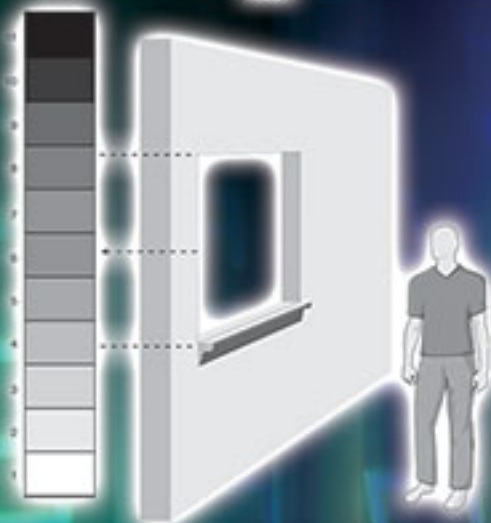
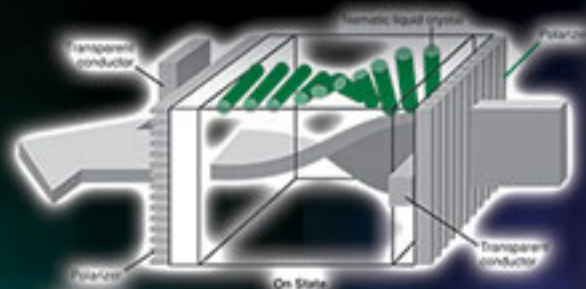


STUDENT WORKBOOK *for* RADIOGRAPHY *in the* DIGITAL AGE

SECOND EDITION



Quinn B. Carroll, M.Ed., R.T.

STUDENT WORKBOOK

for

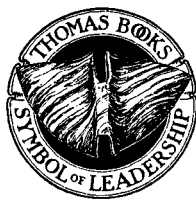
**RADIOGRAPHY IN
THE DIGITAL AGE**

Second Edition

Student Workbook for
RADIOGRAPHY IN THE DIGITAL AGE

By

QUINN B. CARROLL, M.Ed., R.T.



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INTRODUCTION

How to Use this Student Workbook

This **Student Workbook for Radiography in the Digital Age** is designed for use in the following typical radiography courses:

1. Physics of Radiography
 - A. Radiation Production and Characteristics
 - B. Imaging Equipment
2. Principles of Imaging
3. Digital Image Acquisition and Display
4. Radiation Biology and Protection

The **Workbook** is entirely organized in a “fill-in-the-blank” format. The wording of each question closely matches both the textbook and the lecture slide series for each course. This format is designed for *short-term* reinforcement of the student’s retention of lecture and reading material by focusing on key words. The **Workbook** should therefore be used on a *daily basis*, not as a self-test or review after whole units have been covered. The following are specific recommendations on how the student can most fully benefit from the Workbook and other ancillaries:

1. IN-CLASS USE:

*This is the most recommended method, for use with the **Lecture Slides for Radiography in the Digital Age**.* The sequence and wording of questions closely matches the slides. The questions have been kept short, with most blanks for filling in only with *key words* from the slide series. This is an effective “note-taking” tool that strikes a perfect balance between allowing the student to concentrate on the lecture by doing minimal writing, and still provoking the student to *participate* in classroom learning.

Instructors may elect to require this type of classroom participation and award points for completing each unit.

Some additional space at the bottom of each page is provided for any other notes the student might wish to take during lectures.

2. HOMEWORK USE:

If the **Workbook** is used as a reinforcement tool for *homework*, it is strongly recommended that the student answer the corresponding questions after reading *each major section* of a chapter. To facilitate this, the major unit subheadings are included in the **Workbook**. Do not wait until completing the entire chapter, or you may have trouble recalling the **key words** that are elicited by each question.

3. UNIT REVIEW AND SELF-TESTING:

For the purposes of review, self-testing or preparation immediately prior to a test, **Chapter Review Questions** are available at the end of each chapter in the textbook. Answer keys to these questions may be made available from your instructor. These are better suited for unit review than the workbook material.

A complete answer key for this workbook is available on CD, in the *Instructor Resources for Radiography in the Digital Age, 2nd Edition*, available from Charles C Thomas, Publisher.

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STUDENT WORKBOOK

for

**RADIOGRAPHY IN
THE DIGITAL AGE**

Chapter 1

INTRODUCTION TO RADIOGRAPHIC SCIENCE

The Scientific Approach

1. Fill in the terms for the following definitions:

_____ : The attempt to simplify concepts and formulas, to economize explanations; the philosophy that simple explanations are more likely to be true than elaborate, complex ones.

_____ : The requirement that proofs (experiments) can be duplicated by different people at different times and in different locations with precisely the same results.

_____ : The requirement that any theory or hypothesis can logically and logistically be proven *false*. Anything that cannot be proven false is not science, but belongs in another realm of human experience.

_____ : The requirement that experiments and their results can be directly observed with the human senses.

_____ : The requirement that results can be quantified mathematically and measured.

2. Perhaps the strongest aspect of the scientific method is that when it is used correctly, it is _____ - _____.

Additional NOTES: _____

3. Radiography is primarily a science because the radiographic image contains a _____ amount of diagnostically useful details, a _____ amount of information.
4. The standard of practice for all radiographers is to use good _____, sound _____, logical _____ and objective _____ in providing the best possible care for their patients.

A Brief History of X-Rays

5. In 1895, Wilhelm Roentgen was one of several researchers studying _____-rays which streamed across their _____ tubes when electricity was applied.
6. Roentgen accidentally discovered x-rays on November _____, _____ in _____, Germany.
7. The following year, Becquerel discovered natural _____, which was later found to consist of 3 distinct types, _____ particles, _____ particles, and _____ rays.

The Development of Modern Imaging Technology

8. The first fluoroscope was invented by _____.
9. Early fluoroscopes required high doses of radiation to patients, and were not substantially improved upon until 1948 when the _____ was developed.
10. A dentist, William Rollins, developed both the first _____ and the first _____.
11. The high-efficiency hot-filament x-ray tube was invented by _____.

Additional NOTES: _____

12. American professor _____ sandwiched x-ray film between fluorescent intensifying screens (developed by Thomas Edison) to create the first x-ray cassette.

The Development of Modern Digital Imaging

13. The first digital imaging technology to be demonstrated, in 1979, was digital _____, using the TV camera signals from image intensifiers.
14. "PACS" stands for "_____ and _____ system."
15. _____ was appropriately dubbed as "cassette-less radiography."
16. Compared to film-based radiography, the main advantage of all digital imaging systems is their capacity for _____ - _____ of images, which spares repeated exposures to the patient.

Living with Radiation

17. Radiation can be broadly divided into three types:
1. _____
 2. _____
 3. _____
18. One example of #1 above is _____
19. One example of #2 above is _____
20. One example of #3 above is _____
21. To be particularly harmful, radiation must be capable of _____ atoms.

Additional NOTES: _____