

Specialized Topics in Areas of Radiologic Sciences
P.O. Box 2931 Toledo, Ohio 43606 419-471-1973
E-mail: info@xrayhomestudies.com
www.xrayhomestudies.com

Radiography Essentials

For

Limited Practice

By

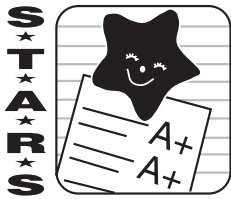
Long, Frank, Ehrlich, et.al.

3rd Edition

Prepared by:

Carolyn J. Frigmanski, M.A.,B.S.R.T. ®

Founder, S.T.A.R.S.



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Dear GXMO/LSO/LSR participant,

Welcome to your selected S.T.A.R.S. developed continuing education home study!

In the spring of 2013, The Ohio Department of Health (ODH) approved ALL of them for GXMO license renewal. Please check with your state licensing agency if you are not a licensed GXMO in Ohio to be sure your state accepts these ce credits for your state license renewal requirement.

This product consists of a text on a desired topic and multiple question, short answer post test(s) pages. The number of Ohio Department of Health approved continuing education (ce) credits is listed on our order form. This home study product was originally developed for radiographers across the country who were registered with the American Registry of Radiologic Technologists (ARRT) and approved by the American Society of Radiologic Technologists (ASRT). Please disregard any reference to the ASRT/ARRT within this product, if any.

You must complete the reading and questions with a **75% or higher score** on the post test(s) to get your approved CE credit!

Please return all the post test pages to the **S.T.A.R.S.** address listed on our letterhead **BEFORE** your license expires. We will forward your certificate of completion on the same day your post test(s) were evaluated (except for holidays and Sundays). If you did NOT receive a 75%, we will send the pages back with the questions needing a new answer selection. Send them back for a **FREE** re-evaluation. No refund will be provided for unsatisfactory personal performance on any ce product.

Plan the return of your post test(s) pages in a timely manner. I cannot accept emailed or faxed copies since I need to retain my **ORIGINAL** records for the ODH for 3 years in case you may be audited.

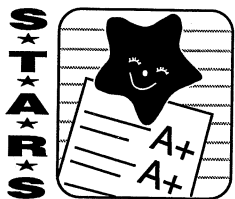
Remember to get your envelope weighed at the post office whenever submitting more than 4 pages. The post office will return it to you if you have insufficient postage, thereby delaying it for my evaluation and your certificate of completion.

Feel free to contact me by email: info@xrayhomestudies.com or telephone: **419 471-1973** if you have any questions. Please share with others in the future.

Thank you for selecting **S.T.A.R.S.** to meet your continuing education needs!

Sincerely,

Carolyn J. Frigmanski, M.A.,B.S.R.T. ®, Founder



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Dear S.T.A.R.S. participant,

Thank you for your order of Radiography Essentials for Limited Practice. This self-learning unit is approved by the Ohio Department of Health for continuing education of licensed gxmors. You may select the following options for ce credits:

Complete the first half Chapters 1 –11 Questions 1 – 61 14.75 ce credits

Complete the second half Chapters 12 – 28 Questions 62 – 120 14.00 ce credits

Complete **ALL** the chapters and the **ENTIRE** post test at the same time 29 ce credits

Please make an extra copy of the post test answer sheet if you are submitting for partial credit at this time since you will need it when you submit the second section.

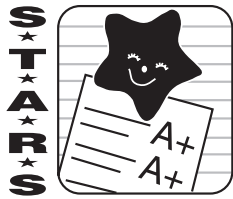
Remember you must submit the post test answer sheet **BEFORE** your license expires.

This textbook is a great reference for non-licensed employees preparing for the state licensure exam as well as a resource for information. Feel free to share it with others if you so choose.

Thank you for choosing **S.T.A.R.S.** for your educational needs!

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How to renew your GXMO license in Ohio:

The Ohio Dept. of Health (ODH) requires a **minimum of 12 continuing education credits (ceus) to be completed every 2 years (your biennium) BEFORE your license expires.** You may do more than 12 ceus, but not less than 12 ceus, if you so choose. Ceus in excess of 12 cannot be carried over to the next biennium.

You will receive a hard copy renewal notice by mail from the ODH 60 days **BEFORE** your license expires. **It is your responsibility to amend your personal information to the ODH whenever you change your name, address or place of employment as soon as possible by using the ODH website or contacting the ODH by telephone at 614 752-4319 for assistance. Failure to receive an ODH notice is not an acceptable reason for failing to renew on time.** You can add completion of clinical modules to your GXMO license on the ODH web site.

Your ODH notice informs you that you may renew online or request a hard copy form from them. **You must have your S.T.A.R.S. certificate(s) of completion immediately available when you renew since your course title(s), number of ceus, and ODH accreditation number(s) and date(s) of completion are printed on it.**

You can renew immediately when you receive your notice or you have 30 days to complete the renewal process and payment to the ODH after your license expires. Online renewal requires your credit card for payment. If you chose hard copy renewal, you may submit a check or money order.

You and/or your employer can view and/or print your renewed license on line upon completion of the process. Problems that exist with renewal should be addressed to the ODH by calling for assistance.

S.T.A.R.S. personnel are NOT responsible for your renewal. Please direct any questions or needed assistance with renewal to the ODH personnel.

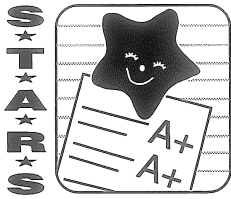
GXMOs must notify the ODH in writing within 30 days of any changes in the physician providing direct supervision. If your scope of practice changes (e.g. chiropractic to podiatric), a competency form must be completed and submitted to the ODH.

You may also want to check the ODH web site periodically for changes that may have occurred during your biennium and to share this information with your co-workers and/or administrative staff members.

The ODH website is: <http://www.odh.ohio.gov/odhPrograms/rp/rlic/rstatus.aspx>

Email is: BRadiation@odh.ohio.gov

Thank you very much.



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Instructions for Mailing your Continuing Education Post Tests

Complete ALL hard copy unit post tests for the products you purchased in legible printing BEFORE your license expires. Mail is processed the same day it is received.

You may want to copy them BEFORE you mail them to the S.T.A.R.S. office to minimize mail delivery complications. They will NOT be returned to you unless you get a 75% or less. If you do NOT get a 75% or better after evaluation, the post tests will be sent back to you with the questions needing a new answer selection. After completing the questions, send them ALL back to the S.T.A.R.S. office for re-evaluation.

Be sure to use the CORRECT postage by having it weighed at the post office if it consists of more than 5 pages. Envelopes with INSUFFICIENT POSTAGE will be sent back to the participant and delay your post test evaluation and certificate creation.

I do NOT accept faxes since faxes fade over time and I need to keep my records for 3 years in case you would get audited by the Ohio Dept. of Health for some reason.

I do NOT accept scanned pages because I do NOT want you putting your private, personal information on the internet. I do NOT open attachments due to the threat of virus contamination that may jeopardize my web site and computerized databases.

Do NOT send your study media i.e. CD, DVD, booklets and/or books back to me.

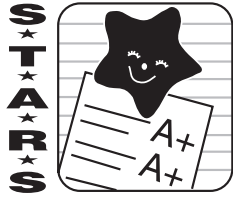
United States Postal Service (USPS):

If you are using USPS for priority or express mailing, please keep your receipt with the tracking number in case of a problem with the delivery. Please mark the section for NO SIGNATURE REQUIRED for express mail and send it to my home address: Carolyn J. Frigmanski, MA, BSRT (R) 3134 Aldringham Road Toledo, Ohio 43606. The USPS does NOT deliver to my P.O. Box address. Please call to let me know I should be expecting it at 419 471-1973.

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If you are using these delivery services, please keep your receipts with the tracking number in case of a problem with the delivery. Please mark the section for NO SIGNATURE REQUIRED for express mail and send it to my home address: Carolyn J. Frigmanski, MA, BSRT(R) 3134 Aldringham Road Toledo, Ohio 43606. Please call to let me know I should be expecting it at 419 471-1973.

Thank you very much.



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Unit: Radiography Essentials for Limited Radiography by Long, Frank & Ehrlich

Please *complete the answer sheet at the conclusion of this post test* and *return* to S.T.A.R.S.

Chapter 1

1. The world's oldest and largest radiologic science professional organization is the
 - a. American Society of Radiologic Technologists
 - b. American Registry of Radiologic Technologists
 - c. American College of Radiology
 - d. Joint Review Committee on Education in Radiologic Technology
2. Real-time viewing of x-ray images in motion is called
 - a. angiography
 - b. fluoroscopy
 - c. sonography
 - d. nuclear medicine
3. Another term for limited radiography is _____ radiography.
 - a. general
 - b. clinical
 - c. specialized
 - d. practical
4. Today, _____ states have laws requiring some type of credential to practice radiography.
 - a. 18
 - b. 30
 - c. 41
 - d. 50
5. Practicing without a valid license or permit may result in
 - a. a suspension
 - b. imprisonment
 - c. a lawsuit
 - d. probation

Chapter 2

6. The radiation that passes through the film holder and exposes the film is called
 - a. remnant
 - b. scatter
 - c. primary
 - d. secondary
7. Scatter radiation generally has *less* energy than the primary beam. a. true b. false
8. The device that receives the x-ray beam energy to create the image is called a(an)
 - a. cassette
 - b. magazine
 - c. image receptor
 - d. plate
9. The tube motion along the long axis of the table is called
 - a. transverse
 - b. longitudinal
 - c. vertical
 - d. angular
10. Trendelenburg position allows the head end to be lowered 15 degrees. a. true b. false

11. The control booth usually has a window made of
a. plexiglas b. glare proof c. double pane d. lead glass
12. Limited operators should ***never*** be used to hold patients or image receptors. a. true b. false

Chapter 3

13. The term _____ is the number divided into in a division problem.
a. divisor b. quotient c. dividend d. denominator
14. If you multiple the whole number 300 by the fraction $\frac{1}{5}$, your answer will be
a. 50 b. 60 c. 90 d. 120
15. To get 75% on this post test of 120 questions, you must get _____ questions correct.
a. 60 b. 70 c. 80 d. 90
16. The prefix ***kilo*** means
a. 1 b. 10 c. 100 d. 1000
17. One inch is equal to _____ centimeters.
a. 1.5 b. 2.54 c. 3.28 d. 4
18. 200 milliamperes at $\frac{1}{2}$ second equals _____ mAs (milliampere-seconds).
a. 100 b. 125 c. 150 d. 175
19. Below 85 kVp, an adjustment of _____ kVp/cm will compensate for small part changes.
a. 1.0 b. 1.5 c. 2 d. 3
20. The conversion factor when going from no grid to a 12:1 grid ratio is
a. 1 b. 2 c. 4 d. 5

Chapter 4

21. Matter is composed of “building blocks” called
a. electrons b. atoms c. protons d. molecules
22. The term used to identify a neutral atom that has gained or lost an electron is a(an)
a. isotope b. photon c. ion d. positron
23. X-rays with greater energy have longer wavelengths. a. true b. false

36. The difference in radiographic density between adjacent portions of the image is called
- a. detail b. contrast c. fog d. scatter
37. Recorded detail is always improved by using a
- a. small focal spot b. fast screen c. short distance d. x-ray tube tilt

Chapter 8

38. Over ____% of the x-ray image is formed by screen light.
- a. 50 b. 65 c. 80 d. 99
39. Quantum mottle will become *less* pronounced as screen speed increases. a. true b. false
40. Film emulsion consists of a mixture of gelatin and _____ _____ crystals.
- a. calcium tungstate b. rare earth c. silver halide d. cesium iodide
41. The temperature range for film storage is _____degrees Fahrenheit.
- a. 30 to 40 b. 40 to 50 c. 50 to 70 d. 60 to 70
42. The slope of a sensitometric curve indicates the film's inherent
- a. contrast b. density c. fog d. speed

Chapter 9

43. Photostimulable plates can be reused at least _____ times before they need replacement.
 - a. 2,000
 - b. 4,000
 - c. 6,000
 - d. 10,000
44. Amorphous selenium detectors are used in indirect conversion. A. true b. false
45. The postprocessing technique that can remove anatomy such as bones or organs is called
 - a. enhancement
 - b. reversal
 - c. subtraction
 - d. edge enhancement
46. The image management system used in radiology departments is called
 - a. radiology information
 - b. picture archival and communication
 - c. hospital information
 - d. information technology
47. The image must have a minimum of ____ sides of the collimated field.
 - a. one
 - b. two
 - c. three
 - d. four

Chapter 10

48. Darkroom fog may cause *increased* radiographic density. a. true b. false
49. The chemical that reduces exposed silver halide to black metallic silver is
a. sodium sulfite b. potassium alum c. glutaraldehyde d. hydroquinone
50. Optimal developing time is _____minutes at 68 degrees Fahrenheit or 20 degrees Celsius.
a. 3 b. 4 c. 5 d. 6
51. The type of gloves to wear when mixing or pouring chemicals or cleaning up spills is
a. latex b. nitrile c. rubber d. cotton
52. The device that activates the replenishment pumps as films are fed into the processor is called
a. intake sensor b. microswitch c. intake valve d. crossover
53. Processing tanks should be completely drained
a. weekly b. biweekly c. as needed d. monthly
54. The tolerable range of fluctuations for speed indices is a plus or minus of
a. 0.05 b. 0.1 c. 0.15 d. 0.2
55. The first factor to troubleshoot when increased base fog exists is
a. developer temperature c. developer contamination
b. developer overdilution d. fixer depletion
56. Artifacts that occur repeatedly at right angles to film travel are called
a. dark streaks b. "pinholes" c. abrasions d. Pi lines

Chapter 11

57. The interaction in which an incoming photon interacts with an outer shell electron is called
a. Compton effect c. photoelectric effect
b. coherent scattering d. true absorption
58. Scatter radiation creates
a. the final image b. fog c. contrast d. blur
59. The relationship between the height of the lead strips and the width of the space between them is
a. grid radius b. grid frequency c. grid ratio d. focal range

60. Grid striping describes the appearance of the grid

- a. interspacing b. frequency c. cutoff d. image

61. Air gap method involves using a

- a. short object-image receptor distance c. short source-to-image distance
- b. large object-image receptor distance d. long source-to-image distance

Chapter 12

62. The highest kVp setting that will produce sufficient contrast for acceptable image quality is called

- a. preferred b. specific c. optimum d. desired

63. The recommended mA for extremities imaging is

- a. 100 b. 150 c. 200 d. 300

64. A condition in bone tissue that requires a *decrease* in exposure is

- a. osteopetrosis b. osteomyelitis c. Paget disease d. osteoporosis

65. A ____% change in kVp will produce the same effect as doubling or halving the mAs.

- a. 10 b. 15 c. 20 d. 30

66. Compensating filters should be used when imaging body parts with

- a. pathology b. casts c. varying thicknesses d. air

Chapter 13

67. The conventional unit of radiation exposure in air is called the

- a. roentgen b. absorbed dose c. gray d. rem

68. The SI radiation unit to measure occupational dose is called the

- a. rem b. gray c. coulombs per kilogram d. sievert

69. The 23 pairs of microscopic bodies that contain genetic information are called

- a. genes b. chromosomes c. DNA proteins d. sex cells

70. An observable short-term effect of radiation exposure to the skin is called

- a. dermatitis b. dryness c. erythema d. ulceration

71. An acute whole body exposure of 25 rem will produce

- a. nausea b. erythema c. diarrhea d. blood changes

72. The greatest cause of unnecessary radiation to patients by limited radiographers is
- poor positioning
 - repeats
 - darkroom errors
 - wrong technique
73. Shields that attach to the collimator are called
- shadow
 - gonad
 - fixed
 - removable
74. Collimation, gonad shielding, minimal repeats and high kVp are examples of applying the
- radiation safety rules
 - occupational dose limits
 - ALARA principle (as low as reasonable achievable)
 - dose prevention guidelines
75. The personnel monitor using aluminum oxide as a radiation detector is known as
- thermoluminescent
 - optically stimulated luminescent
 - conventional film
 - ionization
76. Radiation in excess of ____ rad or ____Gy to the uterus is a cause for concern during pregnancy.
- 15 or 0.15
 - 20 or 0.20
 - 25 or 0.25
 - 30 or 0.30

Chapter 14

77. A wide variety of shapes and structures describes the bone type classified as
- long
 - short
 - flat
 - irregular
78. Projections that are produced by directing the CR to “skim” the profile of the subject are called
- axial
 - tangential
 - oblique
 - lordotic
79. Some side markers incorporate a plastic bubble that contains _____to indicate position.
- lead
 - silver
 - mercury
 - barium
80. The immune system’s response to cellular injury manifests as a(an)
- inflammation
 - edema
 - atrophy
 - degeneration

Chapter 15

81. The *funny bone* or *crazy bone* describes the anatomic structure identified as the
- styloid process
 - olecranon process
 - coronoid process
 - head of ulna
82. In the PA projection of the hand, the CR (central ray) is directed perpendicularly to the
- second metacarpophalangeal joint
 - second interphalangeal joint
 - first metacarpophalangeal joint
 - third metacarpophalangeal joint
83. A “breathing technique” is used for a transthoracic lateral shoulder. a. true b. false

84. An inflammation of bone and its marrow caused by a pathogenic organism is diagnosed as

- a. tendinitis b. osteolysis c. osteomyelitis d. an abscess

Chapter 16

85. The calcaneus and the talus compose the portion of the foot referred to as the

- a. midfoot b. hindfoot c. longitudinal arch d. transverse arch

86. The rotation of the ankle for an AP oblique projection is _____ degrees.

- a. 15 b. 25 c. 30 d. 45

87. "Tunnel" views are performed to demonstrate the

- a. intercondylar fossa b. patella c. ankle mortise d. acetabulum

Chapter 17

88. An abnormal lateral curvature to the spine is called

- a. lordosis b. kyphosis c. scoliosis d. rotoscoliosis

89. A Scottie dog configuration is demonstrated on _____ lumbar spine radiographs.

- a. AP b. oblique c. lateral d. L₅S₁ conedown

90. The anode heel effect is advantageous when performing _____ spine projections.

- a. cervical b. lumbar c. all d. thoracic

Chapter 18

91. The first seven pairs of ribs are called

- a. true b. false c. floating d. fused

92. The organ that serves as a storage sac for bile is the

- a. liver b. pancreas c. gall bladder d. spleen

93. An ideal gonad shield for chest radiography is to use a

- a. shadow b. half-apron c. contact d. portable screen

Chapter 19

94. The PA axial (Caldwell method) requires a caudal tube tilt of _____ degrees.

- a. 0 b. 23 c. 37 d. 15

95. The parietoacanthial projection (Waters Method) utilizes the _____ baseline.
- a. infraorbitomeatal b. glabellomeatal c. orbitomeatal d. acanthiomeatal
96. A fracture of the orbital floor by a blow to the eye may cause a
- a. blowout b. contrecoup c. simple d. compound

Chapter 20

97. Research indicates that about ____% of communication received by adults is nonverbal.
- a. 30 b. 50 c. 70 d. 90
98. The group of pediatric patients who may be the greatest challenge is in the age range of
- a. newborn – 1 year b. 1 – 4 years c. 4 – 7 years d. 8 – 12 years
99. Older patients may develop ulcerated areas over bony prominences from pressure called
- a. abrasions b. lacerations c. friction burns d. decubitus

Chapter 21

100. The factor that should be adjusted to alter radiographic density is
- a. distance b. kVp c. mAs d. image receptor
101. A possible cause whenever an image is too light is to consider
- a. processing b. film c. screens d. high temperature
102. Most experienced limited operators have a repeat rate that is less than
- a. 1% b. 4% c. 10% d. 15%

Chapter 22

103. Rules that apply to correct behavior and standards for our actions within a profession are called
- a. morals b. ethics c. values d. principles
104. The principle involving truth and an obligation to tell the truth is known as
- a. beneficence b. fidelity c. nonmaleficence d. veracity
105. One major aspect contained in The Health Insurance Portability and Accountability Act is
- a. finances b. reimbursement c. privacy d. ethics
106. When you finish viewing or entering a medical record on the computer, it is important to
- a. log off b. turn it off c. close the window d. clock out

Chapter 23

107. The study of the human body in relation to the working environment is called
- a. kinesiology b. ergonomics c. body mechanics d. occupational safety
108. The four factors involved in the spread of disease are sometimes called the
- a. infection control b. hygiene c. asepsis d. cycle of infection
109. The combination of universal and body substance precautions is now called
- a. body substance isolation c. standard precautions
b. infection control d. isolation technique

Chapter 24

110. The measurement of temperature, pulse rate, respiratory rate and blood pressure is called
- a. vital signs b. baseline c. physical status d. vital statistics
111. A moderate allergic reaction characterized with hives is known as
- a. asthma b. urticaria c. anaphylaxis d. skin sensitivity

Chapter 25

112. Acetaminophen (Tylenol) is in the drug category called
- a. andrenergics b. anticholinergics c. analgesics d. anticonvulsants
113. The height of the infusion bottle or bag should always be _____ inches above the vein.
- a. 10 to 15 b. 18 to 20 c. 20 to 24 d. 24 to 30

Chapter 26

114. The vein most commonly used for venipuncture is located in the
- a. finger b. hand c. elbow d. foot
115. The appearance of urine normally ranges from
- a. clear to slightly hazy c. bright yellow to moderately hazy
b. light yellow to moderately hazy d. dark yellow to slightly hazy

Chapter 27

116. Distance vision assessment is usually done with the patient _____ feet from the eye chart.
- a. 6 b. 10 c. 15 d. 20
117. The normal cardiac cycle involves atrial and ventricular contraction and rest. a. true b. false

Chapter 28

118. It is estimated that _____% of American women have osteoporosis.

- a. 50 b. 65 c. 80 d. 90

119. The instantaneous imaging system that has no mechanical scanning motion is called

- a. pencil-beam collimation c. array-beam system
b. cone-beam densitometry d. serpentine densitometry

120. Normal bone density has a T score of

- a. +1 to -1 b. +2 to -2 c. +3 to -3 d. +4 to -4



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Please complete the following information so that you can obtain a signed certificate from an official from **S.T.A.R.S.** when you receive a 75% or higher score. **(Please Print)**

Name _____

Address _____

City _____ State _____ Zip Code _____

Social Security Number _____ Date _____

Answer Sheet for: Unit: Radiography Essentials for Limited Practice
by Bruce W. Long, Eugene D. Frank and Ruth Ann Ehrlich

**Please place your lettered selection for each question in the respective box and return
*ONLY this post test sheet to S.T.A.R.S.***

1.	11.	21.	31.	41.	51.	61.
2.	12.	22.	32.	42.	52.	62.
3.	13.	23.	33.	43.	53.	63.
4.	14.	24.	34.	44.	54.	64.
5.	15.	25.	35.	45.	55.	65.
6.	16.	26.	36.	46.	56.	66.
7.	17.	27.	37.	47.	57.	67.
8.	18.	28.	38.	48.	58.	68.
9.	19.	29.	39.	49.	59.	69.
10.	20.	30.	40.	50.	60.	70.

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71.	81.	91.	101.	111.
72.	82.	92.	102.	112.
73.	83.	93.	103.	113.
74.	84.	94.	104.	114.
75.	85.	95.	105.	115.
76.	86.	96.	106.	116.
77.	87.	97.	107.	117.
78.	88.	98.	108.	118.
79.	89.	99.	109.	119.
80.	90.	100.	110.	120.