

BC 4-H POULTRY MEMBER'S MANUAL

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INTRODUCTION

How To Use This Manual

This manual is for new 4-H poultry members to learn about how to care for and raise their project(s). When we talk about poultry, we are referring to all the birds we raise for meat or eggs. These birds include chickens, turkeys, ducks, geese, quail, pigeons, guinea fowl, partridge and pheasants. During this project, we will be talking mostly about chickens but most of the information is similar for all poultry. There are some sections that only apply to certain units and others that will be beneficial for a poultry member no matter what unit you have decided to complete. Ask your leader which section would be most relevant to your project. For a complete list of units consult the poultry regulations, BC 4-H Publication #1100.

If you find that there are **bold** words that you are unfamiliar with there is a glossary located at the back of this manual. There may be some words that you do not know that are not in the back of this manual – a good dictionary should help you out in this case!

This manual provides good basic information. You will find that there are some situations and skills that are not covered. You will have to find out more about poultry from other sources – such as the BC Chicken Marketing Board, BC Egg Producers (Marketing Board), BC Turkey Marketing Board, books, the internet (including www.infobasket.gov.bc.ca), members of the community, senior 4-H members, and of course your 4-H Leader.

The 4-H Poultry Project

Learning about poultry can be fun and rewarding. This is not just a project about taking care of an animal. You will be in control of this project and you will be making all of the important decisions. The success of your project depends on you.

The 4-H poultry project is organized to provide experience for young people in the selection, feeding, husbandry, and exhibiting of poultry. Handling a live animal, watching it grow for several months and exhibiting the animal has value far beyond the monetary gain which is possible from the project. This fact should be kept in mind by the 4-H Club Member at all times.

The type of poultry project you select is up to you. Although this manual is mainly about chickens, you may also raise ducks, geese or turkeys. 4-H poultry projects range in length from 4 to 12 months depending on the objectives of the unit. Review the BC 4-H Poultry Project Regulations (publication #1100) and discuss unit options with the 4-H Club Leader when selecting units at enrolment time.

New or inexperienced members are encouraged to begin the 4-H Poultry project with one of the following units:

- Beginning Poultry Husbandry or Showman
- Poultry Raising – Layer
- Poultry Raising – Meat
- Waterfowl

As members develop they are encouraged to challenge themselves by trying one of the more advanced units such as:

- Hatchery
- Layer Production
- Meat Production
- Market Bird
- Layer Bird

Senior 4-H members with extensive poultry experience are encouraged to try a Senior Management project.

The animal must be the property of you the member or your parent or if by other arrangement, using the 4-H Livestock Lease, 4-H Publication #140(E).

Remember your club leader is a good source of advice when considering a project. Other members of the community are usually quick to help a 4-H member with questions they may have. These are great sources of information when you are trying to select your project animal. Who knows – perhaps in the years to come, other new members will be coming to you for help with choosing their animal.

To complete a 4-H Poultry Project, you must:

- Complete a record book for each project
- Exhibit your project at Achievement Day (advanced skill projects may have other arrangements)
- Have fun!

Record Keeping

Record keeping is a very important part of 4-H project work. Records should be kept accurately, neatly, and continuously. Record keeping disciplines a person and provides valuable information for anyone to take pride in his or her efforts. Record keeping is becoming increasingly important to the farm operator today and a thorough understanding of the basic fundamentals will be a tremendous asset in the future.

Record books are available from the BC 4-H Publications Order Form. Ask your leader about obtaining a copy each year for each project. If properly completed, your record book will tell the complete story of your project, from the time it was born or purchased until the end of the project. A completed record book is necessary for 4-H Achievement.

Livestock Care

4-H members are responsible for providing the highest quality of care for their 4-H livestock project(s). This can be achieved by ensuring that the “Five Freedoms” of farm animal care are being provided.

Five Freedoms

1. *Freedom from Hunger and Thirst* – provide access to fresh water and adequate feed.
2. *Freedom from Discomfort* – provide appropriate shelter from the elements and a comfortable resting area.
3. *Freedom from Pain, Injury or Disease* – take steps to prevent accidents and disease, monitor health, and provide rapid treatment when disease or injury is detected.
4. *Freedom to Express Normal Behaviour* – provide sufficient space and company of the animal's own kind.
5. *Freedom from Fear and Distress* – ensure conditions and treatment which do not alarm the animal.

A Poultry Project Summary

The following steps are typical of things to do to complete your project.

1. Plan your project.

Talk about what you want to do for your project this year with your parents, 4-H leader, or other knowledgeable person. Write your plan in your project record book.

2. Obtain one or more birds.

Choose guineas, chickens, ducks, turkeys, geese, pheasant, quail, pigeons, doves, or other poultry which are healthy. Select birds from a state blood tested pullorum-free hatchery or a clean flock of birds. If you prefer, you may work with birds from your own breeding flock. If you will breed the birds hatched from your breeding flock, have your breeding flock tested.

3. Care for the birds.

Take care of them for at least three months. Provide feed, water, housing, cleanliness, sanitation, health care and plenty of fresh air.

4. Keep records.

Write your plans and what you do with your birds in your record book. Include the kinds and numbers of your birds. Tell what you do to care for them and keep them healthy. Write down dates when you spend money and when important events happen. Record the amounts of money you spend and receive. Write down the kinds, amounts, and costs of feed and other items you use. Include grit fed, toys bought, and cage or housing changes.

5. Learn the right way to handle birds.

Prove that you can handle your bird properly. Do this for your parent, 4-H leader, or other person who knows how to handle birds. Show how to examine the bird's parts for molt, growth, health and reproductive condition.

6. Read about poultry.

Find books, pamphlets, magazines, or other references on the care of your species of poultry. Read, study, and learn from them. Follow practices mentioned in them.

7. Give a presentation.

Show or tell others about something you learned or did. Give a demonstration, illustrated talk, or oral report at a club meeting, presentation contest, or other event.

8. Exhibit your poultry or make a display.

Before the show learn to wash a bird in warm water containing a small amount of mild soap. Exhibit healthy, clean, and vaccinated birds, only. You may vaccinate the birds you show for Marek's Disease, Laryngotracheitis, Newcastle Disease, and Infections Bronchitis or Fowl Pox. Get advice on vaccination from a qualified person before you vaccinate. If you cannot exhibit a bird, you may exhibit a poster or display instead.

9. Write a story or report.

Tell about what happened and what you did with your project. If you like, you may include pictures of your birds.

10. Do three or more beginning, intermediate, or advanced level activities.

Choose from the activities which follow. If you were in this project last year or another year, try to do activities which you have not done before.

Activities for your Poultry Project

Beginning Level Activities (Years 1 and 2)

Do at least three of these activities per year. Put a check mark beside the ones you do.

- View an approved film to learn more about your kind of birds or poultry in general.
- Visit a business or person with poultry experience. Talk about what is done with poultry.
- Learn if and for what diseases you should vaccinate your birds. Get advice on vaccination from a qualified person before you vaccinate.
- Learn to recognize normal and abnormal behaviour in your kind of bird. Watch your bird or birds carefully for about an hour at three different times. Good times to watch are in the morning, at night, at feeding time, and when you handle them. Write down the kinds of behaviour you saw. Discuss what you saw with your parents, leader, or other club members.
- Show or describe how to prepare your bird for a show. Include the steps to follow and what you should do to groom, condition, and bathe it.
- Show or describe the correct way to pick up, handle, carry, and present your bird in a showmanship contest.
- Participate in a showmanship contest for your kind of bird.
- Name and identify the parts of your kind of bird on a live bird or picture.
- Name and learn to identify at least five ingredients in the feed of your bird. Examples are corn and soybean meal.
- Make a poster or display about something you learned about your kind of bird.
- Lead a game, song, or the 4-H Pledge at a 4-H meeting or event.

Intermediate Level Activities (Years 3 and 4)

Do at least three of these activities per year. Put a check mark beside the ones you do.

- Participate in one or more poultry judging clinics, workshops, practice sessions, or contests.
- Participate in an avian bowl practice session or contest.
- Participate in a poultry skill-a-thon.
- Make a poster or display about something you learned about your kind of bird.
- Find out how amount of living space affects a bird. Small birds need 4 square feet per bird. Large birds need 10 square feet per bird. Game birds need 30 square feet per bird. Write or present a report or make a poster or display about what you learn.
- Find out where and how your species or kind of bird was developed. Write a report about the life history of the species. Be sure to include what continent it came from and how selective breeding has developed it.
- Describe how and explain why to perform each of these types of surgery on birds:
 - Wing feather clipping
 - Beak trimming
 - Toe nail trimming
 - Spur trimming*

* Once each year in Pennsylvania, a male chicken with a spur on its leg attacks and injures a child. Be aware of this and prevent it.

- Breed one or more of your birds. Incubate and hatch the eggs. Brood the young birds that hatch.
- Make a diagram of the digestive system of your kind of bird. Explain how feed moves through it.
- Prepare a report, talk, demonstration, poster, or display about how to control external or internal parasites in birds.

- Prepare a report, talk, demonstration, poster, or display about poultry disease. Show or tell how to prevent or control it.
- Make a picture story, slide set, or videotape about a topic related to your kind of bird.
- Learn to identify at least six of the different species, breeds, or strains of poultry or game birds.
- Pick another topic about poultry that interests you. Prepare a report, talk, demonstration, poster or display about the project.

Advanced Level Activities (Years 5 and up)

Do at least three of these activities per year. Put a check mark beside the ones you do.

- Participate in one or more poultry judging clinics, workshops, practice sessions, or contests.
- Participate in an avian bowl practice session or contest.
- Participate in a poultry skill-a-thon.
- Participate in a poultry speech or demonstration contest.
- Choose a topic about poultry that interests you. Locate at least three references about that topic. Write a report about the topic. Also prepare a talk, demonstration, poster, or display about your topic.
- Breed one or more of your birds. Incubate the eggs and hatch and brood the chicks, ducklings, squabs or goslings from the mating.
- Learn to use a computer to keep records about your birds.
- List career opportunities in the poultry industry. Interview two people with different careers in the poultry industry to find out more about those careers.
- Teach a skill related to poultry to another 4-H member in your club.
- Help to organize a poultry event, such as a show, field day, clinic, or contest.
- Attend a clinic, workshop, conference, field day, or educational meeting for your poultry producers.
- Join the junior or adult breed, fancier, or commodity organization for your bird, if one exists. Participate in one or more of its activities.
- Do another activity of your choice.

HISTORY AND PROJECT SELECTION

History

People started raising poultry a long time ago. The first chickens were thin, tough birds called the Jungle Fowl. They lived in Asia more than 5,000 years ago, and may still be found today. Turkeys have been used for food in North and South America since people have been here. Ducks were first raised for food in China thousands of years ago. Muscovies, which are like a combination breed of duck, geese and turkey come from South America. Geese come from Europe and North America.

Today, there are many different breeds of poultry each of them raised for a special reason. In recent years, the main goal in poultry breeding has been to develop stock that is efficient in egg or meat production. Traditionally, the breeds of chickens raised to give us meat included Barred Rock, White Rock and Cornish. Certain lines or strains widely known for their commercial production have been established and have contributed to the rapid development of Canada's present poultry industry. Today, however, most meat birds are commercial crosses of breeds such as White Rock and Cornish. Often, these commercial crosses are called Broiler Chicken.

Meat birds are sold as broilers, which weigh 2.0 kg (4.5 lbs.) or less, or as roasters, which weigh more than 2.0 kg (4.5 lbs.). In the past, chickens raised to lay eggs included White Leghorn (lays a white egg) and Rhode Island Red and New Hampshire Reds (lay a brown egg). As with the meat birds, today's commercial egg layers are commercial crosses of several breeds. Egg layers are usually selected by the colour of eggs that they lay, (i.e., white egg layers, brown egg layers).

Breed Characteristics

Breed characteristics include body size, feather colour, and conformation peculiar to a particular breed.

The standard weights, roughly, on all of these breeds are as follows:

Cockerels: 2.5 – 3.2 kg.

Hens: 2.2 – 3.0 kg.

Pullets: 2.0 – 2.8 kg.

The Egg Producing Flock

- Production-Type Rhode Island Red
- White Leghorn
- Hybrids
- Sex-Link

These birds have smaller bodies than broiler chicks, and they do not eat as much feed. They also lay more eggs.

The Broiler (Meat Producing) Flock

Cross-bred chicks are used for broiler production. These chicks grow fast and produce broilers in 6 to 7 weeks. A pound of meat is produced on less than 2 pounds of feed. The principles of brooding broilers are the same as for other chickens.

Dual Purpose (Meat and Eggs)

- Rhode Island Red
- New Hampshire
- Sex-Link
- White Plymouth Rock

These birds lay brown-shell eggs and are used to produce both meat and eggs. They are gentle and easy to manage.

Breeds of Poultry

One of the first things that a member has to do when he/she decides to do a 4-H poultry project is to select an animal to work with. Deciding the breed or breeds to be used is the first step. You should learn about the various types of poultry in your area so you can decide which one best suits your needs. To help you to decide you should also look at the regulations (BC 4-H Publication #1100) and choose an animal based on the project you wish to do. There are more breeds than those listed here. You may want to do some additional research to find a breed that works for you and is available in your area.

Rhode Island Red

Varieties: Single Comb

- Rose Comb

Use: A dual purpose medium heavy fowl; used more for egg production than meat production because of its dark coloured pin feathers and its rate of laying eggs.

Characteristics: rapid-feathering and quick-growing makes it a good general purpose breed used for both eggs and meat. Plumage colour is a rich brownish red, with yellow skin and shank colour.

Rectangular-shaped body provides a good capacity for laying brown-shell eggs. Also good for meat purposes.

Standard Weight: Males 3.4- 3.8 kg; Females 2.5-3.0 kg.

Breed Disqualifications: Entirely white feather(s) showing in outer plumage; shanks and feet other than yellow or reddish horn.

Leghorn (Pictured is Dark Brown)

Varieties:

- Single Comb Dark/Light Brown
- Rose Comb Dark/Light Brown
- Single Comb White, Buff, Black, Silver, Red, Black Tailed Red, or Columbian
- Rose Comb White or Buff

Use: Used extensively by commercial egg laying businesses around the world because of their egg laying abilities.

Characteristics: Small size, great activity, hardiness and abundant egg production. Due to body type, they are not very desirable as a meat-producing chicken. They are good foragers and are capable of flying, often roosting in trees if given the opportunity. All varieties have yellow skin and shanks and lay white-shell eggs.

Standard Weight: Mature males 2.2-2.7 kg; Females 1.8-2 kg.

Breed Disqualifications: Red covering more than one-third of the surface of earlobes in cockerels and pullets, more than one-half in cocks and hens.

Plymouth Rock (White Plymouth Rock)

Varieties:

- Barred
- White
- Buff
- Partridge
- Silver Penciled
- Blue
- Columbian

Use: Dual purpose for production of meat and eggs.

Characteristics: Attributes of the Rock in frame size, colour, feathering and egg production have helped make this cross the universal meat chicken of today. The body is long, deep and full, making it a popular dual purpose bird. Skin and shanks are yellow. The egg shell is brown.

Standard Weight: Males 3.6-4.3 kg; Females 2.7-3.4 kg.

Breed Disqualifications:

Barred Plymouth Rocks – Red or yellow in any part of plumage; two or more solid black primaries, or two or more solid black secondaries, or two or more solid black main-tail feathers; shanks other than yellow.

New Hampshire

Use: A dual purpose chicken, selected more for meat production than egg production. Medium heavy in weight, it dresses a plump carcass as either a broiler or a roaster.

Characteristics: The breed's rapid feathering and early maturity characteristics helped develop the broiler chicken industry. Lately, the breed has almost disappeared from commercial use. The skin and shank colour is yellow and eggs are brown. In the male, body plumage is a medium chestnut red, with head and neck as reddish grey. The female is a medium chestnut red throughout.

Standard Weights: Males 3.4-3.8 kg; Females 2.5-3.0 kg.

Breed Disqualifications: One or more entirely white feathers showing in outer plumage.

Sussex

Varieties: Speckled

- Red

Use: A general purpose breed for producing meat and/or eggs. One of the best of the dual purpose chickens, a good all-around farm fowl.

Characteristics: Sussex are alert, attractive and good foragers. The Sussex body is long, broad and deep. The speckled variety is especially attractive with its multi-coloured plumage. Sussex are broody and make good mothers. The skin is white and the eggs are brown.

Standard weights: Male 3.4-4 kg; Female 2.7-3.2 kg.

These are examples of common poultry breeds. Other breeds are available and you may want to research more, as one may interest you for your project.

Waterfowl Breeds

Ducks

Numerous breeds of ducks, only about five have attained some degree of popularity for commercial use. Meat production breeds are White Pekin, Rouen, Muscovy, Aylesburg and Pekin; Egg production breeds are Khaki Campbell and Indian Runner.

Geese

Among the best known domestic breeds in Canada are the heavy breeds – Toulouse, Embden and African; the medium weight – Pilgrim and light weight – Chinese. These most common breeds of geese are fairly satisfactory for meat production. However, the most desired characteristics in a goose are medium sized carcass, good livability, rapid growth and a heavy coat of white or near white feathers.

Waterfowl are not only popular for exhibition purposes, but useful and profitable for the production of meat and eggs. Waterfowl raised for commercial egg production is very limited both in British Columbia and elsewhere in Canada as duck eggs are not very popular with consumers. The many variations in size, type and colour patterns give breeders of ducks a wide range from which to choose a variety most suited to their desires.

The Crested ducks capitalize on a unique feature to give them a distinctive appearance. While not considered a top commercial duck they do offer their owners a breeding challenge with good recovery for the family table.

The Runners are very distinctive in type; in fact, type is the most important characteristic of the breed. In judging Runners, the typical shape must be given first consideration. A ringed-in enclosure may be used when judging Runners so they can be judged “on the move” for correct carriage and gait. Runners move with a quick step, quite unlike the waddle of other ducks.

During the summer old drakes with the colour pattern of the Gray Runner, Mallard, Rouen and Gray Call shed their showy male plumage and take on a plumage resembling that of the female. In the fall, they moult again and take on the male plumage. Young drakes also carry the less showy female colour before they take on adult plumage. English Magpie Ducks are quite similar in type to Khaki Campbells, share their English origin and like the Campbells are high-egg yield, triple-purposed breed.

The skin of all domesticated races of ducks is more or less yellow, with the possible exception of the Aylesbury and Muscovy, the skins of which are pinkish white. Indian Runners produce white eggs, although tinted eggs are common in some strains. Well managed flocks of Indian Runner and Khaki Campbell ducks outperform most poultry breeds for egg production. The Cayuga and the Black East India lay a very characteristic egg. When production begins the eggs are practically black, but as production progresses the black pigment more or less disappears and the eggs are blue. The Rouen egg is bluish-green shelled, although white-shelled eggs are not uncommon.

The larger breeds of ducks are noted for their market and table qualities.

Project Selection

Conformation is the key to selecting project animals and how they will perform. Before knowing what to look for, it is important to know your poultry parts.

When selecting your 4-H project animal there are some characteristics that will be desirable in all breeds:

- Breed type – shape of bird's body as to the ideal breed type for breed being judged.
- Variety of characteristics – comparison of colour of shanks, colour of plumage, colour of ear lobes and kind of comb.
- Condition and vigour of bird and free from disease and/or injury.
- Freedom from breed and general disqualifications.

This is a guide for evaluating physical appearance; additional factors to consider are:

- The type of poultry most suitable for the unit(s) you plan to enroll in.
- The temperament of the bird.
- The breeding qualities, in case you decide to keep it for future breeding projects.

Poultry Selection

A male bird less than 1 year old is a cockerel, and over 1 year of age it becomes a cock. Female birds less than 1 year old are pullets, and over 1 year of age they become hens.

Selecting Cockerels (Male birds less than 1 year of age)

Alert, strong head and eye; well defined and red comb and wattles; yellow beak skin and legs for all yellow pigmented breeds; broad, lengthy and deep body; stand straight and firm on feet; legs medium in length as characteristic of the particular breed.

Selecting Pullets (Female birds under 1 year of age)

Alert head and eye; red, velvety coloured comb and wattles, beak, skin and legs bleached white for high production; no yellow pigment should show when hens have been in heavy production; large and soft abdomen; body deep, lengthy and wide; feathering worn and tattered for heavy production, but no off-coloured feathers such as black feathers in Red varieties or red feathers in Barred Rock varieties.

Selecting Broilers (Meat production)

Select birds with a compact, well rounded, fairly deep and thickly fleshed body. The keel bone should be straight, fairly long and heavily fleshed. The wings and legs should be well rounded and short. Finish can be determined by spreading the feathers on the wing web and over the hips and back and examining the fat covering. A creamy white covering indicates good fat finish while a bluish colour indicates lack of finish. The birds should be well feathered and free from pin feathers.

Selecting Capons

Capons and unsexed males, readily distinguished by the undeveloped comb and wattles, the profusion of long, narrow hackle and saddle feathers and low tail.

Capons should be selected on their meat producing ability. They develop larger frames than cockerels during their growing season from six to eight months. Capons for exhibit should not have a comb, and the wattles should be extremely small. Only a very small, dull colour comb and wattles are present in

true capons. If the caponized birds show signs of developing combs and wattles, they are known as “slips and should not be exhibited in a capon class. Weight and large body type are the most important points in judging this class of meat producing birds.

For more information on what to look for in desirable conformation and undesirable characteristics, consult Publication #427 Livestock Judging Guide. This publication provides information for judging poultry. The following section includes some differences in waterfowl and points to look for when selecting your project.

Waterfowl Selection

As a poultry 4-H member, in addition to chickens, you have the option of choosing a different type of bird. This section outlines the major differences these birds have from chickens, and some features to look for during project selection.

Turkeys are similar to chickens with a few differences, as noticeable by the following picture. They do not have a comb on top of the head. There is a fleshy growth at the base of the beak, known as a snood. On males, this part is very long and hangs down over the beak. In addition to a wattle, turkeys also have red, bumpy, fleshy tissue covering the head and neck called caruncles. Another difference is that male turkeys have a tuft of long, bristly, black, coarse fibers attached to the breast, known as the beard.

A young turkey is a poult. A male turkey of any age is a tom and female turkeys are hens.

Diagram

The differences in ducks can be seen in the following picture. They do not have combs or any other head covering. The bill is flatter than a chicken’s beak, with an extra part on the end called a bean. Ducks have webbed toes, which are used for swimming. There is also a difference between male and female ducks. Males have curled feathers at the base of the tail and they only make a hiss, where the female can also make a squawking sound when handled.

A young duck is a duckling. A male adult duck is a drake and a female adult is a duck.

Diagram

General Characteristics to Look for in Ducks

- Head: short, round and wide. Prominence of cheeks and condition of head plumage.
- Eyes: good size and colour, no blindness
- Bill: colour – true to its breed or sex, shape - short and wide.
- Neck: length and strength (ducks generally have strong necks); arch of neck; feather condition for abnormal colouring.
- Back: length and width. Meat varieties have long and wide back. Back feathers for under colour and signs of moulting or missing feathers.
- Tail: all tail feathers present; curled feathers on adult drake
- Abdominal area: spread of pubic bones (space between rear of keel bone and pubic bone), leanness and hardness; feather condition
- Legs: straightness, cleanliness, colour and abnormality.
- Toes and Nails: colour, length and if any toe nails are missing; foot for abnormalities and abscesses.
- Webs: damage, abnormalities and parasites.
- Breast: length of keel (breast) bone, free from defects; feather condition and amount of meat on breast area for meat birds.

- Wings: spread each one open and look at condition of primary and secondary feathers and coverts. Check for signs of moulting.
- Crop: fullness and free from abnormalities.

In judging Rouen and Gray Call Drakes in the summer or fall, allowance must be made for summer moult common to males of these varieties.

Geese have some distinguishing features. Some breeds have a horny knob at the base of the bill. In addition, some gees have a dewlap, a fleshy growth of skin extending from the base of the lower bill along the top of the throat.

A young goose is a gosling. A male adult goose is a gander and a female adult is a goose.

Diagram

Other waterfowl that you may consider as a 4-H member are pigeons, guinea fowl, peafowl, pheasants, pigeons and swans. If these fowl interest you, you will need to research these birds more before selecting a project.

Importance of Feather Quality in Waterfowl

Feathers act as a protective covering for waterfowl, protecting it from cold, rain, sun and injury, also aiding in short flight. It is important that the feather be broad, the web of good firm texture, with a strong shaft, the barbs, barbules and barbicels closely and tightly knitted together, except a very few ornamental breeds such as Sebastapol Geese.

Benefits of having Ducks for Pets

- **Easy to Raise** – ducks are seldom bothered by sickness or parasites.
- **Resistant to Cold, Wet and Hot Weather** – mature waterfowl are mostly immune to wet or cold weather. Ducks can remain outside in the wettest weather, and can winter comfortably outdoors with only a windbreak, even with temperatures below – 18°C. Ducks also do well in hot climates if they have access to shade and drinking water.
- **Insect, Snail and Slug Exterminators** – ducks are excellent at getting rid of any unwanted insects in your garden.
- **Productive** – they are one of the most efficient producers of animal protein.
- **Easy to Feed** – ducks will eat almost anything that comes out of the kitchen.

Their feathers and manure can be used in by-products, they have gentle dispositions and are very entertaining as a pet.

FEEDING AND NUTRITION

Food and its Use

Poultry (and all other living things) need nutrients from food in order to produce energy to live and function. Proper nutrition is very important for all poultry, but particularly for young growing chicks. Poultry owners must care for their animals and feed them properly to give them a chance to grow well, maintain good health, produce quality meat and eggs, and reproduce and give birth to healthy offspring that will develop to their full potential.

Animals require food for three main purposes:

1. *Maintenance*: to give heat and energy to the body. Maintenance takes first priority on the use of the feed. If fed below maintenance needs, the bird will use up its body reserves of fat and other nutrients, dropping off rapidly in weight or egg production. Eventually, when these are used up, starvation or serious malnutrition sets in and its health is affected. Maintenance requirements are approximately proportional to the bird's weight. The nutrients needed for maintenance will be about the same.
2. *Growth*: to provide essentials for building various body tissues as the bones, muscles, and organs increase in size. Growth requires an abundance of protein, minerals, vitamins and energy.
3. *Work*: includes reproduction and egg production. Poultry do not work like we think of work, but they need energy to move, roost, and play. The laying bird requires nutrients for manufacturing the eggs she produces. Eggs are high in protein, minerals, vitamins and energy. Requirements, therefore, are very heavy for these nutrients. The laying birds also require a great deal of water for their body needs and for egg production. Hens fed a uniform balanced ration will produce rather uniform coloured yolks. Excessive green feed will darken the yolk and make it less desirable to the consumer who is used to a light yolk.

It is important to know the nutritional requirements for the kind of animal being raised. This means knowing what and how much of each nutrient is needed by that animal to be able to live and grow. A nutrient is like an ingredient in a recipe. If we leave a required nutrient out of an animal's diet, it will cause some type of deficiency (a shortage). This will result in problems such as slow growth, disease, stillbirths, reproductive failure, low egg production, higher mortality rates, or poor carcass quality.

Although the majority of operations now rely on purchased complete feeds, it is important to know what is in the food you are feeding your animals and why. This section will also help you to spot any deficiencies your animal might be experiencing. The primary food nutrients required by all animals are classified as carbohydrates, fats, and proteins. Secondary food nutrient classes consist of minerals and vitamins. Another nutrient of importance is water; however, it is obtained primarily from sources other than foods.

What's in Feed?

1. Protein

<i>Essential for:</i>	<i>Supplied by:</i>
<ul style="list-style-type: none"> - Growth - Development of muscles, bone and feathers - Repairing body tissues - Reproduction and egg production 	<ul style="list-style-type: none"> ○ Legume hays ○ Fish meal ○ Soybean meal ○ Canola meal ○ Barley ○ Wheat Bran

Proteins are complex compounds, containing carbon, hydrogen, oxygen and nitrogen. Most proteins contain sulphur and some contain phosphorus. Feed proteins are broken down into amino acids. Tissues that mainly consist of protein are muscles, nerves, cartilage, skin, feathers and beak. The albumin (white) of the egg is also high in protein.

Proteins are especially needed by the young growing birds for production of body tissues. The younger bird is growing at a greater rate than the older bird, thus the percentage of protein in the ration must be greater.

Protein is supplied in the legume hays (alfalfa, clover, linseed meal, milk, wheat bran, oats, and pasture grasses). Animal by products, such as bone meal, fish meal and blood meal, are also rich in protein. Since protein supplements are an expensive portion of the ration, their use should be limited to providing a balanced ration depending on the growth stage of the chickens.

2. Carbohydrates

<i>Essential for:</i>	<i>Supplied by:</i>
<ul style="list-style-type: none"> - Energy for body - Heat - Growth - Fattening 	<ul style="list-style-type: none"> ○ Grains (Oats, Barley, Wheat, Corn) ○ Soybean meal

Carbohydrates include starches, sugar and cellulose.

Carbohydrates are the most important source of energy in the ration. Energy is the most expensive nutrient in the diet. Energy is important because it governs feed intake:

High energy = low feed intake

Low energy = high feed intake

3. Fats

<i>Essential for:</i>	<i>Supplied by:</i>
<ul style="list-style-type: none"> - Energy for body (2.25 times more than carbohydrates) - Heat - Growth - Fattening 	<ul style="list-style-type: none"> ○ Animal fats (hard, inexpensive) ○ Vegetable oils (liquid, expensive) ○ Flax seed ○ Small Quantities in Grains (Oats, Barley and Wheat)

4. Vitamins

<i>Essential for:</i>	<i>Supplied by:</i>
<ul style="list-style-type: none"> - Maintenance of health - Growth - Reproduction 	<ul style="list-style-type: none"> ○ Animal fats (hard, inexpensive) ○ Vegetable oils (liquid, expensive) ○ Flax seed

Vitamins occur in feeds in small amounts, but they are absolutely necessary for growth, reproduction and the maintenance of health. They occur in feedstuffs in varying quantities and in different combinations. They unlock other nutrients that can be used. Some vitamins are produced by micro organisms of the intestinal tract. Vitamin D can be produced by sunlight on the bird's skin. Other vitamins must be supplied in the ration because they are not formed by the birds. It is most likely that your commercially obtained feed will contain all of the essential vitamins needed, but you should check the label just to be sure.

Vitamins are often separated into two groups: (1) fat soluble and (2) water soluble, as demonstrated in the table below.

Vitamin	Use	Source	Deficiency
FAT SOLUBLE			
Vitamin A	health and proper functioning of the skin and lining of the digestive, reproductive and respiratory tracts.	From carotene in green forages and yellow corn; fish oils	
Vitamin D	plays an important role in bone formation and the metabolism of calcium and phosphorus.	Exposure to sunlight; supplementation	
Vitamin E	Normal reproduction and growth. Involved with selenium for maintaining cell structure		
Vitamin K	Blood clotting.	supplementation	
WATER SOLUBLE			
B vitamins (B2, Pantothenic Acid, B12)	involved in energy metabolism and in many other metabolic functions. General health	Supplement	
Vitamin C			
Biotin and Folic Acid			

Many necessary vitamins are partially supplied by feed ingredients such as alfalfa meal and distillers' dried solubles. A vitamin premix, however, is included in the commercial ration to provide additional supplements such as vitamin A, B12, D3, E, K, riboflavin, niacin, pantothenic acid and choline.

5. Minerals

<i>Essential for:</i>	<i>Supplied by:</i>
<ul style="list-style-type: none"> - Bone and teeth formation - Parts of enzymes and hormones - Egg Production (calcium and phosphorous) - Stimulates appetite and water intake (salt) - Maintenance of Health 	<ul style="list-style-type: none"> ○ Trace Mineralized Salt (Cobalt, Iodine, Selenium) ○ Dicalcium phosphate ○ Meat and Bone Meal

Four minerals of the greatest importance are sodium and chlorine (combined in common salt), calcium and phosphorus. Other minerals utilized and likely to be lacking in certain localities are iron, cobalt, sulphur and copper. Their need in the diet varies in certain districts.

The uses of minerals are many. They aid in the proper functioning of the body processes; the manufacturing of blood, digestion, muscle action and bone building. Minerals are stored in the skeleton and tissues.

Calcium and phosphorus are obtained from legume hays and green forage and considerable phosphorus is obtained from cereal grains. Bone meal is a well-known source of these minerals. Limestone is a source of calcium. Several commercial mineral supplements are available on the market containing calcium and phosphate along with iron, iodine, molasses, protein or high protein or high percentage of salt. It is recommended that locally formulated mixes be used as they are designed to meet local needs.

6. Water

<i>Essential for:</i>	<i>Supplied by:</i>
<ul style="list-style-type: none"> - Transportation of nutrients - Control of body temperature - Digestion - All vital processes 	<ul style="list-style-type: none"> ○ Must be supplied at all times, at a temperature of at least 2° C to 10° C

Notes about Water

Water is the most essential nutrient to any animal, but unfortunately it is usually the most neglected. Water is used in poultry, as in humans, to transport nutrients from one place in the body to another. Without water, all areas of a poultry's normal functions are affected, including egg production and rate of gain.

It is important to ensure that your water supply is clean, and within acceptable concentration levels or free of such contaminants as algae, nitrates, sulphates, high mineral levels, salinity and bacteria. Algae growth in ponds can make water smell and taste bad; it can even make it toxic. You should also monitor your water for the presence of nitrates and sulphates. Nitrates often indicate the presence of bacteria that may be harmful to your swine. Large amounts of sulphates may create health problems affecting performance of your poultry.

Waterers with brightly colored bases help the chicks find the water. For the first few days take the chill off the water and have water available near each feed trough. If using a waterer built for adult birds, putting a ring of rubber hose in the base may be necessary so that chicks cannot fall in and drown. Rocks placed in the outer ring of the base can serve the same purpose. Waterers can be made using juice cans in combination with tin plates. Make two holes on opposite sides of the can about 2 cm from the lip. Fill the can with water and place on top. Tip them over and the waterer will maintain its own water level.

A continued supply of fresh water is important if chicks are to thrive. More than 60 per cent of a bird's body weight is water so it is a vital ingredient for all the body functions. Water is also one of the cheapest nutrients. Water for chicks should be maintained at temperatures between 10-21°C. If it is outside this range, the chicks will reduce their consumption and not do as well. Generally, birds will consume water in a 2:1 ratio to feed consumption. This ratio can change if extremes of climate temperatures occur.

The manager should know how much water is consumed daily. It is often a good indication of the bird's health. When the waterers no longer can handle a half-day supply for the flock, it is time to either add more waterers or use larger waterers. One should keep raising the waterers as the birds grow so that the bases are level with the backs of the birds. This not only helps prevent litter from getting into the water supply but also discourages spillage. Place the waterers on stands so that the birds cannot get into any damp litter that may develop beneath the waterers. The water should be changed twice a day. The waterers should be cleaned with disinfectant once a week so that there is no slime build-up.

Classes of Feeds

Feeds can be classified into two main groups: Concentrates and Roughages.

Concentrate Feeds

Concentrate feeds include whole grains, milled feeds and manufactured supplements. They are feeds low in fibre and high in digestible nutrients. They are able to supply large quantities of energy for the bird to use quickly.

Some of the common concentrates are: oats, barley, wheat, wheat bran, shorts or middlings, corn, molasses, linseed meal, fish meal, cottonseed meal and soybean meal.

Several manufactured feeds for poultry are on the market. They are mainly composed of concentrates to which minerals have been added.

They are generally of the following types:

1. Starting Ration – high in protein (20%)
2. Growing Rations – lower in protein than starting rations (16%)
3. Laying Rations – high in calcium and Vitamins A and D.

Succulent Feeds

Succulent feeds are those fed in a green or preserved stage – ensilage and green grass are examples. Succulent feeds are usually roughages. This means they are high in fibre. They cannot be eaten in large enough quantities by poultry for them to receive their total nutrient needs.

Fresh grass, weeds and discarded vegetables are well liked by poultry and can be fed to supplement a complete grain ration.

Digestive system of poultry

Unlike many animals that are found on the traditional farm poultry are not ruminants, but rather monogastrics, meaning that it only has one stomach.

Mouth/Beak: Gather and break down feed.

Esophagus: Tube from mouth to stomach that is open at the mouth end.

Crop: Feed storage and moistening.

The stomach of poultry is broken down into 2 sections:

1) **Proventriculus:** The chemical part of the stomach. The site for digestive juices (HCl and gastric juices) to be secreted. The digestive juices have a breakdown action on the feed materials preparing them for absorption into the bloodstream.

2) **Gizzard:** The physical part of the stomach. Muscular, and food is broken down by movement of the stomach.

Small Intestine: Digestion of proteins, carbohydrates, and fats; absorption of the end products of digestion. Enzymes aid these processes and are found in the small intestine.

Ceca: Essentially non-functioning in monogastrics.

Large Intestine: Bacterial activity, water absorption and waste storage.

Cloaca: Common chamber for GI and urinary tracts.

Vent: Common exit for GI and urinary tracts.

Feeding Methods

Amount and Type of Feed Required for One Chicken by Age and Purpose

<u>Layers (Brown Egg Type)</u>		
Age	Total Amount of Feed (kg)	Ration Type
Day old to 6 weeks	1.8	Starter
7 weeks to 18 weeks	21	Grower
19 weeks to 70 weeks (from lay to end of use)	47	Layer
<u>Layers (White Egg Type)</u>		
Age	Total Amount of Feed (kg)	Ration Type
Day old to 6 weeks	1.4	Starter
7 weeks to 18 weeks	5.4	Grower
19 weeks to 70 weeks (from lay to end of use)	37	Layer
<u>Broilers</u>		
Age	Total Amount of Feed (kg)	Ration Type
Day old to 3 weeks	1	Starter
4 weeks to 7 weeks	3	Finisher

Feeding Chicks

Feed and water should be given to chicks as soon as they arrive. Baby chicks should be given feed within thirty-six hours after hatching to prevent loss of weight and vitality. The first feeders should be flat for ease of access, such as paper plates or egg flats. At the same time feed should be supplied in regular feeders. Ensure that they have also found the waterer or feed consumption can lead to dehydration and eventual death. Once the chicks have learned to feed, the egg flats may be removed.

Faulty nutrition can lead to tremendous costs. Relating the growing stages of a chicken to the type of feed used is important. Chicks should be fed a good starter for the first 4 to 6 weeks of age. Starters sold by reputable feed manufacturers are formulated to meet the nutrient requirements of the birds. Only starters should be fed during the first few weeks. Adding ingredients such as grains, skim milk or greens will only upset the balance of the ration's nutrients.

Raise the feeders as the chicks grow so the top of the trough is level with the backs of the chicks. Manufactured floor trough feeders can also be purchased. The feed troughs and waterers should be arranged around the source of heat so as chicks can move to or away from the heat without piling up against the trough and smothering.

Each class of birds should be fed the starter formulated for them because the levels of minerals, vitamins, protein and energy differ depending on whether the feed is a chick starter, a broiler mash or a turkey starter. The change over to growing and finishing rations should be gradual and the growing mash should be fed according to the manufacturer's directions.

In addition, young birds can be fed insoluble chick size grit. However, when on a commercially prepared feed many nutritionists feel it is not necessary. During the first few days the grit is best mixed on the top of the starter but later should be provided in a separate hopper. With chickens and pheasants the birds should receive intermediate size grit after they are 6 weeks of age. Gravel is not recommended because it is too smooth and does not grind the feed.

Feeding Laying Hens

A laying hen's nutrient requirements are different from that of a young chick or a growing chick. Laying hens should be fed a complete commercially prepared laying ration. Keep the ration in front of the birds at all time.

A complete 16 per cent protein laying ration or breeder ration should always be kept in front of the birds. No other food is needed. If the feeder space is adequate, you will only have to feed once a day. When feeding, do not put new feed on old feed. Let the birds clean out the feeders once or twice a week. Never fill the feeders over half full. Feed wastage can reduce profits for your flock. Remember your greatest expense is feed. Give the hens all they want, but do not waste it.

Calcium is an important mineral needed by laying hens for egg shell formation. About 10 percent of the egg weight is shell. The shell is almost 100 percent calcium carbonate. Most of the complete high energy laying mashes available contain 3.5 per cent calcium. Oyster shells, which are a good source of calcium can be fed to the layers to ensure they have adequate calcium.

By providing more calcium to the layer in a pre-lay diet, the producer makes sure that this calcium is stored in the hen's bone. This calcium can later be used by the bird to make up for the high amount of calcium needed to produce eggs.

A granite grit or coarse sand helps the bird's digestion. They retain this for long periods so feeding every two weeks is sufficient. This grit and oyster shell can be fed in the mash feed. A handful or two is needed for each.

Feeding Broilers

Broilers can be raised to the 1.3 – 1.5 kg weight on 0.9 – 1.0 kg of feed per kg of gain. Thus, each broiler raised to market will consume approximately 3 – 4 kg of feed. The following table shows the differences between feeding layers and broilers.

Feeding Waterfowl

In feeding **ducks**, regardless of age, it is usually recommended that pelleted type rations be used, as they are easier to consume and tend to minimize feed wastage. Pellet size should be 0.3 cm for starter diets, and then may be increased to 0.5 cm from there on. Starting ducklings should be fed a starter diet for the first 2 weeks of age, following which they may be placed on finisher type diet to market age. Potential breeders should be placed on a developer diet about 1 month prior to the date of expected egg production.

As noted with ducks, geese should receive pelleted type diets. Goslings should receive a starter type feed for the first 3 weeks of life, followed by a suitable grower type feed containing 15-16% protein. Pellet size may be similar to that used with ducks. Since geese are known as excellent foragers, they can be expected to obtain a good portion of their feed by this means by the time they are 5-6 weeks of age. From 12 weeks to market age, the birds should have access to pellets on a free choice basis. Either an all mash or a mash scratch system of feeding may be used, providing the system meets the bird's protein requirements of at least 15% after the initial 3 week period. Geese are marketed when they are about 5 to 6 months of age.

Those used for breeding purposes should be provided with a suitable breeder type ration containing approximately 18% protein. This level is somewhat higher than normally required for other kinds of

breeders but, since geese tend to forage extensively, a portion of their diet may consist of material containing less protein.

Guinea Fowl are fed in a manner very similar to turkeys. They may be fed either mash or pellets. Developer feeds are supplied to keets after about 6 weeks. Guineas are marketed generally around 14 weeks of age. As was the case with guineas, the nutritional requirements of pheasant are quite similar to the turkey and feeding methods described for that species may be used in raising these birds.

Experiments at the Oregon Experimental Station in the United States has shown that Japanese **quail** may be raised very successfully by using a turkey starter diet containing 28% protein for the first 2 weeks followed by a well fortified chicken broiler ration to sexual maturity at 56 weeks. For adult quail, a well fortified chicken layer or breeder ration containing 15-16% protein has given satisfactory results.

Tips for Feeding

- Fill feeders half full to avoid spilling out and ensure freshness of feed.
- Always keep feed in front of birds.
- Keep feed troughs free of litter and mouldy feed.
- Both feather picking and cannibalism are common and can develop when the chicks are growing. A similar type of problem is toe picking that can start in a flock of chicks soon after they are put down under the heat lamp. Some factors that can cause this are overheating the birds, lack of feed and water, boredom, and overcrowding.

Cannibalism

The easiest and most satisfactory method of controlling cannibalism is cutting the bird's beaks. De-beaking involves trimming slightly, more than one-half of the upper beak and blunting the lower beak. Do this only if the birds are picking one another. If de-beaking is needed, this is best done before the birds start to lay and should be done by 16 weeks of age. **Since the birds used in 4-H are for exhibition, we do not cut their beaks.**

The following are some solutions to the causes of cannibalism:

1. The low fiber content of commercial feeds and the pellet or crumble preparation allows birds to consume their daily nutrient requirements in a short time. They may get bored not having to forage for food and could start pecking each other. Hanging cabbage heads or lettuce heads and putting a few spruce boughs in the pen can create the necessary diversion to prevent pecking. If the litter is kept dry, then sprinkling some oats on the floor will encourage the birds to stay active by scratching.
2. Ensure that the birds are not overcrowded. Close confinement can cause them to become aggressive toward each other. Make sure that there is also adequate feeder space.
3. A nutrient imbalance can cause birds to become cannibalistic. It is important that you give the birds a balanced ration. Commercial rations are formulated to be balanced to the birds' nutrient needs.
4. Birds in pens with windows are sometimes more prone to cannibalism or feather picking. It usually starts on a sunny day when the birds see the dust particles that are in the air. The particles land on another bird's feathers and a bird trying to pick up the dust particle accidentally pulls a feather or draws blood. Sunspots on the floor can also cause toe picking. Therefore, using artificial light will prevent this.
5. Once the chicks get a taste of blood, they seem to want more. If the problem has started in your flock, the victim should be removed and injured parts painted with pine tar or another preparation with a bitter taste.

Sometimes, even when the chicks apparently have had good care, cannibalism will break out but usually it is due to poor management.

FACILITIES

In the poultry industry the type of housing will change depending on what type of operation it is and the size of the operation. To have a successful operation there must be a warm dry bed, fresh air, and enough food, no matter how big or small the operation is. In Canada we usually keep our poultry in a controlled environment, meaning that people are responsible for making sure the pen is clean, the right temperature and the birds have access to food and clean water.

The success or failure of any flock of poultry is determined during the brooding period – the period of a few days before the birds are received until they are about 4 weeks of age. The flock requires care and attention after this time, but the brooding period is the most important. Aspects to make sure of during the brooding period are providing:

- warm, dry, clean place to live
- plenty of clean water
- fresh air but no drafts

Choosing a brooding pen is the very first decision a project participant must make. How much room is needed? This will depend on whether one plans to raise the chicks in the same pen as they are brooded. For twenty chicks, five square metres are more than ample space to see them through to maturity.

Before your Chicks Arrive

Sanitation – Cleaning and Disinfection

With perhaps the exception of a brand new building and brand new equipment that has never been in contact with poultry or wild birds before, all equipment and building interiors must be thoroughly cleaned and disinfected well in advance of the arrival of the day-old chicks.

All equipment (roosts, nests, feeders, waterers) should be taken out of the building. Remove all traces of dust from the ceiling and walls. Once the bulk of the manure and dirt is out, a hose should be taken to the entire building. Any droppings that have been dried and are stuck to any areas should be soaked and removed. The manure and dirt that is cleaned from the building should be directed to an area away from the building to prevent re-contamination.

Once the building has been thoroughly cleaned, it must then be disinfected. Your local hatchery will be able to advise you as to the type of disinfectant to use. After the area is disinfected and the floor has dried, bed the area with litter. Use the same cleaning procedure for equipment and clean, disinfect, rinse and dry all water and feeding equipment before refilling them.

Features of a Brooding Pen

The house you choose for your 4-H poultry project may be part of a building you already have. Within that house, you can construct a smaller brooding area to help keep your chicks warm and safe. Where you decide to have the brooding pen, a chick guard 38-45 cm should be placed around the brooder (heat source) approximately 1 m around.

The most common type of chick guard is made from corrugated cardboard and is available at you hatchery. The circle will prevent the chicks from wandering away from the heat source and eliminate any corners. Chicks huddle when cold and can pile up by crowding in the corners. Those that end up on

the bottom of the pile will smother. The circle will prevent this as well as floor drafts if the cardboard is entrenched in the litter. As the birds get older the circle can be widened and usually at the end of the first week it can be removed.

Once the area is in place for a brooding pen, there are important features to consider before bringing your chicks in. These are sanitation, litter, temperature, ventilation, feeding and watering space.

Litter Requirements

The brooder house should be completely dried out from the cleaning and disinfecting. It is recommended that the brooder be turned on for a day or two to warm up the floor directly beneath it. The litter can then be spread approximately 10 to 15 cm thick and allowed to warm up. There are quite a number of different types of litter available. Perhaps the best and most economical is course wood shavings. Fine wood shavings will absorb moisture quite well but the birds may start to eat the litter and considerable mortality due to impaction may result. In all cases, club members are cautioned to make sure that the litter they decide to use is completely dry. Damp litter can become moldy and inhalation of the mold spores by the birds may result in pneumonia. Considerable deaths may result. You may want to put paper on top of the shavings for the first few days for ease of cleaning the pen.

Temperature

You will need a brooder, or heating device, to keep the chicks warm. There are many types of brooders and the size of your project will decide the type of brooder you need. This can range from an infrared heat lamp to a self-contained unit, depending on the number of chicks you will brood at one time.

Experience and experimental work have shown that a brooding temperature of 35°C at the edge of the brooder hood and 5 cm above the floor is the most suitable for baby chicks. When chicks hatch, their body temperature is the same as the incubator temperature but soon begins to rise and by 10 days of age reaches the normal temperature of 42°C. Keeping this fact in mind, club members can understand the importance of accurate temperature control during the early brooding period. The brooder stove should be set up 4-5 days previous to the arrival of the chicks so it can be regulated to maintain a uniform temperature of 35°C to 38°C. The temperature is then dropped 2°C weekly until a temperature of 21°C is reached. At this time, the heat may be discontinued if the weather permits. The temperature is best checked by the use of a thermometer hung on the edge of the brooder hood – 5 cm above the litter. The chick brooder thermometer can be checked for accuracy against a clinical thermometer.

The temperature of the brooding rooms should be approximately 21°C to 24°C for the first week but may be reduced to 18°C after this time. A cool yet comfortable room seems to promote better feathering and also encourages the birds to exercise.

You can tell if the temperature is correct by the action of your chicks. If at night the birds spread out in a circle, just under the inner edge of the brooder hood, the temperature is correct. When chilled, the birds will huddle together under the hood and chirp. Overheated chicks tend to move away from the hood. Chilled or overheated birds grow poorly and often develop diarrhea. The number of deaths will vary with the amount of chilling or overheating. Deaths may continue to occur for several days after the temperature has been corrected.

Ventilation and Protection

The room must be free from drafts for they will only cause condensation and litter problems that could also lead to health problems. Avoid drafts, but try to provide fresh air through proper ventilation. Ventilation will also help keep litter dry by removing excess moisture.

The brooding house should be inaccessible to dogs and cats. Rats can also be a problem if there is a large infestation, but normally the brooding circle will discourage them. Wild birds can also be a danger to chick health. One never knows where they have been or what they may have been into so keep wild birds out. They are also carriers of lice and mites. Even older chickens should be isolated from day old chicks.

Feeding and Watering

Feeders

During the first few days, broiler chicks are usually fed from the tops off chick boxes, on egg flats or paper plates. When chicks start eating from the regular feeders, remove the paper plates.

The feeders designed for chicks are place directly on the floor and are covered by tops with holes big enough for the chicks to peck and eat. The feed must be covered since the chicks walk on the feeders. The birds should have access to 2.5 cm of feeder space per bird for the first two weeks. Allow 5 cm per bird for ages 4 to 6 weeks, and 10 cm per bird from 6 to 12 weeks.

As your chicks grown, the feeders will need to be raised to the correct levels. There are different types of feeders and you will need to research this more by asking your 4-H leader or a poultry producer in your area. For more information on what to feed your chicks, refer to the “Feeding and Nutrition” section of this manual.

Waterers

For the first few days it is best to use the portable 4.5 litre water fountains. Three to four of these placed around each brooder stove will be sufficient. Fill the waterers before the chicks arrive so the water will be warm, as they do not like cold water. Always provide clean, fresh water for your chicks and clean the waterers regularly to help prevent diseases.

When the chicks arrive

It is best if one can start brooding them in the early afternoon so that the chicks can get settled if they have come from a commercial hatchery. Let them find the **heat, water and feed** sources. Dip the beaks of the chicks in the water to insure they know water is available. The first few days of brooding are important in the life of the chickens as the conditions, or habits acquired, may affect future growth.

Care During the Growth Period

During the growth period, besides feeding and watering, there are many other jobs to be done.

- Keep the pens clean. Manure should be removed at least once a week and clean shavings added as needed.
- The birds should be watched for signs of disease. (See section on DISEASES).
- Generally, you should check the birds to see if they are lively and the combs are bright and healthy looking. Observe how they behave and make notes on anything you find interesting.

Meat type breeds may be processed as broilers at 8 – 9 weeks of age or as roasters at about 14 weeks. Pullets will start to lay when they are 20 to 24 weeks of age.

Problems in the Brooder Pen

The poultry producer should watch for the conditions in the following chart when trying to prevent problems in the brooder pen.

Condition	Problem	Remedy
Young birds are spread uniformly over the floor area and are at the feeders and waterers.	None	OK
Birds are crowded along the perimeter of the chick guard or along the wall.	Too hot	Lower Temperature
Panting and gasping	Respiratory disease or too hot	Lower temperatures if too hot, otherwise have a veterinarian examine a few of the ill birds.
Birds are huddled to one side of a heat source.	Too draft	Eliminate drafty conditions
Birds are huddled under heat source.	Too cold	Raise temperature
Birds are huddling and piling in small groups or in corners.	Too cold or too drafty	Raise temperature or eliminate draft conditions
Small, scrawny birds and some dead after two days of brooding.	Possibly dehydrated from not finding water and dying of thirst or starvation from not finding feed.	Check that all young birds are in close proximity of water and feed. Ensure that lighting is adequate. Dip beaks in water when placed.
Vent pasting (fecal material sticking to the vent)	Birds could be too hot, too cold, or feed could cause laxative condition.	Rise or lower pan temperature. Sprinkle some finely cracked wheat or corn on top of feed if laxative condition.
Birds are crowded after six weeks of age.	There is not enough space causing unevenness in size of birds.	Provide more space
Crowded feeders and waterers	There is not enough feeding and watering space causing some birds to become thin.	Provide more feeders and waterers
Wet litter	Too many birds for space provided.	Provide adequate space. Also, provide good ventilation. If litter very wet, replace with new litter material.
Strong ammonia odours	Poor air movement. Too many birds for the space provided.	Provide good ventilation.
Feather picking cannibalism. (Cannibalism is the habit of one bird pecking at another)	Causes unthrifty birds, injuries and mortality.	Provide plenty of space. Good ventilation. Reduce light intensity in pen. If all else fails, trim beaks with an electric beak trimmer.
Birds have poor feathering and lack uniformity at five to six weeks old.	Poor watering or feeding system or not enough pen	Provide good quality feed and water and increase space per bird.

Management of All Poultry

Heat Stress

A heat stress problem can occur any time during the year if the ventilation system fails. Laying hens continually adjust their feed intake according to the environmental temperature.

In winter, when large fans are covered, and outside doors on air intakes are closed, it is important to ensure that there is enough back-up or emergency fan capacity to cool the barn. An equipment failure is just as serious in winter as in summer.

When the barn temperature rises about 27C, the hen's body temperature begins to rise and she eats much less. As eating declines, the egg weight declines. This seems to be due to the smaller amount of protein eaten at higher temperatures. When temperatures rise above 32C, the number of eggs laid will also decline, since the hen is not eating enough nutrients to continue to lay normally.

Symptoms of Heat Stress

1. Panting
2. Stretched-out neck
3. Raised wings
4. Decreased activity
5. Death

The most frequent result of heat stress is a decline in shell quality. As the hen pants to keep cool, excess carbon dioxide is exhaled. This causes the blood to become more alkaline and reduces its ability to hold and carry calcium for shell formation.

Because the birds drink more, the moisture content of their droppings will increase as well in hot weather. This can cause increased soiling of egg shells and difficulties in handling and storage of manure, because it is very wet.

The immune system of the bird is also affected by heat stress, so vaccinations should not be given in very hot weather. When birds are under stress, their resistance to disease is lowered. Just as doctors do not give us vaccines when we have a cold, poultry vaccinations are not given in times of stress.

Ventilation

Ventilation of poultry buildings is necessary to

- (a) Control the temperature and humidity of inside air
- (b) Remove dust, harmful gases and odors
- (c) Maintain a fresh supply of air

Any system which performs all of the above under all weather conditions is acceptable. Use of windows to control ventilation is likely sufficient in a small building with a small poultry flock. Direct drafts must, however, be avoided. With larger flocks in a large building a well-planned fan ventilation system should be used.

A barn with warm, humid air will provide the ideal conditions for growing harmful bacteria. Also, stale air contains carbon dioxide and ammonia. Good ventilation will remove odours, stale air and moisture, and replace these with fresh air.

These are some of the ways to provide fresh air while avoiding drafts:

1. The use of windows that are hinged at the bottom so that they open outwards at the top.
2. The use of ventilation inlets at the top of the walls (such as between the roof trusses). Air can exit at the top of the roof through a covered ventilation outlet.
3. A barn with a single pitch roof (sloped in only one direction) can be ventilated by leaving ventilation inlets and outlets at the top of the walls between trusses.
4. If you are using windows or doors to ventilate a building, try not to create a “wind tunnel”. This happens when a large amount of air can flow directly into and out of a building through large openings. For example, this diagram shows a barn with a large door on each end of the central aisle. If these doors are left wide open, a very strong wind will blow through the barn. A strong wind blowing along the barn floor will pick up dust and chaff and blow this into the pen. Dust and chaff can cause eye, respiratory irritations. Also, a strong wind could also chill animals if the weather is cool.

A better way to ventilate this barn would be to leave one of the doors partly opened, and to open a side window instead. Or, you could close the door on the leeward side (the side away from the wind) most of the way so that it will limit the air that can flow out of the barn. This will limit the air that flows into the barn as well.

Laying Hen Management

Obtaining the Laying Flock

The two methods by which to obtain laying stock are:

1. Obtaining day old pullet chicks from a hatchery.
2. Obtaining ready to lay pullets from a hatchery or commercial pullet raiser.

4-H members should obtain day old pullets from a commercial hatchery or if hatching the eggs yourselves or as a club project, separate the pullets from the roosters at about five weeks of age.

Preparing the Pen

Between flocks, the hen house should be thoroughly cleaned. Take the manure out and clean and disinfect the equipment and interior of the house. Make any repairs to the house or equipment at this time.

Facilities Needed for the Flock

Housing requirements would allow for 0.3 square metres per bird. This would mean 3.25 square metres for ten laying hens or a 2 x 1.5 m area. A separate breeding pen for one rooster and one or two hens would also be required. The house must be waterproof and insulated for protection against drafts and cold in winter and to hold in existing heat.

An inlet for ventilation that can be open or closed, as the climate dictates, is necessary. There should be no windows in the laying pen. Supply light using a 25 watt incandescent bulb connected to a timer.

Much of the equipment can be homemade or second hand equipment can frequently be purchased. The feeders should be adequate to supply the days feed for the flock without wasting feed. Feeders should be 15 cm deep with a guard to keep hens out of the feed and a lip to prevent hooking out of feed.

For more information on what to feed your layers, refer to the “Feeding and Nutrition” section of this manual. If the feeder space is adequate, you will only have to feed once a day. When feeding, do not put new feed on old feed. Let the birds clean out the feeders once or twice a week. Never fill the feeders over half full. Feed wastage can reduce profits for your flock. Remember your greatest expense is feed. Give the hens all they want, but do not waste it. For feed storage, a barrel, box or bin to keep feed in will help reduce feed wastage that occurs when feeding out of a bag. Also, the danger of rats or mice destroying feed is reduced.

Provide one oyster shell hopper for each 75 to 100 pullets. Placing some of the hoppers on the back wall above the dropping pits will increase shell consumption. Birds need a good supply of oyster shell in order to put a good sound shell on the eggs.

Hen size granite grit or coarse bank run gravel should be provided at all times. Grit has no feed value but acts as a grinding agent in the gizzard and the birds are able to utilize the feed more efficiently.

The waterer can be an open pan, a pail or a fountain on a platform.

If the laying pen is large enough, a yard is not necessary. When hens are allowed into a yard to run, there is greater chance of loss from predatory animals and eggs will be dirtier. A yard should be fenced tight and the hens should be shut in the house during the night.

Nests

The nest should always have clean litter. This will prevent dirty, cracked or broken eggs. Remove droppings, broken eggs and soiled material promptly and replace with clean nest material. Eggs should be gathered two or three times a day. Frequent gathering reduces the number of dirty eggs and improves the egg quality.

There should be at least one nest for every five birds. These should be 0.3 x 0.3 x 0.3 m and have a slanting roof to prevent roosting on it. An 8-10 cm board on the front will keep in litter. There also should be a perch in front of the nests and the nests should be 46-60 cm above the floor. The nest in the breeding pen can be a 0.3 metre square box filled with clean nesting material.

Litter

Many litter materials are used such as shavings, sawdust and chopped straw. During the winter, deep litter 10-15 cm is important. Wet litter or caked litter should be removed and replaced with clean litter to prevent dirty eggs. Do not remove dry, loose litter. During warmer months less litter is needed, which helps keep the building cooler.

Lighting

The use of lights in the hen house is to stimulate the hen to lay. Light stimulates the pituitary gland, which in turn secretes hormones that stimulate the ovary of the hen to lay more eggs. Pullets need fourteen hours of light per day throughout their laying cycle. When the source of natural light decreases in the fall, additional artificial light must be used to ensure the birds continue laying productively and at the same rate. One 60 watt light bulb for every 13 square meter of floor area supplies enough light.

During the fall and winter, daylight hours are too short. It is necessary to maintain 13 to 14 hours of light per day for the flock to maintain high production. The time of day and lights are used is not so important as long as the lighting period is uniform. Time switches are used to regulate and control timing of additional light.

Broiler Housing

Almost all of the commercial broiler flocks are raised in total confinement. The main reasons are:

1. Flocks are easier to manage.
2. More efficient use of labor.
3. Complete environmental control.
4. More control of disease.
5. Prevents losses due to predators.
6. Makes it possible to rear more uniform flocks.

Obtaining Broiler Chicks

Broiler chickens should be ordered from local hatcheries so as to maximize convenience and minimize stress during transport. Registered hatcheries in B.C. handle chicks under a brand name. These birds come from selected strains and strain crosses which are produced by multiplier breeding flock owners, who obtain parental stock from primary breeder flocks. Most of the "brand" name birds are competitive with other "brand" name birds.

Give the hatchery sufficient notice on orders. It takes 21 days to hatch a chick. Broilers are often best raised on dry litter in a permanent poultry house. Each bird should have about 1,000 cm² of floor space. Any clean, absorbent material may be used for litter; e.g. wood, shavings, sawdust. The litter should be dry and as free from dust as possible. Apply fresh litter prior to housing a new flock of birds.

Broilers and Lighting

Broilers can be grown under continuous light from chicks to market age. This lighting method can be hazardous since the flock could panic if all the lights go off in a power failure. It is a good practice to shut off the lights for at least 1 hour each day, so they'll become used to darkness.

Incandescent bulbs are considered superior to other light sources because they give off soft light. Too bright white light may be a cause of feather picking which can lead to cannibalism. It is important to be able to dim lights, yet provide enough light for the birds to find their feed and water. The dimming of fluorescent lights is possible, however it is currently expensive to buy the necessary hardware. New compact fluorescent bulbs are being developed and may soon be in use in poultry barns.

Waterfowl Housing

Domestic ducks adapt well to a wide range of environmental conditions and accordingly a variety of satisfactory housing systems have emerged throughout the world. A small farm breeder flock of ducks does not require as elaborate housing as is needed for chickens and turkeys. A pen in a barn or small building that is well lighted, well ventilated and dry will prove satisfactory. Insulation is not necessary because breeder ducks do not require a warm pen. The pen or house should have easy access to the outside yards as ducks prefer to be outdoors during the day, even in winter.

It is important to keep litter in the pen dry. This is difficult with waterfowl and often requires extra attention and the frequent addition of dry material. Straw and wood shavings are good bedding material.

On commercial duck farms, breeders are usually housed in special breeder houses with access to outside yards. Each breeder duck should have .36 - 2.70 square metres of floor space. A pen 6 x 6 meters in size is suitable for 80 to 100 breeders. Smaller flocks tend to be quieter, have fewer broken and soiled eggs, and are not as apt to develop cannibalism.

When feeding mash or pellets in hoppers, allow approximately 2.1 to 3 m of feeding space per 50 ducks. Wooden or tubular metal hoppers used for other poultry are quite suitable for pellet or mash feeding.

Environmental Concerns

Every year there is more and more concern over agriculture activities and the environment. Farm waste that is handled properly can be of great benefit, but if poorly managed waste can end up in places where it is not wanted, polluting the land, air and water.

Two important documents you should make yourself aware of are the “Environmental Farm Planning Guide” (http://www.agf.gov.bc.ca/resmgmt/EnviroFarmPlanning/EFP_Refguide/refguide_toc.htm), and the “Right to Farm Act” (http://www.qp.gov.bc.ca/statreg/stat/F/96131_01.htm). These two documents will help you to understand the effects that agriculture can have and how to properly manage your operation to avoid polluting the environment around you.

Environmental Checklist

I'm already doing	I want to improve	Care
		Manure is properly stored and covered to prevent leaching and runoff and any runoff is directed away from water sources
		Manure pile is located far (15m from water, 30m from water to be consumed) from water sources (wells, creeks) and neighbours to prevent contamination.
		If manure is used as a fertilizer, it is applied in the appropriate quantities and at the appropriate times.
		Pollution of concern to neighbours is minimized, such as constant or loud noise, strong gas emissions or odours, or dusty air.
		Paddocks and other high density enclosures are located far (at least 30 m or 100 ft) from water sources (wells, creeks) to prevent contamination.
		Chemical (pesticides, herbicides, fertilizers) and fuels are properly stored to prevent spills and properly disposed of when outdated.
		Agricultural wastes (straw, wood) are being composted and away from water sources.
		Dead stock is disposed of in an approved and timely manner (varies by cause of death but may include incineration or burial).

Biosecurity Measures – Today’s Reality¹

In recent years, people have become much more aware and concerned about biosecurity issues. Everyone wants to prevent the spread of animal disease as much as possible, and no one likes the possibility of animal diseases contaminating our food supply or affecting our health.

The simplest biosecurity measures are aimed at the possible transmission of animal diseases or pest from one farm to the next. Here are some possible sources of transmission:

- People who travel from one farm to another (for family visits, or for work), unintentionally carrying disease agents on their vehicle, shoes, or clothing.
- Equipment that is moved from farm to farm, carrying dirt, seeds, or micro-organisms.
- Animals from one farm that come into contact with animals from other farms during transport, or during participation at events such as shows, sales, or fairs.
- Farm animals that come into direct contact with infected wild animals, such as rats, mice, raccoons, or others.
- Farm animals that come into contact with airborne disease-causing agents or with fecal matter from infected birds flying overhead.
- Water from streams or irrigation ditches that may have become contaminated upstream from your animals.

Consider the routes of transmission that could affect biosecurity on your farm. Here are some of the general recommendations for farms concerned with biosecurity:

- Restrict human access to the farm property (with signs, fences, and gates) so that farm visitors enter at a single spot.
- Provide disinfectant footbaths or disposable plastic booties for visitors to wear while walking around your farm.
- Provide a graveled or paved parking area for farm visitors (to reduce the carrying of mud from one farm to another).
- Keep containers of disinfectant on hand if equipment, or vehicle tires or undercarriages, need to be washed off.
- Encourage the use of disposable overalls if visitors will come into direct contact with the animals.

The best disinfectant method for hands is vigorous and thorough hand-washing with lots of soap and hot water. If this is not possible, anti-microbial waterless cleansers may be used as a temporary measure, but these cleansers **must** be rubbed in thoroughly, including under the nails. As soon as hot water is available, hands should be re-washed. If visitors will be in direct contact with animals or hard surfaces on your farm, encourage them to vigorously wash their hands at the start and end of the visit.

Note that it is not possible to provide up-to-date information on all aspects of biosecurity, as the situation can change rapidly. However, the BC Ministry of Agriculture and Lands has issued a guideline with some general information. (The complete guideline can be found at

¹Taken from “A Health and Safety Guide for Handling Farm Animals and Poultry,” FARSHA, 2006

www.agf.bc.ca/cropprot/biosecurity.pdf.) For more specific information on biosecurity in the 4 poultry sectors (eggs, broilers, turkeys and broiler hatching eggs), look for the BC Poultry Industry Biosecurity Initiative Manual through the BC Agriculture Council.

HUSBANDRY AND HEALTH

The term Animal Husbandry refers to the management and care of animals. In addition to proper nutrition and health care, there are several practices that are important in the care and management of poultry. These practices will be outlined in the following sections:

- Poultry Behaviour and Handling
- Identification
- Debeaking
- Culling
- Brooding

Animal's Senses²

To understand an animal's reaction, always consider the situation from the perspective of its senses rather than your own.

Strain to hear what it may be hearing. Is there thunder in the distance, or is something rustling strangely? Look around and imagine the view as it appears to your animal. Is it seeing a moving shadow, a glaring light, or something flapping? Watch as it sniffs the air. Could it have picked up an unfamiliar or frightening scent?

Farm animals have the same senses as humans – smell, touch, hearing, sight – but often in very different proportions from our own. Remember this when considering situations from the animal's perspective.

Almost all animals have a much better sense of smell than humans do. A horse, for instance, may surprise you with its reaction if it picks up the scent of a bear or cougar.

The position of our eyes gives us very good depth perception, good distance vision, although not a very wide angle of view to the sides. Most animals, on the other hand, have a very wide angle of view, as their eyes are positioned on the sides of the head. Cattle, for example, are able to see almost 360° with just a little turn of the head!

Unfortunately, though, most animals have very poor depth perception, and do not focus well on objects directly in front of their heads.

- You have probably noticed that horses and cattle must move their heads down to closely examine objects on the ground.
- Livestock may hesitate at the edge of water, simply because they have no way of knowing the depth of what they're stepping into.

² *Animal Senses, Tips about Behaviour, and Good Practices Around Hogs*, are taken from "A Health and Safety Guide for Handling Farm Animals and Poultry," FARSHA, 2006

- Animals tend to move from poorly-lit to more light areas, but do not react well to bright glaring light. In fact, animals that have been in shade or indoors may balk at moving into areas of very bright contrasting light, until their vision has adjusted to the change in light level.

Tips About Poultry Behaviour

This section generally applies to chickens, turkeys, and fowl such as ducks and geese. You may be raising small flocks of poultry for meat or for eggs, or both, and you may be using indoor confinement, outdoor enclosures, or full free-range methods.

Poultry that are stressed by fear, change, climate, or any other concern will be more difficult to handle and pose a greater risk of deliberately or inadvertently hurting you. Birds are easily affected by changes in their immediate environment. For example, heat or cold will prompt a response in the birds and may generate health concerns. Poultry show their alarm and distress with sudden flight, sharp squawks, and they may seek hiding locations.

Flock behaviour means that some birds may begin to turn on those they perceive as weak or defenseless. Be aware that this behaviour may not only be directed at other birds – children can be at particular risk for injury by chickens or turkeys. Additionally, if you are ever cut, injured, or taken ill inside an enclosure with poultry, you must leave immediately, as you are at increased risk of attack. This is particularly true if you are bleeding.

Animal Identification

- Debeaking
- Culling
- Brooding

Flock Health

Well cared for small flocks are not very likely to have many disease problems. However, trouble can occur even in these small flocks. One problem that may occur is lice or mites. These do not live on people or other animals. They do live on wild birds and these frequently carry them to your flock. Lice and Northern Fowl Mites live their entire lives on a chicken. You will see them in the fluff under the vent. The egg clusters can be seen attached to the base of the feathers. Red Mites live on and off the birds. They can be found under the roosts in the morning. Specks of blood suggest mites. For treatment, a 5 percent Canbul dust can be used to dust the birds and the litter.

As far as vaccinations go, all commercial poultry producers vaccinate their birds for Marek's, bronchitis and Newcastle Diseases. Any one of these diseases can cause serious loss of egg production or mortality in the flock. If your birds aren't vaccinated for these, be very careful in not allowing visitors around your flock. Caution should be taken when taking birds to shows. These birds should not be brought home or put with other birds because of possible disease problems. In our area, all show birds are vaccinated for ILT (Infectious Laryngotracheitis). Contact your 4-H Specialist for dates of vaccination.

The habits of cannibalism, feather picking and egg eating are sometimes hard to stop. When an emergency arises, keep the hens busy by adding litter or feeding green feed, increasing area per bird, but the intensity of light or use another method to check the problem. Remember your show birds are never de-beaked.

If an occasional hen gets thin, sick and dies, it is probably nothing to be alarmed over. If the whole flock gets sick, starts to cough and sneeze, looks droopy, stops eating and suddenly stops laying; be sure to find out the cause. Some typical specimens can be taken to the provincial diagnostic laboratory for diagnosis of the problem.

When considering flock health, you should know what the positive signs are of when a bird is healthy:

- bright eye
- red comb
- dry nostrils
- shiny feathers (with most of them there)
- good weight
- clean feathers under the tail
- alert and active manner

Lack of feathers may be due to the annual moult, which occurs in the late summer/fall. Missing feathers at the tail may be from other hens pulling them out, a mineral deficiency, or stress. Fewer feathers on the sides of the neck may be from other hens, or the de-pluming mite. To have an idea of what to look for and the signs of parasites or disease, the next section outlines common parasites and disease to poultry in British Columbia.

Normal Ranges for Poultry	
Heart Rate – Chick	350-450 beats per minute
Heart Rate – Adult chicken	250-300 beats per minute

Source: Merck Veterinary Manual <http://www.merckvetmanual.com/mvm/index.jsp>

Prevention

Prevention is the easiest and most economical way to combat diseases and parasites. Always practice the following:

1. Always use clean water and fresh feed, never feed mouldy or dirty feed.
2. Keep waterer and feed clear of manure and dirt.
3. Keep litter clean and dry.
4. Ventilation – air should be fresh and not too humid.
5. Keep flies under control.
6. Control parasites.
7. Vaccinate to prevent diseases.
8. Prevent exposure to diseases and discourage visitors in the brooder house.
9. Keep adult birds separate from young chicks.
10. Keep bird stress to a minimum by providing appropriate conditions and handling techniques.

Management factors such as temperature of the air, condition of the litter, cleanliness and amount of water, space per bird, and contamination of the Poultry house should be closely watched to prevent sickness and death of your birds. Poor management is the greatest single factor to losses in poultry. Do everything you can to provide your birds with health living conditions.

Culling sick and unthrifty birds is an important practice in disease prevention. Sick birds are carriers of disease and their culling eliminates one source of disease spread. Unthrifty birds present another type of problem; they are usually the birds to first contract disease.

Parasites

Parasite infestations will put the animal under stress and make it more susceptible to secondary infections. Parasites exist in two forms: external and internal. Poultry with internal parasites will have poor feed efficiency, tend to be nervous and generally not do as well as birds without parasites. External parasites on poultry cause discomfort, interrupt feeding habits and cause the animal to be less productive than poultry treated for external parasites.

External parasites such as lice or mites live on the birds. In addition to being very uncomfortable for the animal, they can also cause damage to the skin and reduce the effectiveness of the immune system and lead to other problems.

Internal parasites live in the bird's body in areas such as the digestive system and the lungs. Almost all parasites feed on the bird's body and drain away nutrients. In large enough numbers, most parasites can kill the host (the animal that they live on).

Common External Parasites

Parasite	Description	Transmission	Effects
Mites			
	Small, spider-like insects		Suck blood, burrow in skin or live on or in the feathers. Lower vitality of birds until they do not grow or produce eggs.
Northern Fowl Mite	Grey when empty and red when full of blood	Spend entire life on birds, most commonly below vent and around tail. Females lay eggs on feathers and young will grow without ever leaving bird.	
Common Chicken Mite	Red and grey, can only be seen with a magnifying glass or microscope.	Can live in poultry house up to five months when there are no birds present. Mites feed on wild birds, which may spread infestations.	Suck blood from poultry at night and hide in wall cracks during the day. Cause loss of blood and irritation may lead to anemia in birds.
Scaly-Leg Mite	Very small parasite	Spreads slowly through flock. Lives and works under the scales on the shanks and toes of the chicken. Spends its whole life cycle on birds and spread mainly by direct contact.	Burrows beneath scales into skin, causing irregular-shaped eruptions or crusts to form on the shank. Mite may also attach to comb and wattles.
Depluming Mite		Spread by crawling around the birds and going from bird to bird.	Burrows into skin near bases of feathers, causing feathers to be pulled out or broken.
Lice	Seven species for chickens, three species for turkeys. Common louse is yellow in colour and flat in shape.	Live on birds their entire lives, starting with eggs attached to the feathers, mostly under the tail.	Irritation to skin, cause loss of appetite and lower birds' resistance to disease.
Fowl Tick, also known as blue bug		Live in cracks and crevices of poultry housing and feed on birds at night. Hard to get rid of and require thorough treatment.	Ticks suck blood, which can result in same problems as with mites – weakened birds, reduced egg production, even death.

Treatment of External Parasites

Another pest, not a parasite, around poultry facilities is house flies. They can be controlled with fly tapes and traps. Also, a certain type of wasp can be used to biologically control flies.

To keep mite populations to a minimum and to completely eliminate them, it is important to inspect your birds and poultry houses regularly. A spraying program is also useful, both on the birds and all facilities, especially cracks and crevices. Treatment of lice is similar to mites; however, it is more important to apply the insecticides directly on the bird's body rather than the premises.

There are many insecticides in the form of dusts and sprays available to control external parasites. Some examples are: Carbaryl, malathion, rotenone dust, tetrachlorynphos and permethrin. These products are available ready-to-use, as dusts or sprays. With any of these products, use with adult supervision and according to the manufacturer's recommendations.

Common Internal Parasites

Parasite	Description	Transmission	Effects
Large roundworms	Long, yellow-white worms in intestine		Droopiness, weight loss, diarrhea, death.
Capillary worm	Hair-like worms in crop and upper intestine		Droopiness, weight loss, death.
Cecal Worm	Short worms in the ceca		Unthrifty, weak, loss of flesh
Tapeworm	Long, white, flat, segmented worms in intestine		Unthrifty, slow growth, weakness
Gapeworm	Red, forked worms in trachea		Gasping, coughing

Source: P-11

Treatment of Internal Parasites

The easiest way to control all types and stages of parasitic worms is a powder that can be added to feed. Dewormers can also be found in tablet form and given to individual birds.

The best management program for worm infestation is routine diagnosis along with routine treatment. Diagnosis can be made by submitting manure samples to your local Veterinary Services Lab three or four times a year. After worms are diagnosed then treatment should occur based on the advice of your local veterinarian. A combination of routine treatment and submission of manure samples might be most practical.

Poultry Diseases

Signs of diseases or symptoms are:

- Droopiness
- Ruffled feathers
- Loss of appetite
- Listlessness
- Diarrhea
- Laboured breathing
- High death rate (mortality)

Any sign that is not normal may be an indication of disease. To minimize losses, early diagnosis of the disease is important.

Any one of the above symptoms call for immediate action. If disease is suspected the club member should call the club leader, poultry specialist or a veterinarian. Correct diagnosis and immediate and proper treatment are very important.

Protozoan Diseases

Disease	Age Commonly Affected	External Appearance	Internal Appearance	Prevention	Treatment
Caecal Coccidiosis	1-12 weeks, occasionally older.	Chicks appear cold, wings droopy, feathers ruffled. In acute cases, free blood appears in droppings and feed consumption drops rapidly.	Caecal enlarged, containing blood stained material.	Clean, dry-litter. Low-level feeding of preventive drugs.	Drugs as recommended by manufacturers.
Intestinal coccidiosis	8 weeks & over.	Reduced feed consumption, birds lose weight, some lameness may occur, combs and wattles pale, bloody droppings may occur in acute cases.	Noticeable thickening of intestinal wall with minute white spots on inside. Small haemorrhages may occur in intestine.	Range rotation. Dry litter in laying-house. Low-level feeding of preventive drug.	As above.

Bacterial Disease

Disease	Age Commonly Affected	External Appearance	Internal Appearance	Prevention	Treatment
Pullorum and paratyphoid (turkeys & chickens)	1 day to 4 weeks acute state.	Chicks appear cold, sleepy, chirping, pasting around vent.	Acute, none. Sub-acute, small spots on liver, lungs, and (or) heart.	Blood-test all breeding stock to remove pullorum carriers. Detection of paratyphoid carriers is difficult.	Sulpha drugs, Furazolidone or antibiotics according to the manufacturer's recommendations.
Fowl typhoid	Usually young adult birds.	Droopiness, listlessness, comb and wattles pale, green droppings.	Enlarged spleen, swollen liver, gallbladder distended.	Pullorum-testing removes most typhoid carriers. Obtain a replacement	Same as for pullorum, also nihydrazone.

				stock from tested flocks only.	
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Viral Diseases

Disease	Age Commonly Affected	External Appearance	Internal Appearance	Prevention	Treatment
Fowl-pox (chickens & turkeys)	Rarely in chicks or poults under 6 weeks. All other ages susceptible.	Wart-like scabs on face, wattles, comb and occasionally on feet, legs, and skin.	Yellowish raised patches in mouth and throat in respiratory type.	Vaccination; quarantine all new adult stock for at least two weeks.	Isolate the infected birds; remove objects that may cause comb and wattle injury.
Infectious laryngo-tracheitis.	2 months and over.	Watery eyes followed by violent fits of coughing, gurgling sound during breathing. Birds raise and extend neck when breathing.	Blood-stained mucous adhering to the walls of the windpipe.	Vaccinate all replacement stock at 8-12 weeks of age.	None.
Infectious bronchitis	Any age.	Milk coughing and sneezing. "Crackly" breathing sometimes heard. Low mortality in adult birds. Losses in chicks may be heavy	Mucous plug in lower windpipe.	Vaccination according to manufacturer's recommendation .	Raise brooder-house temperature. Antibiotic helpful to control complications.

Unlike other internal parasites there is no highly effective treatment of coccidiosis. Sulfa drugs and antibiotics are used with some success but they do not always result in a cure. The key to prevention is a dry, clean environment.

There are four diseases to vaccinate against: Marek's disease, fowl pox, Newcastle, and bronchitis. Your county agent or feed dealer can help you with this.

Merek's Disease attacks the nervous system of the chicken and there is no cure once the bird contracts the disease. Flocks can become resistant to it but only after exposure and high mortality. Having vaccinated stock is best to avoid such hazards.

As a precaution, all birds are tested for pullorum when they are vaccinated against ILT (Infectious Laryngotracheitis). ILT is a highly infectious viral disease that can devastate a flock, causing high mortality. The outbreaks occur most often during the fall and winter months, but can strike anytime. Vaccinations give the birds immunity to the disease. All birds in the flock must be vaccinated and there is a 30-day quarantine period. During this time, the birds should be confined. Do not visit other poultry owners or allow them onto your property for fear that the disease gets transmitted to unvaccinated flocks. Try to have adequate feed supplies on hand to last the quarantine period as entering farm supply stores during that period would be hazardous.

Treating and Preventing Diseases

The threat of some diseases can be partly eliminated by vaccinating. Ask your local veterinarian or poultry producers what diseases you should be keeping and eye out for and vaccinate against. If you would like to give the birds vaccinations yourself, learn from your veterinarian to make sure you are using proper techniques. Prevention is the best way to avoid diseases contaminating your flock. Many diseases of animals are spread by contact with other animals.

Tips to Prevent Disease

- Learn to recognize the most common diseases of poultry. Learn how these diseases are spread and how to prevent their spread.
- Limit exposure to visitors.
- Try to purchase poultry from a registered hatchery to ensure chicks have few, if any disease, and do not have pullorum.
- Isolate all new poultry from others for at least two weeks. Watch them carefully for any signs of disease. Do not put them into your flock until you are quite sure that they are healthy.
- Birds are tagged during vaccination with their numbers recorded. All birds entering shows must have current tags as proof of vaccination.
- When treating sick poultry, keep them separate from the rest of the herd. At chore time, handle the sick animals last.
- Prevent contact with wild birds and other animals.
- Eliminate the risk of disease spread by routinely and thoroughly cleaning barns, cages, egg trays, gardening tools, and water and feed containers. No equipment should be shared with or borrowed from other bird owners. Always clean your hands, clothing and footwear before and after handling birds. Promptly dispose of dead birds, litter and unused eggs.

If birds are kept confined in a properly sanitized room, there should be no problem with worms, lice or mites. There is no equal to good management in preventing disease. Good management means not only keeping clean facilities, but also ensuring that the birds are not stressed.

There could be a stress when the chicks are transported from the hatchery to your homes. Find out how long the birds have been in transit and when they were hatched. If there has been more than three or four hours of transit time, putting some vitamins and electrolytes in the chicks' water supply for the first 48 hours would probably be best. Later, if a lack of colour or liveliness becomes evident in the flock, administering a vitamin-antibiotic mixture in the water might be advisable. Remember, stress usually predisposes sickness, so being attentive is best and always try to offer an ideal environment to the flock rather than try to offset poor management with drug supplements.

Avian Influenza

Influenza (flu) is a broad term for many hundreds of related types of viral infections. To avoid confusion about the different types of influenza, here are three important distinctions:

- seasonal (or common) flu is a respiratory illness that can be transmitted from person to person. Most people have some immunity, and a vaccine is available.
- Pandemic flu is virulent human flu that causes a global outbreak, or pandemic, of serious illness. Because there is little natural immunity, the disease can spread easily from person to person. Currently, there is no pandemic flu.
- Avian (or bird) flu is caused by influenza viruses that occur naturally among wild birds. The H5N1 variant is deadly to domestic fowl and can be transmitted from birds to human. There is no human immunity and no vaccine is currently available.

Currently H5N1 avian flu has affected domestic poultry in many parts of the world, and the rare human cases have generally been linked to very close contact with infected birds. Avian flu is beyond the scope of this booklet, as the situation changes weekly. You can find regular updates on the development of avian flu at the British Columbia Centre for Disease control website at www.bccdc.org.

Administration of Medications

Keep in mind that it takes a lot of time and experience to be able to recognize and correctly diagnose diseases. Do not hesitate to seek the help of an expert such as an experienced poultry producer or veterinarian if you suspect your birds are ill, especially when purchasing and administering medications. The wrong type or dosage of medication can do a lot of harm so always be sure to double check. Develop a treatment plan for the various clinical signs that you may see in your birds. There are five ways to administer medications:

Orally - given in water, feed or as a drench

<u>Estimated water consumption in two hours for 1000 birds</u>		
Stock type	Age	Litres
Meat chickens	7 days	16
	14 days	30
Layers	2 weeks	9–11
	3 weeks	11–14
	4 weeks	13–16
	5 weeks	15–18
	6 weeks	16–20
	7 weeks	18–22
	8 weeks	20–25
	9 weeks	22–28
	10 weeks	25–31
	In lay	50

Source: <http://www2.dpi.qld.gov.au/extra/pdf/health/newcastle-disease-5.pdf>

Inhaled - sprayed in the air surrounding the flock

Eye Drop - vaccine is applied to eye through drops

Topical - salves, cream or ointments

Injection - not as common with poultry, as the above methods are usually used successfully. When this method is used, for large flocks a multi-dose vaccination gun can be used. There are three types of injections:

1. Intramuscular (IM) – in the muscle

- There are four sites for giving IM injections: breast, leg, tail and wing. See the diagram below for proper injection sites.
- 12.5 mm x 19 gauge needles are commonly used in automatic syringes.
- You will need two people: one person to hold and the other to give the injection. Hold the bird firmly so that the person injecting can access the injection site.
- Injection into leg – insert needle into the thigh muscle (between the hock joint and the knee joint) and make sure you direct the needle toward the bird’s body.
- Injection into breast – into the thickest part of the muscle and direct the needle toward the bird’s back.

- Injection into tail – point needle towards the bird’s head and to the side of the tail.
- Injection into wing – insert needle into underside of the wing, into the muscle group closest to the body.
- The needle should be inserted into the muscle with a quick thrust. Care should be taken to make sure the needle is inserted in the muscle, not just under the skin. You should pull back on the plunger to make sure the needle has not been inserted into a blood vessel, as evidenced by blood appearing in the syringe. The medication should be slowly injected into the muscle.

Recommended needle sizes and lengths:

Intramuscular Injection		
	Gauge	Length

2. Intravenous (IV) – in the vein

- Sometimes IV injections are necessary to get medicine directly into the bloodstream for a quick response. These are given in the jugular vein. Most producers rely on veterinarians for this type of injection.

3. Subcutaneous (SQ, Sub-Q) – under the skin

- SQ injections should be given in the lower neck. A SQ injection is given by making a “tent” with the skin and injecting the solution under the fold of the skin, parallel with the line of the neck. The medicine should be slowly injected. The size of needle should be similar or smaller than that used for intramuscular injections.

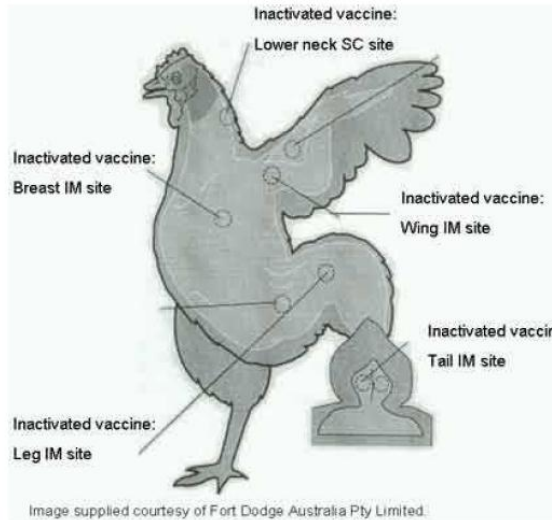
Recommended needle sizes and lengths:

Subcutaneous Injection		
	Gauge	Length

Use the smallest gauge needle possible when giving injections. Thin solutions will need a smaller gauge than thicker ones. A clean needle should be used (each time) when drawing medications or vaccines from a bottle.

Each time you administer any form of medication you should keep a record of it. Recommended label withdrawal times must be strictly adhered to. Additional safety precautions when administering medication would be wearing a mask and/or gloves.

Figure 1. Injection sites for inactivated vaccine



<http://www2.dpi.qld.gov.au/extra/pdf/health/newcastle-disease-5.pdf>

POULTRY REPRODUCTION AND BREEDING

When beginning with a poultry project, you will learn how to raise young birds. As you advance through the poultry project, you will want to explore more about the production of poultry, leading you to breeding stock.

When you select breeding hens, look for breed characteristics and healthy, productive hens. You should learn to distinguish between layers and non-layers, in order to ensure that the hens you keep are productive layers. The following information will help you look at key characteristics:

Character	Laying Hens	Non-Laying Hen
Vent	Large, dilated, oblong, moist, bleached	Small, contracted, round, dry, pigmented
Pubic Bones	Wide apart	Close together
Comb	Large, red, full, glossy, warm	Small, pale, scaly, cold
Wattles and Earlobes	Prominent, soft, smooth	Inconspicuous, rough, dry

Table source: NS 4-H Poultry Leaders Guide

Well cared for chickens will lay eggs for about one year. After your hens have laid eggs for a year, you may want to pick out the non-layers and dress them for eating. The entire flock should be replaced after twelve to fourteen months of production. The only reason to keep hens or roosters longer would be for show if no offspring were developed.

Breeding Methods

1) Rooster runs free with hens

You will need one rooster for 7 to 14 hens. It is recommended to have two roosters on hand in case something happens to one of them. This type of breeding system does not guarantee top quality chicks because hen selection is up to the rooster.

2) Individual breeding of hens

This breeding method allows for more accuracy and hen selection.

For individual breeding of hens, a separate pen is required. Allow .3 square metres (3.5 square feet) per bird. The pen should have clean litter all the time and an open nest available along with water and feed. After placing the rooster with the hen, allow three days before saving eggs for hatching. By using your best male and best female, you will be ensuring hatching top quality chicks.

3) Artificial Insemination (AI)

Artificial insemination is expensive for poultry producers and is very labour intensive. Therefore, for chickens the above 2 breeding methods are more commonly used. For breeding turkeys, however, commercial breeding for turkeys has resulted in a large size difference between males and females. This makes it hard for normal mating to be successful and artificial insemination is almost always used. When breeding turkeys, you will need special feeds and handling. Breeding toms may become hard to handle. The commercial selection of female turkeys has not selected for brooding and mothering ability, so you will require an incubator.

Egg Management for Breeders

Cleaning

Eggs for table use or for hatching should be collected frequently, cleaned and stored. Use clean nest eggs for hatching purposes. Hatching eggs must always be handled gently so that the embryo is not injured or the protective shell cracked. Before the eggs are incubated make sure that they are clean. Eggs can be wiped with a clean cloth or fine sandpaper.

Washing eggs is not recommended for small flock owners, especially for hatching eggs. Table eggs can be washed in 46-48°C water containing an egg detergent-sanitizer (ie., not a household detergent). Wash for no more than two to three minutes and allow for rapid drying and cooling. Never wash eggs in cold water.

Hatching the Egg

It takes some poultry eggs longer to hatch than others. The following table shows the differences in incubation periods of various birds:

Bird	Incubation Period
Pigeon	18 days
Pea fowl	28 days
Chicken	21 days
Turkey	28 days
Pheasant	23 to 28 days
Goose	28 to 34 days
Guinea	26 to 28 days
Muscovy Duck	35 to 37 days
Duck	28 days
Ostrich	42 days
Peafowl	28 to 30 days
Bobwhite Quail	23 to 24 days
Grouse	25 days
Canada Goose	35 days
Canary	14 to 15 days
Parakeet	19 to 20 days
Partridge, Chukar	23 to 24 days
Swan	42 days

Storing Eggs

Eggs for hatching should be collected three or four times daily. Avoid exposing hatching eggs to blasts of extreme cold or hot air, rain or snow. Hatching eggs must be cooled slowly to room temperature. After collection, hold the eggs at room temperature 21-24°C for three to four hours. To keep eggs fresh, store them in a refrigerator at 15 -18°C. Storing eggs in a low humidity refrigerator will allow the air cell to enlarge rapidly. Eggs should be kept at humidities from 70-80 percent. Hatching eggs should be stored small end down until a number are available for setting.

Keeping hatching eggs more than seven days before incubation will reduce the chance for a good hatch. Hatching eggs should not be stored more than seven days before setting. If you have more eggs than you can use, dispose of them weekly, thereby guaranteeing top-quality eggs. Eggs over two weeks of age should not be used for hatching. Egg quality declines as the egg gets older. In hatching egg management, be concerned with prevention of bacterial or mold infection and controlling temperature and humidity.

Storing Waterfowl Eggs

Eggs must be stored away from direct sunlight in a cool, humid location. Cellars or basements are ideal places; refrigerators are usually too cold. The ideal storage temperature for hatching eggs that are held for ten days or less seems to be 13-18°C. Eggs held for five days or more should be turned by leaning one end of the container against a wall or on a block at an angle of 30 - 40 degrees each day alternating the end that is raised.

Incubation

Two ways to incubate an egg are with a broody hen or in an incubator. A chick grows inside an egg the same way a gosling or duckling does and it does not matter if the egg is hatched naturally or in an incubator.

1) Broody Hen

If you are not using an incubator to incubate the eggs, duck, goose, turkey and chicken hens can be used. They are called broody hens. A broody hen is a hen that has stopped laying eggs so it can set on eggs to hatch them. Using a hen from your flock would be best. Broody hens are usually aggressive and cluck loudly indicating the urge to set. The best breeds for broodiness are the bantam breeds that have not had the broodiness instincts bred out of them. If chickens are used for hatching waterfowl, the eggs should be sprinkled daily with lukewarm water. If a duck or goose is used for hatching, water which comes from their feathers after a swim provides enough moisture for a good hatch.

To entice a broody hen to set, darken an area of the pen or a separate area where a nest with eggs is present. The broody hen prefers a darkened, comfortable, draft-free area. Allow 21 days from the time the hen begins to set on the eggs till the day the eggs will hatch. To break a hen of its broodiness, the idea is to do the opposite of what we did when you enticed her to set. That means making her uncomfortable, in bright light and having to move around.

A chicken hen or female duck can set on nine to eleven eggs (Muscovies 16 - 20) of their own eggs. A goose will cover nine to eleven eggs. If there are more than this amount remove the oldest and dirtiest eggs. Eggs must be positioned in a single layer to hatch well. Place the nest where it won't be disturbed during the incubation period and provide a convenient source of feed and water for the bird.

Basic Brooding Guidelines

- Keep the hen warm and dry and protect them from drafts
- Maintain them on dry bedding that provides good footing
- Supply fresh, non-medicated feed that provides a balanced diet
- Provide a constant supply of fresh water
- Furnish adequate floor space and fresh air
- Protect them from predators. Keep ducklings from becoming soaked during their first several weeks outside the shell;
- Bother them as little as possible;
- Confine the hen and chicks/ducklings each night until the chicks/ducklings are 6 to 8 weeks old.

Artificial Brooding for Waterfowl

The most common artificial brooder for 4-H members is the heat lamp, although other brooders can be used such as a battery brooder, hover brooder, and a homemade brooder.

Suspend the heat lamp, with a 250 watt bulb, 45-60 cm above the litter. The ducklings should be confined in a small pen which can be made larger as the ducklings get bigger. Each lamp will provide adequate heat for 20 - 24 ducklings, depending upon the size of the birds and the outside temperature. Always use extreme caution when using heat lamps to prevent fire. Make sure ducklings have adequate space to allow them to get out of direct heat from the brooder lamp.

The best way of determining how much heat the ducklings should have is based on their actions. If the ducklings are noisy and huddle together under the heat source, they are cold and additional heat should be supplied. When they stay away from the heat, or pant, they are too warm and the temperature needs to be lowered. The proper amount of heat is being provided when ducklings sleep peacefully under the brooder or move about freely, eating and drinking. Even at the start of the brooding period, it is extremely important that ducklings are able to get away from the heat source when they desire. Overheating is almost as damaging to ducklings as chilling.

2) *Incubators*

Incubators are heated containers used to hatch eggs. The temperature inside a still air incubator should stay at 39°C and for a circulating incubator, 37.5°C. A big hatchery can have between 14,000 and 100,000 eggs in incubators. Hatcheries that are this size use mechanized incubators but you can hatch eggs just as well in a small incubator.

Types of Incubators

Still-Air Incubators: Available with electric or oil heat. Simple to operate, dependable, nearly maintenance free.

Forced-Air Incubators: Equipped with fans or beaters which move warmed air around the surface of the eggs, and normally have multiple layers of egg trays. Better suited to automatic turning of eggs, and take less floor space for larger quantities of eggs. More complicated and require greater maintenance and sell for higher price. When using an incubator for duck eggs, follow the manufacturer's instructions for the machine being used.

Homemade Incubators: These can be made from a cardboard box and light bulbs for heat. In emergency situations it is possible to hatch eggs in an electric frying pan or heating pad.

Keeping the Egg Healthy

When you are incubating eggs, you have to:

- Keep the egg warm so the chick, or embryo, inside will grow. Temperatures for the incubator vary, a still air incubator has a temperature of 39°C (103°F) and a circulating air incubator has a temperature of 37.5°C (99.5°F).
- Keep the air inside the incubator moist or humid;
- Have good air ventilation inside the incubator but do not have it drafty;
- Turn the eggs regularly. This stops the chick from sticking to the shell. In a small incubator, the eggs should be turned at least four times daily. In large setters, the trays of eggs are usually automatically turned every hour. The eggs should not be turned during the hatching period.

Where to place the incubators

Place incubator in a room where the temperature does not fluctuate more than 5- 10° over a 24 hour period. Constant temperatures are especially important for still air incubators, which should be located in a room with an average temperature of 16-21°C. Do not position your machine where it will be in direct sunlight, or near a window, heater or air conditioner. Make sure the incubator is level.

Setting the Eggs

Start incubator 48 - 72 hours ahead of time. Make all necessary adjustments to temperature before eggs are set. Before placing eggs in the incubator, the eggs need to be warmed for 8 – 10 hours at room temperature. Always set them on their sides with the large end slightly raised. Do not disturb the eggs within the first 24 hours in the incubator.

Temperature

In still air machines the correct temperature is 38.6°C, 39°C, 39.1°C and 39.4°C respectively for the first, second, third and fourth weeks of incubation. Satisfactory results may be obtained by operating the incubator at 39°C for the entire period. It is essential that thermometers be positioned properly in still-air machines or an incorrect temperature reading will be given. In forced-air machines temperature is maintained at 37.5° - 37.7°C, since the sides of the eggs are warmed equally. Lowering the temperature by 1-1.5 degrees for the final two days is beneficial, since ducklings generate considerable internal heat in their struggle to free themselves from their shells.

Humidity

Moisture is usually supplied by water evaporating pans. To control humidity, the water surface area is increased or decreased, and the amount of ventilation regulated. The best indicator of whether the contents of the eggs are dehydrating at the correct rate is the size of their air cells. The air cells volume can be observed by candling the eggs. On the seventh, fourteen, and twenty-first days of incubation, the average air cell volume should be about the same size as the illustration below.

If the air cells are too large, increase the moisture by adding more water surface, and/or decrease ventilation. If the air cells are too small, do the opposite. Goose eggs hatch better if they are dipped into or sprinkled with warm water during incubation.

Turning

Turn the eggs three times daily at about eight hour intervals is the minimum for high percentage hatches. Duck eggs need to be rotated at regular hours and revolved at least 1/3 of the way around at each turning. Begin turning 24 - 36 hours after the eggs are set, and discontinue turning three days before the scheduled hatch date. When eggs are turned manually it is helpful to mark them with an X and an O on opposite side with a wax or lead pencil.

Cooling

For best results in still air incubators, eggs should be cooled once a day, except during the first week and the last three days of the incubation.

Sprinkling

Most waterfowl benefit from higher humidity than poultry and require more frequent sprinkling for a successful hatch. To prevent the egg membranes from drying out and becoming tough during the hatch, it is necessary to sprinkle the eggs with warm water from day 2 to 26.

How a Chick Develops

Before egg laying	Fertilization Division and growth of living cells.
Between laying & incubation	No-growth
During incubation	
Day 1	First sign of resemblance to a chick embryo; appearance of digestive tract; Nervous system, head and eyes start to form.
Day 2	Heart and ears start to form; heart begins to beat.
Day 3	Nose, legs, and wings start to form.
Day 4	Tongue starts to form
Day 5	Sex organs start to appear
Day 6	Beak starts to form
Day 8	Feathers start to form
Day 10	Beginning of hardening of beak
Day 13	Appearance of scales and claws
Day 14	Embryo gets into position to break the shell
Day 16	Scales, claws, and beak become firm
Day 17	Beak turns toward air cell
Day 19	Yolk begins to enter body cavity
Day 20	Yolk sac completely drawn into body cavity. Embryo occupies practically all the space within the egg except the air cell
Day 21	Hatching of chick

Candling Eggs

Eggs for table use will be unfertilized and are candled to check for cracked shells and to see the condition of the air cell, the yolk, albumen, blood spots or meat spots. For care of table eggs, refer to the subsection labelled, "Care of the Table Egg". Candling is done in a dark room with the egg held in front of a strong light that lets you see inside the egg. Candling is also used to see if the eggs are fertilized and if they are, to check how the embryo is growing.

An egg candler can be bought or made. A suitable light can be made by cutting a hole 3.2 cm (1 ¼ inch) in diameter in the end of a coffee or juice can. Insert a light fixture through the lid, using a 40-watt bulb. The interior of the egg can be viewed by holding the large end up to the hole cut in the bottom of the can. As light passes through the egg, twirl the egg several times. If blood spots, cracks or embryo development is present, you can detect them.

White chicken eggs should be checked for fertilization on the third day. Brown chicken eggs should be checked on the fifth or sixth day because seeing the blood vessels before this is difficult. The best time to check fertility or embryonic development for waterfowl is on the seventh day of incubation, unless they have dark-coloured shells; then waiting until the tenth day is better. If eggs are candled prematurely, it is more likely that fertile eggs will be accidentally discarded.

If an egg has been fertilized, you can see a small reddish area, or dark spot, with blood vessels running away from it. This resembles a spider in the center of its web.

If the embryo dies, the blood vessels break away and form a blood ring. All clear eggs and eggs showing blood rings or streaks should be removed from the incubator. Infertile eggs are clear with the yolk appearing as a floating shadow when the egg is moved from side to side.

Remember to candle eggs in a darkened area. To check for fertility of eggs, you can readily see the development of blood vessels three days after setting by using the candler. Dead embryos can be detected early by a ring of blood around the interior of the egg.

Hatch Day

The hatch day is an exciting day. Seeing your next generation of birds starting their life is quite an experience. Towards the end of the incubation period, the chick or duckling will push its head forward and break the shell membrane with its egg tooth, on the beak. The chick or duckling then starts to breathe the air in the air cell. This is called pipping. The following day, the chick will break out of its shell by using its beak to chip out of the egg shell. Assistance can be given to ducklings which are having trouble breaking out of their shells by carefully breaking away the shell just enough so that the duckling will be able to exit under its own power.

Newly hatched birds are wet and tired. They should be kept in the incubator 4 - 12 hours while gaining strength and drying off. If your incubator is equipped with air vents they should be regulated to give your chicks/ducklings extra air. You may find it necessary to place extra water containers in the machine to maintain a good level of humidity. If you do this, watch carefully to ensure none of your chicks or ducklings drown. After most of the chicks/ducklings are hatched, the relative humidity can be lowered to 50 per cent so they will fluff out properly. Remove the chicks/ducklings from the incubator when they are dry to a clean container prepared with soft bedding. This is usually about 24 hours after the hatch is completed. At the end of the hatch, thoroughly clean and disinfect the incubator and store it in a dry, sanitary location.

If hatched with a broody hen, the chicks can be left with the hen a day or two but should be removed soon and put in their own brooder. The broody hen can then be used to continue incubate other eggs.

Most 4-H members are going to raise day-old chicks through to adult birds. Your responsibility will be to care for them as they grow and mature. Ensure chicks have lots of water and feed, stay warm and have a clean pen to live in. Observe the stages of growth and see that the birds are healthy. They may not speak either of the official languages, but their actions and performance will tell you, as an observer, whether they are comfortable, happy and healthy.

Chick and Duckling Management Practices

Poultry

Information to follow

Waterfowl

Litter

Decide what material you are going to put under your ducklings or goslings. Consider these points:

- Thick layer of absorbent, mold free litter;
- Use shavings, sawdust, peanut hulls, peat moss, crushed corncobs, flax or chopped straw;
- Begin with 7.5-15 cm
- Remove wet litter and replace with dry litter.

When ducklings are started on litter, allow a minimum of 0.06 square metres of space per bird for the first two weeks, 0.15 square metres until four weeks, 0.24 square metres until six weeks and 0.27 - 2.70 square metres thereafter. At three to four weeks of age, give ducklings access to an outside pen or yard and allow 5.42 square metres per bird.

Other Examples of Brooders

WATER

Swimming Water

It is not necessary to have swimming water for ducklings. **It is safest to keep them out of the water until they are at least two weeks old.**

To protect ducklings from drowning, all water containers which they can enter should have gently sloping sides with good footing to allow tired and wet swimmers to exit easily.

Drinking Water

Ducklings must have a constant supply of room temperature drinking water. Use water containers designed so that young ducklings cannot get into the water thus reducing the risk of drowning. Ducklings are easily chilled when they become wet while still in the “down” stage. The water should be deep enough to allow them to dip their bills and head. Placing water containers over low wire covered frames helps keep the watering area dry and sanitary. Water containers should be rinsed out daily.

FEEDING

For maximum growth, feed your ducks a diet that provides 20 - 22% protein up to two weeks of age, and 16 - 18% protein from two to twelve weeks.

Management of Table Eggs

A hen can produce an egg without mating, which makes the egg unfertile and edible. Below is a diagram of the part of an unfertilized egg structure.

Diagram of Egg

It is easier to produce clean eggs than it is to clean dirty eggs. A properly insulated and ventilated house with deep litter is a big help in producing clean eggs. Gather the eggs often and keep the nest litter clean. Don't let the birds roost on the nests at night. Provide about 1 nest 1000 cm² of nest area for each 4 or 5 hens in a nesting room away from the heavy traffic in the house.

Even with best care and management a few eggs will be slightly soiled. These can be cleaned with steel wool or sandpaper on a block of wood and should be cleaned soon after they are gathered.

Gather Eggs Frequently in a Wire Basket

Eggs should be gathered at least three times a day and more often in extremely cold or hot weather. Most of the eggs will be laid by noon. A good schedule for gathering is 9:00 a.m., 12:00 noon and 4:00 p.m.

The eggs should be placed in a cool, humid place, free from stale or musty odours as soon as they are gathered. Ideal temperature and humidity are 4° to 15°C and 79% to 80% humidity. A cool basement or root cellar is probably the most practical place for egg storage on the farm. Leave the eggs in the wire basket overnight to cool thoroughly and pack them in the cases the following day.

Pack Eggs Properly

Always pack eggs point down in the case. They will deteriorate very rapidly when packed small end up. Sort out odd shape, small, extremely large, cracked and extremely dirty eggs and use them at home.

Do Not Hold Eggs Too Long

Eggs that are held under ideal conditions should go to market at least once a week. They should be marketed more often if the holding conditions are poor.

SHOWING POULTRY

GOOD PRACTICES AROUND POULTRY

Approach the birds in a quiet, confident, easy-moving manner that does not raise an alarm. Unalarmed birds will not try to take flight. However, poultry flying about an enclosure can cause unintentional injury through their panicked flight. Calm birds can be gently moved in a “herding” movement along the ground.

Catching poultry involves important skills – both for the birds’ wellbeing and your own. It is easiest to catch birds in low or blue light. Birds older than thirteen weeks should be carried by both legs or both wings; when releasing them, try to place them on their feet. Turkeys and larger breeds of chicken require greater support, and should be carried by both legs and one wing.

Never handle a chicken or turkey by the head, one wing, or one leg. This will create an out-of-control panic response in the bird, may injure it, and will almost certainly result in scratching or pecking injuries to the handler. The fear and distress of the one bird will rapidly communicate itself through the whole flock.

Use care when placing the birds into cages, and insert each bird headfirst. Be aware of the door closures to avoid pinching injuries, and file down any sharp edges on cage doors.

When moving chicks from the hatching tray, lift each chick gently and place it down, rather than tipping the whole tray. Chick trays can be heavy and awkwardly-shaped. Lifting these trays can cause back strain, so be sure to let your bent legs carry most of the weight as you lift.

When gathering eggs, pay attention to the behaviour of the roosting hen – she may try to peck as you retrieve the eggs. This can be particularly frightening to children who are asked to bring in the eggs; be sure that any child working around poultry is mature and confident enough to move a roosting hen.

For increased understanding of working with animals, below is a selection from: *Tips about Behaviour, and Good Practices Around Poultry*, are taken from “A Health and Safety Guide for Handling Farm Animals and Poultry,” FARSHA, 2006

Tips for Handling Turkeys

- Darken room for picking up individual turkeys, as a way to calm them.
- If you work closely with your birds as poults, they will learn to trust you and be easier to handle.
- Stampeding can be a problem when something disturbs them and they feel threatened. Stampeding birds will run or fly wildly, crashing into walls and other objects; they might also pile up in a corner and smother each other.

Training and Handling Birds

Handle the birds as often as possible, to get them used to you and trusting you. Pick up the birds by spreading your fingers and placing your hand palm up under the bird's breast as it faces you. As your palm touches the breast, you will find that the bird's legs will be between the fingers. As you lift the birds gently, grasp the legs by closing the fingers. You can now lift the birds without having it squirm and fight. When you have lifted the birds clear, you will find that they rest comfortably on the palm of your hand.

When taking the bird out of the cage, a large fowl especially, turn it to face the door and then gently take hold of the left wing with your right hand. At the same time, place your left hand under the bird to grasp the legs between your thumb and fingers.

For waterfowl, turn it to face the door and gently take hold of the bird with your right hand around the neck, close to the body. At the same time, slide your left hand under the bird's body placing your fingers between the bird's legs. You are supporting the bird along the length of its body with your forearm and palm. Handle geese the same way, being careful to hold the wings so the goose can't fly. Geese have to be handled carefully to prevent damage to their powerful wings.

If properly taken out of the cage, the bird will not struggle too much. To return it to the cage, hold the bird in the basic hand position, as above, open the cage door, turn the bird and gently put it into the cage head first.

Selecting Poultry for Show

Showing poultry does not begin when you enter the judging ring. It starts at least several weeks before with these steps. For more information about project selection, refer to the "Project Selection" section of this manual.

- *Choose your bird for show.* Start by looking at all parts of the bird as a whole picture. What you want is a blending of all parts of the bird viewed as a whole. A quality called symmetry.
- *Go over your bird carefully.* Go over each part carefully so you do not miss some defect or disqualification that the judge will probably find.
- *Your bird should be cage trained* if it is to be at its best with a judge. Place it in a coop for a week or so before you wash it or show it. Teach it to stand quietly and properly to show itself to the best advantage. Handle it daily, moving it gently about the cage. After the bird has quieted down and does not get excited easily, take it out of the cage. Handle it quietly, smoothing down its feathers and extending the wing, much as a judge will do. Ducks learn very fast and will know what is to be expected of them when it comes time to show if you prepare first.

Choose your waterfowl about eight to twelve weeks before the show. Look for a blending of all parts of the bird as a whole. Use the Scale of Points found in the *Livestock Judging Guide* and the Standard of Perfection (from the Fur and Feather Association) for your breed to choose the best of pair to use in the Show. Keep in mind that some breeds can be very flighty and difficult to train, while others are very easily trained. Remember to choose a duck and a drake.

Once you have selected your bird, go over each part of it carefully so you do not miss some defect or disqualification that the judge will probably find. Keep in mind that you are looking for birds that will help you demonstrate your knowledge about birds and your ability to handle them. If your waterfowl has any broken or damaged feathers, pull them out carefully to allow new feathers to grow into their place by show day. Sometimes it may take longer than 12 weeks for replacement feathers to grow back.

Preparing Poultry for Show

Washing Birds

Learning to wash birds is not a difficult task. With a little practice on birds you do not intend to exhibit, you will soon learn how it is done.

Wash Room and Coop – The room in which birds are to be washed should be warm and free from drafts. A temperature from 21°C to 27°C is about right. Coops should be provided in which to place the birds after they are washed. Plenty of clean straw or shavings should be placed in the coop to keep the washed birds from becoming soiled.

Equipment Needed for Washing – Provide four tubs, setting them on boxes or benches. Fill the first two tubs with lukewarm water, and third and fourth with cold water. Place a few drops of bluing in the fourth tub to give the water a slight blue color, but take care not to get the water too blue for it will give the plumage a bluish tinge. The water in the first tub will be used for cleaning, while the other tubs will be used for rinsing.

Washing consists of three parts: washing, rinsing and drying. Each is very important to a good finished job. It will help, especially for large birds, to have someone to help with the washing job.

For large fowl, you will need four large tubs and for bantams, small tubs or large pails will do. You will need mild liquid soap, or detergent, and several towels or soft absorbent cloths to wrap the bird in after the wash. In the first tub, make lots of suds. The water should be about the temperature of your arm. Keep your bird upright and push it up and down in the water, holding the wings, to get it thoroughly soaked right down to the skin. When the bird's feet rest on the bottom of the tub, release one hand but hold the bird firmly with the other. With the free hand, gently work the feathers over all parts of the body so soap and water will penetrate to the skin. Wash it carefully, always working your fingers with the feathers, never against, so as to not break any feathers.

Rinsing the Birds

After the bird has been well soaped and washed, it should then go through the rinse process in the next two tubs. Be sure to get all the soap out of the feathers. If you do not, the bird will be sticky and look worse than before washing, and the feathers just will not work.

The last tub should be cooler but not cold. It helps to put 125 ml (1/2 cup) of lemon juice in this water as it will help to cut any soap left. When the washed bird is removed from the final rinsing, dry the plumage as much as possible. First, work out as much water as possible with the hands, then dry with a towel. Once you have dried the bird as much as possible, place it in a clean coop to dry. Have the temperature warm enough so that the bird will not shiver but so that the feathers will not dry too fast. The washing should be done in the morning so that the bird will not sleep on its damp feathers and get them out of shape.

Drying the Birds

Birds should be watched as they dry to make sure that the feathers smooth out and do not curl. Dusting the bird with cornstarch when they are nearly dry will whiten the feathers and help the drying process. Coloured birds can be improved by gently rubbing the feathers with your hand or a silk cloth at least once a day to give them a glossy shine.

Cleaning the Shanks and Toes – Examine shanks and toes at this time to make sure no dirt remains under the scales. If there is some dirt, remove it carefully with a toothpick from under the scales. Use a

toothbrush, or moisten a small piece of cloth with olive oil or Vaseline, and rub it over the combs, wattles, beaks and shanks of the birds, Do not apply too much or the plumage may become stained.

Wash birds only the day or night before they are to be exhibited or shipped to the show.

Taking Birds to Achievement Day – A good, solid but light shipping coop should be used. Never carry birds to a show in a flimsy coop. Put plenty of clean, dry straw or shavings in the coop and fasten a cup in one corner for water, making sure it will not spill and stain the birds' plumage.

Preparing Waterfowl for the Show

Keep in mind that waterfowl are different than poultry, and bathing them is different. To bath your duck, use three tubs of lukewarm water. Use a soft cloth to wash the feathers and a toothbrush to scrub the birds bill, shank, toes and feet. **DO NOT USE SOAP when washing your duck because soap can cause the duck to dry out and die.** Keep the duck upright and move it up and down in the water to get it thoroughly soaked right down to the skin. **Be sure to keep their head out of the water.** Wash it carefully with your hand, always working your fingers with the feathers, never against.

The next two tubs are used to give the duck a thorough rinse. After rinsing, use towels to remove as much water as you can, before placing it in a clean cage. After you finish drying the bird, keep it at a temperature warm enough so the bird will not shiver but so that the feathers will not dry too fast.

If only some of the birds' feathers are dirty, it doesn't need a complete bath. For white birds, gently work cornmeal through the feathers from the bird's head to its tail. **DO NOT GO AGAINST THE FEATHERS!**

The day before your show, you may want to place a little mineral oil or petroleum jelly on a soft cloth and apply it to the bird's beak or bill, shanks and toes. Be careful not to apply too much or to touch it to the bird's plumage. After you're finished cleaning your bird, be sure its pen is clean so the bird does not get dirty again.

Showmanship

After selecting your show birds, put them in a cage or coop for an hour or so at a time. Feed them in the coops so they feel at home. Handle them carefully. Put them into the take them out of the coops head first. When taking them out use both hands.

A poultry show person is one who has learned the art of selecting, fitting and presenting poultry to advantage at a show. The more you work with your bird at home, the more confident you will be with it at the show, and this will be noticeable by the judge. The more you learn about project selection, parts, defects, disqualifications, breed and variety characteristics, and appearance of the bird by fitting and showing, you will be able to easily answer any questions the judge may have.

Take the job of showmanship step by step so that you get the procedure clearly in mind.

- Do it step by step.
- Repeat the steps and go over any points that you missed or did wrong.
- Have a member of your family act as the judge.

Showing Birds in 4-H

- The birds should be displayed in neat, properly constructed cages. **The name or number of the exhibitor should be on each cage.** The cage should have a hinged or sliding door on the side to enable ease of removing birds from the cage. A wire cage is suitable. It should meet all requirements for size and mesh size set out by the Nova Scotia 4-H program. Please refer to the Poultry Newsletter for specifics.
- The show person should be wearing white clothes. A lab coat is often a good idea as well. 4-H members exhibiting in an outdoor ring are permitted to wear a sun-safe hat.
- Birds should be removed head first from the cage. This is done by placing your hand under the bird, along the keel bone, and this manner of removing a bird from the cage avoids excitement and gives better control. Do not pull the bird from the cage by grabbing the legs.
- When showing the bird, hold it in either hand. The bird should rest along the flat of the arm from the wrist to the elbow. The hand holds the legs tightly to avoid escape by the bird. The other hand can be used to stroke the bird along the back or to open the wing or turn the head, if requested by the judge.
- The bird should be placed back in the cage head first. Gentle handling of the bird is important. Considerable previous handling by the owner will avoid much confusion and excitement of the birds at the show.

General Tips to Remember

- Be neat and clean. The show person should be wearing white clothes. A lab coat is often a good idea. 4-H members exhibiting in an outdoor ring are permitted to wear a sun-safe hat. Wearing hard soled boots or shoes is encouraged.
- Do not chew gum.
- Be **alert** but **polite** and **courteous** to the judge and fellow show people.
- **Do Not be late** entering the ring and **never cause delays** by visiting with other show people or spectators.
- Always remember to control your emotions and appear keen but relaxed despite where you are placed. Accept the decision of the judge like a true sports person. Keep in mind that the class is not over until the final decision is made.
- Be prepared to answer questions that would normally be asked by a judge as "Where did you get your birds?"
- Be prepared to **show any bird** the judge designates.

- **Make sure** the bird is **clean, well groomed** and **well trained**.
- Always keep the **bird under control** and make **frequent glances** at the judge to watch for directions.

Showmanship Technique

- Explicitly **follow the directions** of the judge.
- **Make sure the bird looks** its best from the time it enters the ring until it leaves.
- Never stand between the judge and your exhibit.
- Place the bird to its best advantage. He or she should recognize the conformation faults of the bird. Show it so that faults are minimized.
- **Move from one position to another**, whether up or down in a class.
- **Make room** for a contestant, who has been moved ahead of him or her. Being discourteous in this regard should result in discrimination.
- **Changing birds with another member**. The conformation of the new bird should be observed quickly but carefully to show it to its best advantage. Place the bird properly.

Poultry Showmanship

In poultry showmanship, the show person carries the bird directly to a table where the show person presents the bird to the judge. The value of poultry showmanship is being recognized by people interested in poultry projects for teaching skills and knowledge to young people. At the show table there is every opportunity to see differences in quality, hear all the comments of the judges on your exhibit and to learn by observation the finer points of poultry showmanship. The audience, too, can follow the judging and learn from the experience. The important thing is that the handling of the bird is natural and comfortable for both the show person and the bird and helps the judge see what he or she is looking for. Contests, however, must have some basis for judging correctness and often judges prefer to use the recommended procedures available to all participants as a basis for correct handling. The recommended procedures follow in the chart.

Step	You will do	Judge will do
1. Place birds in exhibition coop for showing.		
	One hand around legs and the other over the back. To avoid fright to prevent birds getting loose. To keep feathers smooth.	
2. Pose birds.		
	From rear of coop with short pointer to keep birds in position so that they will look their best. Keep head, tail, wings, in normal position.	Judge will be able to see the bird more clearly.
I. Remove the bird from coop and carry to the show table		
1) Remove the bird from exhibition coop.		
	Take the bird from the coop by grasping the left wing with hand and turn bird's head toward the door. Place left hand beneath body with the index finger between the legs and the remaining three fingers grasping one leg and the thumb the other. Place right hand on the back and remove head first.	In a large show, the judge will often not see the show person removing the bird from the coop but will see that show person for the first time as he/she approaches the judging table carrying his/her exhibit. If you see the coop, watch for the proper removal of the bird.
2) Carry the bird to the judging table.		
	The proper way to carry a bird is to use the same left-hand hold as in removing from the coop with the head under the elbow with right hand placed on the back. Do not place the bird on the table until the judges asks.	Observe the way the show person is holding and carrying the bird. When you ask the show person to move their birds at the table, they should pick up the bird in carrying position before moving.
II. Showing your bird to the judge		
When asked by the judge, show the following:		
1) The Head		
	Holding the bird in the left hand, show both sides of the bird at shoulder height. Use right-hand thumb on beak to turn head while also turning left hand slightly when showing the right side of the bird's head.	Check head for defects, disqualifications and for outstanding features.
2) Wings		
	Spread wings to show feather pattern and condition. Showing bird's right wing requires crossing right hand over bird with thumb up. Open left wing with the free hand. Open right wing with free hand by switching the free hand across the front of the bird. Remember, the right wing is the bird's right wing and left wing is the birds' left wing.	Check wings for broken or missing feathers and for colour pattern in certain breeds.
3) Under colour; body plumage		
	Show under colour of back and body feathers.	Observe under colour and determine if defects or high qualities are present.
4) Width of body		
	Show width by using span of right hand over back.	Observe the width of the bird.
5) Breastbone		
	Show breastbone by turning the back of the bird against your body with the left hand. With right hand, grasp legs and pull to your right while sliding left hand to breast to expose breast between fingers of the left hand.	Observe straightness of the breastbone general condition of the bird.
6) Feet and legs		
	Show feet and legs by placing bird against your body with head up using left hand. With right hand show feet and spread toes	Observe feet and legs and check for stubs on clean legged breeds and proper feathering on feather legged

ALWAYS STAY ON THE ALERT!! NEVER STOP SHOWING YOUR BIRD!!

Waterfowl Showmanship

A waterfowl show person is one who has learned the art of selecting, fitting and presenting waterfowl to advantage at the show. The confidence and ability displayed by the member and the bird's response suggests previous work done with the bird. Knowledge of the show person in response to questions about parts, defects, qualifications, breed, and variety characteristics and the appearance of the bird shows an ability to select and fit it for show. For general show person tips, read through the tips for poultry people as they also apply to showing waterfowl.

The judge may ask you to show him/her many different things at the showmanship table, these include:

1. **Set up the Duck** - Always stand your duck with its head facing toward the judges right. Stand at attention behind the duck, facing the judge.
2. **Pick up the Duck** - Always hold your duck under your left arm. To pick it up, put your left hand under the duck's breast, giving support to its weight and at the same time grasping the legs together. Your thumb should be outside one leg and your index finger should be between the duck's legs. Use your remaining fingers to grasp the other leg of the duck at the thigh area. Place your other hand over the back of the duck to prevent it from trying to escape. The duck can be held with its head under your arm. The weight of the duck should be rested on your forearm.
3. **Show the Width of the duck** - Spread your thumb and first finger at the base of the wings. This shows the width of the back.
4. **Show the Tail** - With your right hand, gently push the tail feathers upwards and then downwards.
5. **Show the Color** - Brush back the feathers just above the tail.
6. **Body Fluff** - Turn the duck slightly sideways, brush back the feathers from the side of the tail to the base of the wing.
7. **Show the Wings** - To show the left wing, use your right hand to spread the wing. To show the right wing, reach under the duck's head and extend the wing. Younger members can reach over the top of the duck, but the judge will deduct from their showmanship mark.
8. **Show the Head** - Place your right hand under the bill. Show one side then the other. Turn the duck while you are showing each side. The bird should be elevated in the left hand – head outward.
9. **Show the Keel** - To show the keel you must tuck your hand under to flip the duck so its back is resting against your body. Place the keel bone between your first two fingers. The judge may feel the keel.
10. **Show the Feet** - Shown in the same position as the keel. Reach down and show the judge one foot after the other, the top and the bottom.

The Judge may ask you to switch ducks or pick up your duck and walk around the table. Remember when walking around the table to always keep your eye on the judge. **NOTE: Step 2 - 8 are to be done with the duck picked up, not on the table. The duck is only on the table when it is being posed.**

The difference between duck and geese showmanship is that goose show person does not have to hold the gander in the left hand during showing and in between elements; however, the duck show person is required to do this. Instead of holding the heavy or medium-sized gander, it will be allowed to remain on the table for displaying different parts.

Techniques for Showing Waterfowl

Ducks will be shown on a table. If showing a very large goose you may choose to walk the bird in showmanship.

- Walk in a clockwise direction as indicated by the judge.
- Use a cane to guide the bird; forward, right, left and to slow down (with handle) as required in order to keep the bird moving clockwise around the ring.
- When the judge asks you to pose the bird, calmly stop the bird, squat or kneel (on one knee) beside the bird.
- Place your left hand in the front of the neck, with an open palm, do not grasp the neck. Place the bird's feet with your right hand.
- Show the parts of the bird as requested by the judge.
- Just before entering the ring, remember to wipe of any dirt stuck to the bird's legs and anything that may have collected around the vent.
- Take a mat or carpet to the ring with you for your duck or goose to stand on. It should not be a crazy colour that will detract attention from your bird.
- If you have been holding your bird for a while waiting for a class, just before your class put your bird down as they may need to "go to the bathroom" before you enter the showing.
- It is acceptable to use either hand while showing, but advised to use your left hand to hold the bird and right to show the parts of your bird.

General Showmanship Scorecard

<u>Appearance and condition of bird</u> Cleanliness, fleshing, condition of feathers, and evidence of prior handling.	25 Points
<u>Appearance and attitude of club member</u> Clean, courteous, attentive, clothes suitable to the occasion, alert and enthusiastic.	25 Points
<u>Showing the Bird</u> Ability to remove from cage, hold, display bird for examination by judge, replacing bird in cage and posing bird.	30 Points
<u>Knowledge of Poultry Project</u> Ability to answer questions regarding breed, part of the bird, desirable conformation and general disqualifications, bird's faults, and bird's feeding and management program.	20 Points

TOTAL POINTS 100

Practice Makes Perfect

You should be able to answer questions about your project when asked by the judge.

Typical questions might be asked:

1. When were your birds hatched?
2. How much do your birds weigh at the present time?
3. How much feed have they eaten?
4. How much money have you invested in them up to the present time?
5. When do you expect your pullets to start laying?
6. Name five disqualifications.
7. What are the strong points you see in your birds? What are the weak points you would change if you could improve them?
8. What are the large wing feathers called? How many feather in the normal wing?
9. Name five parts of the head.
10. How should you fit your birds for Achievement Day?
11. What is the most important thing you have learned about poultry?

12. How many toes do the common breeds of chickens have?

Marketing

What is Marketing?

Marketing is the activities involved with getting a product from the person who grows the product (the producer) to the person who buys the product (the consumer).

The selection, breeding, feeding and management programs that have been discussed in this manual are designed to put a high quality chicken and egg product on the market. If growers do not produce the kind of chicken consumers will buy, the consumers will look to other meat products to fill their demand for meat.

In Canada, poultry are marketed in various ways. Regardless of your marketing method, go to the market when your birds are sold and learn all you can about poultry marketing. Follow birds through the slaughtering process and examine your poultry carcasses hanging in the meat coolers. Official meat graders will evaluate your poultry carcasses and explain the differences in carcass quality. Arrangements need to be made in advance for this.

The Poultry Industry in BC

British Columbia's poultry industry is made up of four major sectors: chicken (meat) growers, the layer (egg) industry, broiler breeders and turkey producers. Other smaller sectors include breeder pullet growers, layer pullet growers, layer breeders and turkey breeders. Waterfowl and other poultry types that are produced are ducks, geese, squab, pheasant, quail and silkie chickens. The Fraser Valley region is the primary area for chicken, turkey and egg production. Other regions that have production are Vancouver Island and the Interior.

When looking at the poultry industry, it is important to look at how production and consumption of poultry meat and eggs have changed. If you are interested, you will need to research this information and statistics further.

Supply Management

The poultry industry in Canada is under a supply management marketing system. This is where producers control the production of a certain commodity. Supply management is done to make sure that

farmers grow enough food to match what consumers need and want, and that the farmers get stable prices. Supply management for poultry and eggs is through an agreement within the province, as well as nationally.

There are 4 poultry products that are supply-managed: eggs, turkey, chicken and broiler hatching eggs. The following marketing boards look after this system for poultry and eggs in BC:

The BC Broiler Hatching Egg Commission

The BC Chicken Marketing Board

The BC Egg Marketing Board

The BC Turkey Marketing Board

For more information about supply management and the poultry products, start with the different marketing boards and ask producers that are currently working with these systems.

Poultry Products - Meat

Non-producing hens or any bird not required for propagating your flock or for egg production should be removed from the flock. These birds can be slaughtered and used for home consumption.

There are different ways of growing your birds to appeal to different consumers. These are free-run, free-range and organic chicken. Free-run means that the chicken can run around freely and is not confined in a cage. Free-range means that chickens are allowed access to the outside for part of the day. Organic is a broad term, but for chickens it means that the at least 80% of the chicken's diet must be from organic sources.

Processing Birds for Meat

The equipment needed for slaughter are a sharp knife, funnel, rope, propane torch and a pail of scalding water. The birds should be hung upside down in the funnel. The birds should be hung upside down in the funnel which holds the body and allows the head and neck to protrude. The funnel prevents flopping and the bird bleeds freely. To get a good bleed-out, cut the jugular vein in the neck and let bleed for a few minutes or until bleeding stops. The bird should then be removed from the funnel and immersed in the pail of scalding water 60-70°C. Scald only enough to ensure easy plucking. When the feathers become easy to remove, hold the bird by the feet and pluck out the feathers. When all the feathers are removed, use a propane torch to singe off hairs left on the bird. Cool the carcass rapidly to maintain a satisfactory appearance and to prevent spoilage of the meat.

The next step is to eviscerate the bird. Cut along the abdomen and around the vent enough so your hand can be inserted into the bird's body cavity to remove the insides. When all insides are removed, insuring all the lungs and kidneys are gone, remove the crop by cutting along the skin of the neck and plying the crop away from the tissues. The remaining trachea should be removed with the head.

The feet of the bird should be removed and the legs tied together or enclosed in a flap of abdominal skin. The gizzard, heart and liver can be saved for eating. The gizzard is prepared by cutting along the middle, turning the inside out and removing the inner lining of the gizzard. The neck can also be removed. After washing out the inside and outside of the bird, the neck, gizzard, heart and liver may be placed in a small bag and placed inside the bird until the time the bird is ready for use. The bird should

be cooled as quickly as possible and can be frozen until ready to cook. For long term storage, put the carcass in a plastic bag with excess air removed.

Waterfowl

Meat - Non-producing ducks or geese that will not be used for breeding or egg production should be removed from your flock. These birds can be processed and used for home consumption.

Most ducks are marketed at seven to eight weeks of age. Peking ducks will weigh 2.5 - 2.9 kg and be relatively free of pin feathers. As a general rule, geese should be killed when 11-16 weeks of age.

The same materials and method can be used for processing waterfowl as explained above.

Meat Cuts

Knowing the various cuts of chicken will help you learn what to look for in a bird and what is important when feeding and conditioning.

In addition to main cuts, Canadian poultry is also processed into cooked and cured products. In addition, there are specialty poultry products for ethnic markets. These products are based on what we eat in Canada; however, processing can vary depending on what market the producer is trying to cater to if they are marketing internationally.

Quality Grading of Meat

Poultry carcasses are quality graded at slaughter. The three grades of poultry classes are: Canada A, Canada B, Canada Utility, Canada C and Canada Canner. The major grade requirements are listed in the following table.

Canada "A"	Canada "B"	Canada Utility	Canada "C"	Canada Canner
Not deformed except for a slightly crooked keel bone that does not interfere with normal placement of meat.	Not deformed except for a slightly crooked keel bone that may interfere with normal placement of meat.	Has the flesh and fat requirements for at least Canada B and does not have more than:	Has sufficient fullness of flesh on both sides of keel bone to prevent sharp falling away of flesh from anterior to posterior and keel bone does not project more than 4.8 mm beyond flesh.	Meets requirements of other grades except that:
Moderately plump on both sides of leg bone at an anterior end with a moderate tapering of flesh toward posterior end and keel bone at an anterior end does not project more than 3.2 mm beyond flesh.	Has sufficient fullness of flesh on both sides of keel bone to prevent a sharp falling of flesh from anterior to a posterior end and keel does not project more than 3.2 mm beyond the flesh.	a) the wings		a) both legs including thighs
Has definite deposit of fat at the base of neck with fat continuing up the side and into V of wishbone, and there is evidence of fat over breast and thighs.	Has sufficient fat to prevent the flesh from appearing prominently through the skin.	b) one leg including the thigh or both drumsticks		b) area of skin excluding ½ area of breast
		c) the tail		c) an amount of flesh not exceeding ½ of flesh of breast may have been removed.
		d) small areas of flesh from the carcass		

		e) skin not exceeding an area equivalent to 1/2 of area of breast have been removed		
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Source: NS 4-H

Quality Assurance

In Canada, poultry production is under high standards of food safety and quality. This is to make sure that consumers are getting a safe and high quality product. Programs are in place for the poultry industry for on-farm production practices, animal feed manufacturers, and processing of the finished product. If you want to learn more about on-farm food safety, look for the Chicken Farmers of Canada's On-farm food safety program called *Safe, Safer, Safest*. Also refer to other sections in this manual for proper feeding and medication practices so that you can make sure you are taking the appropriate actions with your project animal.

While withdrawal times for antibiotics are important to keep track of, there is more you can do to make sure that your bird brings quality meat to the market. The way that live birds are handled affects their meat quality. Bruised meat lowers the value of the meat, as it must be cut off the carcass. Ways to avoid bruising include taking care when handling and transporting animals.

Meat Inspection

In September 2004, the Province of British Columbia enacted a new Meat Inspection Regulation under the Food Safety Act. Under the new regulations, all BC abattoirs that produce meat for human consumption will have to be either provincially or federally licensed. Only meat from livestock slaughtered in a licensed abattoir can be sold for food. All animals processed in licensed abattoirs will be inspected both before and after slaughter.

To help with this meat industry transition, the BC Food Processors Association along with government and the meat industry developed the Meat Industry Enhancement Strategy (MIES). The MIES addresses issues raised by the industry, including concerns about slaughter and processing regulations, waste disposal, food safety and market access. Its primary goal is to enhance BC's slaughter and meat processing capacity.

In addition to provincially inspected plants, there are federally inspected ones. The Canadian Food Inspection Agency (CFIA) is responsible for federal inspection, which includes veterinarians and inspectors. A Canada stamp will identify meat products processed in federally inspected plants. Federal inspection is not always necessary for a local market, but is important when the meat is exported.

Poultry Products - Eggs

Egg Production

A good flock of ten laying hens will produce three to four dozen eggs per week. This will supply the needs of most families. Waterfowl raised for commercial egg production is limited in BC. Consumers are not interested in purchasing duck or goose eggs for consumption.

If you are collecting eggs for hatching, select those from parents selected for show bird conformation, productivity, vigour, size, health and freedom from any physical abnormalities and must meet breed standards without any disqualifying traits present.

Food Safety and Regulations for Eggs

Quality Grading of Eggs

Eggs are graded to ensure a quality product and so that they are safe for consumers. When grading, eggs are judged on: interior quality, weight, cleanliness and shell construction. Grading is done in a registered egg station to make sure handling and packing is done in a clean manner. The grade standards have been set and monitored by the Canadian Food Inspection Agency. In 2003, Health Canada made nutrition labelling of foods mandatory. Egg cartons need to be labelled with nutrition facts and nutrition and health claims for the consumer's information.

What happens at an egg grading station?

There are 6 stations in BC that eggs can go to be graded, or farmers may have their own license to do it themselves. When the eggs arrive at the station, they are washed and candled, then weighed and packed into cartons. The eggs go into cartons with their matching federal grade name. At the station, everything is clean and gets inspected regularly.

<u>Grade</u>	<u>Grade Characteristics</u>	
Grade A	Egg has a thick white, a well centered yolk, a very small air cell, and a clean, sound shell.	Eggs are sold to retail stores and restaurants, usually within four days of being laid.
Grade B	Egg may have a flat yolk, or a thin, watery white, or a rough shell.	Eggs are used in commercial baking, or sent to breaking plants to be used in further food processing.
Grade C	Egg has a loose yolk, the white is thin and watery, and the shell may be cracked.	Eggs are sent to breaking plants to be used in food processing or used in non-food items. These eggs are not sold to retail stores.

Source: <http://www.bcegg.com/home.aspx>

Only Grade A eggs are sized according to their weight.

<u>Size</u>	<u>Weight Range</u>
Peewee	under 42 g
Small	42 g - 48 g
Medium	49 g - 55 g
Large	56 g - 63 g
Extra Large	63 g - 69 g
Jumbo	over 70 g

Source: <http://www.bcegg.com/home.aspx>

Poultry Products - Feathers

Goose feathers are used for many purposes. The softer feathers are used in making pillows, comforters and sleeping bags of the very finest quality. A goose can yield 100-200 g (3.5 - 7.04 oz). Wash the feathers in lukewarm water with a detergent, rinse thoroughly and dry. Spread the feathers and stir frequently during the drying process to fluff them.

Traceability of Poultry

What is Traceability?

A *poultry traceability system* is a poultry identification system that allows for the tracing back and forth of live animals and their products.

There are three important parts to traceability:

- Identification of product
- Identification of farms and animals
- Tracking movement of animals and products

Why is This Important?

Traceability is important in proving to consumers that poultry meat and eggs are safe products, which are produced under controlled conditions and carefully monitored. The Avian Influenza outbreak pointed out the value of traceability to support crisis management, but showed some gaps in the current system.

Is there a poultry traceability system currently in place?

The poultry industry is to recognize needs for programs at a provincial level. The BC poultry industry initiated a Premise Identification Program in response to avian influenza. This includes locating, identifying, geo-referencing and mapping all commercial poultry operations in BC.

This is an ongoing process that will put the livestock sector in a position to identify all premises in Canada where animals are raised, quarantined, auctioned and slaughtered.

Avian Influenza

As a member interested in poultry, you may have wondered about the current events surrounding avian influenza, also known as bird flu. The symptoms and information of how avian influenza affects poultry is located in the Husbandry and Health section of this manual. It is also important to think about the effects on the poultry industry in BC, Canada and the international community.

Avian influenza is a reportable disease under the Health of Animals Act, meaning that all cases have to be reported to the Canadian Food Inspection Agency (CFIA).

CFIA's Activities

- Setting import restrictions on poultry, poultry products and birds from other countries.
- Surveillance of domestic poultry and wild birds in Canada
- Promoting awareness and adoption of biosecurity best practices in the poultry industry, international travel and commercial importing.
- Developing and implementing foreign animal diseases emergency response plans
- Contributing to international efforts to combat AI in affected countries

The Effect on Canada

With past outbreaks in 2004 and 2005, 410 commercial poultry farms and 553 backyard flocks were affected, totaling 14.9 million commercial and 18 thousand backyard birds. This had a big impact on the industry, and economically it cost over 300 million dollars.

Inspection, control and prevention toward AI are still important and will continue to happen, with the hope of Canada getting back the disease free status. This status is important for the international market and Canada's exports of poultry products.

Glossary

A

Abdomen: area between the keel and pubic bones

Albumen: The whitish watery substance (88% water, 11% protein) that surrounds and contains the yolk in the center of the egg shell.

Allantois: An embryonic membrane which in birds serves as a respiratory organ and a reservoir for waste and facilitates the absorption of albumen and calcium.

Amnion: A thin, membranous fluid-filled sac surrounding the embryo.

Avian: Of or pertaining to the vertebrate class Aves or birds.

B

Bacteria: Microscopic single-celled plants, some of which cause disease.

Balanced Ration: A ration which supplies the necessary nutrients – protein, carbohydrates, fats, minerals, vitamins and water in proportion to properly nourish an animal.

Barring: alternate strips of light and dark across a feather

Beak: upper and lower parts of the mouth of chickens, turkeys, etc.

Beard: Growth or wiry hairs on the front portion of the breast of a male turkey

Bill: upper and lower parts of the mouth of waterfowl

Blastoderm: The collective mass of cells produced by the division of a fertilized ovum and from which the embryo develops.

Blastodisc: The embryo-forming spot on the ovum, from which the blastoderm develops after the ovum is fertilized by a sperm.

Breast: the forward part of the body between the neck and the keel bone

Breed: a group of fowl related by ancestry and breeding. Birds of a breed all show certain characteristics such as body shape and size

Breeder ration: Feed used for the production of hatching eggs.

Breeding Stock: Adult birds used to produce young.

Broiler: usually a young chicken 6 to 7 weeks of age or sometimes a young turkey processed for meat

Brood: Baby chicks hatched from one nest (setting) of eggs.

Brooder: A heated shelter or cover for raising young birds.

Broody: maternal instinct causing the female to want to hatch eggs

C

Candling: Observing the shell and the contents of the egg (blood vessels, embryo, air cell) through the shell by holding the egg up to a bright light focused on the shell.

Cannibalism: The habit of birds attacking other birds due to overcrowding, diet deficiency or other reason.

Capon: An unsexed male bird, distinguished by the undeveloped comb and wattles, the presence of long, narrow hackle and saddle feathers, and low tail.

Carcass: The major portion of a meat animal remaining after slaughter. Varies among animals, but usually the head and internal organs have been removed.

Cell: A microscopic mass of protoplasm enclosed in a semi-permeable membrane and containing a nucleus; it is capable of functioning as an independent unit.

Chalazae: Tiny white cords of protein fiber that are twisted like a rope at each end of the yolk. They anchor the yolk in the center of the egg shell cavity.

Chicken: Means a bird of the species *Gallus Domesticus* having flexible cartilage at the posterior end of the breast or keel bone, tender meat and soft skin of smooth texture.

Chicken Capon: Means a male bird of the species *Gallus Domesticus* having flexible cartilage at the posterior end of the breast or keel bone, tender meat and soft skin of smooth texture.

Chorion: A membrane enveloping the embryo, external to and enclosing the amnion.

Chromosomes: A series of paired bodies in the cell nucleus, constant in number in any one kind of plant or animal and containing genetic information.

Class: the specified geographic area from which certain breeds of chicken originated. For example, the White Leghorn belongs to the Mediterranean Class.

Cloaca: In birds, the common chamber into which the intestinal, urinary, and reproductive canals discharge.

Cock: Male bird over 1 year old.

Cockerel: a male chicken less than 12 months of age

Comb: the fleshy part on top of the head of chickens, usually a reddish colour

Concentrate: Feeds low in fibre and supplying large amount of digestible nutrients, e.g. cereal grains, oil meals.

Conformation: The body type, or physical characteristics of the fowl.

Culling: Process of selecting for most desirable animals and removing undesirable animals.

D

Digestible Crude Protein (D.C.P.): Portion of the total protein in a feed that can be digested by the animal.

Dorsal: Of, on, or near the back.

Down: the soft, fine, fluffy covering of young birds. Down feathers may also be present on adult birds.

Drake: a male duck

Dressed Poultry: Bird with blood and feathers removed.

Duck: female duck

Duckling: young duck of either sex

E

Egg (avian): The female reproductive cell (ovum) surrounded by a protective calcium shell; if fertilized by the male reproductive cell (sperm) and properly incubated, it is capable of developing into a new individual.

Egg tooth: The temporary horny cap on the chick's upper beak which serves for pipping (breaking through) the shell; also called the chicken tooth.

Embryo: A fertilized egg at any stage of development prior to hatching. In its later stages, it clearly resembles the fully developed chick.

Embryology: The study of the formation and development of plant and animal embryos.

Esophagus: The tube in which food passes from the mouth to the digestive tract.

Evaporation: The conversion of moisture (liquid) into vapor (gas).

Eviscerated: slaughtered bird with feather, head, feet and inner organs (viscera) removed

F

Fat: An energy-rich nutrient made up of carbon, hydrogen, and oxygen and found in plant and animal tissue.

Feed Conversion: The ability of birds to convert feed into body growth or eggs. To calculate feed conversion ratios, divide pounds of feed consumed by pounds of body weight or eggs.

Fertile: Capable of reproducing.

Fertility: In reference to eggs, the capability of producing an embryo. Fertility is expressed as a percentage that equals the total number of eggs set minus those that are infertile, divide by the total number set, times 100.

Fertilized: In reproduction, an ovum impregnated by a sperm.

Finish: relates to the meat quality of a dressed or eviscerated bird

Fleshing: the meatiness of a bird, the ratio of meat to bone

Follicle (ovarian): The thin membrane of the ovary which, in the chick, encloses the developing yolk.

Fryer: A young chicken of either sex that weighs from 1 - 1½ kg. (2½ - 4 lbs.) (same as a broiler).

Full-feathered: When a bird has a complete set of feathers.

Further Processing: Means dressed or eviscerated poultry intended for cutting into parts, canning or manufacturing into various food products.

G

Gander: male goose

Gene: An element in the chromosome of the egg or sperm cell that transmits hereditary characteristics.

Germ: developing embryo inside an egg

Gizzard: The muscular organ that contains grit for grinding the food eaten by birds.

Gonad: A gland that produces reproductive cells; the ovary or testis.

Goose: Female goose

Gosling: young goose of either sex

Growing ration: Feed that is formulated to stimulate fast growth in chicks/ducklings over two weeks old.

H

Hackle: plumage on side and rear of the neck

Hatchability: Refers to number of fertile eggs that hatch; usually expressed as a percentage.

Hatching egg: A fertilized egg with the potential for producing a chick.

Hen: a female chicken more than 19 weeks old

Hereditary: The transmission of genetic or physical traits of parents to their offspring

Hock: the joint of the leg between the lower thigh and the shank

Hormones: A chemical messenger sent from one part of the body to another

Humidity: see **relative humidity**.

I

Incubate: To maintain favorable conditions for hatching fertile eggs.

Incubator: A container with the proper humidity and temperature for hatching fertile eggs.

Infundibulum: The entrance to the oviduct.

K

Keel: the breast bone

Keet: a young guinea fowl

L

Laying ration: Feed that is formulated to stimulate high egg production.

M

Mature Duck or Goose: Means a duck or goose that does not have flexible cartilage at a posterior end of the breast or keel bone, tender meat or soft skin of smooth texture.

Mature Turkey: Means a turkey that does not have flexible cartilage at the posterior end of the breast or keel bone, tender meat or soft skin of smooth texture.

Membrane: A thin, soft, pliable layer of tissue.

Moult: to shed old feathers and grow new ones

N

Nutrient: Compound or group of compounds of the same general composition that aid in the support of animal life.

Nutritious: Referring to food that contains substances necessary to sustain life and growth.

O

Oil sac: a large oil gland (preen gland) on the base of the tail used to preen or condition the feathers

Ovary: The female reproductive gland in which eggs (ova) are formed.

Oviduct: The tube through which eggs pass after leaving the ovary.

Ovum: The female reproductive cell.

P

Palatability: The degree to which an animal will eat a feed depending if it is pleasant to the taste, smell and feel.

Papilla: In the rooster, tiny projections in the cloaca through which semen is ejected.

Parasite: Internal or external organism which lives in or on the host animal at whose expense it obtains food and shelter.

Peristaltic action: In the hen, involuntary muscle movement that pushes the egg through the oviduct.

Pin feathers: The tips of new feathers coming through or about to come through a birds skin.

Pipping: what a chick does as it breaks through the shell to hatch

Pituitary gland: A small oval organ attached to the brain that secretes hormones affecting growth.

Pores: In the shell of an egg, thousands of minute openings through which gases are exchanged.

Post-mortem: The thorough examination of a dead bird, usually to determine the cause of death.

Poult: a young turkey

Primaries: the long, stiff flight feathers on the outermost half of the wing

Processed Poultry: Means dressed or eviscerated poultry.

Protein: A nitrogenous compound composed of amino acids.

Protein Supplement: Feeds high in protein, mixed with grains to provide a balanced ration, e.g. soybean meal, fish meal.

Pubic Bone: thin posterior portion of the hip bones that forms part of the pelvis

Pullet: female chicken less than 19 weeks old

Ration: Amount of feed fed to an animal over a 24 hour period.

R

Relative humidity: The amount of moisture in the air compared to the amount the air could contain at that temperature; expressed as a percentage.

Roaster: A young chicken of either sex from 5 - 9 months old, weighing 4 lbs. and up, used for meat.

Rooster: a male chicken.

S

Saddle: the upper back portion of the bird, just before the tail section

Secondaries: the large wing feathers adjacent to the body

Semen: The fluid that carries sperm, secreted by the male reproductive organs.

Shank: the leg portion from the toes to the hocks

Sickles: the long, curved tail feathers of the rooster

Sperm: The male reproductive cell.

Spur: the stiff, horny growth on the inside of the shank of older poultry, more pronounced in males

Stewing Hen: Means a mature female bird of the species Gallus Domesticus that does not have flexible cartilage at a posterior end of the breast or keel bone, tender meat or soft skin of smooth texture.

Still-air incubator: A container for hatching chicks that does not have mechanical ventilation.

Straight run: Young poultry that have not been sexed.

T

T.D.N. (Total Digestible Nutrients): – Measure of approximated heat or energy value of the feed, consisting of the total of the digestible energy producing nutrients – protein, carbohydrates, and fat.

Testes: The male genital glands (singular: testis or testicle).

Thighs: the feathered parts of the legs between the hock and where the leg joins with the body

Tom: a male turkey

V

Variety: subdivision of a breed distinguished either by plumage colour, plumage pattern or comb type

Vent: excretory or fecal opening at the tail area of birds

Vitamin: A fat or water-soluble substance necessary, in very small amounts, for normal growth and body maintenance.

Vitelline: Of, pertaining to, or like the yolk of an egg.

W

Waterfowl: Birds that naturally spend most of their lives on and near water.

Wattles: the thin, fleshy skin at either side of the base of the beak and upper throat

Web Foot: thin, rubbery layer of skin between the toes of waterfowl

Wet-bulb thermometer: A device that measures moisture or water vapour in the air.

Y

Yolk sac: A yellow globular mass of nutrients contained in a transparent membrane (vitelline membrane) in the center of the egg. The yolk is the chick's food during its development and immediately after it hatches.

Young Duck or Goose: Means a duck or goose having flexible cartilage at the posterior end of the breast or keel bone, tender meat and soft skin of smooth texture.

Young Turkey: Means a turkey having flexible cartilage at the posterior end of the breast or keel bone, tender meat and soft skin of smooth texture.