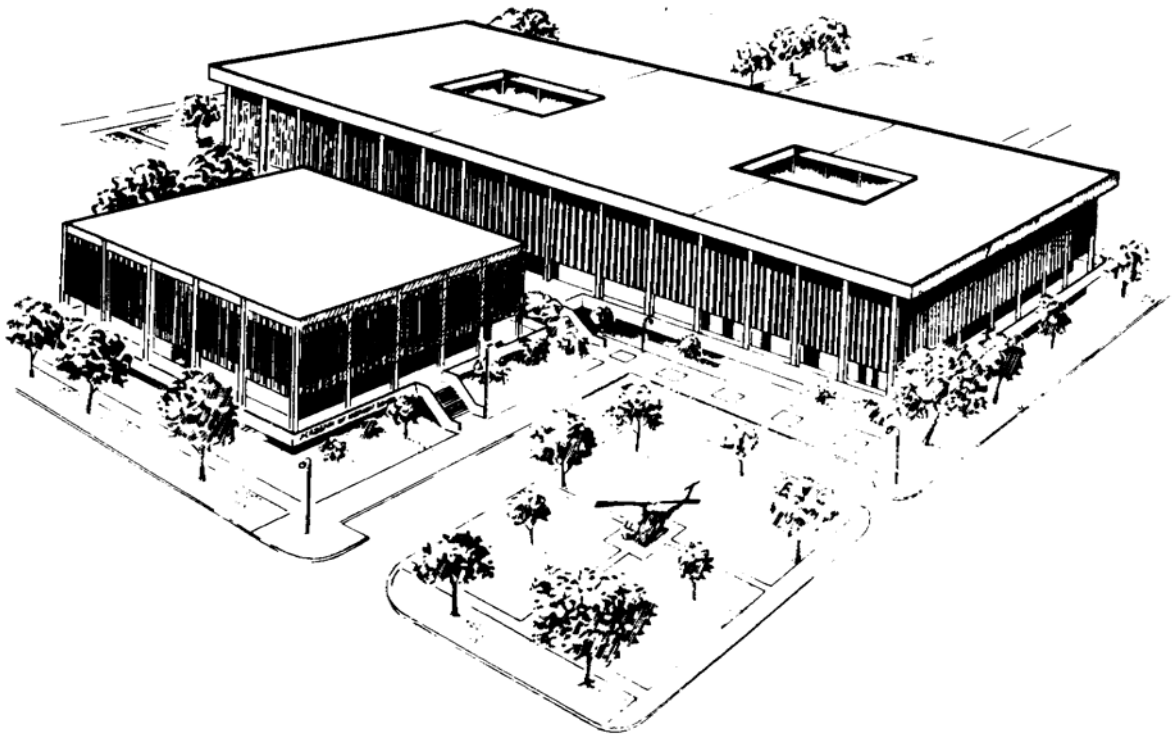

**U.S. ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL
FORT SAM HOUSTON, TEXAS 78234-6100**



POULTRY I

SUBCOURSE MD0712

EDITION 100

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**CORRESPONDENCE COURSE OF THE
U.S. ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL**

SUBCOURSE MD0712

POULTRY I

INTRODUCTION

The veterinary food inspection specialist performs inspection of poultry when it reaches its initial destination and during storage. Chicken is the most common form of poultry bought by the military services. It is a highly perishable product and thorough inspection must be performed. The veterinary food inspection specialist must verify the class, type, style, weight range, and condition of the product. The purpose of this subcourse is to provide you with basic (introductory) knowledges concerning the processing, packaging, and inspection of chicken.

Subcourse Components:

This subcourse consists of two lessons. The lessons are as follows:

Lesson 1, Poultry Processing.

Lesson 2, Destination and Surveillance Inspection of Poultry (Chicken)

Credit Awarded:

To receive credit hours, you must be officially enrolled and complete an examination furnished by the Nonresident Instruction Section at Fort Sam Houston, Texas. Upon successful completion of the examination for this subcourse, you will be awarded 6 credit hours.

You can enroll by going to the web site <http://atrrs.army.mil> and enrolling under "Self Development" (School Code 555).

A listing of correspondence courses and subcourses available through the Nonresident Instruction Section is found in Chapter 4 of DA Pamphlet 350-59, Army Correspondence Course Program Catalog. The DA PAM is available at the following website: <http://www.usapa.army.mil/pdffiles/p350-59.pdf>.

LESSON ASSIGNMENT

LESSON 1

Poultry Processing.

TEXT ASSIGNMENT

Paragraphs 1-1 through 1-8.

LESSON OBJECTIVES

After completing this lesson, you should be able to:

- 1-1. Identify the anatomical features of chickens.
- 1-2. Select the methods for slaughtering poultry (chicken).
- 1-3. Identify the methods for scalding poultry (chicken).
- 1-4. List the types of pickers.
- 1-5. Identify the parts removed when chickens are eviscerated.
- 1-6. Identify the preferred method for chilling slaughtered poultry (chicken).

SUGGESTION

After studying the assignment, complete the exercises of this lesson. These exercises will help you to achieve the lesson objectives

LESSON 1

POULTRY PROCESSING

1-1. ANATOMICAL FEATURES OF CHICKENS

a. **General.** A veterinary food inspection specialist needs to have a working knowledge of the anatomical features of chickens. In order to understand the standard cuts of chicken that are sold to the general public and to the military services, it is necessary to know where the joints are located and what bones are included in the meaty portions of a chicken. The killing of chickens and the preparation of carcasses for market are discussed in lesson one. Product requirements are described in lesson two. Both lessons refer to specific anatomical features of chickens.

b. **Major Bones and Joints.** Terms that are commonly used for the various parts of a chicken are shown in figure 1-1. You may not be familiar with some of the terms. The name of various bones and joints that are related to different cuts of chicken are shown in figure 1-2, a drawing of a chicken skeleton. These terms will be used in lesson two. Some examples of the information that you will find in the figures follow.

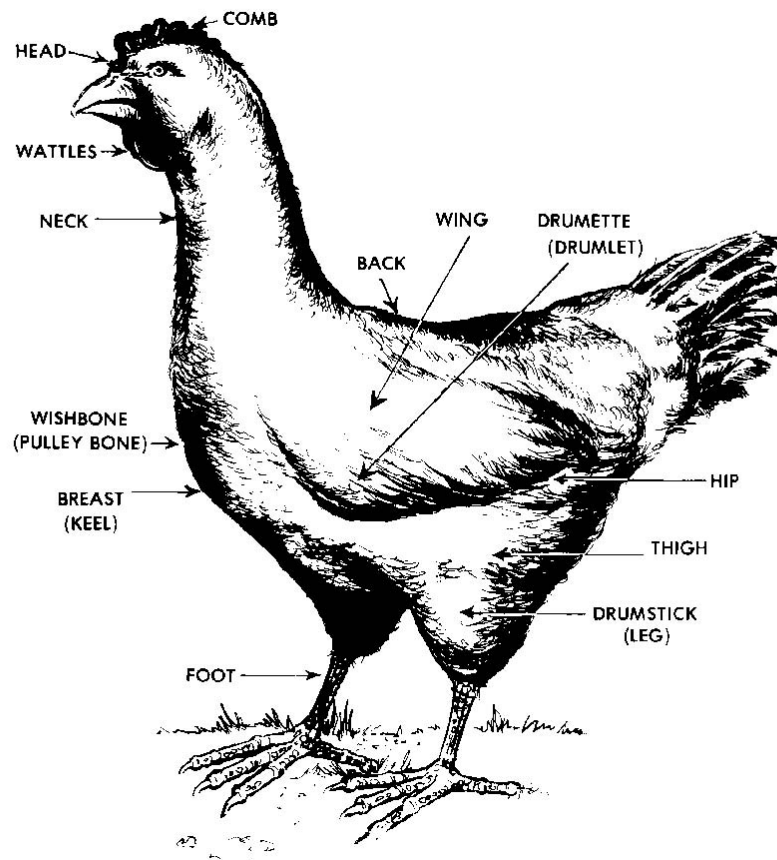


Figure 1-1. External features of chickens.

(1) The drumstick is easily identified in figure 1-2 as the tibia, together with the fibula. The bottom part of the drumstick is the foot joint or metatarsal joint. The top part, which separates the drumstick from the thigh, is the knee joint or patella.

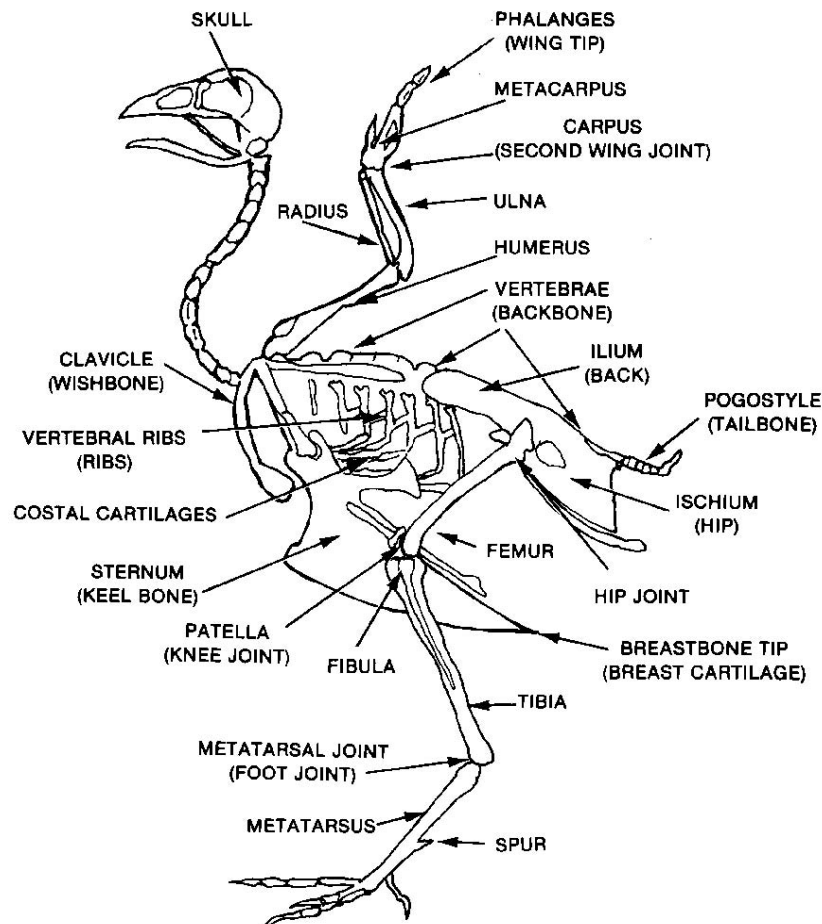


Figure 1-2. Anatomical features of chickens.

(2) The wing, which you can order at a fast-food restaurant, is seen in figure 1-2 as the humerus, the ulna together with the radius, and the metacarpus. The wing tip, or phalanges, is cut off before processing. The drumette, the meaty part of the wing, sometimes known as the drumlet or pegleg, is identified as the humerus.

(3) The breast includes the clavicle or wishbone (pulley bone), the costal cartilages, the sternum or keel bone (keel), and the breast cartilage or breast tip. In some cuts, the breast portion will include part of the vertebral ribs and, in others, the back (ilium).

(4) The thigh is easily identified in figure 1-2 as the femur. The bottom part of the thigh is the knee joint or patella and the top part is the hip joint. In some cuts, the thigh portion will include the hip or ischium.

c. **Internal Organs.** The viscera and various internal organs of a chicken are shown in figure 1-3. These are removed before the chicken is prepared for marketing. The giblets (heart, liver, and gizzard) are separated out for packaging.

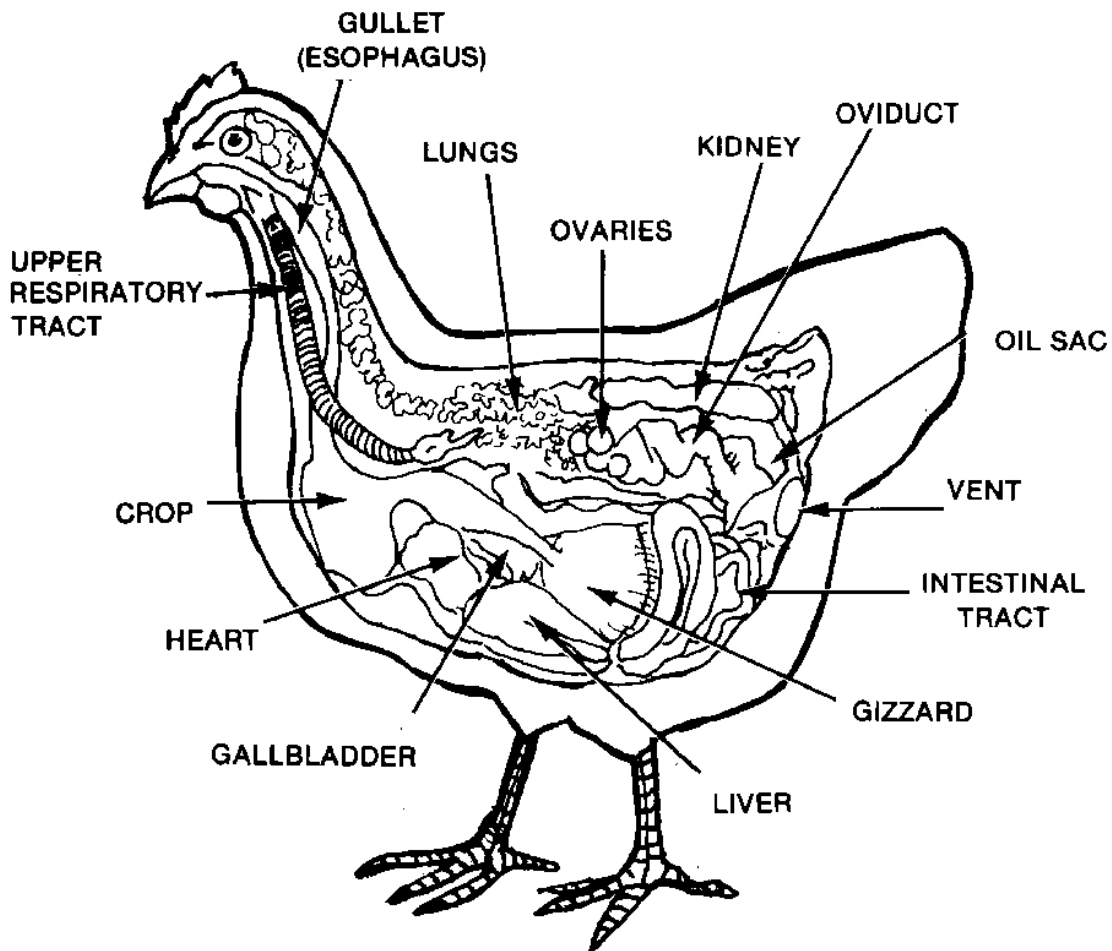


Figure 1-3. Internal organs of chickens.

1-2. SLAUGHTER

There are three common methods of killing chickens.

a. **Electric Stun Killing.** An electric shock is used to stun the chicken before the throat is cut and the bleeding out process is started. (Care must be taken when using this method because too great a charge for the stun will electrocute the bird and it will not bleed freely.) This method is the most common method of slaughter.

b. **Kosher-Kill.** The chicken may or may not be stunned before this type of kill. If it is, the shackled chicken passes through electrified fingers, which stun but cannot electrocute. The shackled chicken next passes down a line where a sharp knife is used

to make a cut from just behind and below the left ear lobe, slightly downward and forward to just behind the jawbone. This severs the jugular vein and the carotid artery and is a relaxed kill. If the windpipe or neck bones and nerves are severed, however, the feathers may set.

c. **Pithing or Braining.** In this procedure, the chicken is first stunned by an electric knife inserted through the mouth into the base of the brain. The knife is then pulled back and moved down the throat to cut the jugular vein. This method is not used extensively, and is usually used for the slaughter of old (big) chickens.

1-3. BLEEDING

The more blood that is removed from a carcass, the better the keeping quality. Chickens do not bleed out completely, but, for practical purposes, young chickens bleed out in about 30 seconds. Older, larger chickens bleed out in about 65 seconds. Sufficient time should be allowed for the chicken to stop struggling so that it will not inhale water during scalding.

1-4. SCALDING

Chickens usually will have enough reflexes left to struggle slightly as they enter the scalding. This ruffles the feathers and facilitates proper, even scalding. Chemical wetting agents in the scalding water also help. Scalding time is usually 60 to 90 seconds, depending on the age and the size of the chicken. Temperatures used and their results are as follows:

Type of Scald	Temperature
<u>Semiscald</u>	125°--130°F
<u>Results.</u> No loss of outer skin. Easy removal of feathers. Skin retains original color and bloom. Has longer shelf life. (Type of scald usually specified by the Armed Forces.)	
<u>Subscald</u>	131--°140 F°
<u>Results.</u> Cooks some of the outer skin layer. Easy picking, but part of the skin comes off and these areas darken and appear leather-like if allowed to dry.	
<u>Hardscald</u>	140+ °F
<u>Results.</u> Cooks outer skin layer. Harms both appearance and keeping quality. Used only in small, live-poultry retail markets.	

1-5. DEFEATHERING--PICKING AND SINGEING

a. **Picking.** While they are still warm from scalding, the carcasses are defeathered. Two types of pickers are currently used:

(1) Drum. The chickens remain shackled and are moved along a line through a series of drums with rubber fingers set so that each series of drums removes feathers from a specific area.

(2) Cyclomatic. This looks like a large centrifuge. The chickens automatically drop off the shackle and rubber fingers pick off the feathers until the chickens reach the edge of the picker. They are then returned to the center of the picker and the process is repeated. When all the feathers are removed, the chickens drop from the picker and are reshackled. In this method, the chickens keep moving so they have fewer disjointed or broken bones. This type of picker takes up less room in the plant.

b. **Singeing.** The chicken is next singed to remove hair and feather particles missed by the picker.

1-6. EVISCERATING

a. After singeing, the chickens are eviscerated (see figure 1-3), i.e., the entire intestinal tract, respiratory tract, liver, spleen, heart, and ovaries and oviduct (or testes) are removed. The oil sac from the base of the tail is also removed, though this is not a part of the viscera.

b. The giblets are separated out from the viscera. The liver is separated from the gallbladder, the lining removed from the gizzard, and the pericardium from the heart.

c. Chickens are eviscerated while still warm since the viscera is easier to remove. Once the carcass has cooled, the flesh becomes firm, and the digestive juices attack the intestinal wall and give the meat an off-flavor.

1-7. CHILLING

Following evisceration, the carcasses and giblets are chilled, either with ice and water (ice slush) or with air.

a. Ice-and-water (ice slush) chilling is the most practical because it removes the body heat rapidly, reduces shrinkage, and bleaches the carcass, which improves its appearance. There must be enough ice so that ice remains in the vat after it is filled. The best way to chill freshly slaughtered chickens is by ice and water with air agitation. Air agitation of ice slush improves its chilling capacity. One of two methods is used to chill with ice and water.

(1) Chickens are passed through circulating, super-cooled water while still on the processing line, for initial chilling, then removed and placed in vats or tanks of ice slush.

(2) Chickens are placed immediately into the vats of ice slush.

b. Air chilling by itself is rarely used because of the space required to hang chickens for chilling and because of excessive shrinkage of the carcasses by the mass movement of air.

1-8. HARD CHILL

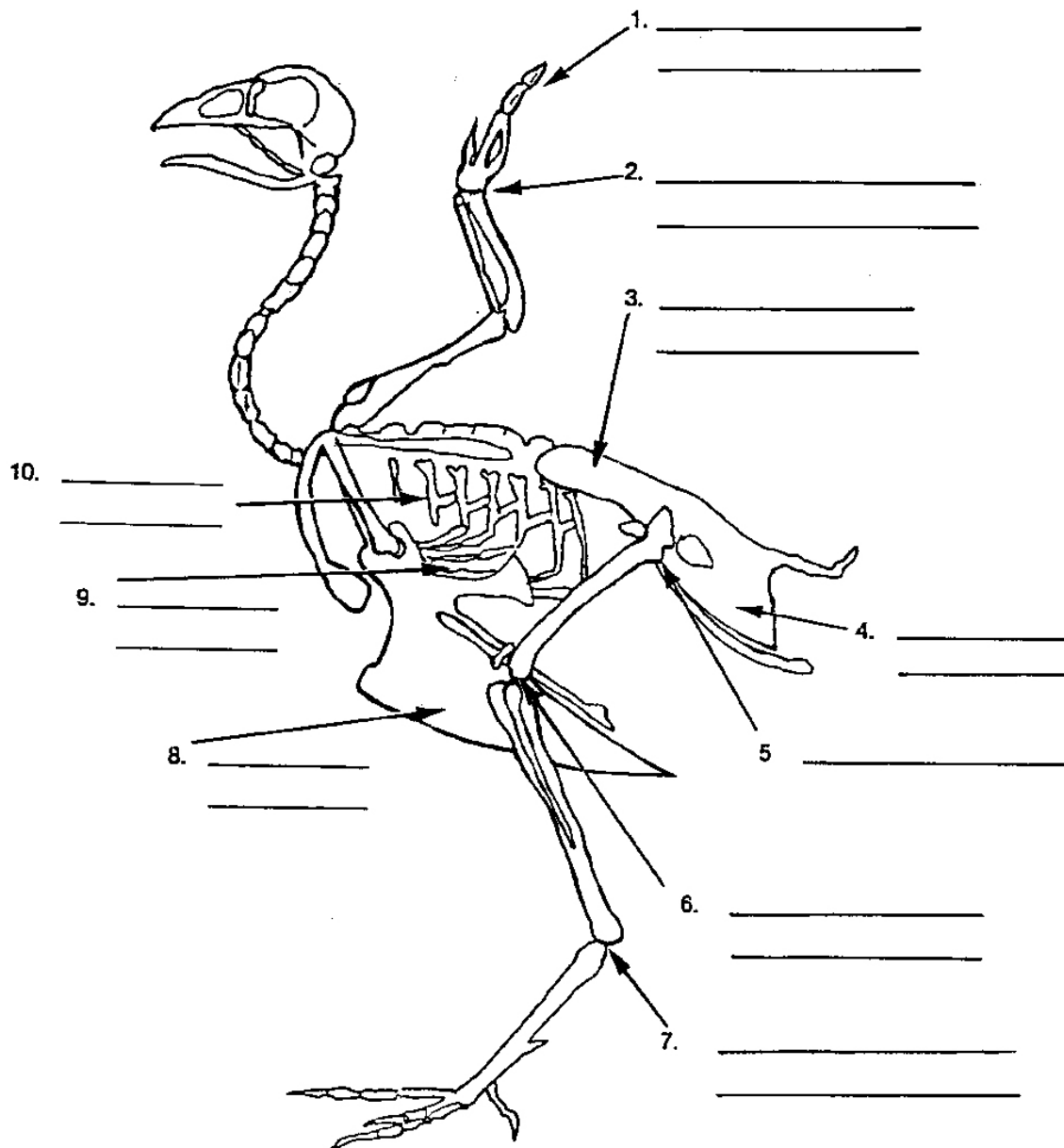
This is a process designed to bring the temperature of the product down to 28°F (-2°C). Small amounts of ice crystals form around the skin surface of the thighs and drumsticks. This is not a frozen state. A common method of processing is to run several blasts of super-cold air over the product. Poultry items must be maintained at 28° F (-2°C) from the factory to the display case. This process is generally used for retail operations.

Continue with Exercises

EXERCISES, LESSON 1

INSTRUCTIONS. The following exercises are to be answered by marking the lettered response that best answers the question or by completing the incomplete statement or by writing the answer in the space provided at the end of the question. After you have completed all the exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers.

1. In the space provided next to the numbers one through ten, write the name of the anatomical feature indicated by the arrows.



2. The anatomical feature of a chicken in Column I matches commonly-used words for parts of a chicken in Column II. Place the letter from Column II by the corresponding number in Column I.

	<u>Column I</u>	<u>Column II</u>
(1) _____	Humerus	a. Thigh
(2) _____	Humerus, ulna/radius, metacarpus	b. Wishbone (pulley bone)
(3) _____	Clavicle	c. Wing
(4) _____	Femur	d. Drumette (drumlet)
(5) _____	Tibia and fibula	e. Back
(6) _____	Sternum	f. Hip
(7) _____	Ischium	g. Breast
(8) _____	Ilium	h. Drumstick

3. List three methods of slaughtering chickens.

4. Which method of scalding chickens is normally specified by the Armed Forces?
- a. Dryscald.
 - b. Semiscald.
 - c. Subscald.
 - d. Hardscald.

5. What is the best way to chill freshly slaughtered chickens?

- a. By air.
- b. By dry ice.
- c. By ice and water without air agitation.
- d. By ice and water with air agitation.

6. What are the reasons that the Armed Forces specify a specific method of scalding chickens?

7. The method used in exercise 6 is the most practical because it removes

b_____h_____ rapidly, reduces shr_____ and bl_____ the carcass, which improves its ap_____.

8. The more blood that is removed from the poultry carcass, the better the

9. Name two types of pickers which are currently used.

10. Why do chickens require singeing?

11. Chickens must be eviscerated while still _____. It is easier to get the _____ out at that time. Also, once the carcass has cooled, the meat may get an off-_____.

12. When chickens are eviscerated, the interior parts which are removed are the:

- a. Int _____ tr _____
- b. Resp _____ tr _____
- c. L _____
- d. Spl _____
- e. H _____
- f. Ova _____ and ovi _____ or t _____
- g. Oil _____ the base of the tail

13. The giblets are separated from the viscera. The giblets are the:

- a. L _____
- b. G _____
- c. H _____

14. Chilled poultry items must be maintained at an internal temperature of _____ from the factory to the display case.

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 1

1.
 1. Phalanges (wing tip)
 2. Carpus (second wing joint)
 3. Ilium (back)
 4. Ischium (hip)
 5. Hip joint
 6. Patella (knee joint)
 7. Metatarsal joint (foot joint)
 8. Sternum (keel bone)
 9. Costal cartilages
 10. Vertebral ribs (figure 1-2)
2.
 - (1) d
 - (2) c
 - (3) b
 - (4) a
 - (5) h
 - (6) g
 - (7) f
 - (8) e (figures 1-1 and 1-2)
3. Electric stun killing
Kosher-kill.
Pitching or braining (para 1-2)
4. b. semiscald (para 1-4)
5. d. By ice and water with air agitation (para 1-7a)
6. No loss of outer skin.
Easy removal of feathers.
Skin retains original color and bloom.
Longer shelf-life (para 1-4)
7. The method in exercise 6 is most practical because it removes body heat rapidly, reduces shrinkage, and bleaches the carcass, which improves its appearance. (para 1-7a)
8. Keeping quality. (para 1-3)
9. Drum
Cyclomatic (para 1-5a)

10. To remove hair and feather particles missed by the picker. (para 1-5b)
11. Warm; viscera; off-flavor. (para 1-6c)
12.
 - a. Intestinal tract
 - b. Respiratory tract
 - c. Liver
 - d. Spleen
 - e. Heart
 - f. Ovaries and oviduct or testes
 - g. Oil sac from the base of the tail. (para 1-6a)
13.
 - a. Liver
 - b. Gizzard
 - c. Heart. (para 1-6b)
14. 28°F (-2°C) (para 1-8)

End of Lesson 1

LESSON ASSIGNMENT SHEET

LESSON 2	Destination and Surveillance Inspection of Poultry (Chicken).
LESSON ASSIGNMENT	Paragraphs 2-1 through 2-19.
LESSON OBJECTIVES	After completing this lesson you should be able to: 2-1. Identify the types, styles, and classes of poultry (chicken) 2-2. Identify considerations used by the inspector to determine quality standards for poultry (chicken). 2-3. Identify considerations used by the inspector to determine quality standards for poultry (chicken). 2-4. Identify how a destination inspector examines poultry (chicken) for identity, condition, and quantity. 2-5. Identify which certificate should accompany a shipment of poultry (chicken). 2-6. Identify the inspection procedures used in performing a surveillance inspection of poultry (chicken).
SUGGESTION	After studying the assignment, complete the exercises of this lesson. These exercises will help you to achieve the lesson objectives

LESSON 2

DESTINATION AND SURVEILLANCE INSPECTION OF POULTRY (CHICKEN)

Section I. DESTINATION INSPECTION OF POULTRY (CHICKEN)

2-1. INSPECTION RESPONSIBILITY

a. The United States Department of Agriculture (USDA) provides inspection and grading services for poultry and poultry products at point of origin. This is always done at the processing plants. The contractor is required to certify the grade of the product. (This will be discussed in paragraph 2-12.)

b. The veterinary food inspection specialist is responsible for performing inspection of poultry at destination. At destination, the veterinary food inspection specialist must determine identity, condition, and quantity of the product.

2-2. PRODUCT INSPECTION

Inspection of the product is conducted to verify that the chicken conforms to the requirements for class, style, type, grade, and weight ranges. These requirements are discussed in the following paragraphs.

2-3. CLASS REQUIREMENTS

a. Chickens are divided into classes according to age, weight, and sex of the bird. Determination of class is difficult when the chicken is frozen.

(1) Age. Age is determined primarily by the comparative flexibility of the tip of the breastbone, but the size and conformation of the chicken are also considered. The cartilage at the tip of the breastbone is very flexible in young poultry. As a chicken ages, the cartilage gradually hardens until it becomes firm and rigid. Young chickens are rangy, the meat is light and soft, and the fat is evenly distributed. Older chickens are more blocky, their meat is darker and tougher, and the fat is gobby or patchy. Excessive abdominal fat is common in heavyweight fowl.

(2) Weight. Weight ranges are stated for each class of chicken in the specifications.

(3) Sex. In live birds, sex is determined by the size, shape, and development of the head, comb, wattles, feathering, and spur. In a dressed chicken, the male carcass is larger and more angular than that of the female, the depth from keel bone (sternum) to back is greater, and the bones are longer. The back is flat and box-shaped in the male, rounded in the female. The skin of the male is coarse, especially in older chickens, with large feather follicles; the female has a smooth skin.

b. Class often denotes the method of preparing chicken to eat based on the age and size of the chicken and the tenderness of the meat. For troop consumption, the Armed Forces procures only Grade A broiler-fryers, roasters, and stewing chickens. (These are Classes 1, 2, and 4. See paragraph 2-6 for verification of grade.) Other classes may be procured for resale at the commissary. Chicken is divided into five classes as follows.

(1) Class 1--broilers or fryers. These are young chickens (usually 6 to 9 weeks of age), of either sex, that are tender-meated with soft, pliable, smooth-textured skin and flexible breastbone cartilage.

(2) Class 2--roaster. These are young chickens (usually 3 to 5 months of age), of either sex, that are tender-meated with soft, pliable, smooth-textured skin and breastbone cartilage that may be somewhat less flexible than that of a broiler or fryer.

(3) Class 3--capons. Capons are surgically unsexed male chickens (usually under 8 months of age) that are tender-meated with soft, pliable, smooth-textured skin.

(4) Class 4--fowl (hens). Birds of this class are mature female chickens (usually more than 10 months of age) with meat less tender than that of a roaster and non-flexible breastbone tip. It is usually used for stewing.

(5) Class 5--Rock Cornish game hens (Cornish game hens). Rock Cornish game hens or Cornish game hens are young, immature chickens (usually 5-6 weeks of age) weighing not more than two pounds ready-to-cook weight, which were prepared from a Cornish chicken or the progeny of a Cornish chicken crossed with another breed of chicken.

2-4. STYLE REQUIREMENTS

There are eight styles of cutting and packaging chicken.

a. **Cutting**. All cuts are made in a neat manner without mutilation of adjacent muscle and bone and without producing bone splinters. The cuts may be made using any mechanical means. The neck is separated at its junction with the body. The separation of the wings and thighs from the carcass and separation of the drumsticks from the thighs must be accomplished at the joints.

b. **Packaging Styles**. All styles are considered ready-to-cook (RTC).

(1) Style 1--whole. The giblets and the neck are inserted in the body cavity.

(2) Style 2--halved (split). Poultry in Style 2 is split in half, down the back line and through the breast lengthwise.

(3) Style 3--quartered. Poultry is cut into quarters after it is split as in Style 2.

(4) Style 4--cut-up, eight pieces. Two wings, two drumsticks, two breast quarters without wings (two breast halves with back portions), and two thighs with back portions.

(5) Style 5--cut-up, eight pieces (without back). Two wings, two drumsticks, two thighs, and two breast portions with vertebral ribs. (No part of the back, except the vertebral ribs, are included in Style 5.)

(6) Style 6--cut-up, nine pieces. Two wings, 2 drumsticks, 2 thighs with back portions, and 3 breast portions (one without and two with back portions). Make a crosswise cut into the carcass to produce a front section (breast portion with back) and a rear section (thigh portion with back).

(7) Style 7--cut-up, nine pieces (without back). Two wings, two drumsticks, two thighs, and two breast portions (one without and two with vertebral ribs).

(8) Style 8--parts. Parts, pieces, or portions may be cut in any manner provided they are specified in the contract or announcement and correctly labeled (that is, drumsticks, thighs, wings, legs, breasts with ribs, thighs with back portion).

2-5. TYPES OF CHICKEN

Chicken is designated by type when reference is made to the state of refrigeration. There are three types, as follows:

a. **Type I--Fresh-Chilled (Ready-to-Cook)**. Type I means that the chicken is fresh chilled ready to cook (RTC). Chilling of the product must comply with the standard requirement. The product must be delivered to destination at an internal temperature of not higher than 40°F (4°C) or lower than 28°F (-2°C). Destination temperature will be taken in the breast or thigh in the bulk of the meat.

b. **Type II--Frozen (Ready-to-Cook) (RTC)**. The placing of the chilled carcasses or parts into the freezer must be accomplished within 48 hours after initial chilling. During this period, if not immediately placed in the freezer after chilling and packaging, the product must be held at 36°F (2°C) or lower. The chickens must be frozen in compliance with requirement (temperature lowered to 0°F (-18°C) or lower within 72 hours).

c. **Type III--Individually Quick Frozen (Ready-to-Cook).** This option may be specified for any cut-up or parts option. The portion or pieces must be chilled and frozen in a manner that will prevent them from sticking together after freezing. The product must be placed into the freezer within 48 hours after initial chilling. During this period, if not immediately placed in the freezer after chilling and processing, the product must be held at 36°F (2°C) or lower. All products must be frozen in compliance with requirement (temperature lowered to 0°F (-18°C) or lower within 72 hours).

2-6. VERIFICATION OF GRADE

a. **Factors.** Chicken is graded by the USDA into three grades according to established standards of quality of the chicken. The grades are as follows: United States (US) Grade A, US Grade B, and US Grade C. The quality is determined by evaluating eight factors, the first three of which are based on natural characteristics and the five remaining on handling and processing practices. See figure 2-1. The factors are:

- (1) Conformation.
- (2) Fleshing.
- (3) Fat covering.
- (4) Pinfeathers.
- (5) Exposed flesh.
- (6) Discoloration.
- (7) Disjointed bones, broken bones, and missing parts.
- (8) Freezing defects.

b. **Conformation.** This is the shape of the body that results from the structure of the skeleton and the amount and distribution of the meat. Some common deformities for which the veterinary food inspection specialist should watch for are definitely wedge-shaped body; dented, crooked, knobby, V-shaped, or slab-sided breasts; narrow, crooked, or hunched backs; and deformed or swollen legs or wings.

c. **Fleshing.** The flesh of young chickens is soft and more tender than that of older chickens, and there is a definite correlation between the flesh covering of the back and the amount of flesh on the rest of the carcass. Females have more flesh over the back and usually more rounded breasts, legs, and thighs than males. Since the

drumsticks, thighs, and breasts carry the bulk of the meat, they should receive primary consideration in grading. Some of the defects that the veterinary food inspection specialist may find are breasts full near the wishbone but tapering sharply to the rear, thin legs and drumsticks, and insufficient flesh on the back to cover the vertebrae and hipbone.

d. **Fat Covering.** The color of the fat darkens as the chicken gets older, but it is not a factor in determining quality. In poultry, fat is judged by the accumulation under the skin, not by marbling. The veterinary food inspection specialist should first check the fat on the back. If it is adequate, he can assume that the chicken has ample fat covering. Fat is first deposited around the feather follicles in the heavy feather tracts; next, at the junction of the wishbone and keel; and finally over the back and hips. On well-finished chickens, the fat over the breast, drumsticks, and thighs makes the flesh difficult to see. Fat is patchy in older chickens and tends to be excessive in the abdominal area in those that have ceased to lay.

e. **Defeathering.** Grade A chicken must be free from both protruding and nonprotruding pinfeathers and vestigial feathers. All ready-to-cook chicken must be free of protruding pinfeathers before it can be graded. In grading, both the number and location of pinfeathers are considered. Protruding pinfeathers are those that have penetrated the skin, but have not necessarily formed a brush. The veterinary food inspection specialist can insert his fingernail under the pinfeathers. Nonprotruding are those that can be seen, but have not penetrated the skin. A chicken is considered "free of protruding pinfeathers" if it is generally clean in appearance, especially on the breast, with only an occasional pinfeather visible on careful examination. There are two types of vestigial feathers: hair, which is easily removed by singeing, and down, the small silky feathers with no web that lie between the main feather lines. Down is often seen on fryers. It is difficult to remove and, when wet, clings to the skin so that it cannot be easily seen or removed by singeing.

f. **Exposed Flesh, Cuts, Tears, and Missing Skin.** Exposed flesh, cuts, tears, and missing skin detract from the appearance of the chicken and permit the flesh to dry out when it is cooked or stored. The location on the carcass determines the number and extent of these defects that are permitted, with the fewest allowed on the breast and legs, which are the most valuable parts. The allowable number of defects due to exposed flesh, cuts, tears, and missing skin varies with the grade and style of poultry, but there must be no related bruise or blood clot.

g. **Discoloration.** All areas of discoloration are considered together in grading. Certain varieties of chickens have a normal, bluish-green pigment (melanin) in the feather follicles in the abdominal area and these are included in the aggregate. Bruises are also considered. Skin bruises are distinguished from flesh bruises by moving the skin. Blue or green bruises must be removed before grading, and the resulting cut considered with the total area of other cuts and tears. Discoloration of areas that have dried out as a result of cuticle removal is not the problem that it once was now that poultry is either ice packed or wrapped in water-resistant paper. Areas with box burn (see paragraph 2-6i Note) are counted as part of the total area of discoloration.

h. **Disjointed Bones, Broken Bones, and Missing Parts.** Cartilage that is separated from the breastbone is not considered a disjointed or broken bone. The pygostyle (free part of the tail) and the phalanges (wing tips) may be removed without affecting the grade of the chicken. In B-quality chickens, the wings may be removed at the second joint (the carpus); in C-quality, the complete wings may be removed. Carcasses to be used for cut-up style may have any number of parts removed for any reason.

i. **Freezing Defects.** Discoloration and drying out of the skin of chicken carcasses during storage is called freezer burn. It starts in the feather follicles as small, white pockmarks that increase in size and coalesce with other pockmarks into large irregular areas with a pitted appearance. Causes are improper packaging and storage practices, such as temperature fluctuations, low humidity, excessive air currents, incomplete wrappers, or wrapping that is not moisture proof.

NOTE: Box burns are white areas where the skin comes in contact with the box liner or box and should not be confused with freezer burn. They occur at the time of initial freezing and are most common when products are frozen in a wind tunnel at a very low temperature because the area of contact permits a greater transfer of heat with a proportionate loss of moisture. There is little or no increase in size of the discoloration after the product is frozen. Box burn is not, in itself, cause for downgrading, but it is considered in the overall area of discoloration.

j. **Graphic Description.** A summary of specifications for standards of quality for individual carcasses of ready-to-cook chicken is shown in figure 2-1. Minimum requirements and maximum defects permitted are shown.

2-7. WEIGHT RANGE

Weight ranges for each individual chicken carcass and for cut up and parts options are specified in the contract. The data states if the weight at the time of weighing does or does not include the neck or giblets.

2-8. DESTINATION INSPECTION OF CHICKEN

a. At destination, the veterinary food inspection specialist must determine quantity, identify, and condition of the product. Before he performs the destination inspection, the veterinary food inspection specialist must have the following documents in his possession.

(1) Federal Specification PP-C-248 (Chickens and Chicken Parts, Ready-To-Cook, Chilled and Frozen).

(2) Defense Personnel Support Center Master Solicitation for Poultry. (Defense Personnel Support Center (DPSC)).

FACTOR	A QUALITY	B QUALITY	C QUALITY
CONFORMATION	Normal	Moderate deformities	Abnormal
Breastbone	Slight curve or dent	Moderately dented, curved, or crooked	Seriously curved or crooked
Back	Normal (slight curve)	Moderately crooked	Seriously curved
Legs and Wings	Normal	Moderately misshapen	Misshapen
FLESHING	Well-fleshed, moderately long, deep, and rounded breast	Moderately fleshed, considering kind, class, and part	Poorly fleshed
FAT COVERING	Well-covered (especially between heavy feather tracts on breast), considering kind, class, and part	Sufficient fat on breast and legs to prevent distinct appearance of flesh through the skin	Lacking in fat covering over all parts of carcass
DEFEATHERING			
Nonprotruding pins and hair	"Free"	Few scattered	Scattering
Protruding pins	"Free"	Occasional	Occasional
DISJOINTED AND BROKEN BONES	Carcass--1 disjointed and no broken bones	Carcass--2 disjointed and no broken bones or 1 disjointed and 1 non-protruding broken bone	No limit
	Parts--none	Parts--no broken bones; may be disjointed	No limit
MISSING PARTS (Whole carcass only)	Wing tips and tail	Wing tips, 2nd wing joint, and tail Back area not wider than base of tail and extending half way between base of tail and hip joints	Wing tips, wings, and tail Back area not wider than base of tail, extending to area between hip joints
FREEZING DEFECTS (When consumer packaged)	Slight darkening on the back and drumstick. Overall bright appearance. Occasional pockmarks due to drying. Occasional small areas showing layer of clear or pinkish ice.	May lack brightness. Few pockmarks due to drying. Moderate areas showing layer of clear, pinkish, or reddish-colored ice.	Numerous pockmarks and large dried areas.

Figure 2-1. Summary of quality standards for chicken (continued).

FACTOR		A QUALITY			B QUALITY			C QUALITY
EXPOSED FLESH								No Limit
Carcass Weight		Breast and Legs	Else-where ¹	Part	Breast and Legs ²	Else-where ²	Part	
Minimum	Maximum							
None	2 lbs	None	1"	Slight trim on edge	1/3 of flesh exposed on each part of carcass, provided meat yield not appreciably affected		1/3 of flesh exposed; meat yield not appreciably affected	
Over 2 lbs	6 lbs	None	1 1/2"					
Over 6 lbs	16 lbs	None	2"					
Over 16 lbs		None	3"					
DISCOLORATIONS ³								No Limit ⁴
Carcass Weight		Breast and Legs	Else-where	Part	Breast and Legs	Else-where	Part	
Minimum	Maximum							
None	2 lbs	3/4"	1 1/4"	1/4"	1 1/4"	2 1/4"	1/2"	
Over 2 lbs	6 lbs	1"	2"	1/4"	2"	3"	1"	
Over 6 lbs	16 lbs	1 1/2"	2 1/2"	1/2"	2 1/2"	4"	1 1/2"	
Over 16 lbs		2"	3"	1/2"	3"	5"	1 1/2"	

¹Maximum aggregate area of all exposed flesh due to cuts, tears, and missing skin. In addition, carcass may have cuts or tears that do not expand or significantly expose flesh, provided the total aggregate length does not exceed the permitted tolerance for the weight range.

²For purposes of definition, the parts of the carcass shall be each wing, leg, entire back, and entire breast with each permitted to have one-third of the flesh exposed by cuts, tears, and missing skin.

³Flesh bruises and discolorations such as "blue back" are not permitted on breast and legs of A quality carcass or on these individual parts. Not more than one-half of total aggregate area of permitted discolorations may be due to flesh bruises or "blue back" (when permitted) and skin bruises in any combination.

⁴No limit on size and number of areas of discoloration and flesh bruises if such areas do not render any part of the carcass unfit for food.

Figure 2-1. Summary of quality standards for chicken (concluded).

b. Final acceptance by the government is at destination. When, in the course of the inspection, there is evidence that the product is inaccurately marked (for example, in regard to net weight), the veterinary food inspection specialist will report the findings, through the supervisor, to the contracting officer, who will immediately notify the contractor that the product does not conform with contract requirements.

2-9. EXAMPLE OF DESTINATION INSPECTION PROCEDURE

Destination inspection includes verification inspection. In the event of obvious evidence of fraud or substitution, the veterinary food inspection specialist must not hesitate to recommend rejection of the product to his supervisor. Borderline questions of grade and minor deviations should be noted in the remarks section of the inspection report. The following is a suggested procedure for conducting a destination inspection.

a. A lot of 30,000 pounds of Grade A chickens, Type III, Class 1, Style 8, was received on purchase order number CHI 1234-80. The authorized weight range per carcass was 2 to 2 3/4 pounds. The total number of cases received was 480.

b. The truck was examined upon arrival, and the opening temperature was 10°F. The temperature of the product was 0°F. There was no indication of dirt, filth, or objectionable odors. Cases of chicken were selected at random and removed to the inspection room. The product was emptied from the cases to determine quantity, identity, and condition.

2-10. QUANTITY

The veterinary food inspection specialist verifies the product quantity by noting the quantity marked on the container, then verifying the pieces in the container.

2-11. IDENTITY

The veterinary food inspection specialist must determine that the product received at destination is the same as that specified in the contract and is the same one that was shipped. He does this by looking at inspection stamps, case codes, delivery vehicle numbers, invoices, manifests, labels, certificates accompanying shipment, and the product itself.

2-12. CERTIFICATES ACCOMPANYING SHIPMENT

The contractor performs origin inspection of poultry in accordance with DPSC requirements, or he employs the services of the USDA inspection service to perform the inspection at origin. The contractor is required to certify the grade of the product.

a. **United States Department of Agriculture Grade Certificate.** (See figure 2-2.) For contracts covering quantities of more than 2,500 pounds, the contractor will furnish a written USDA poultry products grading certificate, with the contract number on it, which certifies that:

U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE POULTRY DIVISION				This certificate is receivable in all courts of the United States as prima facie evidence of the truth of the statements therein contained. This certificate does not excuse failure to comply with any of the regulatory laws enforced by the United States Department of Agriculture.					
POULTRY PRODUCTS GRADING CERTIFICATE		The conduct of all services and the licensing of inspecting, grading, sampling personnel under the regulations governing such services shall be accomplished without discrimination as to race, color, religion, sex, or national origin.							
AUTHORIZATION NO.		FY: MO: DAY:		APPLICANT NO.		CERTIFICATE NO. DIA 13H 93 C N766 PPA- 1452252			
APPLICANT (Name and address, include ZIP Code) Poultry Pursuers, Inc. Box 765 Pelahatchie, Ms. 39145		NAME AND ADDRESS OF SHIPPER OR SELLER J. McMaster Co. 1235 W. Graham St. Chicago, IL 60657		NAME AND ADDRESS OF RECEIVER OR BUYER Accountable Officer DPSC Scobey Cold Storage San Antonio, Tx. 78219					
PLACE ISSUED Jackson, Ms.		PLACE EXAMINED Pelahatchie, Ms. 39145		PRODUCT GRADED (Check) ☒ POULTRY ☐ EGG PRODUCTS		TOTAL NO. OF CONTAINERS 665			
TOTAL MARKED WEIGHT 39,014									
LOT NO.	NUMBER PACKAGES PER LOT 1	NUMBER PACKAGES EXAMINED	PRODUCT TYPE AND CLASS		MARKED WEIGHT OF LOT 1	TEST ☐ SHORTAGE ☐ OVERAGE	TOTAL NET 39,014		
5	665	15	Frozen Ready to Cook Quartered Frying Chicken W/O Necks & Giblets Type 11, Class 1, Style 3 3-3 1/2 lbs.		39,014	None	A		
WHERE HELD AND TEMPERATURE Freezer-10°F									
TYPE AND CONDITION OF CONTAINERS New Corrugated Fiber Master container waxed inner cartons		WAREHOUSE NO./CAR NO.		CONTAINERS WERE STAMPED WITH ☒ SAMPLE ☒ ALL US Military Provisional Cert. No. 1452252					
REMARKS Packaging tare weights: Primary containers (4) 1.69 lbs. Supplies listed hereon conform to all quality requirements of the contract. Visual examination indicates conformance to packing, unitization, labeling and marking requirements of the contract and contractor furnished certificate of conformance is on file.									
SHELL EGGS									
LOT NO.	TOTAL CASES	CASES EXAMINED	NET WEIGHT 1/2	PERCENTAGES AA A B B+ DIRTIES CHECKS LOSS SMALL END UP 2/ UNDER WEIGHT 3/ SHORTAGE 4/				OFFICIAL GRADE AND SIZE	
LOT NO.	EGGS	CASE	PACKAGING	CASE QUALITY RANGE	CASE TEMP RANGE	CHARACTER OF LOSS			
WHERE HELD AND TEMPERATURE				CASES WERE STAMPED WITH ☐ SAMPLE ☐ ALL					
REMARKS				In compliance with the Regulations of the Secretary of Agriculture Governing the Grading and Inspection of Poultry, Eggs, and Egg Products issued pursuant to the Agricultural Marketing Act of 1946, as amended, and any other Act of Congress conferring like authority, it is certified that the products listed hereon were examined and that the class, quality, quantity and/or condition of the products at the time and on the date shown were as stated above.					
SUBCENTER NUMBER		UNITS	RATE CODE	AMOUNT DOLLARS CENTS		OFFICIAL GRADER Joel A Puckett Joel A Puckett 7/11/93			
		EXPENSE	Z 1 7	TOTAL		1/ As stated by applicant or contractor 2/ Weights based on 30 dozen equivalent 3/ Eggs reported as undersized and small end up are also reported under other headings according to their quality. 4/ Percent reported as shortage was replaced to determine grade			

Figure 2-2. United States Department of Agriculture poultry products grading certificate.

(1) The marked net weights, type, class, weight range, and piece count are accurate.

(2) The product has been examined after freezing and after the awarding of the contract and has been determined to be in compliance with USDA regulations.

(3) The product meets all time and temperature specifications concerning chilling, holding, and freezing.

b. **Certificate of Conformance.** For contracts covering quantities of 2,500 pounds or less, the contractor may furnish either a written USDA grade certificate (as described above in "a") or a certificate of conformance (CoC). The CoC will be worded substantially as follows:

"I certify that (Name of Item) (Quantity in Lot) presented for acceptance under terms of contract # _____ .

(1) Comply with all specification and contract requirements.

(2) Were examined for accuracy of marked net weights and all standard poultry product specifications.

(3) Were frozen and stored in the following location(s):

(Name(s) and location(s) of all freezer(s) and all storage warehouses utilized after packing and before shipment.)"

Signature _____
(Company Representative)

Date _____

Address _____

2-13. CONDITION

The veterinary food inspection specialist must determine that the product is in the condition required by the contract. He examines the chicken to verify that it meets contractual requirements for temperature, packaging, and packing. Usually about 2 percent of the boxes in the lot are inspected and they should be taken from areas most likely to show deterioration such as those at the top and sides of stored product where they are exposed to air currents. The veterinary food inspection specialist examines for off-condition, off-odors, freezer burn, and so forth. He must try to detect any signs of deterioration or spoilage in the product.

2-14. DESTINATION TEMPERATURE

a. **Vehicle Inspection.** The veterinary food inspection specialist determines the temperature in the interior of the delivery vehicle and records the results.

(1) A thermometer reading is taken as close to the center of the load as possible. This is done to determine if the temperature of the product has been properly maintained during shipment.

(2) The vehicle is checked for presence of dirt and objectionable odors.

b. **Temperature of Sample.** The veterinary food inspection specialist determines the temperature in a sample unit and records the results. The sample unit is any standard shipping container (case) of chicken. The sample size is based on inspection Level S-3.

(1) The temperature inside the case is measured. The thermometer is inserted through a punctured opening in the case, remaining in place for at least 5 minutes.

(2) The internal temperature of chicken is measured with a thermometer. In Styles 1, 2, and 3, the thermometer is placed in the breast or the thigh without touching the bone. In Styles 5, 6, 7, and 8, it is placed in a thick (fleshy) part of a cut-up chicken, such as a breast, a drumstick, or a thigh.

(3) The standard internal temperature for chilled chicken ranges from 28°F (-2°C) to 40°F (4°C). For frozen chicken, it is 0°F (-18°C) or below.

(4) While checking the temperature of a sample unit, the veterinary food inspection specialist checks for evidence of thawing of frozen chicken or for freezing or thawing of chilled chicken.

c. **Product Rejection.** When a load of chicken is rejected for failure to meet destination temperature requirements, the contractor may be permitted (under certain circumstances), at his own expense, to rework the product and reoffer the chicken to the government when authorized to do so by the contracting officer.

2-15. PACKAGING, PACKING, AND MARKING

a. Each bird, Style 1, whole chicken, must be inserted in a plastic bag, which shall cling tightly to the chicken. The giblets and the neck of the individual chicken are tightly wrapped or bagged in plastic, waxed paper, parchment paper, or cellophane and placed inside the chicken. All packaging and packing considers the style of the product and conforms to that indicated in the contract or the specification.

b. When specified, only chicken of one weight range will be packed in any one box. Unless otherwise specified, Type I product (chilled) of all classes and styles, will be packed in mechanical refrigeration acceptable to commissaries for safe delivery at destination at the lowest transportation rate for such suppliers. The shipping container must be in accordance with the rules or regulations applicable to the mode of transportation. Shipping containers are fiberboard boxes. Boxes are lined to protect the container from juices from the product.

c. Commercial labeling is acceptable if the information given shows class and style of product and its net weight.

d. Shipping containers for the military are marked in accordance with military standards. The date of pack for Type I (chilled) chicken shall be the slaughter date, designated as month, day, and year. The nomenclature of the product will consist of the grade, item, class, and style. The information may be abbreviated so that Grade A, Class I, Style 1 chicken would appear as: CHIX GR A BRO/FRY RTC WHL (Grade A chicken, broilers or fryers, ready-to-cook, whole).

e. The following information, as applicable, must appear on top of the shipping container near the back side in bold letters between 1 and 1 1/2 inches high, all letters being the same height.

**PERISHABLE--KEEP FROZEN
(0°F or below)**

**PERISHABLE--KEEP REFRIGERATED
(28°F to 40°F)**

Section II. SURVEILLANCE INSPECTION OF POULTRY (CHICKEN)

2-16. INSPECTION RESPONSIBILITY

The veterinary food inspection specialist is also responsible for surveillance inspection of poultry. The purpose of surveillance inspection is to watch over government-owned food supplies to ensure that they remain in good condition and recommend action to be taken if their condition deteriorates. Surveillance inspections are Classes 5, 6, 7, and 9. These government-owned food supplies are inspected to determine if they are wholesome and suitable for shipment, consumption, further storage, issue, or sale.

2-17. SAMPLE SELECTION FOR CLASSES 5, 6, 7, AND 9

a. Samples should be drawn so as to be representative of the lot, but special attention is paid to obtaining some of the sample units from possible areas of storage stress, such as along warehouse walls, near the ceiling, areas close to cooling coils and doors, and so forth. Strict random sampling is not used.

b. One hundred percent inspection (inspection of the entire lot) will be performed at the request of a responsible quality assurance element (QAE) or when sampling inspection results indicate a 100 percent inspection is necessary (provided that the personnel and equipment are available).

c. The same sample may be used to perform condition and identity inspection.

d. If performing a class nine inspection at a defense personnel support center (DPSC) supply point, sampling inspection will be in accordance with DPSC Manual 4155.7. If performing a Class 9 inspection at a commissary operation, sampling procedures will be in accordance with local standard operating procedure (SOP). Particular attention should be paid to the procedure for highly perishable products such as poultry.

e. When performing a Class 5, 6, or 7 inspection, every effort will be made to assure that only serviceable supplies are shipped and/or received. This may require up to 100 percent inspection.

2-18. IDENTITY INSPECTION

Identity inspection is a determination that the product is that specified on the container and/or shipping documents. If necessary, the primary containers of the product will be opened for examination.

a. Fresh chilled poultry at a commissary resale operation is subject to very rapid deterioration and will be inspected daily to determine shelf life. A part of this inspection will be for identity.

b. At a DPSC supply point or military installation, frozen perishable poultry is routinely inspected by direction of the accountable officer.

c. If inspection findings leave doubt as to the identity of the product, an additional inspection will be performed using the criteria in the appropriate commodity standard, specification, or procurement document.

d. On Class 5 and 6 inspections, the inspector should ensure that those items listed on the shipping documents are those being shipped or received.

e. When performing a class 6 inspection at a DPSC supply point, the inspector will ensure that stock being shipped is from the warehouse lot number on the shipping document.

2-19. CONDITION INSPECTION

Condition inspection is a determination to detect deteriorative conditions in poultry and to assure that the packaging and packing are in such condition as to protect the product during storage and distribution. Condition inspection includes three different evaluations.

a. The first evaluation is a visual evaluation in which the veterinary food inspection specialist looks for conditions such as:

(1) Dehydration--evidenced by dark, dry, rough-looking flesh or skin.

(2) Freezer burn--a whitish discoloration and drying of the flesh resulting from improper humidity in storage area.

(3) Box burns--white areas where the skin encounters the box liner or box. These should not be confused with freezer burn. Box burn is, in itself, not a cause for downgrading, but is considered in the overall area of discoloration.

(4) Foreign material--any extraneous material which does not organically belong where found, which has been introduced from the outside, or which does not naturally occur in the quantity found at the location examined.

(5) Mold--growth resulting from contamination of the product and varying in size and color.

(6) Excessive frost--evidenced by ice crystals.

b. The second evaluation is a tactile (touching) evaluation. In this evaluation the veterinary food inspection specialist touches the poultry to determine decomposition. Decomposition results in a slimy condition of the skin, sticky to the touch and normally yellow to green in color. There may be a putrid or sour odor. There may be greenish cast over the back and between the thigh and rib area.

c. The third evaluation that the veterinary food inspection specialist does is an olfactory (smell) evaluation. This evaluation consists of smelling the product to detect foreign, stale, sour, rancid, putrid, moldy, and/or musty odors. Each product should have the characteristic odors of that product.

Continue with Exercises

EXERCISES, LESSON 2

INSTRUCTIONS. The following exercises are to be answered by marking the lettered response that best answers the question or by completing the incomplete statement or by writing the answer in the space provided at the end of the question. After you have completed all the exercises, turn to "Solutions to Exercises" at the end of the lesson, and check your answers.

1. List the documents the veterinary food inspection specialist should have in his possession prior to performing destination inspection of chicken.

2. Destination inspection of chicken includes examination of the product for which of the following? (More than one response may be correct.)

- a. Identity.
- b. Condition.
- c. Quantity.
- d. Sterility.
- e. Gross weight.

3. Chicken is divided into five classes according to which of the following criteria? (More than one response may be correct.)

- a. Age.
- b. Conformation.
- c. Weight.
- d. Fat covering.
- e. Sex.
- f. Exposed flesh.

4. Style of chicken refers to:
 - a. The weight range of the chicken.
 - b. The sex of the chicken.
 - c. The way chicken is cut and packaged.
 - d. The quality of the chicken.

5. Type of chicken refers to the:
 - a. State of refrigeration.
 - b. Quality of the chicken.
 - c. Size of the bird.
 - d. Sex of the bird.

6. Match the style designation for chicken in Column I to the description of cutting and packaging in Column II.

<u>Column I</u>		<u>Column II</u>
(1) _____	Style 1	a. Parts
(2) _____	Style 2	b. Cut-up, 9 pieces
(3) _____	Style 3	c. Cut-up, 8 pieces
(4) _____	Style 4	d. Halved (split)
(5) _____	Style 5	e. Cut-up, 9 pieces (without back)
(6) _____	Style 6	f. Cut-up, 8 pieces (without back)
(7) _____	Style 7	g. Quartered
(8) _____	Style 8	h. Whole

7. Match the class designation for chicken in Column I to the age of the chicken at the time it was processed to be ready-to-cook (RTC), in Column II.

<u>Column I</u>		<u>Column II</u>
(1) _____	Class 1, Broilers/fryers	a. Under 8 months of age
(2) _____	Class 2, Roasters	b. 6 to 9 weeks of age
(3) _____	Class 3, Capons	c. More than 10 months of age
(4) _____	Class 4, Fowls (hens)	d. 5 to 6 weeks of age
(5) _____	Class 5, Rock Cornish game hens	e. 3 to 5 months of age

8. After processing, chicken is frozen by lowering the temperature to 0°F (-18°C) within 72 hours.
- a. True.
 - b. False.
9. Individually frozen chicken pieces (Type III) stick together after freezing and cannot be easily separated.
- a. True.
 - b. False.
10. Labeling information, "PERISHABLE - KEEP REFRIGERATED," would appear on the top of the shipping container for which type chicken?
- a. Type I.
 - b. Type II.
 - c. Type III.

11. After initial chilling, Type II and Type III chicken must be placed into the freezer within:
 - a. 24 hours.
 - b. 72 hours.
 - c. 48 hours.
 - d. 36 hours.

12. If not immediately placed into the freezer after chilling and packaging, Type II and Type III chicken must be held at a temperature of _____ or lower.
 - a. 32°F
 - b. 40°F
 - c. 38°F
 - d. 36°F

13. What grade and class of chicken is procured by the Armed Forces for troop consumption?
 - a. Grade A, all classes.
 - b. All grades and Classes 1 and 2.
 - c. Grade A and Classes 1, 2, and 4.
 - d. Grade A or better and Class 1.

14. For contracts covering quantities of 2,500 pounds or less, the contractor may furnish:
- a. A certificate of conformance.
 - b. A certificate of origin inspection.
 - c. A verification inspection certificate.
 - d. A USDA grade certificate.
 - e. Either a or b.
 - f. Either c or d.
 - g. Either a or d.
15. The internal temperature of chicken is measured with a thermometer placed in the breast or thigh. The thermometer should be touching the bone.
- a. True.
 - b. False.
16. At destination the temperature of frozen chicken must be _____, and for chilled chicken it must be no higher than _____.
- a. 5°F or lower; 42°F.
 - b. 0°F or lower; 40°F.
 - c. 0°F or lower; 38°F.
 - d. -10°F or lower; 36°F.

17. List at least five factors considered in establishing the grade of chicken.

18. Grade A chicken must be free from both protruding and nonprotruding _____, Vestigial feathers include _____, which is easily removed by singeing, and _____, the small silky feathers.

19. When selecting samples for a surveillance inspection of poultry, special attention should be placed on areas where there is _____.

20. What document establishes inspection procedures at a DPSC supply point?

21. List three evaluations for condition inspection used in surveillance inspection.

22 List six deteriorative conditions that may be found in a visual examination:

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 2

1. Federal Specification PP-C-248
DPSC Master Solicitation for Poultry (para 2-8a)
2. a, b, c (identity, condition, quantity). (para 2-1b)
3. a, c, e (age, weight, sex) (para 2-3a)
4. c (para 2-4)
5. a (para 2-5)
6. (1) h
(2) d
(3) g
(4) c
(5) f
(6) b
(7) e
(8) a (para 2-4)
7. (1) b
(2) e
(3) a
(4) c
(5) d (para 2-3)
8. a (para 2-5 b,c)
9. b (para 2-5 c)
10. a (paras 2-5a, 2-15e)
11. c (para 2-5b, c)
12. d (para 2-5b, c)
13. c (para 2-3b)
14. g (para 2-12)
15. b (para 2-14b(2))
16. b (para 2-15e)

17. Conformation, fleshing, fat covering, pinfeathers, exposed flesh, discoloration, freezing defects, and disjointed bones, broken bones, and missing parts.
(para 2-6)
18. Pinfeathers; hair; down (para 2-6e)
19. Storage stress (para 2-17a)
20. DPSC Manual 4155.7 (para 2-17d)
21. Visual
Tactile
Olfactory (para 2-19a, b, c)
22. Dehydration
Freezer burn
Box burns
Foreign material
Mold
Excessive frost (para 2-19a)

End of Lesson 2