, and termites.
Mineral feeds: bone meal, crushed oyster shells, snail shells, burned and crushed eggshells (so chickens don't recognize them and start eating them from the nests).
Oil rich feeds: tallow, oil cake meals, fish oil.

Guidelines on Supplementary Feeding:
- Feed should be given fresh daily.
- Feed should be given at the same time and place so chickens are used to it.
- Feed should be given in a feeder so it does not mix with soil or get stepped on by chickens, this reduces the chance of spreading disease.
- Feeder should be cleaned daily before refilling to reduce spread of disease.
- Feeder should be placed where the chance of attack by predators is limited.
- Feed should be broken into small pieces since chicken have no teeth.
- Feed the cock last. If the cock eats first he will eat too much and leave little for the hens. He is more able to find his feed while scavenging.

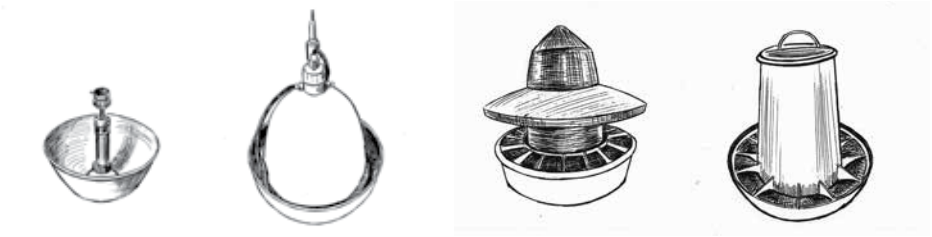
Determinants of quantity of supplementary feed

Number of chickens
The more chickens there are in a village, the higher the competition will be for food when scavenging. This will result in a greater need for supplemental feeding if there are many village chickens looking for food.

Season
The scavenging feed resource base (SFRB) will change over the seasons. The makeup and availability of the SFRB will depend on the geography, climate, and farming system in the area. The chickens may find nearly all they need in the surroundings during harvest or close to nothing during lean season.

Provision of Water

Water should be available at all times. Clean fresh water is best, but if it is scarce, used water without chemical or detergent in it may be given. Five hens consume about 1 liter of water a day. Drinkers can be made out of local materials. An empty tin with 2 holes placed upside down on a plate makes an excellent drinker. By keeping the tin can upside down, you avoid dirt contaminating the water. Clay bowls work as well, but should not be too deep so chicks don't drown in it. Placing small stones in the bowl will help prevent this. Open containers have a greater chance of contamination which spreads disease.



Guidelines on Water:
- Drinkers should be cleaned and refilled daily to prevent spread of disease.
- Drinker should not be so big that chickens climb in and contaminate the water.
- Drinkers should be kept in the same place so chickens are used to it.

- Drinkers should be placed where the chance of attack by predators is limited.
- Drinker should be checked during the day to make sure they have water, especially during hot weather

RECORD KEEPING OF FLOCK BEHAVIOR AND POULTRY PRODUCTION

It is important to keep records on the flocks behavior and production on a daily or weekly basis. This will help the poultry keeper notice signs of injury or illness and reduce the risk of loss. It will also help to decide which chickens to breed and which to sell or consume. The flock should be observed for a little time each day. This can be done during the supplementary feedings in the morning and evening.

What to look for in flock behavior:

- Signs of disease or malnutrition
- Injury
- Parasites
- Hens with good brooding and mothering abilities (to hatch her eggs for future laying hens)
- Good looking cockerel who grew fast to have on hand as a replacement
- Low egg laying
- Negative behavior (egg eating, excessive chick pecking, hen pecking)

What to record for production:

- Number of live hens, cocks, growers, chicks
- Number of dead hens, cocks, grower, chicks
- Number of eggs and clutches laid by each hen
- Number of fertile eggs being incubated
- Number of hatched eggs
- Number of spoiled eggs
- Number of sold hens, cocks, growers, chicks, eggs
- Number of consumed hens, cocks, grower, chicks, eggs
- Gift giving
- Vaccination dates
- De-worming dates
- Medicine given
- Illness

(see Appendix III for an example of a poultry production record keeping forms)

Summary:
It is very important to keep records on the flock's behavior and production. This will help decide when to consume or sell, and when to breed. Keeping records also reduces the risk of loss.

Lesson #15
NIGHT COOPS

Objective: To understand the importance of providing night housing for chickens.

Outcomes:
Students will be able to
1. Explain how night housing helps manage chickens.
2. Identify different types of night coops.
3. Specify requirements of good housing in terms of access, space, necessary fittings, and ventilation.
4. Construct a simple night coop using local material.

Output:
Students will draw and label a diagram of a chicken house with all the required elements.

Key Vocabulary:
- Ventilation
- Confinement

Materials Needed:
- piece of paper

LESSON

This lesson should be taught over 2- 3 sessions.

Anticipatory Set:
Ask students
- Why do humans need housing?
- Can they recall the 4 areas of improvement from Learning Point 1, Lesson 1? *(One area was housing)*
- Can they recall why chickens need housing?
- How does housing the flock at night help to manage the flock?

Direct Instruction (this may take one teaching session):
Share with students today's objective is to understand the importance of providing night housing for flock management.

Ask students to think of their own homes.

Have them brainstorm some of the requirements their homes need ***(walls, roof, window, a place to sleep).***

Explain to students chickens have some of the same needs as humans.

Ask students to share what they think a chicken coop needs to have, and why.

Using "Background Information Needed for Teaching" under the "Housing" heading explain the requirements of a night coop. Have students record the requirements to build a night coop in their notebooks (they will use this information later to draw a diagram of a coop).

In their notebooks have students draw a 2 by 5 grid (draw one line vertically about 1/3 of the way across the page, then draw 4 lines horizontally across the page, equal distance apart).

Instruct students to write the following down the first column: ***types of coops, location, size, perches, nests***

Using student participation and the "Background Information Needed for Teaching" under the "Housing" heading fill in the box next to the topic with:
- Types of material that can be used to build a night coop
  When discussing this point have students recall from the previous lessons on external parasites and

predation what can be done to minimize parasite infestations and predation.
- Requirements for the location
  When discussing this point have students from the predation lesson what can be done to limit predators.
- Dimensions for the size
- Dimensions and quantity of perches, and materials to make them
  When discussing this point have students recall from the external parasite lesson what are things that can be done to minimize parasite infestations.
- Types of nests, number, and materials to use
  When discussing this point have students recall from the external parasite lesson what are things that can be done to minimize parasite infestations.

(a student example can be found in Appendix I)

Share with students that providing night housing not only protects the flock, but it is a way to manage the flock. When the flock is in the coop it can be:
- observed for illness or injury
- observed for behavior
- easily caught for vaccination
- counted

Additionally, when the flock is in a night coop eggs can be:
- collected
- counted
- marked/dated
- replaced in nests for incubating

This helps manage and make decisions about the flock and sale of poultry products.

Guided Practice:
Take students to the demonstration coop to observe the requirements of night housing - request students to take their notebooks with them to refer to their notes.

Draw their attention to all the details in the demonstration coop:
- **Location of the coop** – is the area around the coop free of tall grass and bushes, is it in a shaded area?
- **Construction of the coop** - materials used, are there windows for ventilation, is there are door that can be locked, what is the temperature like?
- **Size of the coop** – is it correct for how many chickens are in the flock?
- **Types of nests** (brooding nests and laying nests) – what are the nests made of, what materials are in the nests, how many of each type of nest are there compared to the number of hens?
- **Perches** - how many are there, what materials are they made of, what size are they, is the distance between them enough to avoid fighting between hens?
- Ask students to consider if anything could have been done differently or better, was anything not done?
- Ask students to think about predation...are the chickens at risk in this coop? Have holes and cracks been closed up, are there bushes around, is it elevated?

Independent Practice:
Instruct students to draw a night coop they would like to construct based on materials available and the location they would build it.
- On one side of the paper students should draw the exterior of the coop, its surroundings, and label all parts of it and materials used.
- On the opposite side of the paper students should draw the interior of the coop, label all parts of it and the materials used.
- Encourage students to use the notes they took, the observation of the coop, and their own experience if they have a coop at home ***(a student example can be found in Appendix I).***

Closure:

Ask students

- How do night coops help manage the flock?
- What are 3 things night coops should have inside? **(perches, nesting boxes, laying boxes)**
- What materials can be used to build night coops?
- Why are 2 types of nests needed?

Home-School Connection:

Ask students to take the diagrams home to share with their families, pointing out all the requirements, especially any which are new to the family.

Have several students share their experience with the class.

Lesson #16
SUPPLEMENTAL FEEDING

Objective: To realize chickens need food and water in order to grow, produce and reproduce.

Outcomes:
1. Students will be able to explain why chickens need food and water regularly.
2. Students will be able to explain when and how much water and supplemental feed to give chickens.
3. Students will be able to describe different containers that can be used to feed and water chickens.
4. Students will be able to explain chickens need to eat proteins, carbohydrates, minerals and vitamins, and list sources.
5. Students will be able to know the difference between scavenging and supplemental feeding.
6. Students will be able to identify symptoms of nutritional deficiency in chickens.

Output:
Students will write an informational article for a poultry magazine on supplemental feeding.

Key Vocabulary:
- Scavenging
- Supplemental feed
- Symptoms
- Nutritional deficiency

Materials Needed:
- Student notebook

LESSON

**This lesson can be taught during several class sessions.*

Anticipatory Set:
Ask students to
- Recall what the 4 areas of improvement for village poultry are. (disease prevention, housing, flock management, and feeding)
- Recall why feeding is an area that needs improvement? (They could look at the 4 square problem/solution paper they wrote)
- What are two solutions to improving feed? (provide supplemental feeding and clean water, provide creep feeding to chicks)

Direct Instruction:
Share with students the objective of the lesson is to understand that chickens need food and water in order to grow, produce, and reproduce.

- Remind students one of the benefits of raising village chickens is their ability to self feed through scavenging.
- Explain that like humans, chickens need a balanced diet consisting of protein, carbohydrates, vitamins, minerals, fiber, fat and water (Use "Background Information Needed For Teaching" under the "Poultry Nutrition and Water" heading to provide more details).
- Like humans, when chickens are getting enough nutrients, they are able to grow and put on weight, and produce quality eggs. But when they are not getting enough nutrients they are not able to grow, can't fight off disease, and show signs of poor nutrition such as feather loss, weight loss, low energy. **Highlight that good nutrition for chickens is a biosecurity step because it helps chickens keep from getting ill**.
- Ask students if they think chickens are always able to get their nutritional needs met by scavenging. Have them consider the various seasons, weather conditions, harvest, when there is an increase in the flock size, and in the flock sizes of the rest of the village.

- Explain that to ensure chickens get enough nutrients it is important to provide supplemental feeding. Explain supplementary feeding. Be sure students understand that supplementary feeding is not meant to replace scavenging and should be done consistently.
- Share with students when providing supplementary feed it is best to separate the different nutrients so chickens can self select the nutrients they are lacking.
- Draw a bamboo feeder with 3-4 compartments with different feed in each one.
- Ask students to brainstorm other ways to provide supplemental feed to chickens.
- Review with students that dirty water can spread diseases, so it is also important to provide clean water for chickens each day.
- Draw a drinker.
- Point out diseases can spread among the flock so it is VERY important to clean the feeder and drinker daily.
- Supplementary feeding also trains the flock to return to the coop in the evening. If the flock is fed twice a day at the same time, the flock will naturally return from scavenging in the late afternoon to roost in the coop.

Instruct students to draw a 2 column by 4 row grid in their notebooks.

- Title it: Supplemental Feeding
- Label the 4 left side boxes: **What to feed, When to feed, How to Feed, Feeding Tips**
- Using the "Background Information Needed for Teaching" and student participation, fill in the right hand column for each topic.

Ask students to draw a 2 column by 3 row grid in their notebooks

- Title it: Watering
- Label the 3 left side boxes: **When to give water, How to give water, Watering Tips**
- Using the "Background Information Needed for Teaching" and student participation, fill in the right hand column for each topic ***(a student example can be found in Appendix I).***

Guided Practice:

Demonstration coop visit to observe feeder and drinkers. Take students to the coop to observe the cafeteria feeder and drinkers.

Independent Practice:

Tell students to pretend they are a livestock extension officer, a poultry researcher or a veterinarian. Part of their job responsibility is to inform the public about poultry husbandry. They are to write an informative article that would appear in a magazine or journal about supplemental feeding and the provision of water for chickens **(an explanation of an article can be found in Appendix II)**.

They are to use their notes from the lesson and visit to the demonstration coop to inform others about:

- why chickens need supplemental feed and water
- what they can be fed
- when they should be fed and given water
- tips on feeding and watering
- signs of nutritional deficiency

The opening sentence should grab the readers' attention with a question, interesting fact, or a statement. Illustrations of a feeder and drinker made with local materials should be included. The article needs an interesting title ***(a student example can be found in Appendix I).***

Closure:

Ask students

- Can leftover human food be given to poultry as supplemental feed?
- What are some signs of nutritional deficiency in chickens?
- Why is it important to clean feeder and drinkers daily?

- What is the reason behind providing supplemental feed in separate compartments?
- Is it ok to only provide supplemental feed sometimes?

Home-School Connection:
Have students take their articles home to read to their families.
Students can also share their articles in small groups in the class.

Lesson #17
FLOCK BEHAVIOR AND PRODUCTION RECORDKEEPING

Objective: Understand the importance of keeping records in poultry production.

Outcomes: Practice keeping records on flock behavior and egg production.

Output: Recording sheet completed.

Key Vocabulary:
- Production
- Record Keeping

Materials Needed:
- Student notebook
- Poultry production recording sheets ***(samples can be found in Appendix III)***

LESSON

**This lesson can be taught during several class sessions.*

Anticipatory Set:
Ask students how do poultry keepers know
- if the hens are being productive?
- how many eggs a hen is laying?
- how many chickens are in the flock?
- if a chicken is injured or sick?
- if all the flock has returned from scavenging each day?

Direct Instruction:
Share with students the objective of the lesson is to understand the importance of keeping records about the flock's production.

Ask students to recall from Lesson 1 what "production" is?

Why does a poultry keeper need to know if the flock is being productive? ***(to know if the laying hens should be replaced, to be sure the investment of time and supplemental feed is providing the poultry keeper with additional food and income)***

Have students talk with a partner or in small groups to discuss what information would poultry keepers need to know if the flock is productive.

Ask several groups to share their ideas *(how many chickens are in the flock, number of eggs being produced daily, number of chickens being sold).*

How can poultry keepers get this information?

Discuss with students why it is important to record the flocks behavior and production on daily/regular basis.

Ask if they can think of a good way to organize and keep track of the information so it could be used to make decisions.

Ask students to brainstorm all the things they think should be recorded.

Instruct students to write the following in their student notebooks:

What to record for flock production:

- Number of live hens, cocks, growers, chicks
- Number of dead hens, cocks, growers, chicks
- Number of consumed hens, cocks, growers, chicks, eggs
- Number of sold hens, cocks, growers, chicks, eggs
- Number of eggs and clutches laid by each hen
- Number of fertile eggs being incubated
- Number of hatched eggs
- Number of spoiled eggs

Share with students that it is a good time to observe the flock's behavior when visiting the coop to let the flock out in the morning. Have students discuss in small groups what they think you should look for in the flock's behavior.

Have groups share their ideas.

Then have students record the following in their notebook:

What to look for in flock behavior:

- Signs of disease or malnutrition
- Injury
- Parasites
- Hens with good brooding and mothering abilities (to hatch her eggs for future laying hens)
- Good looking cockerel who grew fast to have on hand as a replacement
- Low egg laying
- Negative behavior (egg eating, excessive chick pecking, hen pecking)

Have students discuss in small groups what a poultry keeper should do if any of these behaviors are observed in the flock.

For example:
If signs of disease = isolate the chicken
If malnutrition = give supplemental feed
If injured = isolate and treat chicken
If parasites = isolate and treat the chicken, clean all nests and coop, fumigate the coop
If good cockerels and hens with good brooding and mothering abilities = make notes about which one in the record keeping sheet
If low egg laying and negative behavior = consume or sell chickens

Guided Practice:
Demonstration coop visit.

Introduce the poultry production forms from Appendix III or create your own. Demonstrate to students how to record the information and why it is helpful.

Take students to the demonstration coop and model for them how to record the information for the day.

Ask students to take their notebooks to refer to.

If possible, work with the poultry caretaker to do this part of the lesson, especially if the caretaker is the one recording the information each day.

<u>While in the coop have students participate as much as possible</u>

- Ask them what is the first thing that needs to be counted?

- Then have them count while you count.
- Continue using the record sheet and ask students what else should be counted based on their notes.

Independent Practice:
It is suggested at this point to have a small group of students be responsible for collecting this information daily so they have practice recording it. You can rotate the groups each day or week so all students have the opportunity to record the information. Work with the poultry caretaker to provide guidance to the students while they are in the coop counting if needed.

Closure:

- Why is it important to keep records about the flock on a daily basis?
- What should a poultry keeper count to tell how productive the flock is?
- What should a poultry keeper do if the flock is not being productive?
- What should a poultry keeper do if he finds a chicken that is ill?

Home-School Connection:

- Ask students to share this information with their families and suggest making a poultry production sheet for their own flock.
- Recommend students begin recording the production for a 1-2 week period and bring the results in to share with the class or in small groups.

LEARNING POINT 7:
SPECIAL CARE FOR CHICKS AND EGGS IS IMPORTANT

Topic	Learning Objective **Learner will...**	Basic Competencies **Learner will be able to...**
Egg and Chick Management	Realize eggs and chicks need special care.	• Demonstrate how to determine if an egg is fertile (candling). • Demonstrate how to determine if an egg has gone bad/spoiled. • Explain why dating/numbering laid eggs is important. • Explain which eggs should be used for incubation. • Know the incubation period for eggs. • Describe how eggs should be stored. • Explain why 1 egg is left in the nest. • Discuss the best clutch size. • Explain that chicks need supplemental feeding the first 6 weeks. • Describe the use of day baskets for young chicks. • Discuss the importance of extra protection for chicks.

WORDS TO KNOW:

Candling – *to examine an egg for fertility and freshness*
Fertile – *an egg that is able to produce a chick*
Incubation – *keeping eggs at a warm temperature so they can develop and hatch*
Pullet – *young hen*

BACKGROUND INFORMATION NEEDED FOR TEACHING

CHICK PRODUCTION VERSUS EGG

Not all eggs laid eggs should be hatched. Eggs should not be hatched if there is not enough food to feed hatched chicks. If the weather is too hot or too cold the eggs or chicks may not survive. Also, eggs are a good source of protein for family consumption, and can be sold fresh or boiled for income generation. Careful consideration needs to be taken when deciding how many eggs to hatch versus consuming or selling.

Chick Management
A good way to keep newly hatched chicks safe, as well as reduce the time hens raise their chicks so they can return to laying more quickly is called the "basket system".

At night chicks should be kept with their mother in a night basket. This is a cage made of bamboo or narrow dry wood that is closed so predators can't enter. A closed basket also helps the hen keep her chicks warm. The night basket should have litter on the floor. The night basket can be kept in the smaller room of the night coop where the laying and nesting boxes are kept.

In the morning chicks are removed from the night basket and put in a day basket. This is a bigger basket that allows chicks to move around without being stepped on by the hen. A small feeder and drinker need

to fit inside. If using an open drinker, put stones in it to prevent chicks from drowning. High protein feed needs to be provided to the chicks during this time. The day basket needs to have good ventilation. The day basket is bottomless so chicks can begin to learn to scavenge, but should be moved to a new spot daily to avoid disease. If the ground is wet or damp, a straw mat should be put under the cage so chicks don't get sick.

The following is a suggested timeline to wean chicks from the hen so she can return to laying more quickly:

Age	Confinement		Chicken Feed
Birth to 1 week	Chicks and hen = FULL Daytime in the day basket. Night time in the night basket placed inside night coop.	This allows hen to naturally adjust the temperature for chicks and to protect them. The basket must remain clean. Place a woven mat or newspaper under the baskets. These can collect spilled food or droppings and then be easy removed for cleaning or replacement.	Chicks ***should be given a drink of water immediately after birth.*** They will need to be taken to the drinker and have their beak dipped in the water. Be sure there is clean water, high protein feed for the chicks, and feed for the hen in the day basket.
1 to 3 weeks	Chicks = FULL Daytime in the day basket. Night time in the night basket inside night coop. Hens = Partial Daytime allowed to enter day basket if she wants. Night time with chicks in night basket.	Hens should scavenge during the day while chicks remain in day basket. Hens should be able to hear chicks and be allowed to enter the day basket if she wants. The basket must remain clean. Place a woven mat or newspaper under the baskets to catch spilled food or droppings. These can be easily removed for cleaning or replacement.	Be sure there is clean water and high protein feed for the chicks in the day basket. Maize, bran, crushed maize or wheat **plus** shrub legumes, fruit or any other green feed. Protein source: termites or other insects, crumbled hard-boiled egg can be given sometimes. May be fed household leftovers but problems may occur if the feed contains too much salt (watery droppings).
3 to 6 weeks	Chicks = Partial Daytime gradually let out of basket during the morning. Night time in night basket inside night coop. Hens = Night time only In night basket with chicks.	Gradually allow chicks to scavenge with the hen during the day. Begin slowly with just a few hours in the morning, add a little more time each day. However, chicks should still have access to clean water and high protein feed. This can be done by providing a creep feeder. This is a basket with openings that allow chicks to enter, but larger chickens can't get inside. The ground and basket need to remain clean.	Mother hen will teach them how to scavenge for worms, insects, grains. Provide fresh water all day. If using an open drinker, put stones in it to prevent chicks from drowning. Clean daily.

Age	Confinement		Chicken Feed
After 6 weeks	**Hens and chicks = Nighttime** Inside night coop.	Chicks scavenge all day with mother hen.	Give supplementary feeding in the evening with the whole flock. Provide fresh water all day in a clean drinker.

Birth to 1 Week

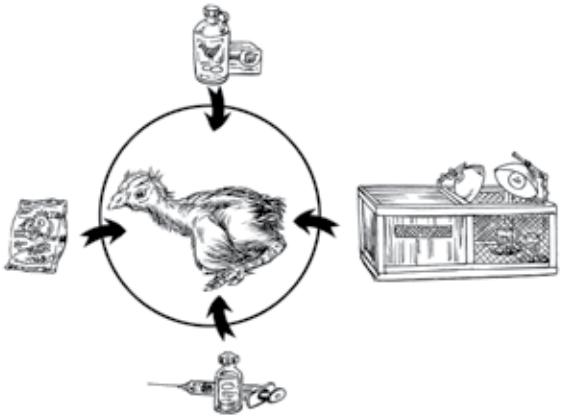
1-3 Weeks

3-6 Weeks

After 6 Weeks

Chick Feed

For baby chicks: corn, rice, cereals, beans and mineral should be ground up to make grains easier to swallow and digest. Leaves and hard-boiled eggs should be finely chopped.



Egg Management

Eggs should be collected twice each day. This keeps the eggs clean, and prevents them from getting cracked. The date or a number should be written on each egg so the freshest eggs can be identified. This includes the one egg left in the nest to encourage the hen to keep laying eggs. The eggs should then be kept in a cool, dark, and humid place such as a secured box in a hole inside the house. This will provide a cool temperature and protect the eggs from spoiling and predators. These eggs can be considered for consumption, selling, or hatching.

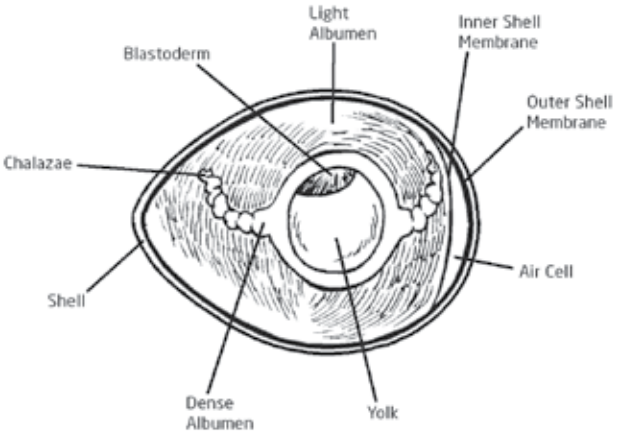
Consumption or Sale

The first 5 eggs laid by a hen have a lower chance of being fertile or hatching. They should be consumed or sold. The eggs should not be kept more than 7-10 days or they will go stale. Consider selling the eggs if there are any household expenses or school fees to be paid.

Hatching

To decide if eggs should be hatched the following should be considered:

- Are some pullets needed for future breeding?
- Is a cockerel needed for future breeding?
- Would it be beneficial to have some day old chicks to sell?
- Is there enough supplemental feed and coop space to raise some cockerels and pullets for future consumption or to sell?
- Is there an upcoming festival when demand for chickens is high, and the price increases?

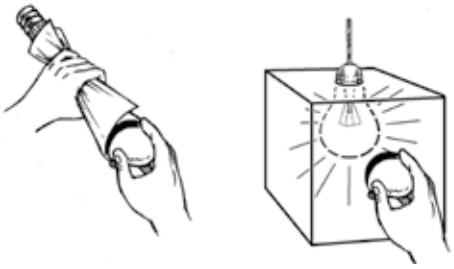


Once it has been decided to hatch some eggs, selection for hatching is very important. Better quality eggs will increase the hatchability. Eggs should not be too small or too large. Look for smooth, un-cracked shells. Cracked eggs may have lost too much moisture inside or bacteria may have entered. In either situation, the embryo may be unhealthy or have died. Well shaped strong eggs should be selected. If weak eggs are selected, this trait will be passed on to future generations. Hatchability and chick quality will suffer. Eggs from young hens should not be set because they often don't hatch well. It is better to consume or sell eggs from young hens. Eggs for incubation should not be stored for more than 8/10 days. These eggs can be identified by looking at the date that was marked on the collected eggs.

When a hen becomes broody, 10-12 fresh, stored eggs should be placed under her. The eggs should not be more than 8/10 days old.

DETERMINING FERTILE EGGS (candling)

An egg becomes fertile if a hen has mated with a cock before the egg is laid. If an egg has not been fertilized by a cock a chick will not hatch. After 7-10 days of natural incubation eggs should be checked for fertility. To check that an egg is fertilized and has a live embryo inside, candle the egg by gently holding it in front of a bright light inside a dark room or box.



A fertile egg will have a dark spot which is the embryo, and visible blood vessels. If the embryo is dead, a ring of blood will appear around the embryo. An infertile egg has an enlarged air cell and the yolk causes a dark area in the egg. Infertile eggs and eggs with dead embryos should be removed from the nest. They will decompose and may spoil the other eggs.

Eggs with dead embryos can be given as pig feed or put out to compost. Infertile eggs can be consumed or sold, but first must be checked to see if they have gone bad. To see if an egg has gone bad gently place the eggs in water. Bad eggs will float because the air sack in the egg gets larger as the egg gets older. Bad eggs can be used as fish or pig feed, or put in compost. The good eggs will stay at the bottom of the water. These eggs should be eaten within 5-7 days

After 21 days the eggs will hatch. It may take longer if the hen was not able to cover all the eggs with her body.

Summary:
Eggs should only be hatched if there is enough food to feed the chicks and if the weather is not too hot or cold. Chicks have a high mortality rate. Using the basket system until they are 6 weeks old increases their chance of survival. Egg should be collected two times each day, and kept in a cool, dark, and humid place. One egg should always be left in the nest to encourage the hen to lay more eggs. The first 5 eggs should be eaten or consumed because they have a smaller chance of being fertile. Eggs should be candled to make sure they are fertile. If eggs are unfertile, they need to be checked to see if they have spoiled before eating.

Lesson #18
CHICK CARE

Objective: To realize chicks need special care.

Outcomes:
1. Students will be able to explain that chicks need supplemental feeding the first 6 weeks of life.
2. Students will be able to describe the use of day baskets for managing young chicks and increasing hen production.
3. Students will be able to discuss the importance of extra protection for chicks.

Output:
Basket system flip book.

Key Vocabulary:
- Mortality rate
- Independent

Materials Needed:
- Piece of paper

LESSON

**This lesson can be taught during several class sessions.*

Anticipatory Set:
Ask students
- Do newborn babies take care of themselves?
- What needs do they have?
- How are those needs taken care of?
- How do they become independent? **(they learn)**

Direct Instruction:
Share with students the objective of the lesson is to realize chicks need special care until they become independent.

Explain to students newborn chicks have a high mortality rate.

Ask students if they can recall some of the reasons why from Learning Point 1 **(starvation, drowning, dehydration, accidents, predation, disease).**

Write each reason on the chalkboard.

Have students sit in small groups. Ask them to come up with ideas that could be done to increase the chance of survival for newborn chicks. Provide enough time for student groups to come up with solutions for each area.

Have student groups share their ideas. Write their answers on the chalkboard.

Try to find some ideas that are the same for each reason.

Examples:
starving and dehydration = you can provide feed and water for them
drowning/accidents/predation/disease prevention = you can confine them

Point out the common solution to the problems are to confine the chicks and to provide feed and water.

Then introduce the "basket system" and supplemental feeding as ways to manage newborn chicks, and to increase hen production (see "Background Information Needed for Teaching" under *Chick Management* heading). Briefly review each of the 4 stages and explain how to confine hen and chicks during each stage, how they are fed, and why.

Ask students if they see a connection to how babies are raised or other farm animals?

Instruct the students how to make a flip book ***(see Appendix II for explanation of a flip book)*** with the stages of the basket system as described in the steps below:

- Step 1- Have them take out a piece of paper, and fold it in half (in the long direction), then cut or tear along the fold.
- Step 2- Next lay the 2 pieces of paper on top of each other, then slide one about 5 cm above the other paper.
- Step 3- Then fold the papers in half. If students are able to put a small amount of glue along the top fold between the 2 pieces of paper, this will secure them.

There should be 4 "flaps" on the fold-over booklet ***(a student example and direction can be found in Appendix I).***

- On the bottom of the top "flap", students should write "Birth to 1 Week"
- On the second "flap" students should write "1-3 Weeks"
- On the third "flap" students should write "3-6 Weeks"
- On the last "flap" students should write "After 6 Weeks"

Use the chart from "Background Information Needed for Teaching" under the *Chick Management* heading to provide students with the time period for BOTH hens and chicks:

- Type of confinement (full or partial)
- Daytime confinement
- Night time confinement
- Feed and water requirements

Ask students to record this information in their flip books with an illustration to show the confinement of chicks and hens.

Review the timeline for incubation (21 days) and a hen's natural inclination to raise her young for 8-12 weeks.

If a hen follows this timeline, the hen would not be laying eggs for 3-4 months.

Ask students if they can see how the basket system can also help increase chicken production ***(the chicks can be weaned from the hen at 3-6 weeks instead of at 8-12 weeks, so the hen can return to laying more quickly)***.

Guided Practice:
Coop visit to see basket system versus night basket in coop. Review why using the basket system for chicks from birth to 6 weeks is useful. Demonstrate with the baskets how to confine chicks for each of the 4 stages (Birth to 1 Week, 1-3 Weeks, 3-6 Weeks, After 6 weeks). Share with student why each stage is necessary. Then have students demonstrate how to use the basket system for each of the 4 stages.

Independent Practice:
"Grouping Facts Game"
-Have students work in partners.
-Each student should use a piece of paper and cut/tear it into 8 pieces by folding it in half, then folding it in half 2 more times. Cut or tear along the edges. Working as partners they will have 16 pieces of paper between them.

Instruct students to:

1. Write on 4 of the pieces the different time periods written on them:
   - Birth to 1 Week
   - 1-3 Weeks
   - 3-6 Weeks
   - After 6 weeks

2. Write on 4 other pieces of paper the hen and chick confinement types for each time period:
   - hen and chick full confinement
   - chick full confinement/hen partial confinement
   - chick and hen partial confinement
   - chicken/hen partial confinement

3. Write on 4 different pieces of paper the feed and water requirements for each time period:
   - give chicks water immediately, clean water, chick high protein/ hen supplemental feed INSIDE basket
   - clean water, chick high protein feed inside the basket/hen scavenge and supplemental feed outside the basket
   - clean water, chick high protein feed in creep feeder, learning to scavenge/hen scavenge and supple mental feed outside the basket
   - clean water, hen and chicks scavenging all day and supplemental feed

4. Draw on the last 4 pieces of paper illustrations showing the chicks and hens confinement for each of the time periods:
   - chicks and hens inside a day basket
   - chicks inside a day basket, hen outside of basket
   - chicks and hens outside the basket, but some chicks inside eating creep feed
   - chicks and hens outside scavenging (no basket in the picture)

Students should mix up the cards, and then work as a pair to categorize the cards under the 4 different time periods.

Closure:

Ask students

- What should the chick be learning to do by the 3rd week of its life? ***(scavenge)***
- Where should chicks sleep at night? ***(in a night basket with the mother hen inside the night coop until 6 weeks old, then in the night coop with the other hens after 6 weeks)***
- How the basket system reduces chick mortality? ***(the basket system provides food and water until chicks have learned to scavenge on their own. This keeps them safe from predation, accidents, starvation and dehydration, and limits the chance of disease)***
- How does it increase hen production? ***(the hen can return to laying more quickly because chicks are weaned at 3-6 weeks old instead of the hens natural ability to care for her chicks until 8-12 weeks old)***

Home-School Connection:

Have students take the basket system flip book home to share the information with their families.

Lesson #19
EGG SELECTION AND CARE

Objective: Understand special selection must be given to eggs for incubation, and realize eggs need special care.

Outcomes:
1. Students will be able to explain why numbering or putting the date on laid eggs is important.
2. Students will be able to determine which eggs should be used for incubation.
3. Students will be able to know the incubation period for eggs.
4. Students will be able to describe where eggs should be stored.
5. Students will be able to explain why only 1 egg is left in the nest.
6. Students will be able to discuss the best clutch size.
7. Students will be able to demonstrate how to determine if an egg is fertile (candling).
8. Students will be able to demonstrate how to determine if an egg has gone bad.

Output:
Candling and good egg test.

Key Vocabulary:
- Chalaza
- Albumen

Use figure in "Background Knowledge Needed for Teaching" to draw and label egg on chalkboard

Materials Needed:
- Student notebook
- Materials to show candling and good/egg test:
  -bright light (torch, candle, paraffin lamp)
  -blanket and/or dark construction paper
  -container of water

LESSON

**This lesson can be taught during several class sessions.*

Anticipatory Set:
Ask students
- How do poultry keepers decide which eggs to consume, which to sell, and which to hatch?
- What would happen if a hen sat on eggs for 21 days that weren't fertilized?
- What if the eggs were spoiled/bad?

Direct Instruction:
(review "Background Information Needed for Teaching" under the Egg Management heading before teaching this lesson)

Share with students today's lesson is to understand how to select eggs for incubation, and how to care for eggs.

Ask students
- Should all laid eggs be hatched? ***(no, only if there is enough supplemental feed and room in the night coop)***
- How long will it take the eggs to hatch? ***(21 days)***
- What will the hens be doing while they brood? ***(keeping the eggs warm)***
- Will the hens be productive during this time? ***(no)***

Discuss the importance of egg selection for incubation. Eggs that have the best possible chance of hatching need to be chosen because the hen will not lay more eggs for the 21 days while incubating, plus the 3-6 weeks of raising her chicks. Because hens don't produce during the time they spend brooding and raising their chicks, poultry keepers need to produce as many live chicks from the clutch as possible.

Have students draw and label an egg in their notebooks.

Ask students to take notes on the following key points:

Collection

- Eggs are collected **twice each day**, once in the morning and once in the late afternoon.
- One egg should be left in the nest to encourage the hen to lay more eggs.
- The date or a number should be written on each egg so the freshest eggs can be identified, including the one egg left in the nest.
- Eggs should then be kept in a cool, dark and humid place where they are safe from predators.

The **first 5 eggs** laid by a hen have a lower chance of being fertile or hatching. They should be consumed or sold. The eggs should not be kept more than 7-10 days or they will go stale (in hot climates no more than 5 days old). Consider selling the eggs if there are any household expenses or school fees to be paid.

Hatching

To decide if eggs should be hatched the following should be considered:

- Are some pullets needed for future breeding?
- Is a cockerel needed for future breeding?
- Would it be beneficial to have some day old chicks to sell?
- Is there enough supplemental feed and coop space to raise some cockerels and pullets for future consumption or to sell?
- Is there an upcoming festival when demand for chickens will increase, therefore the price of chickens will increase?

Egg Selection for Hatching

Eggs should:

- not be too small or too large.
- have smooth and un-cracked shells.
- be well shaped and strong.
- not be from young hens because they often don't hatch well.
- not be more than 8/10 days old (look at the date marked on the eggs).

Clutch

- 10-12 eggs should be placed under the broody hen for hatching.
- Place food and water near the hen. This will keep her from leaving the nest for too long, so the eggs will stay warm.

Explain to students the importance of knowing if an egg has been fertilized. If a hen incubates an egg that is not fertilized, no chick will hatch. Un-hatched eggs will spoil by the time the incubation period is over. The eggs will have been wasted because they could have been consumed or sold. After 7-10 days of incubation is a good time to check for fertility. This is done by "candling" the eggs in the clutch. This procedure shows if an embryo is developing inside the egg.

To Candle Eggs:

This is best done in a dark environment like in the coop at night. A dark environment can be created by covering yourself under a blanket or rolling a dark piece of paper around the end of a torch and placing the egg at the end of it *(see Appendix I for an example of how to candle an egg).*

Hold the egg between the thumb and first 2 fingers, put large end of it up close to a bright light (torch or light bulb, candle, paraffin lamp) and turn it gently.

What to look for: *(draw a sketch of all 3 on the chalkboard if possible so students can copy and take notes)*

- fertile eggs:
  A **live embryo** will have a dark spot on the yolk that may move in response to the light. That is the embryo. A network of blood vessels will be coming from the spot.
  A **dead embryo** will appear cloudy, be darker in some places, and more or less be spotty.

- infertile eggs: will appear clear and have an enlarged air sac with the yolk creating a dark area in the egg, and chalaza (cord-like attachment of the yolk to the albumen {egg white}).

Eggs with dead embryos should be removed from nest and disposed of.

Infertile eggs should be checked to see if they are good so they can be consumed or sold. To do this gently place eggs in water ***(see Appendix I for an example of how to check eggs)***. Good eggs will stay low in the water, possibly at the bottom. Bad eggs will float because the air cell inside the egg gets larger as the egg gets older (draw a sketch for students to copy during independent practice). Bad eggs should be disposed of.

Candling can be done again at day 18 to look for developing eggs. Eggs with dead embryos or bacterial rot should be thrown out. They can explode in the nest and cause infections for hatching chicks. Candling should not be done after day 18. Eggs should be left undisturbed for the final 3 days of incubation.

Guided Practice:

- Have students come to you in small groups to demonstrate how to candle eggs, and check to see if eggs are good or bad.
- While other students are waiting for their turn have them complete the independent practice.

Independent Practice:

Have students draw and label the following diagrams in their notebooks

- how to candle eggs
- fertile egg with live embryo, fertile egg with dead embryo, infertile egg
- how to check to see if eggs are good or bad (with good and bad eggs labeled)
- a short paragraph explaining why eggs should be candled

Closure:

Ask students

- What days should you candle eggs?
- How can you candle eggs at home?
- How you can tell the difference between fertile and infertile eggs?
- What do you do with eggs that are infertile?
- Why do infertile eggs need to be checked for being spoiled?
- What can happen if you keep spoiled eggs in the nest?

Home-School Connection:

Have students take their notebooks home and explain to their parents how and why to candle eggs and how to check to see if eggs are spoiled.
Encourage students to actually demonstrate for their parents the candling of an egg and checking to see if it is spoiled.

LEARNING POINT 8:
CAREFUL SELECTION OF HENS AND COCKS IMPROVES FLOCK

Topic	Learning Objective **Learner will...**	Basic Competencies **Learner will be able to...**
Breeder Management	Understand special selection and care must be given to breeding cocks and hens.	• Describe the characteristics of a good cock for breeding. • Discuss when a new breeding cock should be selected. • Describe what qualities make the best hen for breeding. • Explain that laying hens need additional calcium and supplemental feed. • Discuss when new breeding hens should be selected. • State the ideal cock to hen ratio.

WORDS TO KNOW:

Cockerel – *a young rooster, usually less than a year old*
Pullet – *a young domestic hen, usually less than a year old*
Traits – *qualities passed on to offspring from parents*

BACKGROUND INFORMATION NEEDED FOR TEACHING

BREEDER MANAGEMENT

The **traits** of the hen and cock will be passed down to the chicks. If poor quality chickens are bred the number of poor quality chickens in the flock will increase. All chickens should be examined for good health when deciding which to breed.

Hen to Cock Ratio

The flock should have 1 rooster for every 10-12 hens. This will ensure a high fertility rate of the eggs. A young cockerel should be on hand ready for replacement in case the cock becomes ill, is old, or dies. Look among the flock for a healthy young cockerel that grew fast. It should be kept for future breeding. Cocks should be replaced every 2 years to limit inbreeding.

Cock Management

A healthy and good cock should have the following qualities:

- alert, strong and protective nature
- cockerel should be attentive to hens and court them from time to time, without bullying
- shiny and normal feathering for the breed
- clear and shiny eyes

- red comb without any blue edges
- clean and dry beak and nostrils, without any wheezing (a sign of respiratory problems)
- clean feathers around the vent
- straight legs and toes with no signs of scaly legs
- check for lice
- large size relative to the hens

When extra cocks reach a marketable size at 4-5 months old, they should be consumed, sold, or given as gifts. This will reduce the number of chickens that need supplementary feeding, and self feeding in the surrounding area. It will also eliminate cock fighting and stressing the hens.

Hen Management

Hens begin laying eggs at 5-6 months and usually lay 1 egg a day for 10-15 days. All the eggs laid by the hen are called a "clutch". After laying her clutch the hen will become broody and sit on the eggs to incubate them. After 21 days, 8-12 chicks will hatch. The hen will take care of her chicks for 8-12 weeks. A hen will lay 3-4 clutches each year. The number of eggs laid and the number of clutches can be increased if the breeding process is managed:

» *To increase egg production*

Collect the eggs from the laying boxes twice a day, once in the morning around 10:00 am, and once in the late afternoon. This will also help to keep the eggs from getting dirty. It is best to remove the eggs when the hen is not on the nest. <u>Always leave one egg in the nest</u>. This will encourage the hen to lay more eggs because she will want to complete a clutch before brooding..

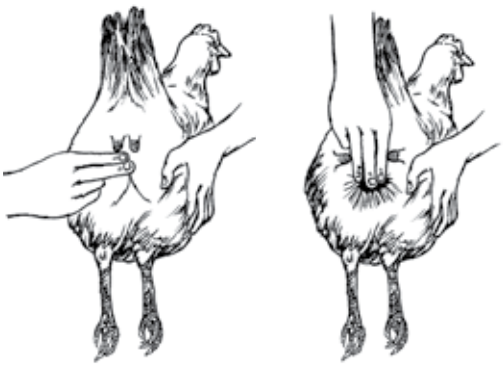
» *To increase the number of clutches per year*

By using a creep feeder and the basket system (Learning Point 7 Chick Management section) for protection from predators, chicks can be separated from the hen at 6 weeks. The hen will then come back into lay more quickly because she is not caring for her chicks.

Hens should be selected for both laying and brooding abilities if you produce your own chicks.

A healthy and good egg-layer should have the following qualities:

- should appear healthy and lively
- be large to cover and keep the eggs warm
- feathering normal for the breed
- a red comb (more colored when in lay)
- eyes should be clear and shiny
- clean and dry beak and nostrils without wheezing (a sign of respiratory problems)
- clean feathers around the vent
- straight legs and toes, with no signs of scaly legs
- legs less colored in lay
- the breast bone should not be too sharp
- check for lice



A broody hen should be separated from the flock so she feels safe from predators and won't be disturbed by humans and others in the flock. As recommended in the housing section, it is best to have a night coop with a separate room for individual brooding nests. Hens prefer nests that sit above the ground and are padded with clean straw or grass. Sprinkle some wood ash on the nest to prevent parasites.
To be sure the hen is ready to set the eggs and won't abandon the nest, 2-3 old eggs can be placed under the hen.

If she stays on them for 2-3 days, she is broody. The old eggs should be removed from the nest in the evening when it is dark and replaced with 10-12 fresher eggs that were stored. Eggs for hatching should not be more than 8 days old. Eggs from other hens may be added if there is room. Place water and feed nearby so she only leaves the nest for short periods of time. This will decrease the time the eggs are uncovered and increase the chances of the eggs hatching. The hen will brood for 21 days and then the eggs will hatch.

Provide special diet

A nutritionally balanced diet and good management of the birds during breeding is important for good health but also to provide good chance of the eggs hatching and healthy chicks. A varied but balanced diet including greens is recommended, with a high level of protein. At the beginning of the laying season burnt crushed egg shells or other types of shells (snail) should be added to the hens' diet for calcium (the shells are burnt so the hens do not get a taste for eating eggs). This is necessary for good shell production

Other considerations when breeding:

- Consume or sell hens with negative behavior (egg eating, excessive chick pecking, hen pecking). The trait will be passed on to offspring.
- Some pullets need to be kept to replace old hens for future breeding. Keep the pullets of hens that were good layers and had good mothering abilities.
- If a mature hen is laying few eggs, consume or sell it.
- Hens lay most eggs the first year and then produce less especially after the second year. When egg production becomes low, consume or sell the hen.

Summary:

A strong and healthy cock and hens with good mothering abilities should be selected for breeding. One cock for 10-12 hen is a good ratio. Cock should be replaced about every 2 years. Hens lay more eggs their first year and being to decrease the second. Consume of sell hens when egg production becomes low. Brooding hens need a special diet. It takes 21 days to incubate eggs. To increase egg production, collect eggs twice a day and always leave one egg in the nest. Also, use the basket system and creep feed chicks so hens can begin laying eggs more quickly.

Lesson #20
SELECTING FOR BREEDING

Objective: To understand special selection must be given to breeding cocks and hens.

Outcomes:
1. Students will be able to describe the characteristics of a good cock for breeding.
2. Students will be able to know when a new breeding cock should be selected.
3. Students will be able to describe what qualities make the best hen for breeding.
4. Students will be able to explain that laying hens need additional calcium.
5. Students will be able to know when new breeding hens should be selected.
6. Students will be able to state the ideal cock to hen ratio.

Output:
Fact Book on cock and hen selection.

Key Vocabulary:
- Characteristcs
- Inherited
- Gene
- Inbreeding

Materials Needed:
- Piece of paper or student notebook

LESSON

**This lesson can be taught during several class sessions.*

Anticipatory Set
Ask students where do some of their characteristics come from, for example the:
- shape of their face
- length of their nose
- how tall they are

Explain to students that these characteristics are inherited from their parents – they are a combination of their mother's and father's genes.

Share with students animals are the same way, they inherit characteristics from both the mother and father. When raising chickens to produce meat and eggs it is important to look for certain characteristics in both cocks and hens so they will be passed on to the chicks, and then will reproduce those same characteristics.

Ask students why they think it is important to pass on certain characteristics.

Direct Instruction:
Share with students the objective of the lesson is to understand special selection must be given to breeding cocks and hens.

Inform students they will be making a Fact Book about cock and hen selection (an explanation of a fact book can be found in Appendix II). **It is important for the teacher to make a book with the students. It can be referenced in the future, and can be given to students who were not present on the day the lesson was presented to duplicate** ***(a student example can be found in Appendix I).***

Instruct students to fold a piece of paper in half like a book.

On the front cover ask students to write "Cock & Hen Selection".

Instruct students to write:
"Cock Selection" at the top of the left inside page.
"Hen Selection" at the top of the right inside page, the back of this page will be used for hens as well.

For this lesson use "Background Information Needed for Teaching" under the *Chicken Management* heading to provide the information students with information.

Write "Cock Selection" and "Hen Selection" on the chalkboard to record information about each one.

Ask students to think about what would make a good cock or hen to breed ***(possible answers: healthy, no parasites, strong)***.

Have students brainstorm
- What signs to look for when selecting a good cock or hen to keep for breeding, and why?
- Can they think of special dietary needs hens have since they lay eggs, what are the sources of those nutrients?

Provide students the following information:
- It is important to have 10-12 hens for each cock, and possibly 1 extra cock/cockerel in case the cock is injured, gets sick, or dies. This is a good ratio to ensure fertility of eggs. Having more cocks than this will cause fighting among the cocks to establish seniority. Having more hens than this with only 1 cock may result in many unfertilized eggs.
- A new cock should be selected every 2 years, this will help reduce inbreeding.
- Hens will begin laying eggs at 5-6 months, and will lay the most eggs the first year.
- Laying hens usually lay 1 egg a day for 10-15 days (this is called a "clutch").
- After laying a clutch hens become "broody" and sit on the eggs to incubate them.
- After 21 days, 8-12 chicks will hatch.
- Hens will take care of her chicks for 8-12 weeks.
- Hens lay 3-4 clutches each year.
- Laying hens should be consumed or sold when egg production becomes low, usually after the 2nd year.

Instruct students to write the information in their fact books ***(a student example can be found in the Appendix I to see how to organize the information in the fact book).***

Guided Practice – Coop Visit:
If you are able, have a livestock extension officer or poultry keeper help with this lesson.

Take students to the coop to observe the hens and the cocks. Examine some of the hens and cock for the qualities listed in "Background Information Needed for Teaching".

Ask students to observe the behavior of the flock and to point out things they notice the hens and cock doing that would make them good for breeding.

Use the visit as an opportunity to review when to select a new cock, when eggs hatch, how to know a hen is broody, and other facts they wrote in their notebooks.

Independent Practice – Student Created Quiz:
Share with students they will each be creating a quiz about poultry selection and care. Another student will take the quiz. Students are to use their fact book and demonstration coop visit to write 10-15 questions about Cock and Hen Selection and Care. These are some suggestions on what types of questions to ask. Be sure to use several types or all of the types:

- True or False questions
- Multiple Choice questions
- Fill in the blank questions
- Matching words
- Short answer

After the questions have been written, each student needs to write the answers to the quiz they created on another piece of paper ***(a student example can be found in the Appendix I).***

Provide students with time to study for the student created quiz (a good idea is to assign studying the information for homework and take the quiz a few days later).

Ask students to find a partner to exchange quizzes with.

Students are to take each other's quiz.

Be sure the students write the answers on another piece of paper because the original quiz will be used quiz later for homework.

Students are to correct the answer sheet and return it to the person who took the quiz.

Closure:

Ask students

- Why should you look for certain characteristics when selecting cocks and hens for breeding?
- When should a new cock be selected and why?
- What are signs that a hen would make a good breeder?
- When should new hens be selected for breeding?
- Why should you feed a hen burnt crushed egg shells or crushed snail/mollusk shells?
- Are having 2 cocks and 5 hens a good ratio? Why or why not? What would be better?

Home-School Connection:

Have students take the fact book home and share the information with their families.
After sharing the information students should ask their families the questions from the quiz they created.

LEARNING POINT 9:
GETTING GOOD PRICES FOR CHICKENS AND EGGS

Topic	Learning Objective **Learner will...**	Basic Competencies **Learner will be able to...**
Marketing of Poultry	Understand that poultry provides food and income for families. Understand entrepreneurial skills and knowledge are needed for the management of poultry production to generate income.	• Identify ways people can earn money through poultry production. • Describe the working habits of a successful poultry entrepreneur. • Explain the factors that need to be considered when deciding to consume or sell poultry products (first 5 eggs). • Practice keeping record of poultry product sales. • Calculate the expenditure and income from the sales of poultry products.

WORDS TO KNOW:

Entrepreneur –*a person who has their own business*
Profit – *additional money earned after paying for expenses*

BACKGROUND INFORMATION NEEDED FOR TEACHING

BREEDER MANAGEMENT

An entrepreneur is a person who starts their own money making business. To do this, an entrepreneur sees an opportunity and then makes a plan to start the business. The entrepreneur then starts and manages the business, and receives the profits of the business. Profits are the remaining money after the expenses related to running the business are covered. Raising chickens is being an entrepreneur. If managed well, raising chickens provides income for families as well as food.

To be a good poultry entrepreneur:

- Keep the flock healthy
- Keep production records
- Keep financial records
- Analyze the flock, financial situation, and production to make decisions
- Look for opportunities to market chicken products (know the high season for live birds versus eggs for consumption)

Before beginning chicken production, it is important to know the cost of producing chickens, and price people pay for chickens and eggs. This will help to decide the size of the flock and what to produce more of, chickens or eggs.

There are many markets for poultry products. Households require chickens for daily consumption, holidays, ceremonies and religious rituals, or for income. Food canteens, restaurant, and hotels need poultry products for food preparation. Typically local chicken is preferred over commercial breeds for its taste and texture, and for traditional ceremonies.

There are a variety of poultry products that satisfy these different needs. When thinking about poultry, it is more than just the chicken and the egg.

- ✓ Eggs can be sold raw or cooked (boiled, fried, omelet, scrambled).
- ✓ Day old chicks can be sold for raising.
- ✓ Cockerels can be sold for breeding or future consumption, and can be sold live or cooked.
- ✓ Pullets can be sold for breeding or future consumption, and can be sold live or cooked.
- ✓ Older hens can be sold for consumption (live or cooked) or ceremonies.
- ✓ Older cocks can be sold for consumption (live or cooked) or ceremonies.

The first eggs laid in a clutch have a smaller chance of being fertile or hatching. Therefore, the **first five eggs** should always be consumed or sold.

It is better to sell eggs every few days when there are several to sell. This provides a larger income for the effort of going to the market and builds a reputation for having stock on hand.

Keep track of upcoming holidays and festivals. The price of chickens increases at this time. This will help to plan when to sell chickens.

Chicken meat and eggs contain important nutrients, contain vitamins and minerals sometimes unavailable in other food, and are rich in protein that humans need to grow, be strong, and stay healthy. Because of this, the most important thing to remember is to **feed the family FIRST**... then make decisions about selling chickens and eggs.

When to sell?

- Cockerels should be sold at 4-5 months of age. Only 1 cock for 10-15 hens, plus one for future replacement is needed.
- If a cock is not doing a good job of mating, it should be sold.
- Old hens that are not laying should be sold.
- Hens with negative behavior should be sold.
- Pullets should be sold when the price is high if possible.
- Eggs should be sold before they are 5-7 days old if they have been stored in a cool place, within 1-2 days if in a warm climate.

It is important to keep a record of expenses related to raising the flock and the income generated in addition to production records as mentioned in the flock management section. This will help determine if it is profitable to raise a flock.

Expenses are things that a poultry keeper spent money on to raise the chickens.

Expenses Include:

- Materials
- Purchase of initial flock
- Baskets
- Coop construction
- Nests
- Feeder
- Drinkers
- Other materials
- Inputs
- Feed stuff
- Medicine
- Anti-parasitic pesticide
- Disinfectant or lime wash
- Vaccines
- De-worming

Income is the money the poultry keeper receives for the sale of any chickens or eggs.

Income Includes money earned from:

- Sale of fresh eggs
- Sale of cooked eggs
- Sale of chicks
- Sale of pullets
- Sale of cockerels
- Sale of hens
- Sale of cocks
- Sale of cooked chickens

These records should be reviewed together to make future decisions. Looking the cost of keeping the poultry needs to be compared to the income being generated by the sale of chicken products. When the cost of upkeep is more than the benefit gained, cutting back the flock size should be considered. However, the value of the non-monetary benefits needs to be considered as well. Consumption of chicken products and increased nutrition, and the value of having chickens to trade for other goods and for ceremonial purposes are forms of income as well ***(see Appendix III for an example of income and expense record keeping forms).***

Summary:

Raising poultry can provide food and income for families. To do so the flock must be managed well. This is done by inspecting the flock daily and keeping the flock healthy and keeping track of production and financial information. It is also important to analyze the flock and compare it to the financial situation and the flock's production to make smart decisions about when to sell – after feeding the family first. Poultry keepers need to look for opportunities to market chicken products by knowing the high season for live birds versus selling eggs for consumption.

Lesson #21
SELLING CHICKEN AND EGGS

Objective: To understand special selection must be given to breeding cocks and hens.

Outcomes:
1. Students will be able to identify ways people can earn money through producing chickens and eggs.
2. Students will be able to describe the working habits of a successful poultry entrepreneur.

Output:
Write a "help wanted" ad for a poultry keeper/coop caretaker.

Key Vocabulary:
- Expeses
- Income
- Profit

Materials Needed:
- Student notebook

LESSON

**This lesson can be taught during several class sessions.*

Anticipatory Set:
Ask students to brainstorm (write answers on the chalkboard)
- What are all the ways you can prepare an egg? ***(hardboiled, fried, scrambled, omelet, mix in with other food)***
- What are some reasons people want chickens? (***to eat, to lay eggs, to start raising, to use in a ceremony, as an offering, to give as a gift)***
- What are all the ways you can buy a chicken? ***(live, dead but uncooked, cooked)***
- What are all the ways you can cook chicken? ***(answers will depend on local culture)***
- Do families raise their own chickens? ***(Some do)***
- Where do families who don't raise chickens buy chickens? ***(buy them from someone or the market)***
- Do all restaurants raise chickens? ***(No)***
- Where do they get them from? ***(buy them from someone or the market)***
- Point out that for families that raise chickens, it provides food sources (chicken and eggs) but for families who don't raise chickens, they must buy poultry products from someone else.

Direct Instruction:
Share with students the objective of the lesson is to understand chickens provide food and income for families.

Ask students
- Can families who raise chickens for eating also get money from the flock?
- When should a poultry keeper sell eggs or chickens?

Have students discuss in a small group or with a partner ways that raising chickens could provide income for families.

Students should review the brainstorming list to come up with ideas.

Have student groups share their ideas (possible answers: sell raw eggs, sell boiled eggs, sell day old chicks, sell live chickens, sell raw uncooked chickens, sell fried chickens, open a food stall and sell cooked eggs and/or chickens, partner with a restaurant to supply some of the chickens it serves).

Explain to students what an entrepreneur is.

Be sure to include the following:

- ✓ Make the connection that when a poultry keeper goes from raising chickens just for family to eat to selling poultry products as well, the poultry keeper becomes an entrepreneur.
- ✓ When raising chickens to generate income, extra attention is given to the flock because it has become more valuable to the poultry keeper.
- ✓ The flock can provide money or be used to trade for other needs.
- ✓ The flock should be protected because it cost money to produce.
- ✓ The poultry keeper needs to keep track of expenses and income related to the flock to determine that the income is greater than the expenses – so a profit is generated.

Ask students if there is a difference in prices of eggs and chickens?

Discuss with students the difference in income when selling eggs versus chickens:
It may seem better to sell a chicken because poultry keepers can get more money for 1 chicken. But, the chicken is able to continue laying eggs so more money can be earned over time. Selling the chicken at the higher price gives you more money, but the chicken is gone, it can't lay eggs, and the poultry keeper must wait until a pullet is 4-6 months old to sell.

Have students figure out how many eggs need to be sold to earn the same amount of money for selling one chicken.

Then have students discuss how much more money a poultry keeper could earn if the chicken continues to lay another 5 clutches of 10-12 eggs before it is consumed or sold.

Guided Practice:
Have students take notes in their notebooks.

Share with students to be a good entrepreneur the poultry keeper must:

- ✓ Keep the flock healthy and safe (Remind students they learned this in Learning Point 7 and 8, use this as an opportunity to review).
- ✓ Keep production records (they learned about this in lesson 17 and practiced recording data on the recording sheets).
- ✓ Keep financial records (they will learn about this in Lesson 22 and practice keeping track of what was spent to start the flock, expenses for the flock each week, and income from selling poultry products).
- ✓ Look for opportunities to sell chicken and eggs (know in which months prices for chickens or eggs are usually higher, think about different ways to sell poultry products – look at the brainstorming list).

Have students work in small groups or with a partner to come up with 5 words or phrases that describe the qualities and skills a poultry keeper needs to have and why.
examples:
mathematical = to keep track of income and expenses
precise = to count the flock and eggs
responsible = to feed and water the flock, keep the flock safe, and to protect it from illness
knowledgeable = to know what to feed and how to care if a chicken is ill or has parasites
careful = to care for the flock
creative = to find ways to see the poultry products
determined = to find ways to keep the flock healthy and make a profit
resourceful = to find ways to make the coop and feeder/drinkers and nests
organized = to keep track of the flock, the financial information and to care for the flock
punctual = for supplemental feedings and to let the flock in and out of the night coop
good memory = to remember all the information to care for the flock, feedings, timings, vaccinations, & illnesses

Ask student groups to each share 1 of the adjectives they came up with and why – encourage students to share adjectives that have not shared so students hear a wide variety of choices.

Independent Practice:
(if possible bring in a newspaper to show students a job posting)

Explain to students they are going to write a "help wanted" posting that would appear in a newspaper ***(an explanation of a help wanted ad can be found in Appendix II)***. The job posting needs to:

- ✓ Have a larger print title in capital letters of what the job is (*for example:* POULTRY KEEPER WANTED or POULTRY COOP CARETAKER WANTED)
- ✓ State 4-5 adjectives that describe the skills the person must have and why
- ✓ Provide a brief description of what the person will be responsible to do
- ✓ Provide a way to contact someone to arrange an interview

Have students share their job posting with the small group they worked with earlier ***(a student example can be found in Appendix I).***

Closure:
Ask students

- Why do poultry keepers need to keep the flock healthy and safe? ***(the flock can generate income so it needs to be protected so it can provide for the poultry keeper)***
- How can families generate income from raising chickens? (selling ***cooked and raw eggs, and live and dead chickens)***
- Why must a poultry keeper have good math skills? ***(to keep track of expenses, income, and flock production)***
- What are some other skills poultry keepers should have?

Home-School Connection:
Have students share their job posting with their parents.

Lesson #22
INCOME AND EXPENSE RECORDKEEPING

Objective: Understand entrepreneurial skills and knowledge are needed for the management of poultry production to generate income.

Outcomes:
1. Students will be able to explain the factors that need to be considered when deciding to consume or sell poultry products (first 5 eggs).
2. Students will be able to practice keeping record of poultry product sales.
3. Students will be able to calculate the expenses or raising chickens and income from the sales of chickens and eggs.

Output:
Recordkeeping worksheet.

Key Vocabulary:
- Expeses
- Income
- Profit

Materials Needed:
- Student notebook

LESSON

**This lesson can be taught during several class sessions.*

Anticipatory Set:
Ask students
- What were some of the skills a poultry entrepreneur needed to have?
- Why does a poultry entrepreneur need to have good math skills?
- What does a poultry keeper have to do to make a profit? **(sell the chickens and eggs for more than it cost to raise them)**
- How does a poultry keeper know when that is?
- What can a poultry keeper do to find this information?.

Direct Instruction:
Share with students the objective of the lesson is to understand what skills and knowledge are needed for management of poultry to earn money.

Ask students to write notes.

Explain to students the poultry keeper needs to decide when to sell poultry products.

What do students think a poultry keeper needs to think about when deciding to sell chickens or eggs?

The most important thing to remember is to **feed the family FIRST...** then make decisions about selling chickens and eggs:

When to sell?
- The first 5 eggs should be sold or consumed.
- Eggs should be sold before they are 5-7 days old if they have been stored in a cool place, within 1-2 days if in a warm climate.
- If possible, live chickens should be sold during months when prices are high such as close to festivals when the price and demand of chickens increases.

- Cockerels should be sold at 4-5 months of age.
- If a cock is not doing a good job of mating, it should be sold or consumed.
- When a cock is 2 years old it should be sold to limit inbreeding.
- Old hens that are not laying eggs should be sold or consumed.
- Hens with negative behavior should be sold or consumed.

Explain to students the money a poultry keeper receives from selling chickens and eggs does not mean extra income (profit) has been earned. They must think about the expenses related to raising the chickens. Then, subtract the expenses from the income to determine the how much money was earned.

Ask students to brainstorm all the expenses related to chickens (see Background Information Needed For Teaching).

To determine if extra income has been generated (profit) from the sale of chickens and eggs the following equation needs to be used:

Profit = Income – Expenses

- Income is the money given to the poultry keeper for the eggs and chickens by the people who buy them.
- Expenses are all items related to keeping the chickens healthy and safe.
- Profit is the extra money a poultry keeper has after all the expenses are taken care of.

Ask students to

- Brainstorm what **expenses** are related to raising chickens? (see Background Information Needed for Teaching)
- What mathematical operation used to figure out the expenses? ***(addition)***
- Provide several examples of expenses and have students total them.

Ask students

- How can a poultry keeper find out how much income has been earned from selling chickens and eggs? ***(keeping track of what has been sold and how much it was sold for)***
- What math operation is used to figure this out? ***(multiplication and addition)***
- Provide several examples of income and have students total them.
- Is that profit? ***(No, the expenses must be subtracted from the income. What is remaining is profit.)***
- Provide an example of expenses and income, have student total them and determine what the profit is.
- Then call on students to give examples of expenses and income. Next determine what the profit is.

Guided Practice:

Remind students of the poultry record keeping sheet from Lesson 17. Students have been keeping track of the number of chickens, consumed or dead chickens, and eggs laid, sold and consumed on a daily basis.

Now they will keep track of the expenses related the raising the chickens and any income from the sale of chickens and eggs.

Review with students the poultry income and expense sheet from **Appendix III**, or create your own.

Fill in the sheet with some numbers.

Ask students what they would need to do to find out if there is a profit from the sale of poultry ***(add up the expenses. Then add up the income. Then subtract the expenses from the income. The difference it the profit).***

Share with students that even if the poultry keeper is not generating profit from the flock, it doesn't mean to stop raising chickens. The flock provides chicken and eggs for family consumption and can be used to

trade for other needed items. If the poultry keeper is not generating enough income to cover the expenses the keeper should reduce the size of the flock.

Independent Practice:

- Have students work in small groups or partners.
- Create a scenario with expenses and income and write it on the chalkboard.
- Provide students time to work together to complete the poultry production record sheet based on the scenario, and answer the questions.
- Have several student groups present their solution to the class.

Demonstration Coop Visit:
Have students visit the coop in small numbers to record what expenses the demonstration coop has. When all students have observed the coop, have them share what they observed, and see if they can provide an estimate of the costs.

Closure:
Ast students

- What should be done with the firs 5 eggs?
- When should a cock be sold?
- When is a good time to sell grown live chickens and why? ***(near festivals because there is more demand so the price is higher)***
- How do poultry keepers know if they are generating extra income from the sale of poultry products?
- What information do poultry keepers need to record to find out if extra income is being generated?
- Why is it important to record expenses?
- If the flock is not providing extra income, should the poultry keeper stop raising chickens?

Home-School Connection:
Have students ask their parents all the expenses related to raising poultry at their home. If they are not raising poultry, they can ask about other expenses for livestock or crops.

LEARNING POINT 10:

EATING CHICKENS AND EGGS ARE GOOD FOR FAMILY NUTRITION AND HEALTH

Topic	Learning Objective **Learner will...**	Basic Competencies **Learner will be able to...**
Nutrition	Understand the nutritional value of poultry products and how that affects human health.	• Describe how nutrition affects human health. • Explain how the key nutrients in poultry products benefit the human body. • Understand storage, handling, an consumption safety of poultry products.

WORDS TO KNOW:

Nutrients – *what humans, animals, and plants need to grow and survive*
Stunted – *undersized*

BACKGROUND INFORMATION NEEDED FOR TEACHING

NUTRITIONAL VALUE OF POULTRY PRODUCTS

The human body needs nutrients to stay healthy and for growth. The important nutrients for life include carbohydrates, proteins, and fats, as well as fiber, vitamins, minerals, and water. These nutrients are found in food. The human body absorbs these nutrients when food is digested. The body then uses these digested nutrients from food to grow, repair and maintain our bodies. When we get the nutrients our body needs our bodies are able to fight illness and disease better. If the body is not getting enough of a nutrient there is a deficiency. A deficiency can lead to health problems such as **stunted** growth, visions loss, poor memory, and low muscle growth.

The egg is one of nature's most complete foods. The reason for this high nutritional value is that the developing chick's only source of food during its stay inside the egg is the nutrients present in the egg. This explains the perfect balance of the six nutrients necessary for growth.

One of the key nutrients chicken and eggs provide is protein. Proteins play a role in nearly every part of your body. Every cell of the human body has proteins. Hair and nails are mostly made of protein. The body uses protein to build and repair tissues. Protein is an important building block of both cardiac and skeletal muscles, cartilage, skin, and blood. Proteins are also responsible for the maintenance and building of other structures in the body, such as cells and bone. Proteins also play a role in the transport of oxygen and other substances in the body. The human body can't survive without proteins! Protein is a "macronutrient," which means the body needs relatively large amounts of it. Getting enough protein in the diet is very important, especially for pregnant women and children. Consuming eggs and chicken meat provides a good source of protein.

In addition to providing a source of protein, chicken and eggs provide micronutrients for women, children and infants. They are also a good source of Iron, Zinc, Vitamins A and B12, Selenium, and Choline (essential for memory and brain development). Both are high in Omega 3 Fatty Acids, Carbohydrate, Fat, all Essential Amino Acids, Vitamins A, B, D & E, and Trace Metals (Calcium, Iron, Magnesium, Phosphorus, Potassium, Zinc).

Because of all the health benefits of chicken and eggs, it is very important to remember the family comes first before selling. This will allow children to grow and be strong, and for their brain to develop properly. This will also help protect families from illness and allow mothers to produce healthy babies and to nurse them well.

BENEFITS TO THE HUMAN BODY

Whole eggs and chicken are among the most nutritious foods, containing a little bit of almost every nutrient we need. These nutrients aid the body in many ways. Both are a high-quality protein so when eaten a person feels fuller, can concentrate longer, and stays energized.

Brain Function

Chicken meat and eggs contain choline. Choline helps the brain to function by building cell membranes in the brain. Eating chicken meat and eggs supports signally molecules in the brain that help send messages from the brain through nerves to the muscles. A single egg contains more than 100 mg of this very important nutrient. This is especially beneficial for women raising children.

Chicken meat also contains selenium. This is an essential trace mineral important for cognitive function and a healthy immune system.

Muscle Growth

Chicken meat and eggs help in physical development. When eaten regularly muscles strengthen, and muscle-loss is prevented.

Eye Health

Eggs are also high in Vitamin A, which is very important for healthy eyes. Vitamin A deficiency is the most common cause of blindness in the world.

HANDLING AND SAFETY OF POULTRY PRODUCTS FOR CONSUMPTION

- Never eat sick or dead chickens. They should be buried.
- Hands should be washed with soap before handling chicken meat and when finished.
- Thoroughly wash knife and work surface used to prepare raw chicken.
- Raw chicken should be separated from other foods.
- Cook chicken thoroughly, the juice from it should be clear, not pink.
- Soup and stew with chicken should be boiled.

It is best to consume eggs that are as fresh as possible. This will reduce the risk of germs which can cause diarrhea. Eggs should also be well cooked before eating. This can be done by boiling the eggs or well frying them. The following is guideline for consumption of eggs:

Egg Condition	When to Consume
Egg with broken or cracked shell	Use immediately
Fresh fertile and unfertile eggs stored in warm environment (above 20 degrees)	Eat in 1-2 days, but check to see if they have gone bad by placing in water. Bad eggs will float.
Fresh fertile and unfertile eggs stored in cool environment	Eat within 5-7 days
Egg boiled on day of lay	Eat within 1 week of boiling

Summary:
Proteins are the main building blocks of the human body. Chicken and eggs are one of nature's best sources of protein, and contain many of the key ingredients for life. The proteins contained within eggs are very important in the development of the human brain and muscles, help prevent disease and contribute to well being in later life. Proper handling and cooking of chickens and eggs are important to avoid becoming ill.

*World Egg Day is celebrated on the second Friday in October. Use it as and opprtunity to teach your students about the excellent and affordable source of high-quality protein eggs are !

Lesson #23
GOOD NUTRITION

Objective: Understand the nutritional value of poultry products and how that affects human health.

Outcomes:
1. Students will be able to describe how nutrition affects human health.
2. Students will be able to list the key nutrients chickens and eggs provide.
3. Students will be able to explain how they benefit the human body.

Output:
Poster/flyer.

Key Vocabulary:
- Nutrition
- Nutrients

Materials Needed:
- Student notebook

LESSON

**This lesson can be taught during several class sessions.*

Anticipatory Set:
(Review Learning Point 2 "Benefits of Raising Chickens", point 1 – nutritional value)

Ask students if they recall the 4 benefits of raising chickens? If they are not able to recall, have them review their matrix they created. Highlight point 1, "Nutritional Value".

Ask students
If they have had an egg or chicken recently?
How was it prepared?
Do they know eating eggs can improve their vision?
Do they know eating chicken or egg can make them stronger?

Direct Instruction:
Share with students the objective of the lesson is to understand how eating poultry products affects our body and health.

Using the "Background Information Needed for Teaching" explain to students the need for the human body to have nutrients and the key nutrients poultry products provide, especially protein. Be sure to impress upon students that eggs and chicken are an important part of a balanced diet and consuming them help families stay healthy. Be sure to discuss the side effects of nutrient deficiency. Provide more detail about the specific areas poultry products help develop: brain, eye sight, muscles.

Discuss how eating spoiled or contaminated poultry can have a negative impact on our health, then share the guidelines on handling chicken and the timeline on eating eggs (Can be found in "Background Information Needed for Teaching"). Draw the grid of when to consume poultry products on the chalkboard and have students copy it into their notebooks.

Then share the practical uses and benefits of eating poultry products.

Guided Practice:
Draw an outline of a human body on the chalkboard and ask students to do the same in their notebooks. Above the drawing ask students to write "The Power of Poultry".

Ask students to recall the 3 areas of the human body that benefit from consuming chickens or eggs (brain, eyes, muscle growth).

Direct students to:
Draw a line outward from the brain on their diagram of the human body. At the end of the line write "Brain Function".
Draw a line outward from an eye on their diagram. At the end of the line write "Eye Health".
Draw a line outward from the bicep on an arm on their diagram. At the end of the line write "Muscle Growth".

Have students work in partners or small groups to recall how eating poultry benefits each of these areas of the body and what happens to each area of the body if there is a deficiency. These outcomes should be noted on their drawing under each heading (Brain function, Eye health, and Muscle growth).

Independent Practice:
Instruct students to use their notes to draw a poster or flyer ***(an explanation of a poster/flyer can be found in Appendix II)*** that educates others about one of the following:

1. The nutrients in chickens and eggs and how it benefits the different parts of the human body.
2. What happens to the body when there is a protein deficiency.
3. The practical value of chickens and eggs.
4. The handling of poultry products.
5. A combination of the above.

(a student example can be found in Appendix I)

Closure:
Ask students
What are the 3 areas of the body protein benefits? ***(brain function, muscle growth, eye health)***
What can happen if a human has a deficiency? ***(stunted growth, visions loss, poor memory, and low muscle growth)***
What is an excellent source of protein and vitamins? ***(eggs and chicken meat)***
What can happen if the egg you eat is not fresh? ***(can cause diarrhea)***
Should a chicken that is sick or died be eaten? ***(no!)***

Home-School Connection:
Have students take their poster/flyer home to share with their families.

References

Acharya, K.P. and Kaphle,K. 2015. *Major Issues for Sustainable Poultry Sector in Nepal.Global Journal of Animal Scientific Research.* 3(1):227-239.

Ahlers C., Alders R.G., Bagnol B., Cambaza A.B., Harun M., Mgomezulu R., Msami H., Pym B., Wegener P., Wethli E. and Young M. 2009. *Improving Village Chicken Production: A Manual for Field Workers and Trainers*. ACIAR Monograph No. 139. Australian Centre for International Agricultural Research: Canberra, 194 pp.

Beyer, S., Sampson, M., VanSkike, K., and Winkler, E., 1998. *Kansas 4-H, Poultry Leaders Notebook*. Kansas State University, 456 pp.

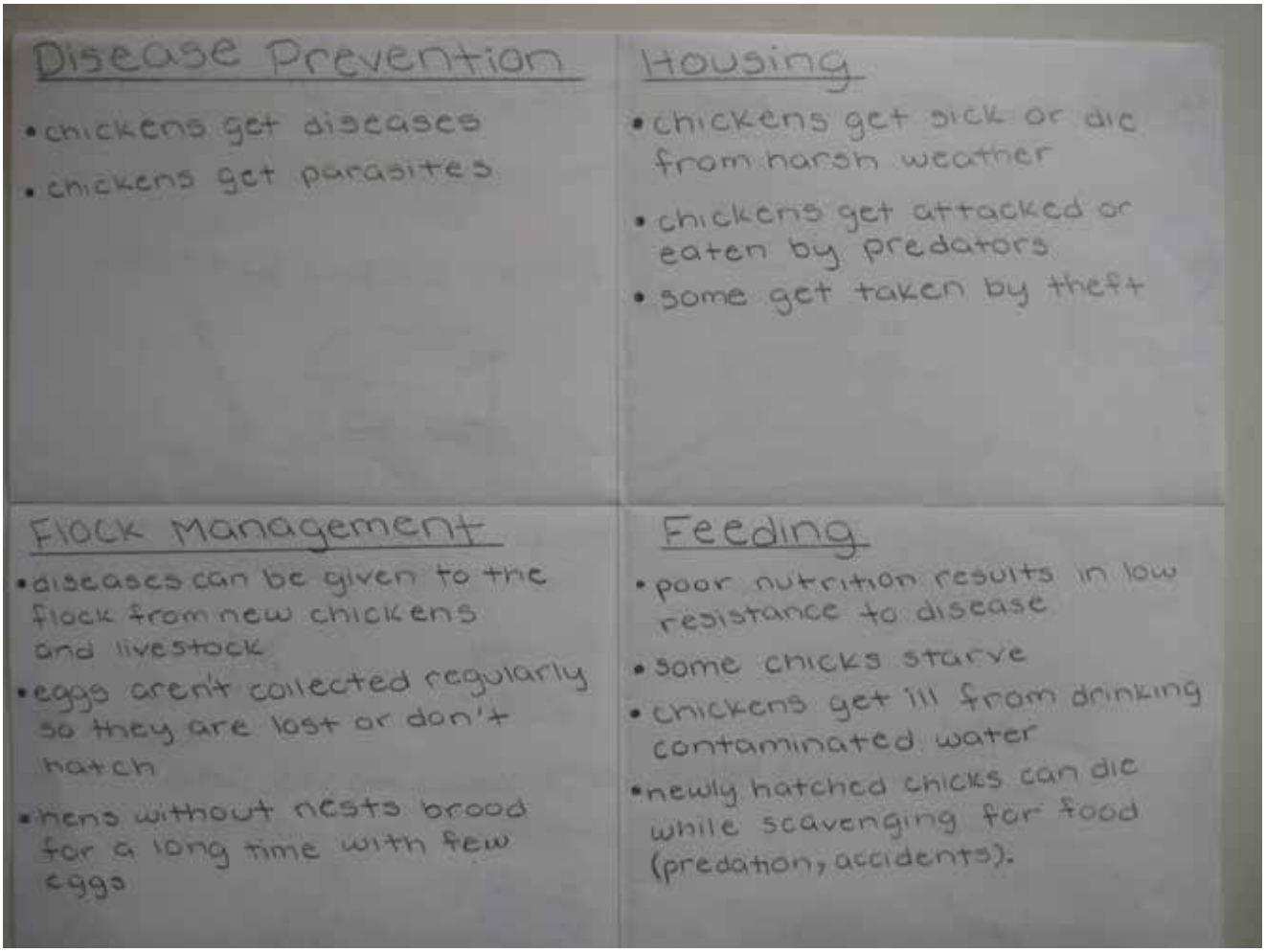
Frederiksen L., Permin A., Riise J. and Vesterlund McAinsh C. 2004. *Keeping Village Poultry: A Technical Manual on Small-Scale Poultry Production*. Network for Smallholder Poultry Development. Copenhagen, Denmark: DANIDA, 89 pp.

Appendix I

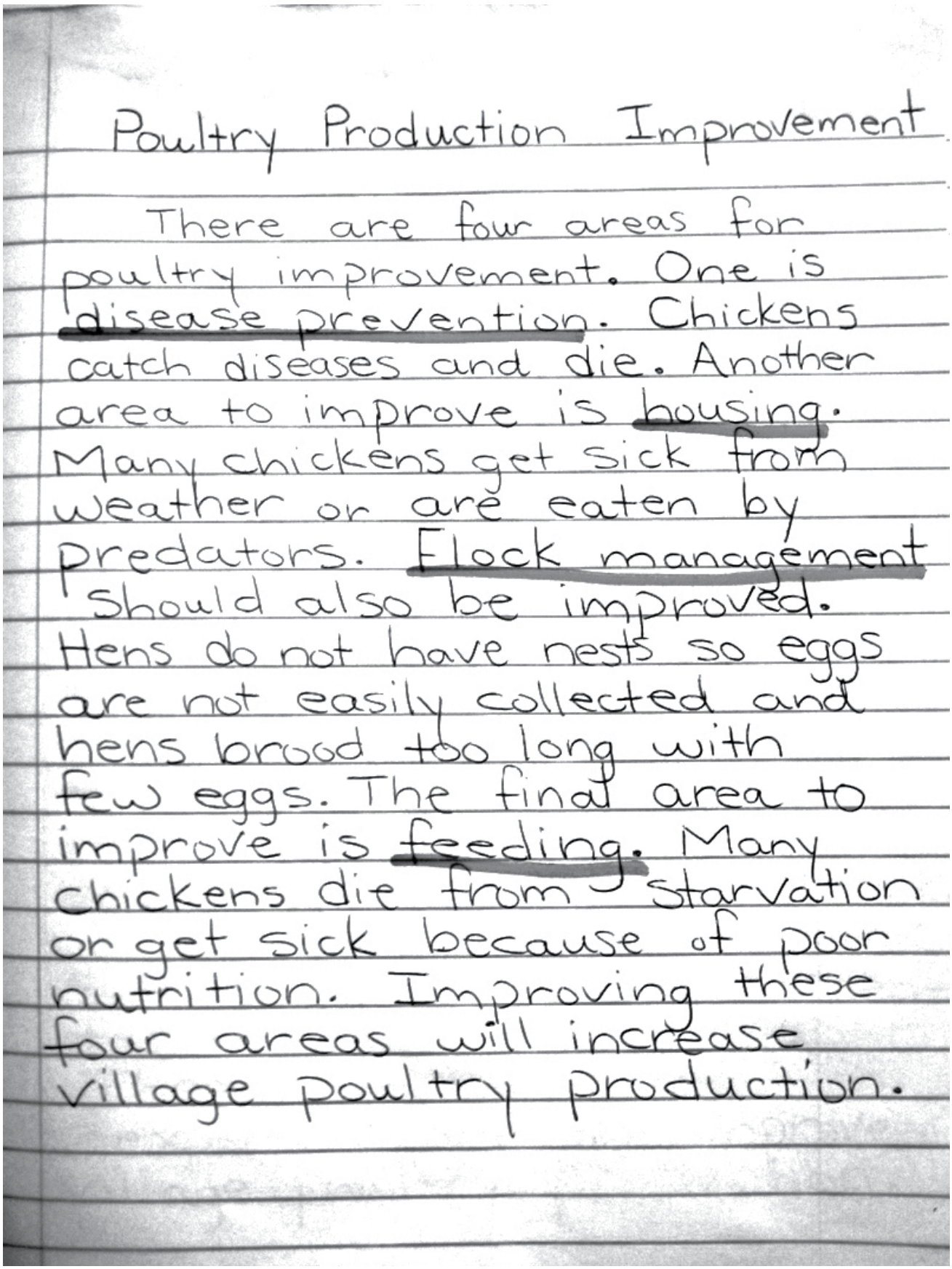
Student Work Examples

LEARNING POINT 1 - VILLAGE CHICKEN AND EGG PRODUCTION CAN BE IMPROVED AT LITTLE COST

Lesson 1: *4 Square Matrix - Causes of Low Poultry Production*



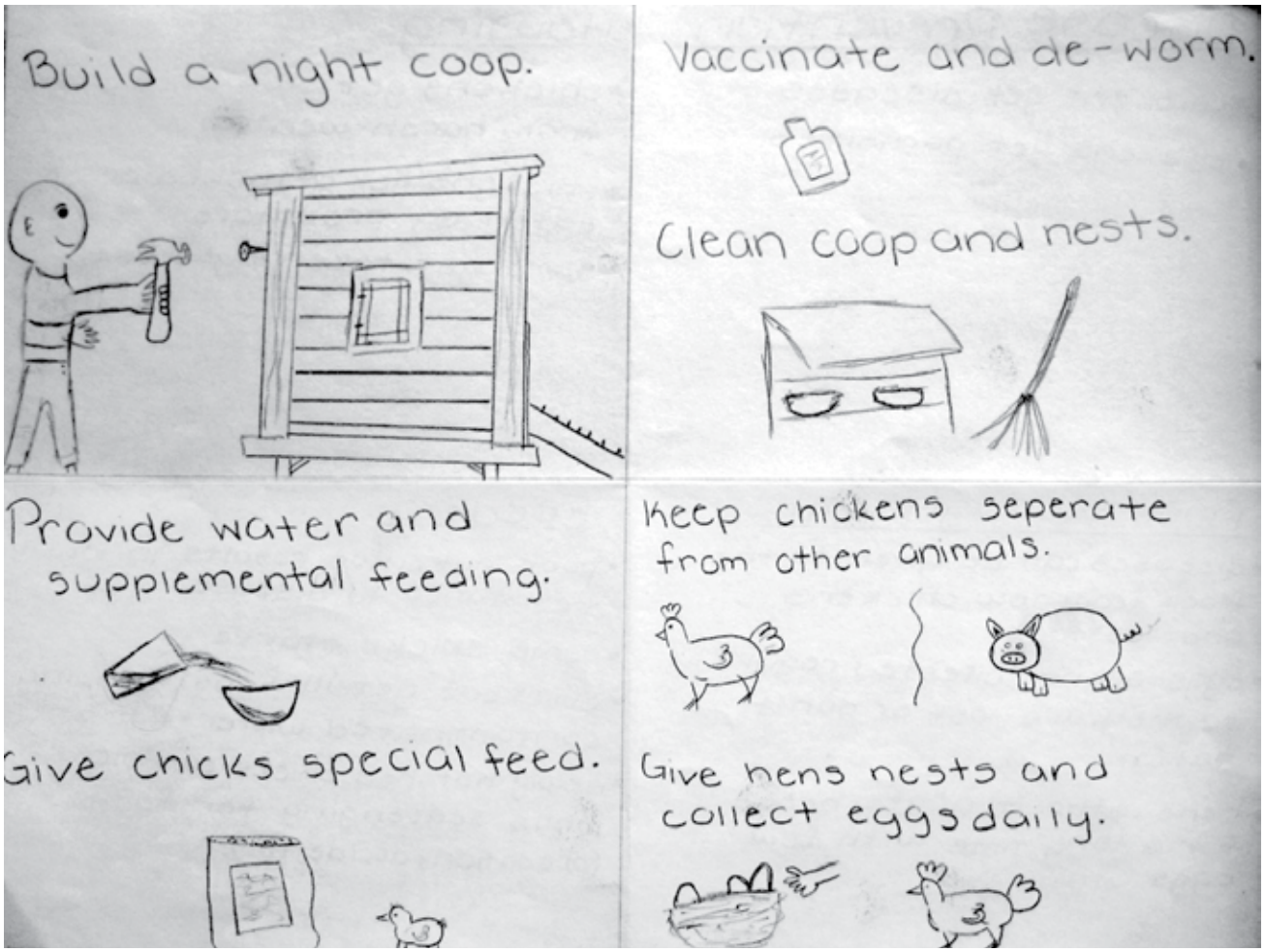
Lesson 1: *Student Paragraph*



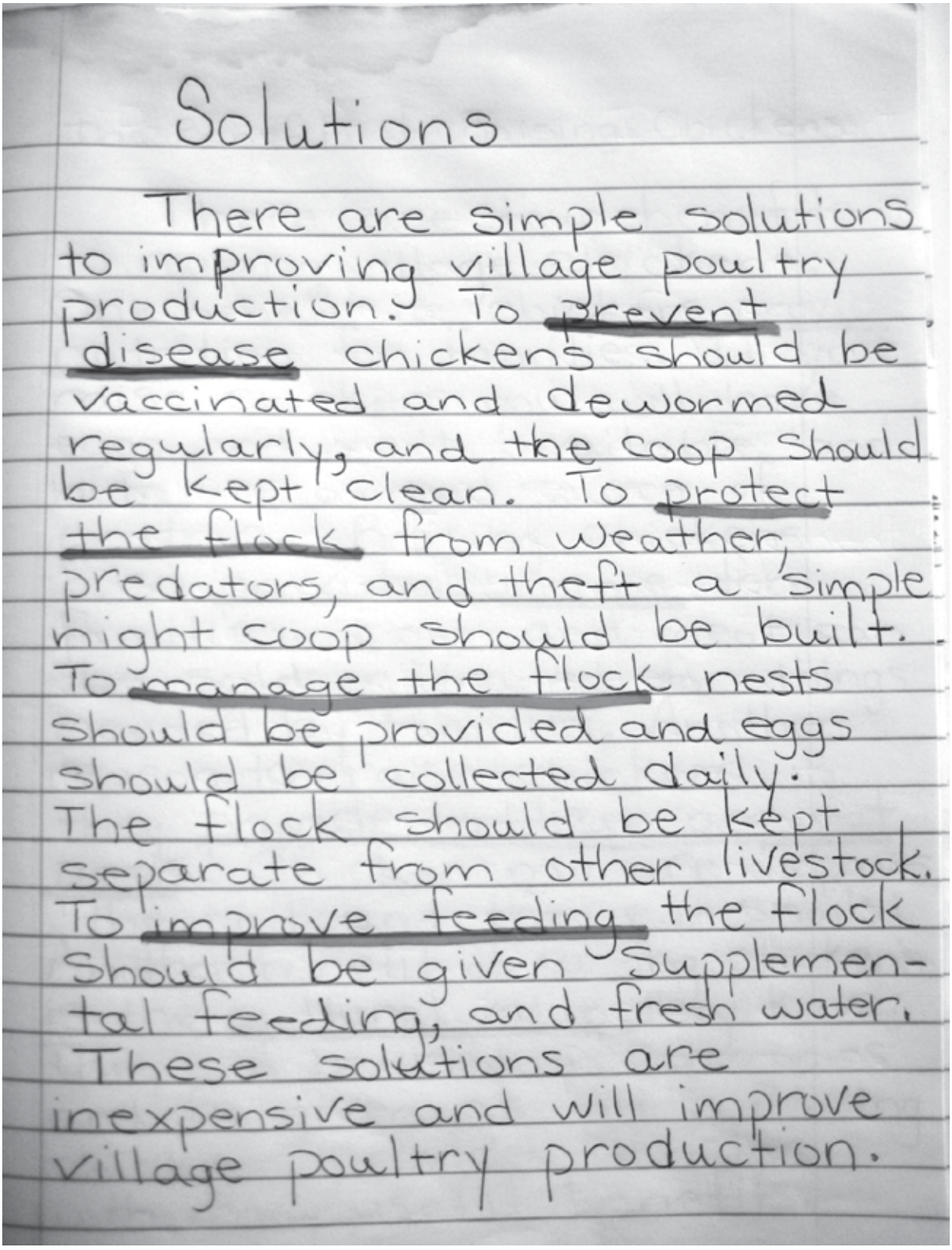
Poultry Production Improvement

There are four areas for poultry improvement. One is disease prevention. Chickens catch diseases and die. Another area to improve is housing. Many chickens get sick from weather or are eaten by predators. Flock management should also be improved. Hens do not have nests so eggs are not easily collected and hens brood too long with few eggs. The final area to improve is feeding. Many chickens die from starvation or get sick because of poor nutrition. Improving these four areas will increase village poultry production.

Lesson 2: *4 Square Matrix -Solutions to Increase Poultry Production*



Lesson 2: *Student Paragraph*

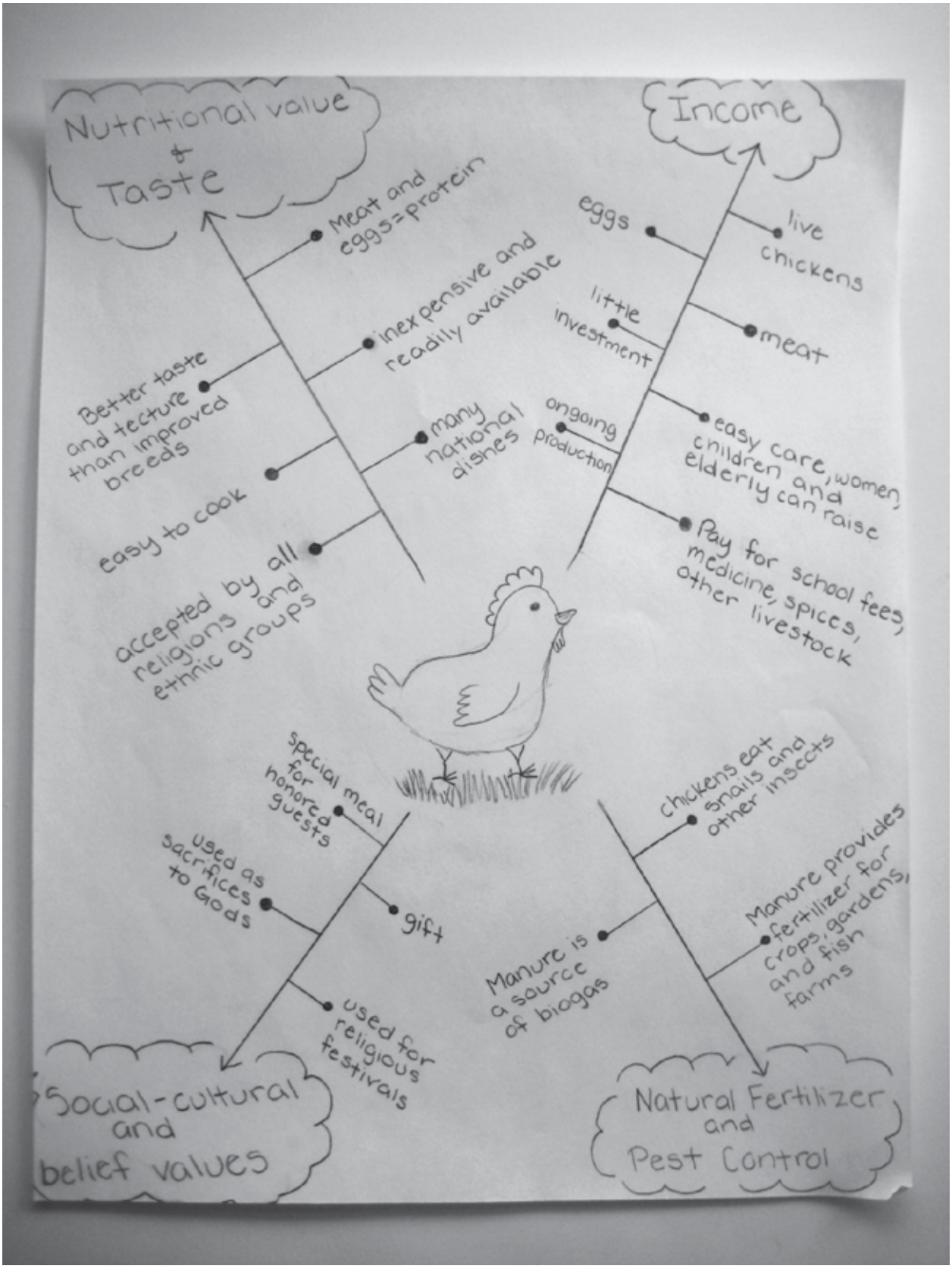


Solutions

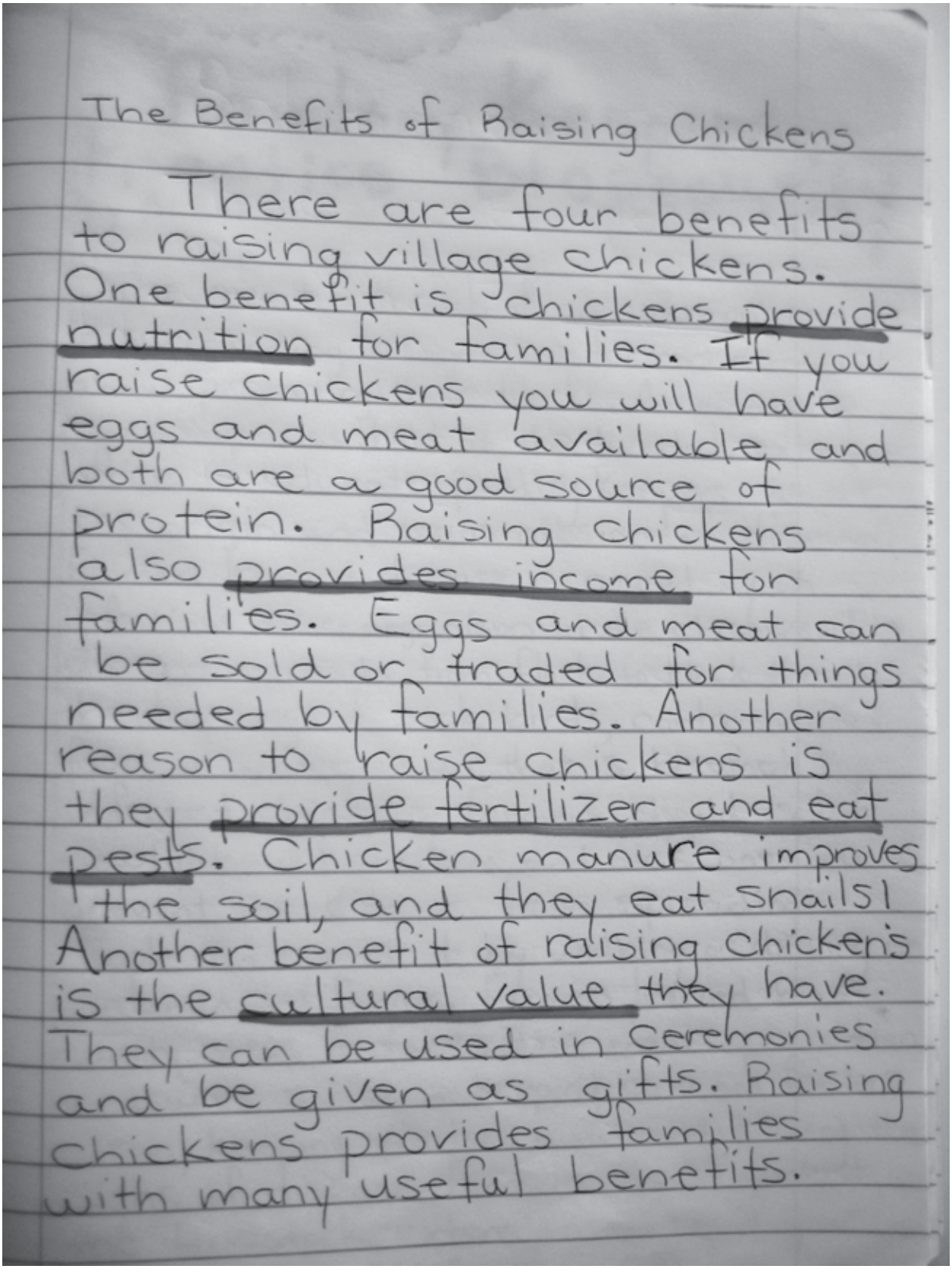
There are simple solutions to improving village poultry production. To prevent disease chickens should be vaccinated and dewormed regularly, and the coop should be kept clean. To protect the flock from weather, predators, and theft a simple night coop should be built. To manage the flock nests should be provided and eggs should be collected daily. The flock should be kept separate from other livestock. To improve feeding the flock should be given supplemental feeding, and fresh water. These solutions are inexpensive and will improve village poultry production.

LEARNING POINT 2 - RAISING VILLAGE POULTRY IS IMPORTANT FOR SEVERAL REASONS

Lesson 4: *Word Web with 4 Benefits and Uses of Chickens*



Lesson 4: *Student Paragraph*

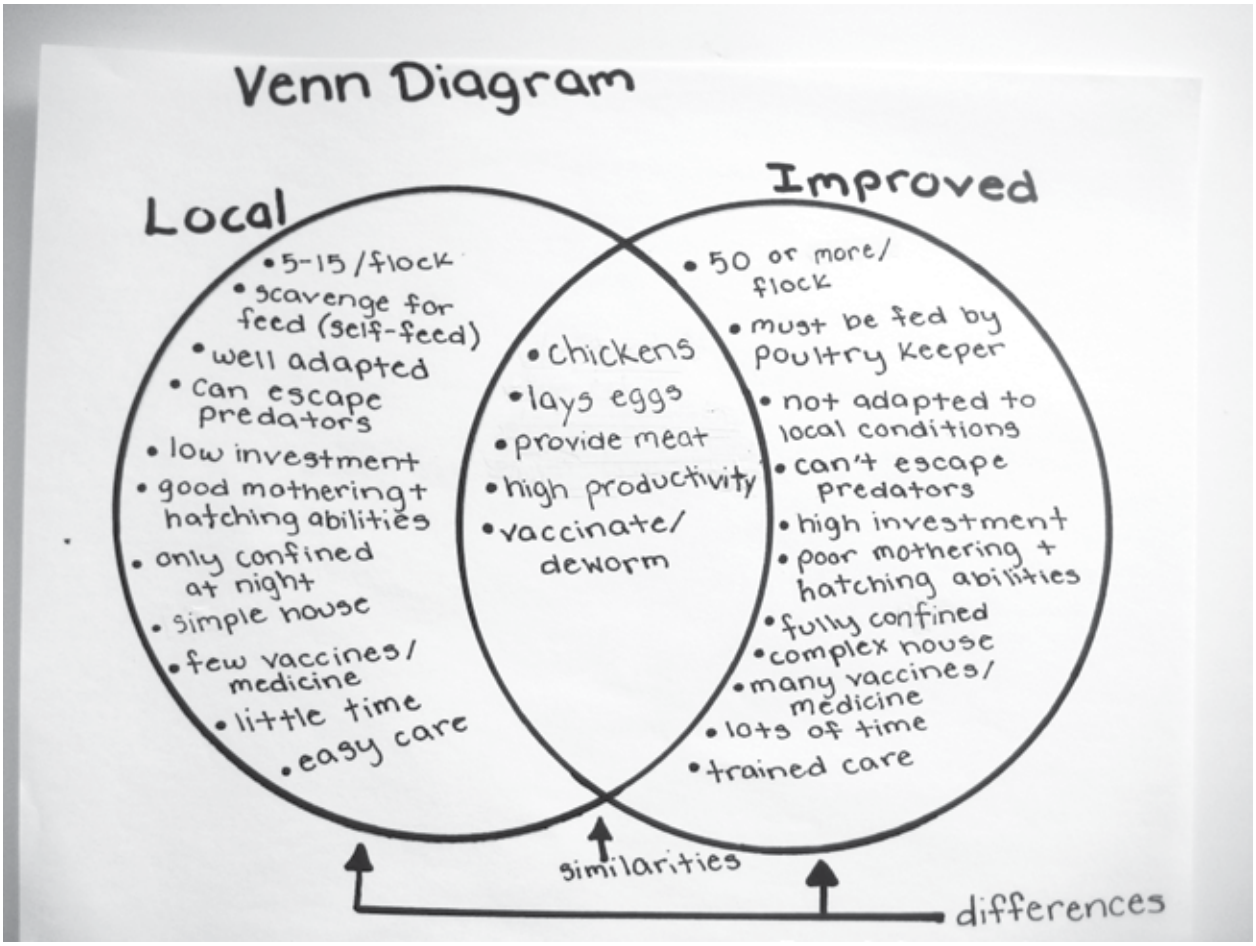


The Benefits of Raising Chickens

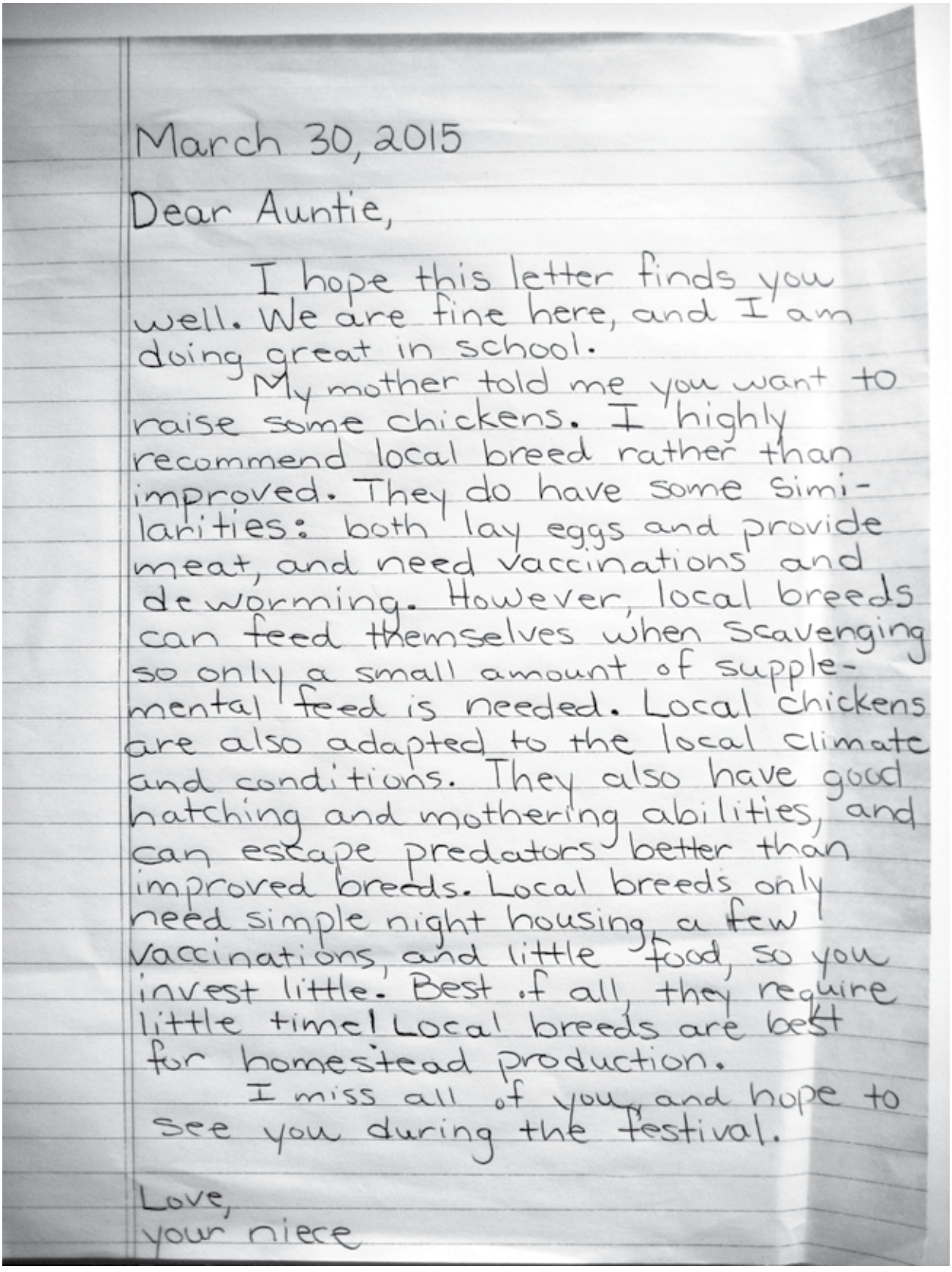
There are four benefits to raising village chickens. One benefit is chickens provide nutrition for families. If you raise chickens you will have eggs and meat available and both are a good source of protein. Raising chickens also provides income for families. Eggs and meat can be sold or traded for things needed by families. Another reason to raise chickens is they provide fertilizer and eat pests. Chicken manure improves the soil, and they eat snails! Another benefit of raising chicken's is the cultural value they have. They can be used in ceremonies and be given as gifts. Raising chickens provides families with many useful benefits.

LEARNING POINT 3 - IMPORTANT DIFFERENCES BETWEEN CHICKEN BREEDS

Lesson 5: *Venn Diagram – Local Versus Improved Breeds*



Lesson 5: *Persuasive Letter*



March 30, 2015

Dear Auntie,

I hope this letter finds you well. We are fine here, and I am doing great in school.

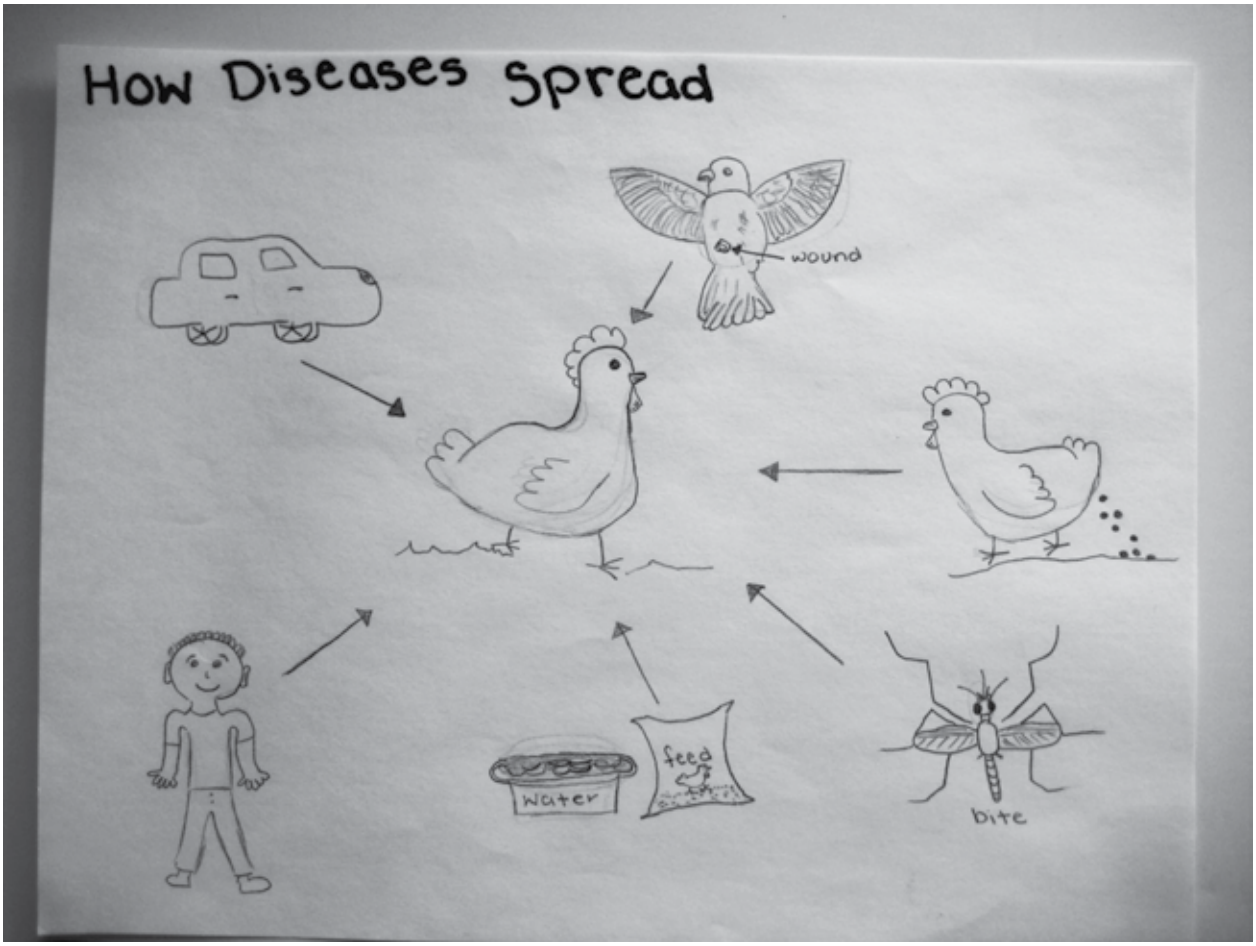
My mother told me you want to raise some chickens. I highly recommend local breed rather than improved. They do have some similarities: both lay eggs and provide meat, and need vaccinations and deworming. However, local breeds can feed themselves when scavenging so only a small amount of supplemental feed is needed. Local chickens are also adapted to the local climate and conditions. They also have good hatching and mothering abilities, and can escape predators better than improved breeds. Local breeds only need simple night housing, a few vaccinations, and little food, so you invest little. Best of all, they require little time! Local breeds are best for homestead production.

I miss all of you, and hope to see you during the festival.

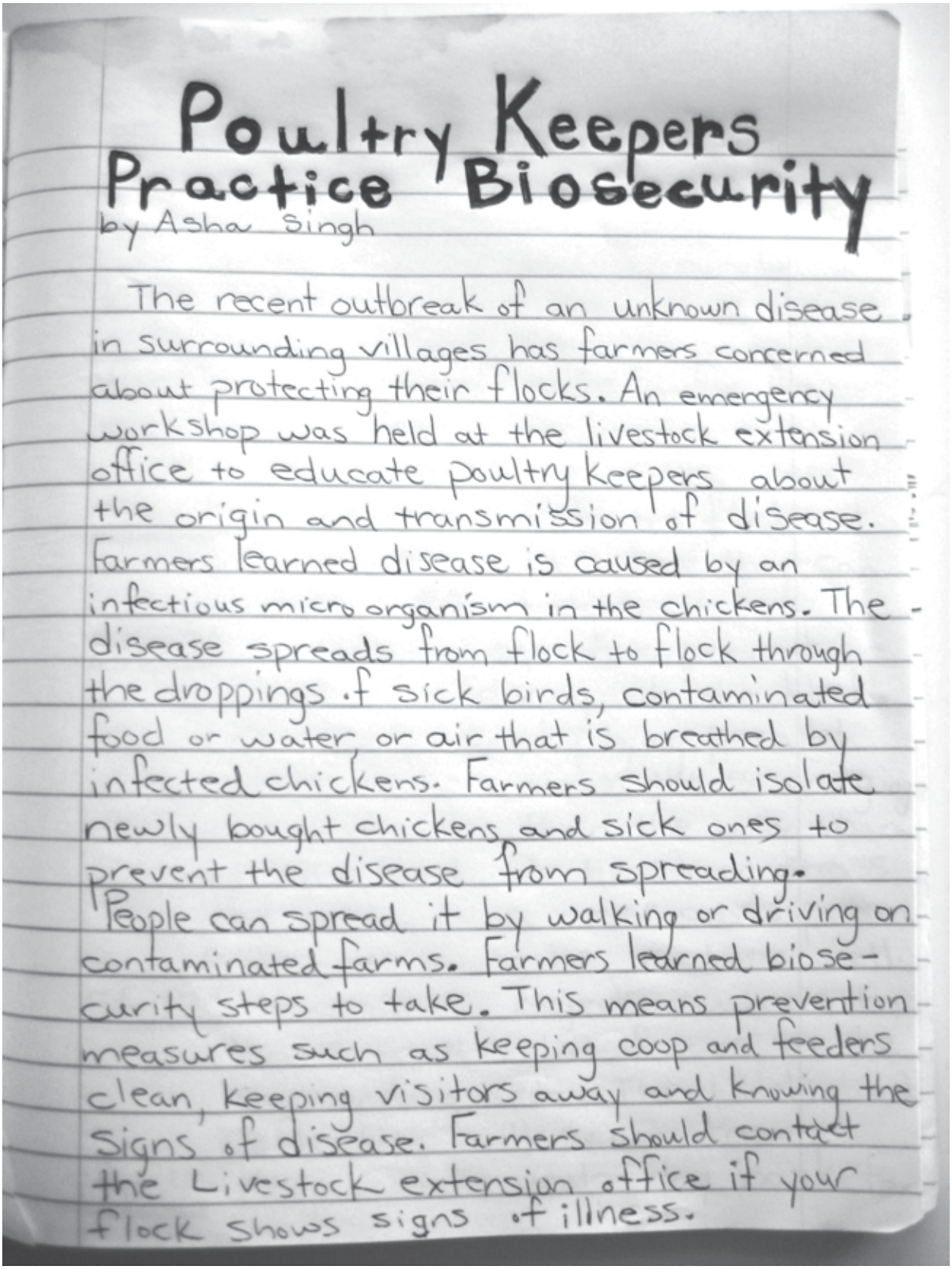
Love,
your niece

LEARNING POINT 4 - HOW TO KEEP CHICKENS HEALTHY

Lesson 7: *Disease Transmission Diagram*



Lesson 7: *Newspaper Article*

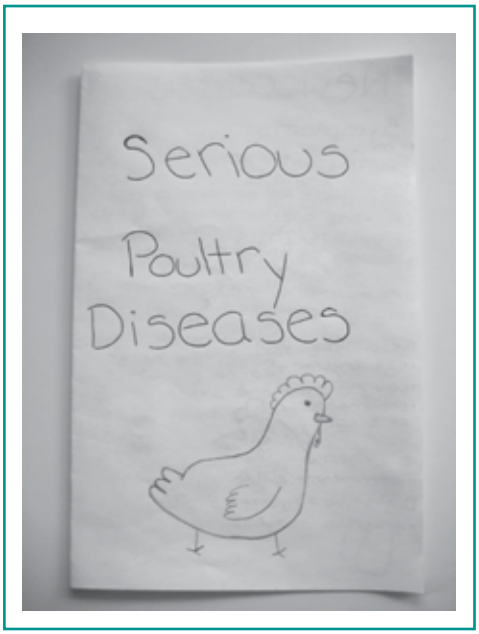


Poultry Keepers Practice Biosecurity

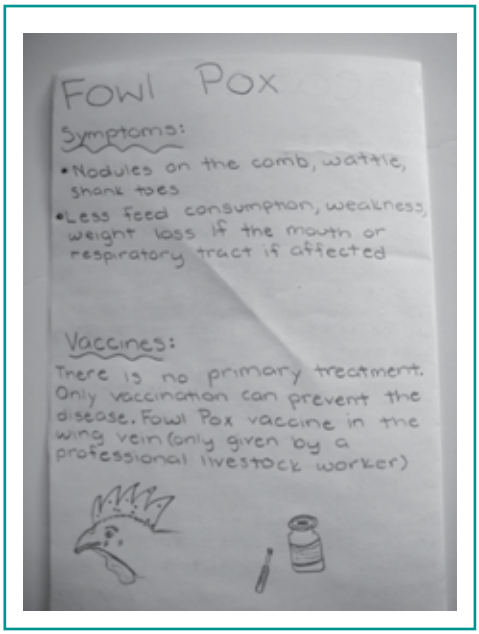
by Asha Singh

The recent outbreak of an unknown disease in surrounding villages has farmers concerned about protecting their flocks. An emergency workshop was held at the livestock extension office to educate poultry keepers about the origin and transmission of disease. Farmers learned disease is caused by an infectious micro organism in the chickens. The disease spreads from flock to flock through the droppings of sick birds, contaminated food or water, or air that is breathed by infected chickens. Farmers should isolate newly bought chickens and sick ones to prevent the disease from spreading. People can spread it by walking or driving on contaminated farms. Farmers learned biosecurity steps to take. This means prevention measures such as keeping coop and feeders clean, keeping visitors away and knowing the signs of disease. Farmers should contact the Livestock extension office if your flock shows signs of illness.

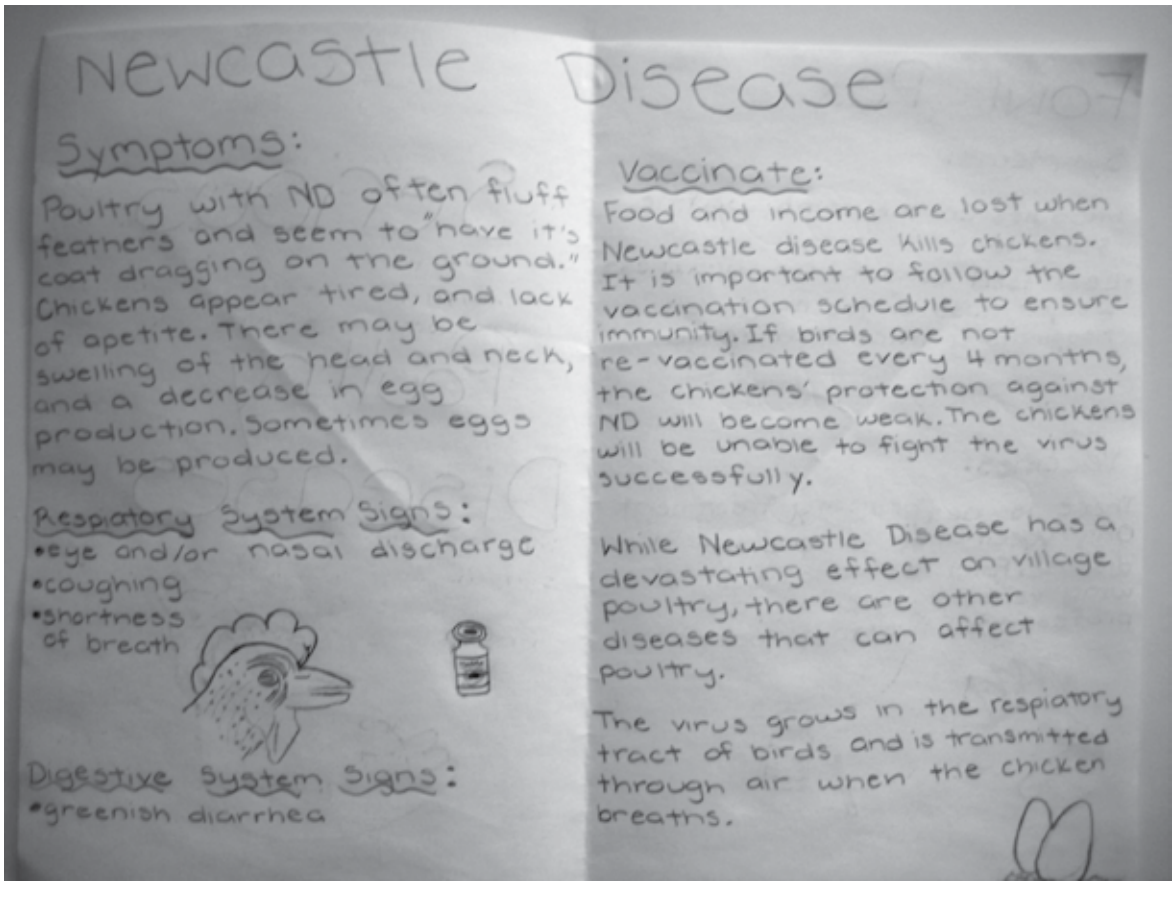
Lesson 8: *Newcastle Disease and Fowl Pox Brochure*



Front Cover

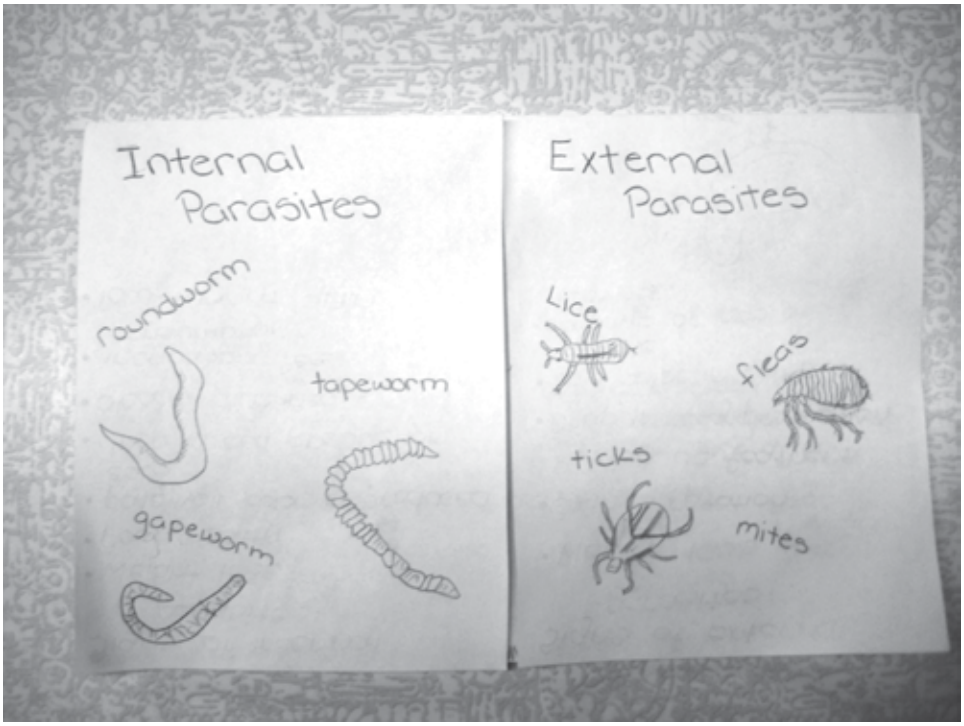


Back Cover



Inside of Brochure

Lesson 9: *Internal and External Parasites Fact Sheet*



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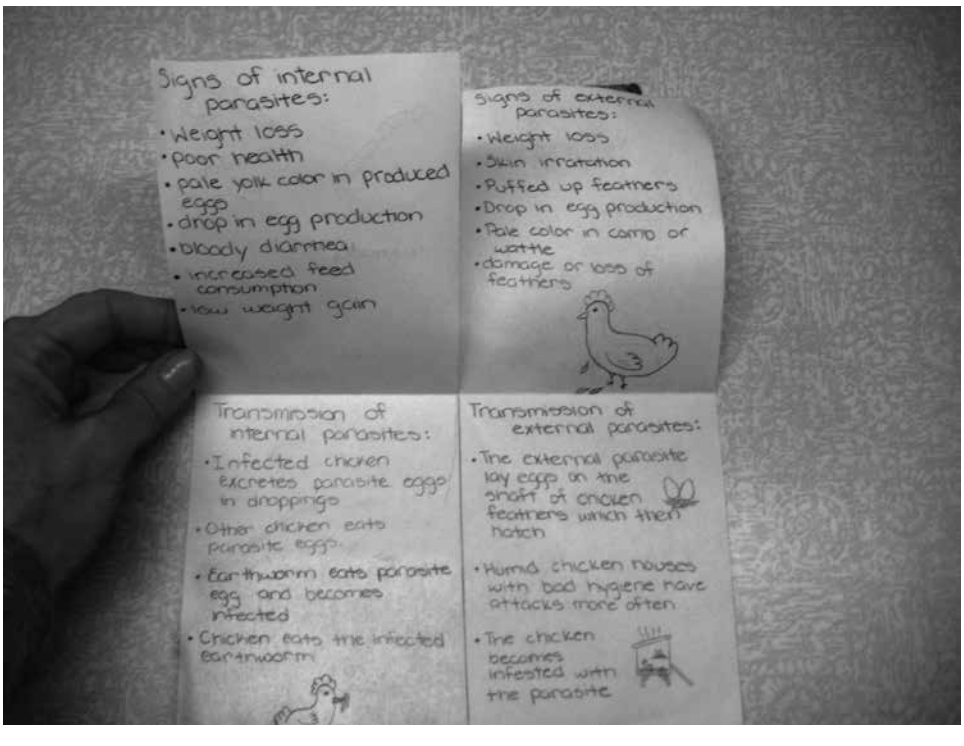
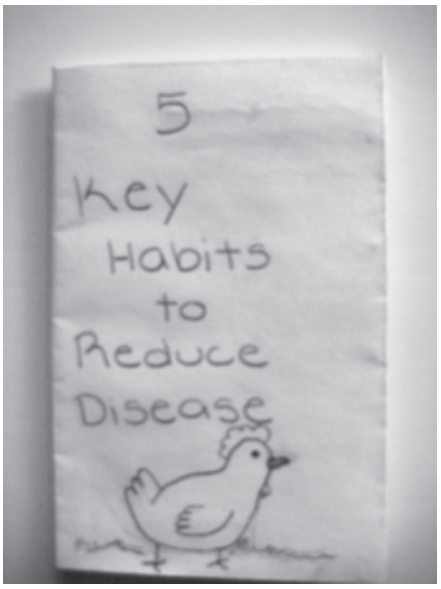


Inside

Lesson 10: *Foldable Booklet on Disease and Parasite Prevention*



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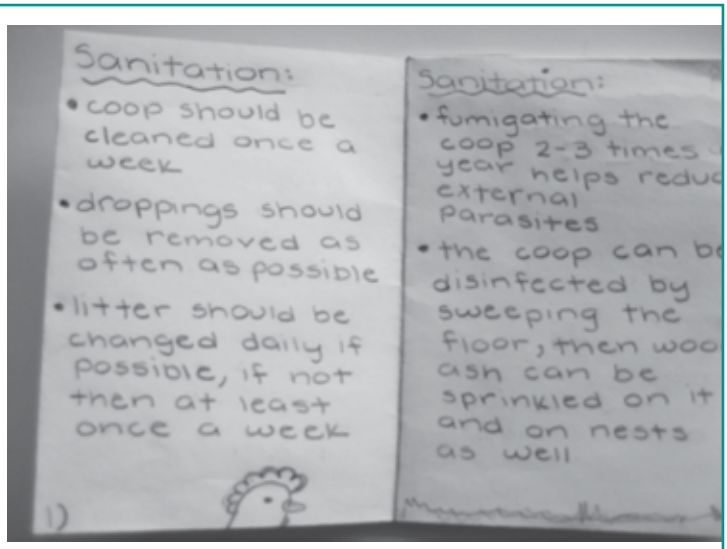
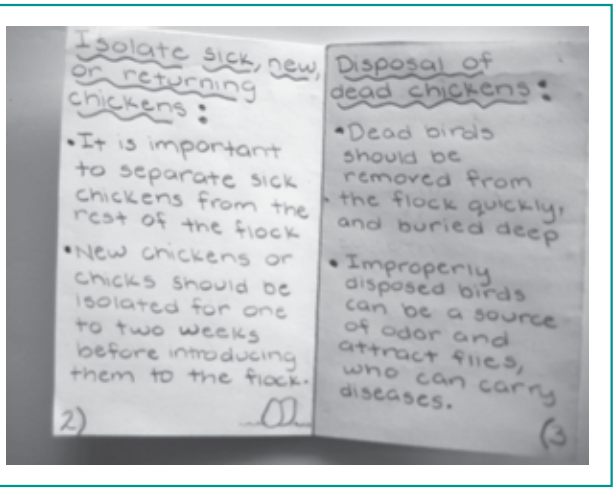
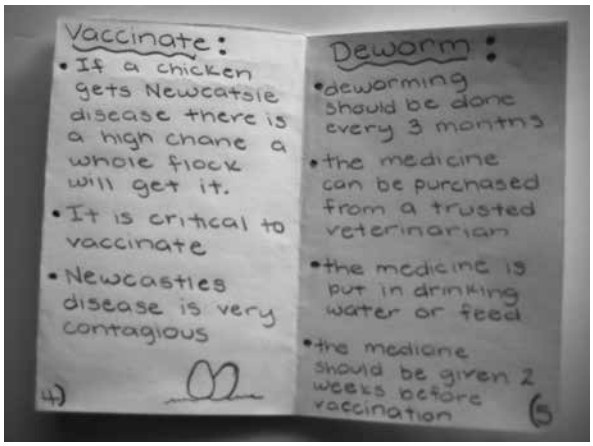


Inside Pages 1 & 2

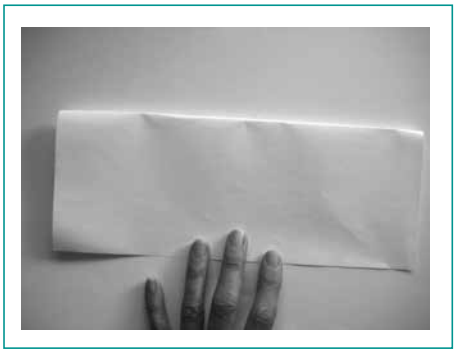


Inside Pages 3 & 4



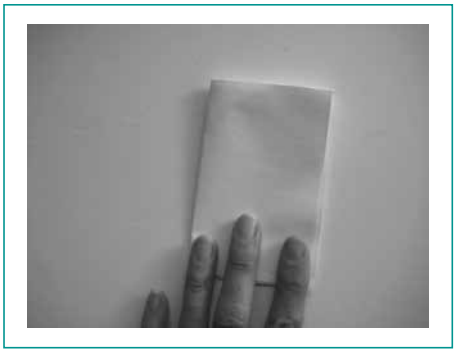
Inside Pages 5 & 6

HOW TO FOLD PAPER TO MAKE BOOKLET:

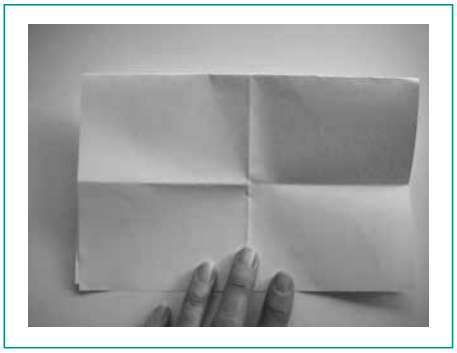


1-Fold paper in half length wise

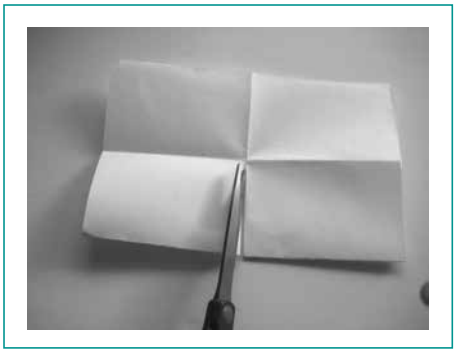
2-Fold paper in half again



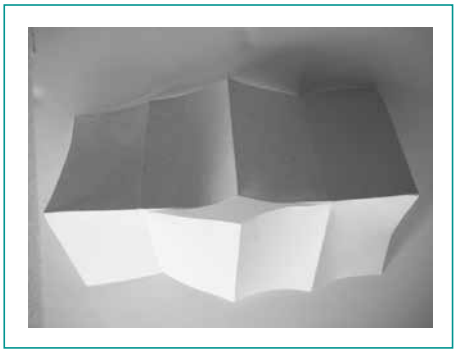
3-Fold paper in half once more



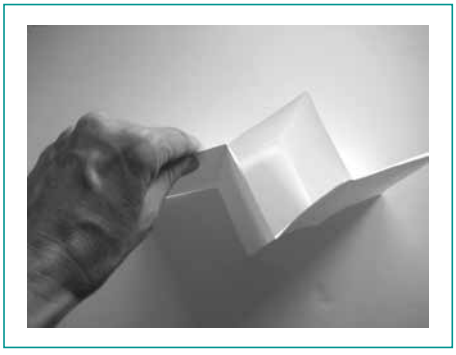
4-Open paper, and fold in half width wise



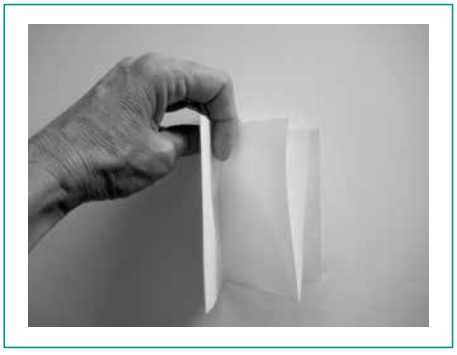
5-Cut or gently tear along the line of the first box only



6-Open paper and refold again lengthwise

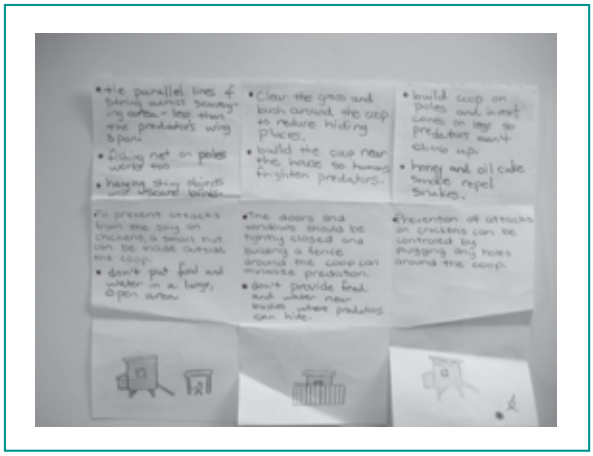


7-Holding the edges of each side of the folded paper, push both sides towards each other

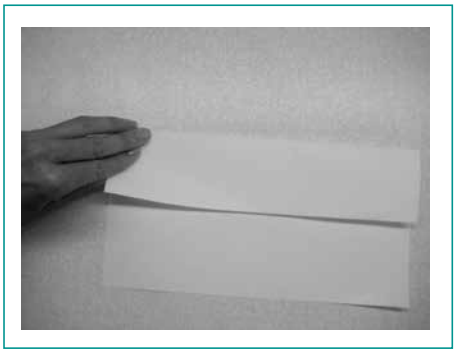


8-Crease the edges to create a mini-booklet

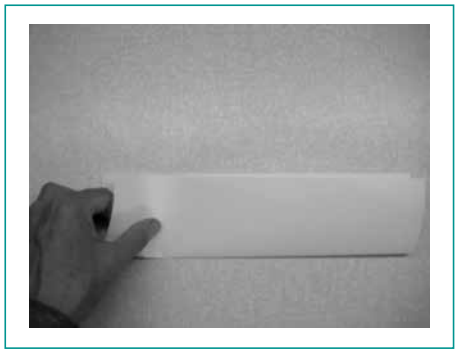
Lesson 11: *Fold-up Booklet on Predation*



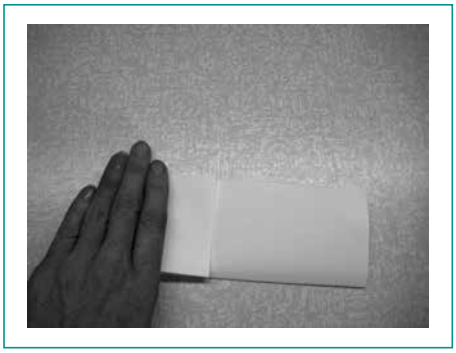
HOW TO FOLD PAPER TO MAKE BOOKLET ON PREDATION:



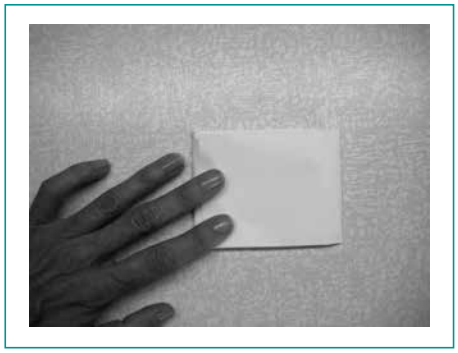
1 – fold the top 1/3 of the paper down.



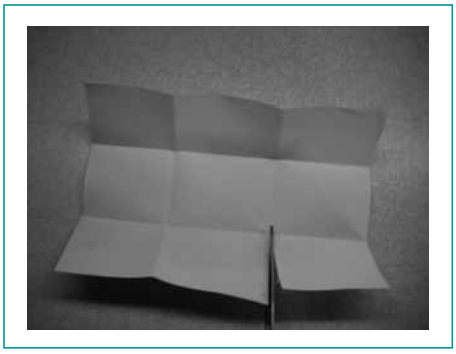
2 – fold the bottom 1/3 of the paper up



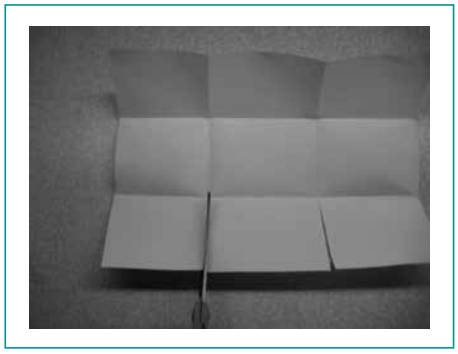
3 – fold the left 1/3 of the paper over.



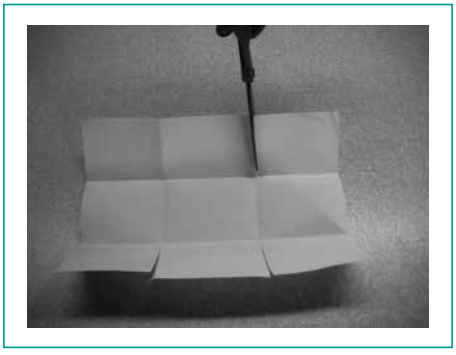
4 – fold the right 1/3 of the paper over.



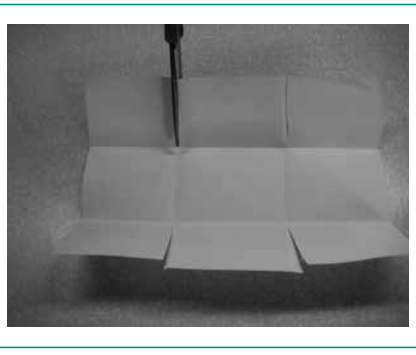
5 – Open the paper up and cut along the 4 lines



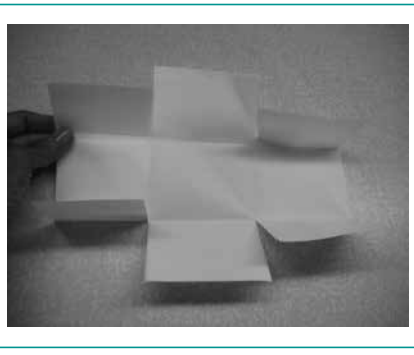
6 – Cut again



7 – Cut once more

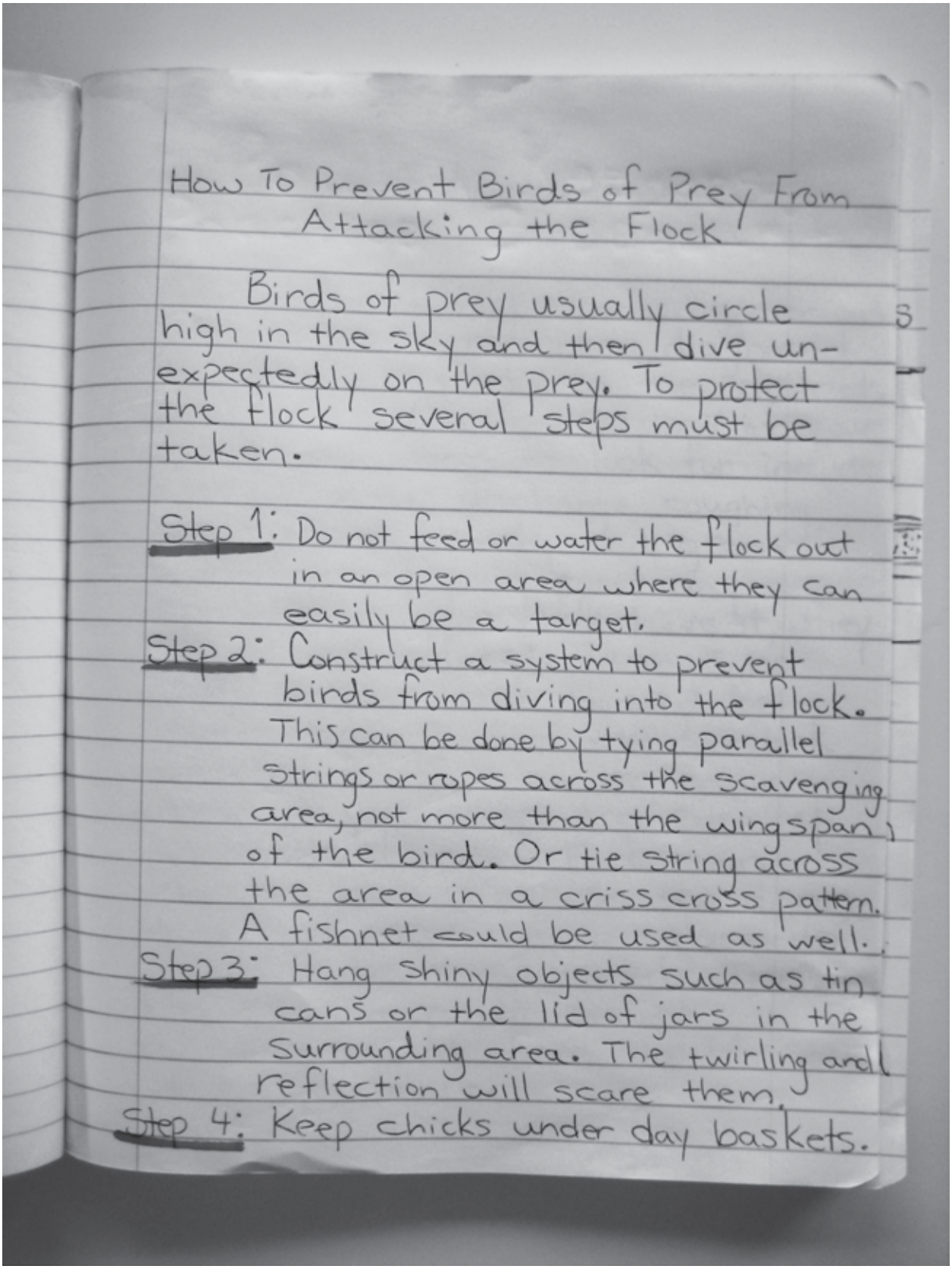


8 –Final cut



9 –Final

Lesson 11: *"How To Stop Predation" witing sample*



How To Prevent Birds of Prey From Attacking the Flock

Birds of prey usually circle high in the sky and then dive unexpectedly on the prey. To protect the flock several steps must be taken.

Step 1: Do not feed or water the flock out in an open area where they can easily be a target.

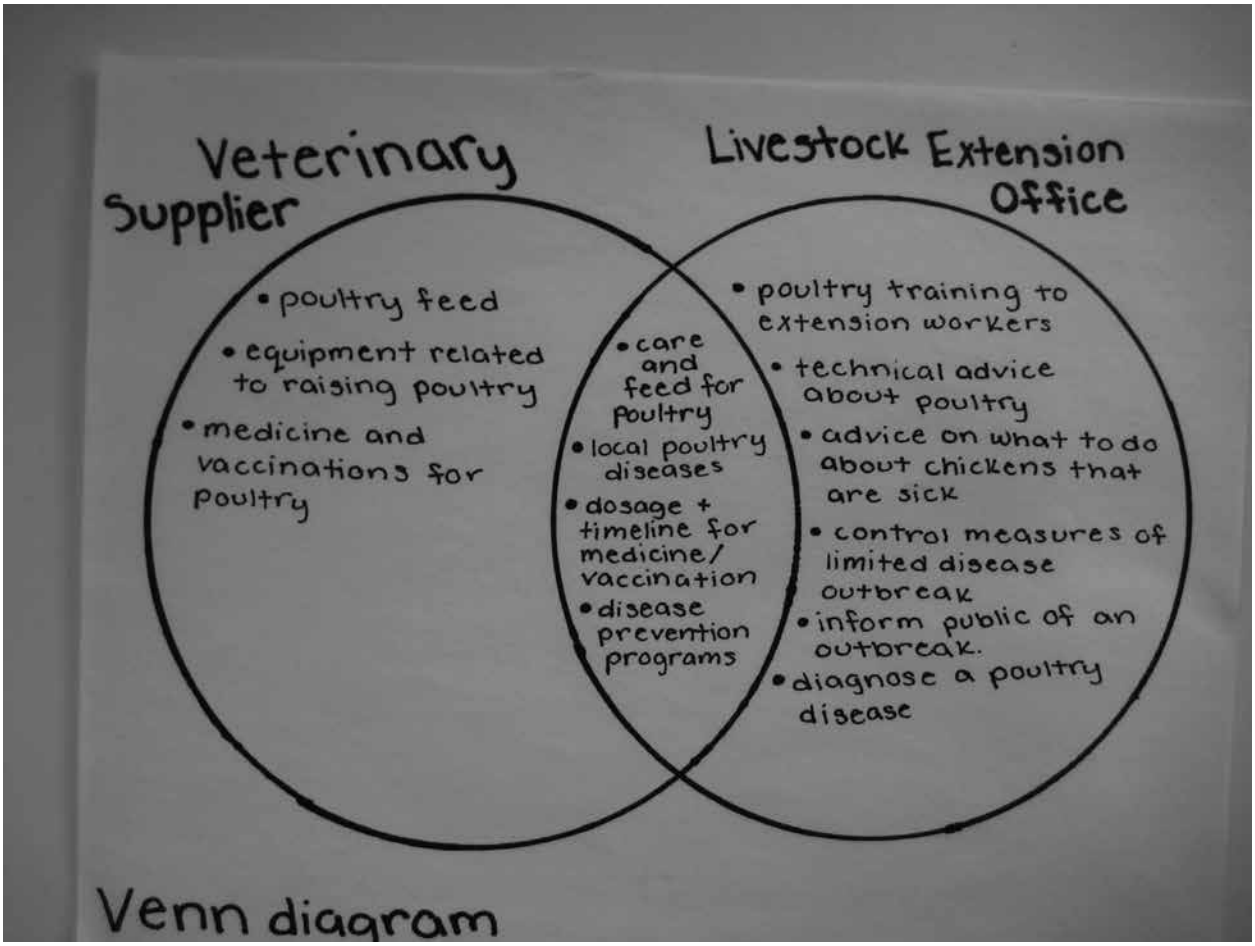
Step 2: Construct a system to prevent birds from diving into the flock. This can be done by tying parallel strings or ropes across the scavenging area, not more than the wingspan of the bird. Or tie string across the area in a criss cross pattern. A fishnet could be used as well.

Step 3: Hang shiny objects such as tin cans or the lid of jars in the surrounding area. The twirling and reflection will scare them.

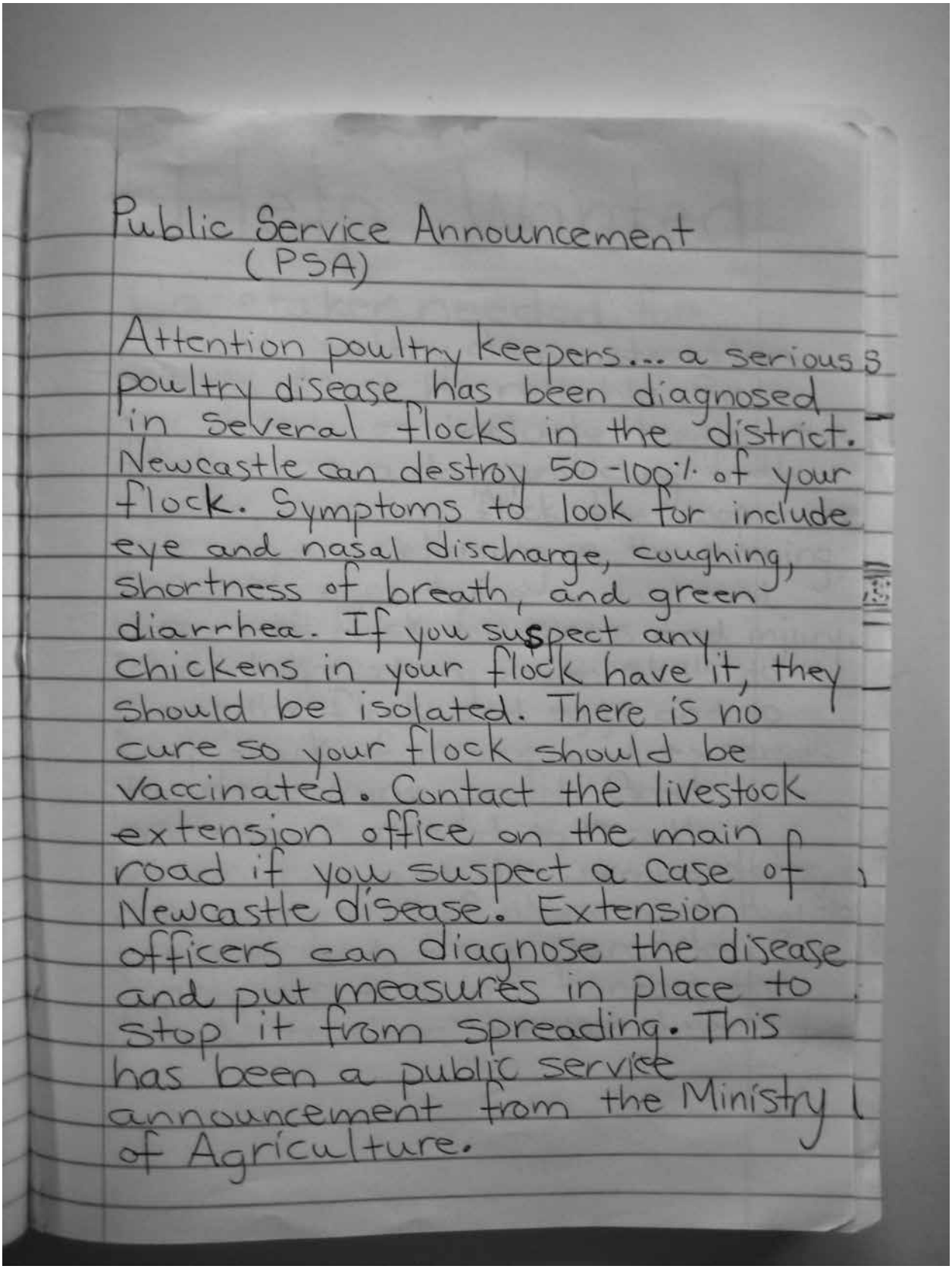
Step 4: Keep chicks under day baskets.

LEARNING POINT 5 - CONNECTION TO TRUSTED VETERINARY RESOUCES

Lesson 12: *Venn Diagram – Veterinary Supplier versus Livestock Extension Officer*



Lesson 12: *Public Service Announcement*

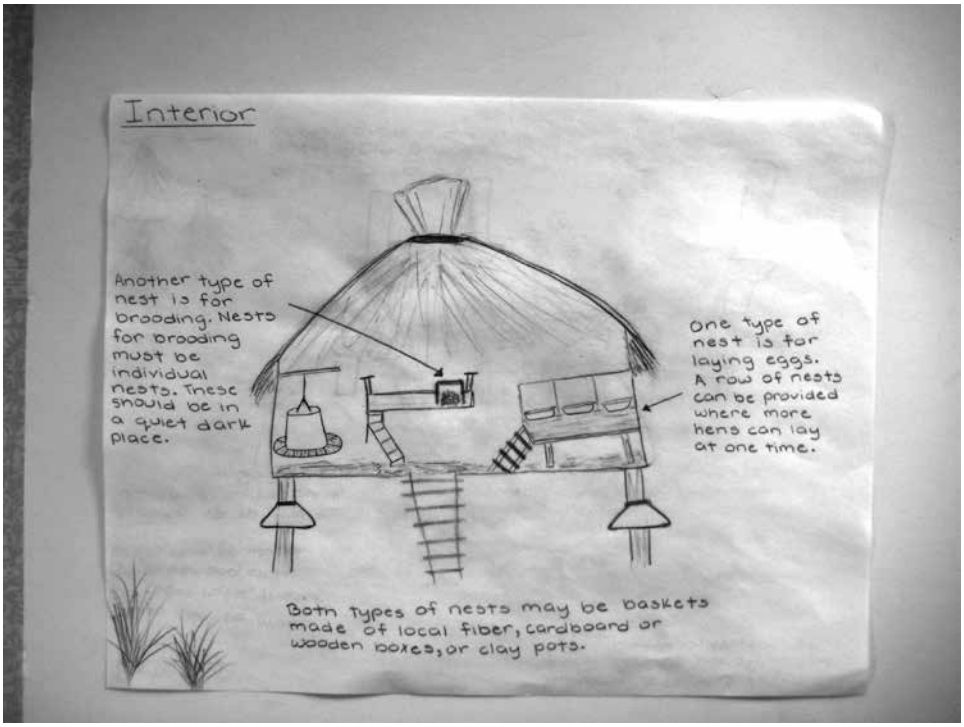


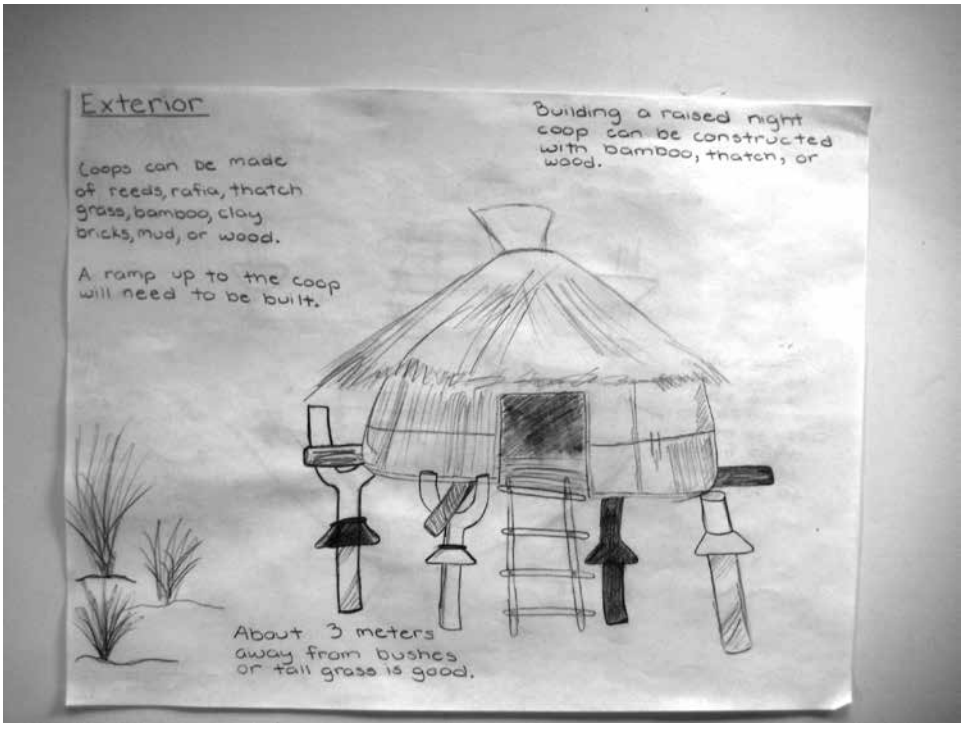
Public Service Announcement
(PSA)

Attention poultry keepers... a serious poultry disease has been diagnosed in several flocks in the district. Newcastle can destroy 50-100% of your flock. Symptoms to look for include eye and nasal discharge, coughing, shortness of breath, and green diarrhea. If you suspect any chickens in your flock have it, they should be isolated. There is no cure so your flock should be vaccinated. Contact the livestock extension office on the main road if you suspect a case of Newcastle disease. Extension officers can diagnose the disease and put measures in place to stop it from spreading. This has been a public service announcement from the Ministry of Agriculture.

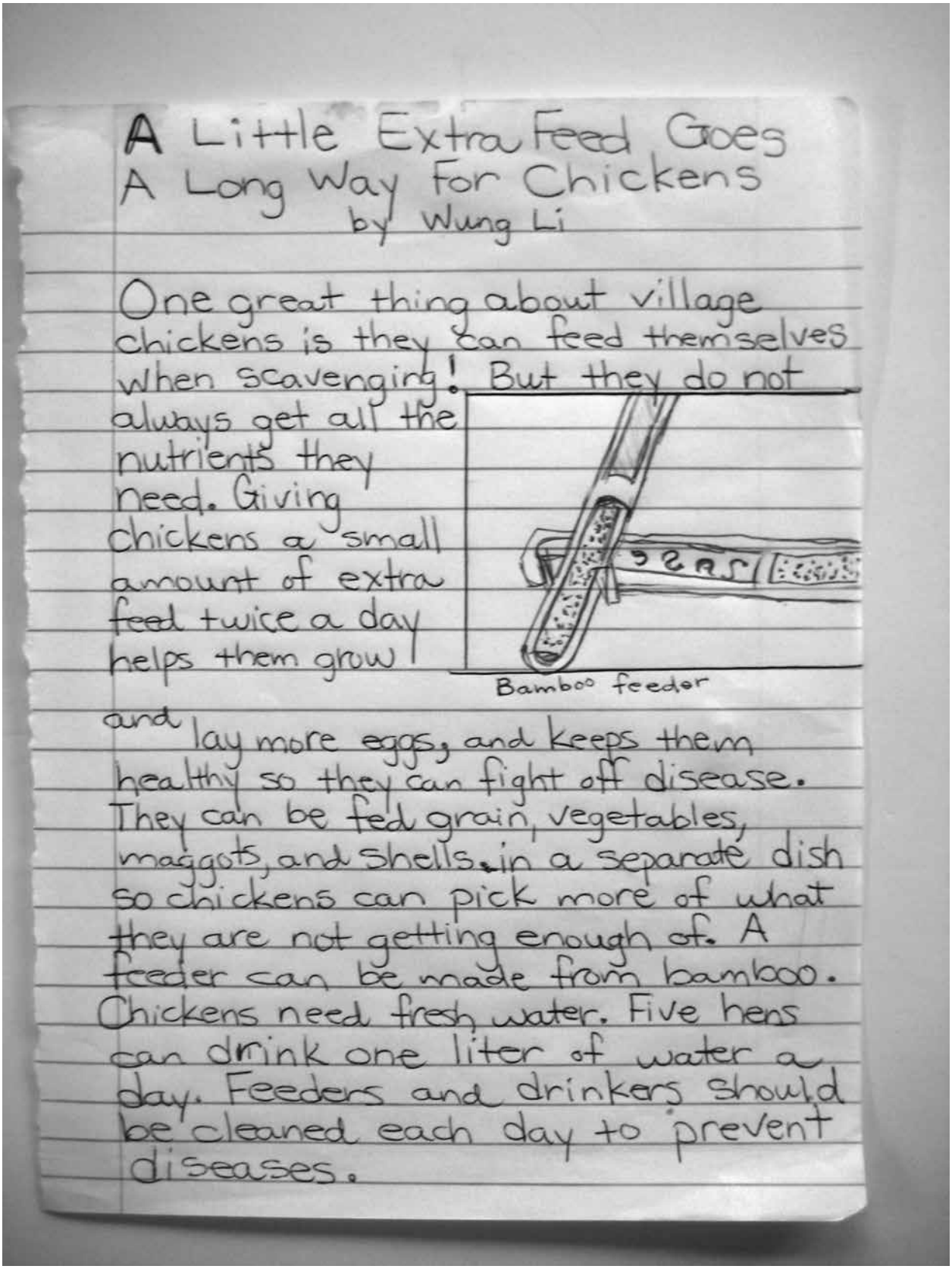
LEARNING POINT 6 - CAREFULLY MANAGING THE FLOCK

Lesson 13: *Coop Diagram*





Lesson 14: *Magazine Article*



A Little Extra Feed Goes A Long Way For Chickens

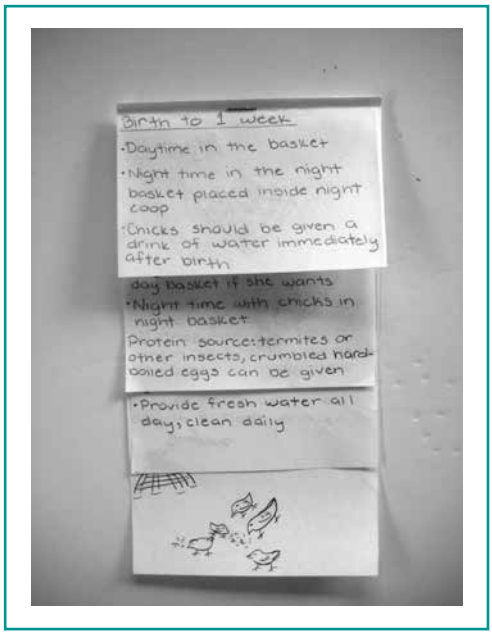
by Wung Li

One great thing about village chickens is they can feed themselves when scavenging! But they do not always get all the nutrients they need. Giving chickens a small amount of extra feed twice a day helps them grow and lay more eggs, and keeps them healthy so they can fight off disease. They can be fed grain, vegetables, maggots, and shells in a separate dish so chickens can pick more of what they are not getting enough of. A feeder can be made from bamboo. Chickens need fresh water. Five hens can drink one liter of water a day. Feeders and drinkers should be cleaned each day to prevent diseases.

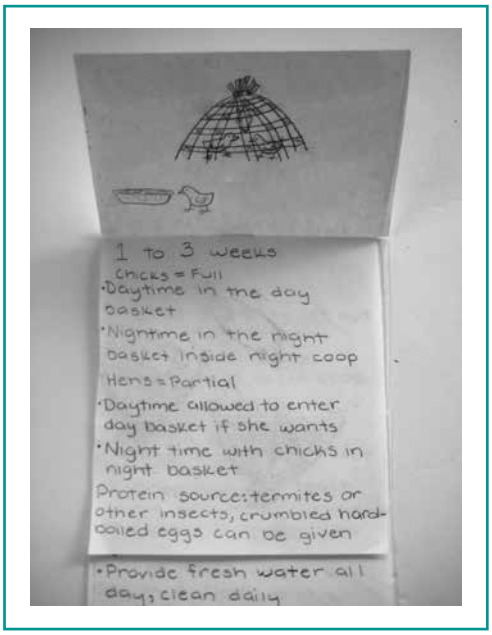
Bamboo feeder

LEARNING POINT 7 - SPECIAL CARE FOR CHICKS AND EGGS IS IMPORTANT

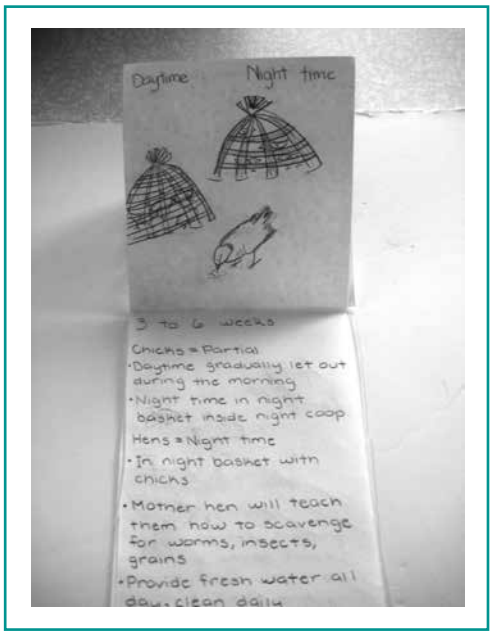
Lesson 16: *Chick Management - Basket System Flip Book*



Birth - 1 Week Old



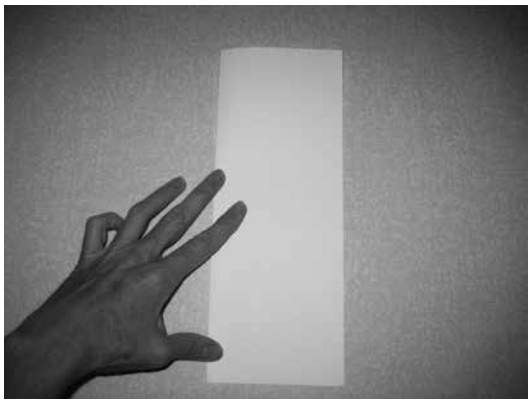
1 - 3 Weeks Old



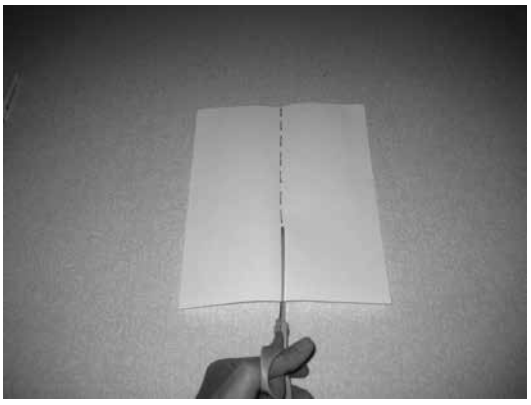
3 - 6 Weeks Old

After 6 Weeks Old

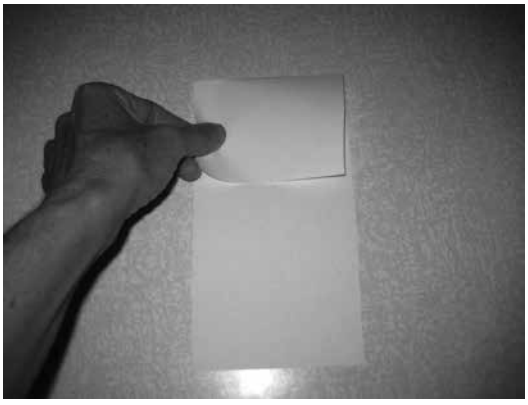
HOW TO MAKE BASKET BOOKLET:



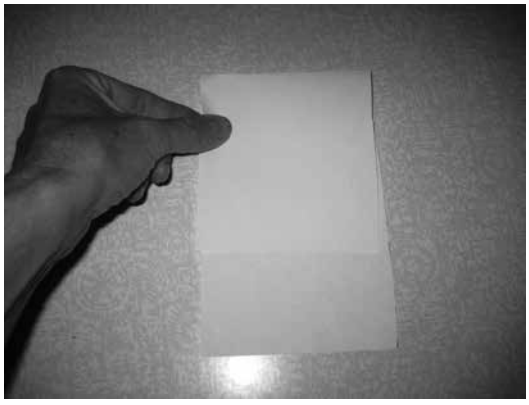
1-fold the paper in half length-wise.



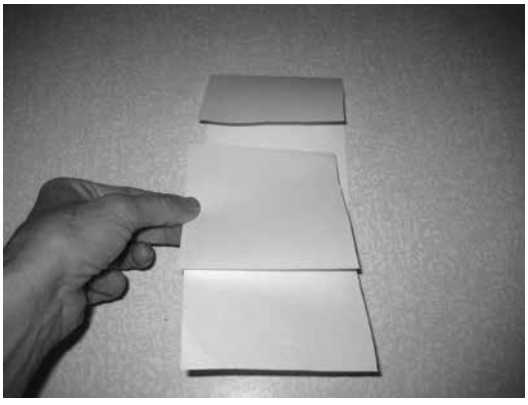
2-cut or tear the paper in half.



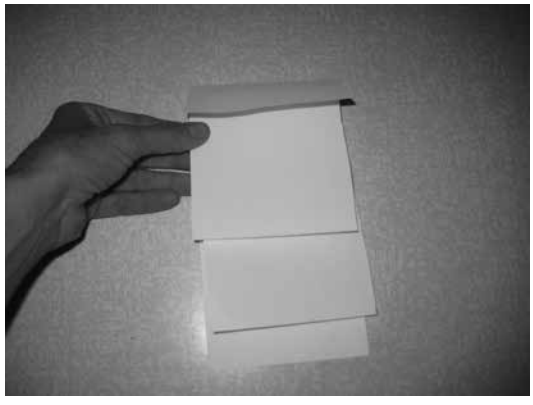
3-fold the top 1/3 of the paper down.



4-fold the top 2/3 of the other paper down.



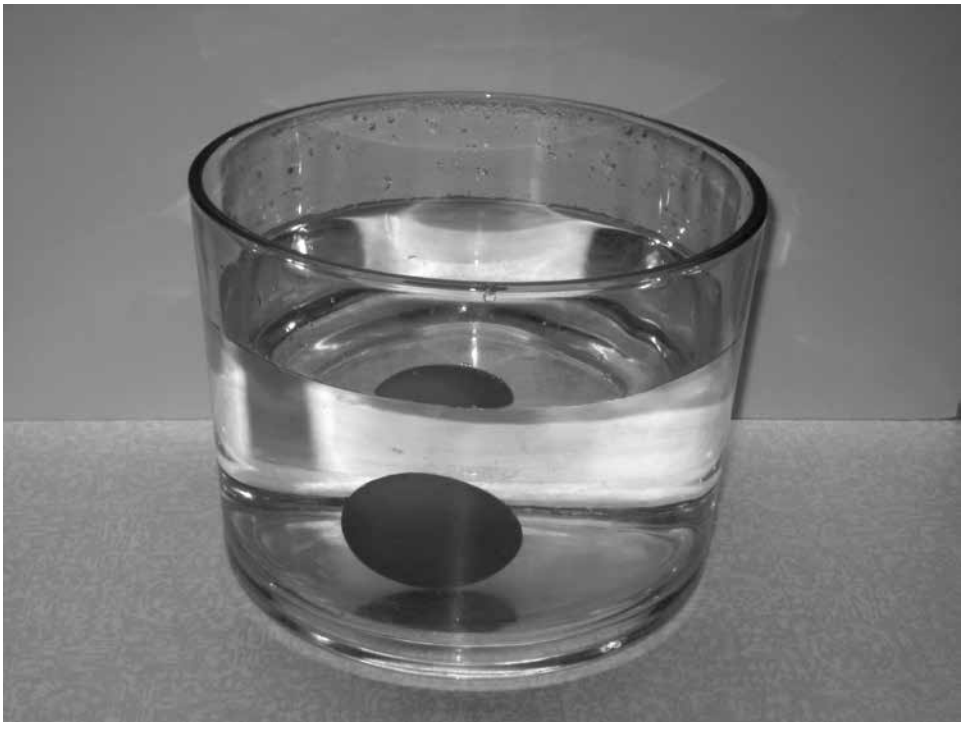
5-insert the paper that was folded 2/3 down into the fold of the other paper.



6-tape or glue along the top edge if possible.

Lesson 17: *Candling and Fresh Egg Test*

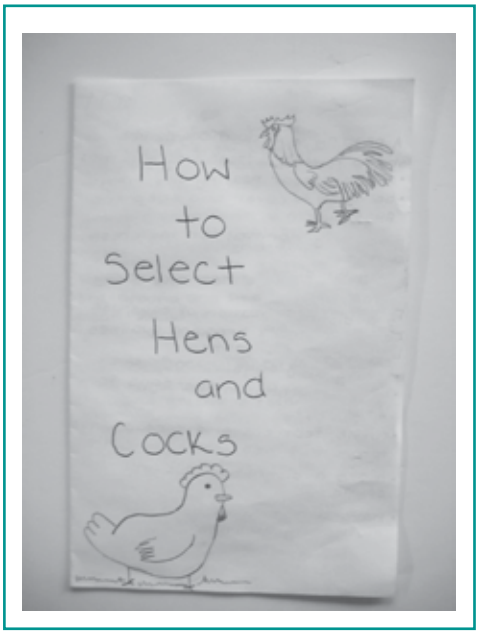
Candle the egg by gently holding it in front of a bright light inside a dark room or box. A fertile egg will have a dark spot which is the embryo, and visible blood vessels.



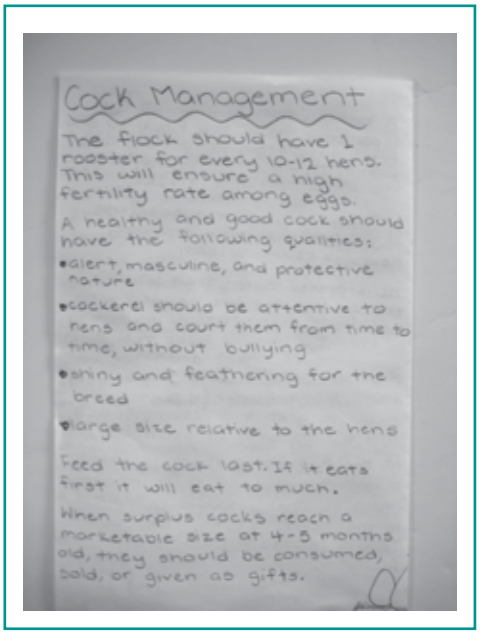
To see if an egg has is good gently place the eggs in water. Good eggs will stay at the bottom of the water. These eggs should be eaten within 5-7 days. Bad eggs will float because the air sack in the egg gets larger as the egg gets older.

LEARNING POINT 18 - CAREFUL SELECTION OF HENS AND COCKS IMPROVES FLOCK

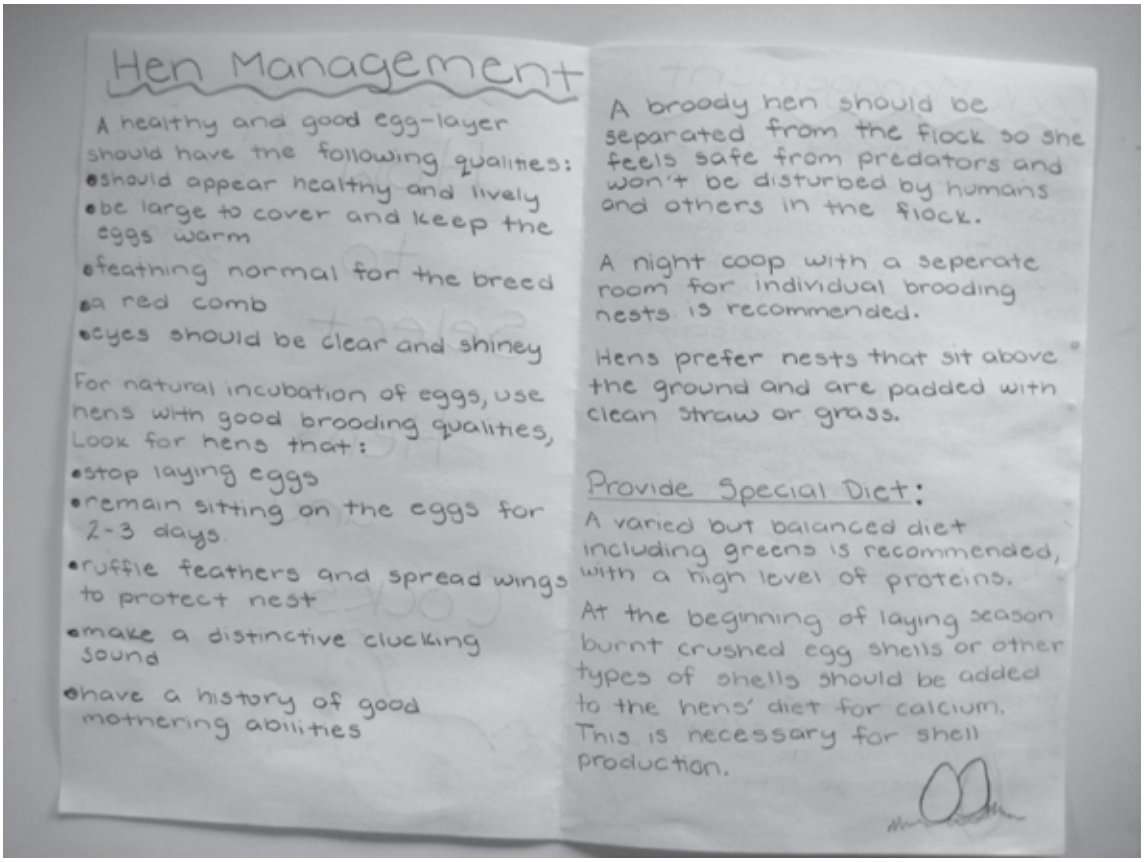
Lesson 18: *Booklet – Hen and Cock Selection and Management*



Front Cover

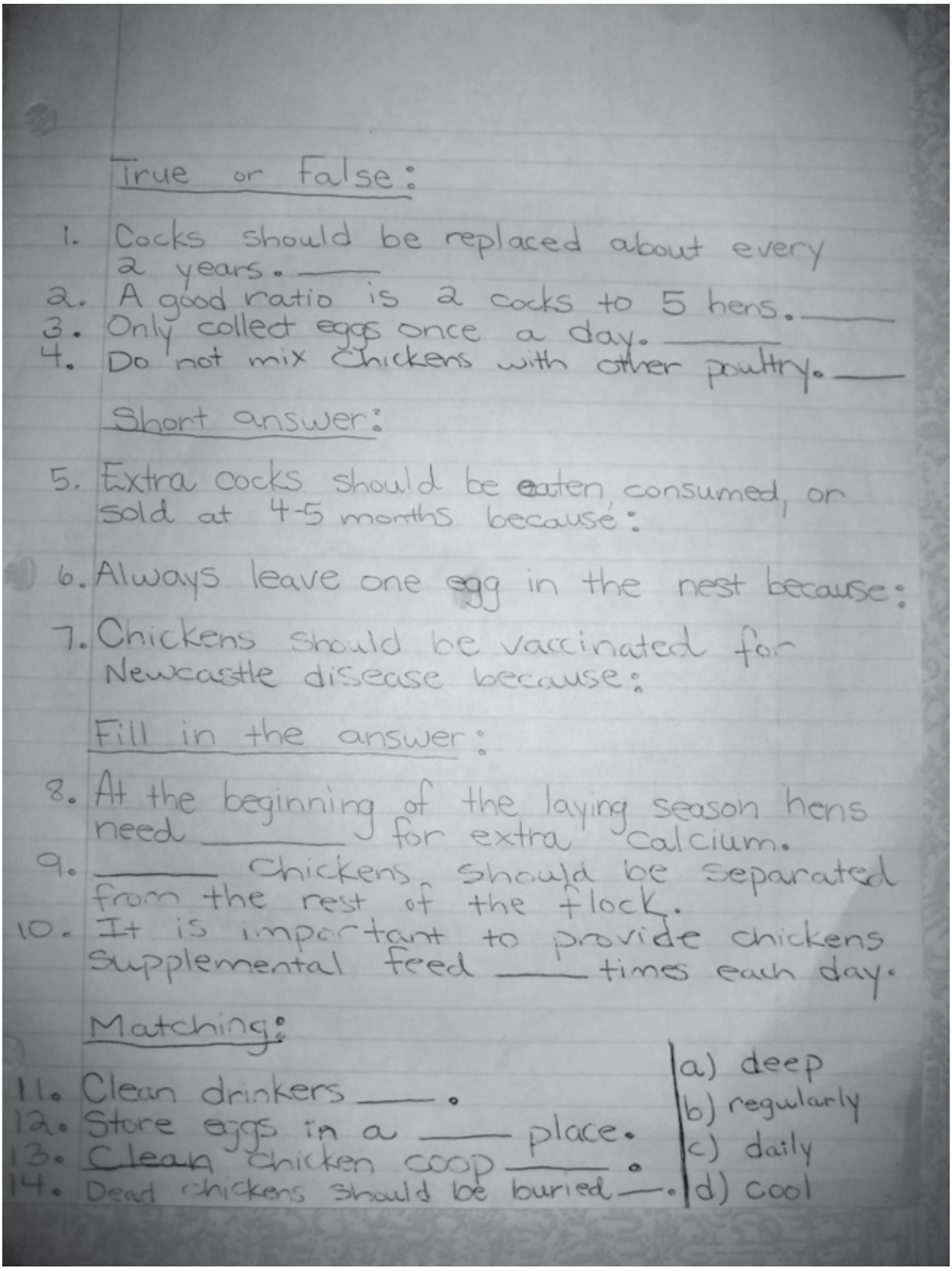


Back Cover



Interior

Lesson 20: *Student Created Quiz*



True or False:

1. Cocks should be replaced about every 2 years. ____
2. A good ratio is 2 cocks to 5 hens. ____
3. Only collect eggs once a day. ____
4. Do not mix chickens with other poultry. ____

Short answer:

5. Extra cocks should be eaten, consumed, or sold at 4-5 months because:
6. Always leave one egg in the nest because:
7. Chickens should be vaccinated for Newcastle disease because:

Fill in the answer:

8. At the beginning of the laying season hens need _____ for extra calcium.
9. _____ chickens should be separated from the rest of the flock.
10. It is important to provide chickens supplemental feed ____ times each day.

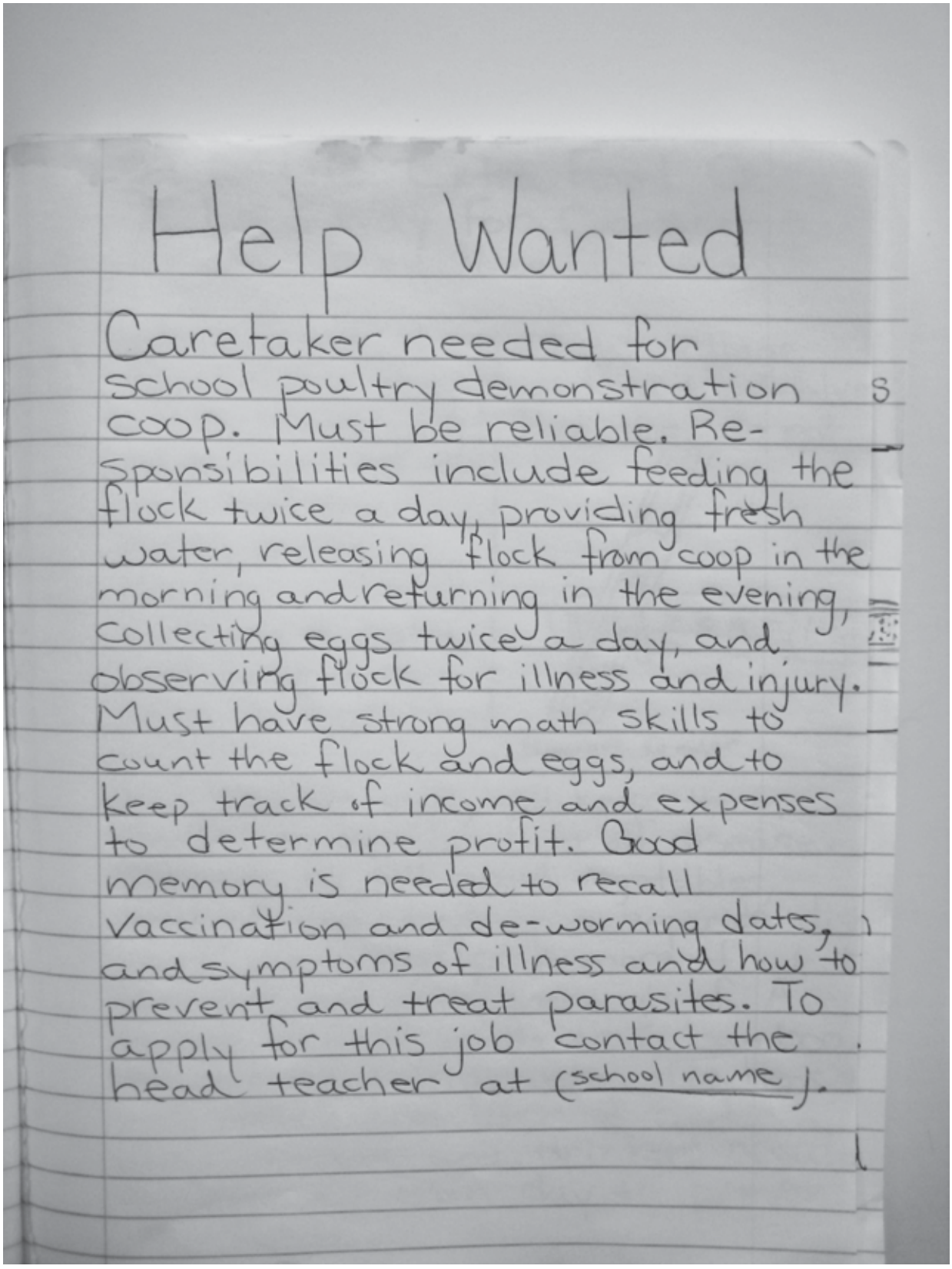
Matching:

11. Clean drinkers ____.
12. Store eggs in a ____ place.
13. Clean chicken coop ____.
14. Dead chickens should be buried ____.

a) deep
b) regularly
c) daily
d) cool

LEARNING POINT 9 - GETTING GOOD PRICES FOR CHICKENS AND EGGS

Lesson 21: *Help Wanted Advertisement*

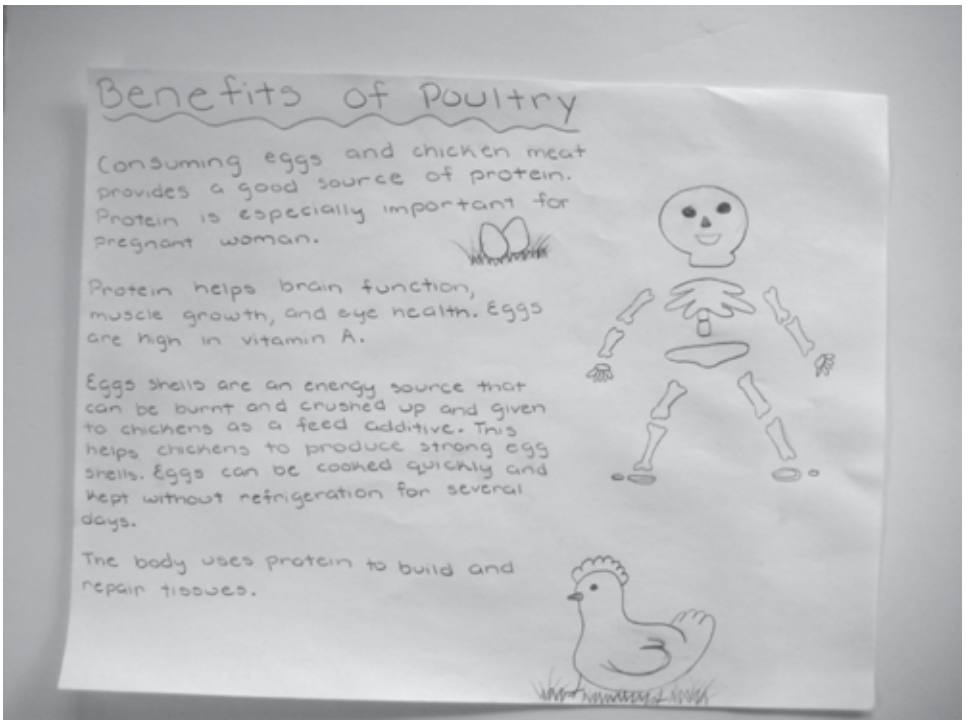


Help Wanted

Caretaker needed for school poultry demonstration coop. Must be reliable. Responsibilities include feeding the flock twice a day, providing fresh water, releasing flock from coop in the morning and returning in the evening, collecting eggs twice a day, and observing flock for illness and injury. Must have strong math skills to count the flock and eggs, and to keep track of income and expenses to determine profit. Good memory is needed to recall vaccination and de-worming dates, and symptoms of illness and how to prevent and treat parasites. To apply for this job contact the head teacher at (school name).

LEARNING POINT 10 - EATING CHICKENS AND EGGS ARE GOOD FOR FAMILYNUTRITION & HEALTH

Lesson 23: *Poster / flyer*



Appendix II

Writing Descriptions

WORD WEB (Lesson #4)

A word web is a visual map that gives structure to a paragraph or paper. It is a pre-writing tool students use to brainstorm their thoughts about a topic.

To create a Word Web:

1. Write a topic on the center of piece of paper and circle it. Everything in the paper/paragraph will have a connection to this word.
2. Draw a few lines leading away from the circle. At the end of the lines write one or two words which summarize the central word. For example, if writing a paper about cats, write the word "cat" in the center of the paper and circle it. At the end of the lines leading away from the central word write major ideas people would need to know about cats like: eat, sleep, live and reproduce.
3. Under each of those categories, write facts, words or phrases related to each major idea. Each word or phrase will become a sentence in the paragraph for that major idea.

VENN DIAGRAM (Lessons #5 and #13)

A Venn Diagram is a tool to organize information when comparing 2 or more topics by identifying similarities and differences between them. Overlapping circles are used to visually represent the similarities and differences. The parts of the circles that are not overlapping list the differences between the topics. The part of the circles that do overlap list what is similar about the topics.

To create a Venn Diagram:

1. Draw 2 circles that overlap.
2. Above each circle, write one of the topics.
3. Above the overlapping part of the circles write "similarities".
4. Fill in each circle with information that is specific to each topic.
5. Fill in the overlapping part of the circles with information/facts they both have in common.
6. Use the Venn Diagram to write a comparison paper or paragraph about how the 2 topics are similar and how they are different.

PERSUASIVE LETTER (LESSON #5)

Persuasive writing uses words to convince the reader that the writer's opinion is correct in regards to a topic or issue. Persuasive writing sometimes involves convincing the reader to do something.

A well-written persuasive piece is supported with a series of facts which help the author argue his or her point. In addition to facts, authors may include stories and hypothetical situations to build a stronger case.

BROCHURE (LESSON #8)

A brochure is an informational piece of writing that is folded into a pamphlet. Brochures are used to inform people about a topic, organization, product, or a service.

FACT SHEET (LESSON #9)

A fact sheet is a one-sheet paper giving useful information about a topic in a format which highlights key points. The layout is simple, easy to read, and often uses bullet points.

FOLDABLE/PANEL/FLIP BOOKLETS (LESSONS #10, #11, #17, #19)

Foldables are a different way of organizing information. You could have students just take notes but they might lose interest fast. Foldables are pieces of paper that are folded in different ways, and information is

written on. It's a good way for students to put together what they know in a creative way. It makes a great review for a test.

Students use their notes and books to put together everything that's important on a topic in a creative booklet. Tell students - the more effort they put on to making their foldable, the more prepared they will be for their test.

"HOW TO" (LESSON #11)

How To writing explains to the reader by giving specific directions on how to do something. It is often written in steps, or by using sequencing words such as first, next, after, then, and finally. The writing is so clear that the reader can follow along and complete the task.

PUBLIC SERVICE ANNOUNCEMENT (LESSON #13)

Public service announcements, or PSA's, are short messages that provide the community with beneficial information. They are usually presented over the radio to reach large audiences. However with cell phones in high usage, PSAs are also transmitted via SMS. PSAs tend to be really good at encouraging the audience to do something -- for example, stop smoking or drinking, use condoms, or don't drink and drive. PSAs can raise awareness of your issue. They are not an advertisement to sell something.

MAGAZINE ARTICLE (LESSON #15)

An article is a written work published in a magazine that relates to the subject of the article. It may be written for spreading research results, academic analysis, debate, or news. It informs people who have an interest in the subject.

HELP WANTED ADVERTISEMENT (LESSON #21)

A help wanted advertisement is a posting in a local newspaper that informs the public you have a job vacancy. The advertisement should include: the name of the company, the type of job, what the duties are, what skills & qualifications are necessary, and who to contact.

POSTER/FLYER (LESSON #23)

Posters and flyers are printed sheets meant to be posted in a public place. Posters tend to be fairly large and professionally printed, and almost always feature an illustration, while flyers (also known as mini posters) are usually 8 ½" x 11" or so, might be simply photocopied or e-mailed, and often rely solely on words to get their point across. Posters and flyers are usually informational in nature. They can also be used to encourage positive behaviors or draw people to an event.

Appendix III

Forms

FLOCK CARD

NAME OF THE POULTRY FARMER:- MR./MS.
NAME OF THE FAMILY HEAD:- MR./MS.
NO. OF ADULTS IN HOUSEHOLD (ABOVE 18 YEARS):-
NO. OF CHILDREN (BELOW 18 YEARS):-
VILLAGE:-

WARD:-
ADDRESS:-

CONTACT PHONE NO:-
VILLAGE FACILITATOR:-MR/.MS.
NAME OF THE CAHW:-MR./MS.

1. VACCINATION & DEWORMING RECORD

Date	Name of Newcastle Vaccine	Dewormer Used	No. of Chicks	No.Of Adult birds	Total Cost	Service Provider

Comments

2. SUPPLEMENTARY FEED GIVEN

Date	No. of Birds 	Type of Feed-paddy/ millet/ corn/ commercial/ others	Quantity (in Kg)	Home grown (in Kg)	Purchased from Market (in Kg)	Total Estimated cost

Comments

2. SUPPLEMENTARY FEED GIVEN

Date	Opening Balance		New Purchase			Hatched	Sold			Consumed			Mortality		Theft, Lost, Spoiled			Closing balance			
	No.		Cost	No.		No.	No.			No.			No.		No.			No.			
			$						$												$

Comments/Notes/Symptoms

4. CHICKS HATCHED

Date	No. of Eggs Kept for Hatching 	Chicks Hatched 	No. of Spoiled Eggs 

5. EGGS PRODUCED

Weekly Record	Produced								Consumed								Sold								Eggs Spoilt	Eggs Kept for Hatching
	M	T	W	T	F	S	S	Total	M	T	W	T	F	S	S	Total	M	T	W	T	F	S	S	Total		

FLOCK EXPENSES		
Material	*Quantity*	*Cost*
Baskets		
Nests		
Feeders		
Drinkers		
Feed		
Medicine		
Vaccinations		
Deworming		
Other materials:		
	Total Expenses:	

DISEASE PREVENTION RECORDS				
Newcastle Disease				
Date Of Vaccination	*Number of Chickens Vaccinated*	*Name of Vaccination*	*Total Cost*	*Service Provider*
Deworming				
Date Of Vaccination	*Number of Chickens Vaccinated*	*Name of Vaccination*	*Total Cost*	*Service Provider*

DISEASE PREVENTION RECORDS					
	Eggs Laid	*Eggs Consumed or Sold*	*Eggs Incubated*	*Eggs Hatched*	*Total in Clutch*
Hen A 					
Brooding Dates:					
Brooding Dates:					
Brooding Dates:					
Brooding Dates:					
Hen B 					
Brooding Dates:					
Brooding Dates:					
Brooding Dates:					
Brooding Dates:					
Hen C 					
Brooding Dates:					
Brooding Dates:					
Brooding Dates:					
Brooding Dates:					

HEIFER
PROJECT NEPAL

Hattiban, Lalitpur - 15
P.O. Box: 6043, Kathmandu, Nepal
Tel: 977-1-5250554/5250841
Fax: 977-1-5250873
E-mail: heifer.nepal@heifer.org
Website: heifernepal.org

Heifer Project Nepal (HPN) is a non-profit, sister organization of Heifer International Nepal. Since its establishment in 1993, HPN has been striving to alleviate hunger and poverty, increase knowledge and skills, and bring about ecological restoration in partnership with other people, associations and institutions. HPN is currently active in 3 districts and has worked with donor agencies such as Global Alliance for Livestock Veterinary Medicine, Harvard Nutrition Innovation Lab, Tufts University, Tech Outreach, Heifer International etc.

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Feed the Future Innovation Lab
COLLABORATIVE RESEARCH { Adapting livestock systems to CLIMATE CHANGE }

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