Radiologic Technology I

8375 36 weeks

Table of Contents

Acknowledgments ......................................................................................................................................... 1
Course Description ........................................................................................................................................ 2
Task Essentials Table .................................................................................................................................... 3
Curriculum Framework ................................................................................................................................. 4
Exploring the World of Radiologic Technology ........................................................................................... 4
Developing Effective Communication and Patient Care Skills ................................................................. 5
Using Medical Terminology ......................................................................................................................... 8
Understanding Human Anatomy and Physiology ...................................................................................... 11
Applying Critical Thinking and Problem Solving in the Healthcare Setting ................................................ 22
Applying Legal, Ethical, and Professional Responsibilities to Clinical Practice .............................................. 26
SOL Correlation by Task ............................................................................................................................ 30
Teaching Resources .................................................................................................................................... 33
Appendix: Credentials, Course Sequences, and Career Cluster Information ............................................. 35

Acknowledgments

The components of this instructional framework were developed by the following panelists:

Beulah Archer, Licensing Specialist, Virginia Board of Medicine, Richmond
Rebecca Keith, Program Director, Radiography, Virginia Commonwealth University, Richmond
Shawda Haskins-Martin, Lead Radiology Technologist, Virginia Commonwealth University Health System, Richmond
Ericka Lasley, Director, School of Radiologic Technology, Mary Washington Healthcare, Fredericksburg
Terri Settle, Instructor, C.S. Monroe Technology Center, Loudoun County Public Schools, Leesburg
Taffi Simone, Chair, Virginia Society of Radiologic Technologists, Virginia
Nicole Winkler, Program Director, Assistant Professor of Radiography, Piedmont Virginia Community College, Charlottesville

Correlations to the Virginia Standards of Learning were reviewed and updated by:
Course Description

Suggested Grade Level: 11 or 12

Students will gain a basic understanding of the historical development and role of a radiologic technologist within the healthcare setting, as well as obtain basic knowledge of human anatomy, physiology, basic disease processes, and the essentials of patient care. This course will also explain the legal, ethical, and professional responsibilities associated with becoming a radiologic technologist, while emphasizing the importance of good communication and critical-thinking skills. Mastery of the material in this course would provide students with a strong background should they wish to pursue certification in areas such as first aid, CPR, or AED.

NOTE: This course has specific state laws and regulations from a governing medical board or agency. Please contact the Virginia Department of Education, Office of Career and Technical Education prior to implementing this course. All inquiries may be sent to cte@doe.virginia.gov.
## Task Essentials Table

- Tasks/competencies designated by plus icons (⊕) in the left-hand column(s) are essential
- Tasks/competencies designated by empty-circle icons (⊙) are optional
- Tasks/competencies designated by minus icons (⊖) are omitted
- Tasks marked with an asterisk (*) are sensitive.

<table>
<thead>
<tr>
<th>8375</th>
<th>Tasks/Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exploring the World of Radiologic Technology</strong></td>
<td></td>
</tr>
<tr>
<td>⊕</td>
<td>Trace the historical development of radiology.</td>
</tr>
<tr>
<td>⊕</td>
<td>Identify by name and abbreviation the leading professional organizations for medical imaging.</td>
</tr>
<tr>
<td><strong>Developing Effective Communication and Patient Care Skills</strong></td>
<td></td>
</tr>
<tr>
<td>⊕</td>
<td>Adapt communication and patient skill techniques for diverse populations.</td>
</tr>
<tr>
<td>⊕</td>
<td>Describe the essentials for patient/radiologic technologist interaction.</td>
</tr>
<tr>
<td>⊕</td>
<td>Describe the essentials for interactions among the multidisciplinary healthcare team.</td>
</tr>
<tr>
<td>⊕</td>
<td>Perform patient-related and administrative documentation.</td>
</tr>
<tr>
<td><strong>Using Medical Terminology</strong></td>
<td></td>
</tr>
<tr>
<td>⊕</td>
<td>Explain commonly used prefixes, roots, and suffixes in medical terminology.</td>
</tr>
<tr>
<td>⊕</td>
<td>Explain medical terminology commonly used in radiologic technology.</td>
</tr>
<tr>
<td>⊕</td>
<td>Use medical terminology in communication with medical professionals.</td>
</tr>
<tr>
<td><strong>Understanding Human Anatomy and Physiology</strong></td>
<td></td>
</tr>
<tr>
<td>⊕</td>
<td>Identify the basic structural levels of body organization, anatomical structure, and body cavities.</td>
</tr>
<tr>
<td>⊕</td>
<td>Identify chemical components of the body.</td>
</tr>
<tr>
<td>⊕</td>
<td>Identify the structures and functions of the cell.</td>
</tr>
<tr>
<td>⊕</td>
<td>Identify the structures and functions of tissues, membranes, and glands.</td>
</tr>
<tr>
<td>⊕</td>
<td>Identify the structures and functions of the integumentary system.</td>
</tr>
<tr>
<td>⊕</td>
<td>Identify the structures and functions of the skeletal system.</td>
</tr>
<tr>
<td>⊕</td>
<td>Identify the structures and functions of the muscular system.</td>
</tr>
<tr>
<td>⊕</td>
<td>Identify the structures and functions of the cardiovascular system.</td>
</tr>
<tr>
<td>⊕</td>
<td>Identify the structures and functions of the respiratory system.</td>
</tr>
<tr>
<td>⊕</td>
<td>Identify the structures and functions of the nervous system.</td>
</tr>
<tr>
<td>⊕</td>
<td>Identify the structures and functions of the urinary system.</td>
</tr>
<tr>
<td>⊕</td>
<td>Identify the structures and functions of the male and female reproductive systems.</td>
</tr>
<tr>
<td>⊕</td>
<td>Identify the structures and functions of the lymphatic system, including the concept of immunity.</td>
</tr>
<tr>
<td>⊕</td>
<td>Identify the structures and functions of the gastrointestinal system.</td>
</tr>
<tr>
<td>⊕</td>
<td>Identify the structures and functions of the endocrine system.</td>
</tr>
<tr>
<td>⊕</td>
<td>Identify the structures and functions of the sensory system.</td>
</tr>
<tr>
<td><strong>Applying Critical Thinking and Problem Solving in the Healthcare Setting</strong></td>
<td></td>
</tr>
<tr>
<td>⊕</td>
<td>Identify the qualities of a critical thinker.</td>
</tr>
<tr>
<td>⊕</td>
<td>Demonstrate basic critical-thinking skills.</td>
</tr>
</tbody>
</table>
| ⊕ | Apply critical-thinking skills to healthcare situations.
Curriculum Framework

Exploring the World of Radiologic Technology

Task Number 39

Trace the historical development of radiology.

Definition

Tracing should include

- describing the events leading to the discovery of X-rays
- describing the evolution of radiation safety practices
- listing the pioneers in radiology (e.g., Wilhelm Conrad Röntgen, Marie Curie, Thomas Edison, William D. Coolidge) and describing the contributions of each to the field.

Process/Skill Questions

- What role did intellectual curiosity play in the discovery of X-rays?
- How was background knowledge important in the discovery of X-rays?
• What specific advancement of knowledge is associated with each pioneer in the history of radiologic science?

HOSA Competitive Events (High School)

Teamwork Events

○ HOSA Bowl

Task Number 40

Identify by name and abbreviation the leading professional organizations for medical imaging.

Definition

Identification should include

- Virginia Society of Radiologic Technologists (VSRT)
- American Society of Radiologic Technologists (ASRT)
- American Registry of Radiologic Technologists (ARRT)
- Joint Review Committee on Education in Radiologic Technology (JRCERT)
- American College of Radiology (ACR)
- American Chiropractic Registry of Radiologic Technologists (ACRRRT)
- Radiological Society of North America (RSNA)
- American Registry of Magnetic Resonance Imaging Technologists (ARMRIT)
- American Registry for Diagnostic Medical Sonography (ARDMS)
- Nuclear Medicine Technology Certification Board (NMTCB).

Process/Skill Questions

- What is the benefit of membership and involvement in VSRT, ASRT, ARRT, ACR, ARDMS, and NMTCB?
- How would one distinguish among certification, accreditation, registration, and licensure? What role does each play in the field of radiologic technology?
- What are the consequences of practicing radiology without the appropriate credentials?

Developing Effective Communication and Patient Care Skills
Task Number 41

Adapt communication and patient skill techniques for diverse populations.

Definition

Adaptation should include sensitivity to the differences among diverse populations (e.g., the elderly, those with special needs).

Process/Skill Questions

- Why is it necessary to be sensitive to cultural differences among patients?
- How can communication be adapted to various patient age groups?
- Why is it necessary to assess, adjust, and execute differently with each patient?

Task Number 42

Describe the essentials for patient/radiologic technologist interaction.

Definition

Description should incorporate concepts and techniques related to

- approaching the patient
- identifying the patient by two verifications (e.g., date of birth, spelling of last name)
- addressing the patient appropriately and respectfully
- questioning the patient to obtain a clinical history relevant to the procedure
- explaining a procedure to the patient
- providing patient education about the need for the procedure
- applying effective verbal and nonverbal communication skills
- initiating rapid response of the designated healthcare team.

Process/Skill Questions

- Why is vital to have two forms of identification when verifying patients? Why do patients sometimes misidentify themselves?
- Why is the initial greeting a vital part of patient care?
- What is the difference between the rapid response team and the code blue team?
Task Number 43

Describe the essentials for interactions among the multidisciplinary healthcare team.

Definition

Description should include the essentials for interaction during standardized patient handover (i.e., situation-background-assessment-recommendation [SBAR]) and report (e.g., patient condition changes and status), including emergency situations, among the multidisciplinary healthcare team.

The healthcare team typically may include

- physicians
- nurses
- respiratory therapists
- radiologic technologists
- patient advocates.

The communication tools used may include

- SBAR
- acknowledge, introduce, duration, explanation, and thank you (AIDET)
- clarifying questions
- key words at key times.

Process/Skill Questions

- Why is effective communication essential among members of the healthcare team?
- Why is it vital to communicate patient condition and status when turning a patient over to another modality, area, or shift?
- What principle overrides routine interaction with the healthcare team?
Health Science Events
  o Knowledge Test: Medical Law and Ethics

Task Number 44

Perform patient-related and administrative documentation.

Definition

Performance should include a demonstration and explanation that reflect a working understanding of the following:

- Medical writings are legal documents.
- All documentation should be accurate, complete, legible, timely, and recorded/stored according to the policies of the healthcare facility.
- Patient-related documentation may include medication, orders, progress notes, and patient history.
- Administrative documentation may include computerized integrated information systems and a picture archiving communication system (PACS).

Process/Skill Questions

- How does the principle of “the right procedure/right patient/right exam every time” influence medical documentation?
- Under what circumstances should a radiologic technologist question a patient order?
- What are the differences among computerized information systems and PACS?

HOSA Competitive Events (High School)

Health Science Events
  o Knowledge Test: Medical Law and Ethics

Using Medical Terminology

Task Number 45
Explain commonly used prefixes, roots, and suffixes in medical terminology.

Definition

Explanation should include dividing medical terms into prefixes, roots, and suffixes to determine their meanings based on Greek, Latin, and other language origins.

Process/Skill Questions

- What is the difference between the prefixes hyper- and hypo-? What common medical terms illustrate each?
- What is the difference between the suffixes -itis and -algia? What common medical terms illustrate each?
- Why are Greek and Latin prefixes, roots, and suffixes the basis of medical terminology?

HOSA Competitive Events (High School)

Health Science Events

- Medical Terminology

Teamwork Events

- HOSA Bowl

Task Number 46

Explain medical terminology commonly used in radiologic technology.

Definition

Explanation should include terminology associated with anatomy, physiology, biomechanics, disease processes, injuries, and radiology-specific procedures and equipment.

Process/Skill Questions

- What abbreviations are commonly used in radiology?
- What acronyms are commonly used in radiology?
• Why is it essential to keep current with new medical terminology? What resources are available for maintaining current awareness?

HOSA Competitive Events (High School)

Health Science Events

○ Medical Terminology

Teamwork Events

○ HOSA Bowl

Task Number 47

Use medical terminology in communication with medical professionals.

Definition

Use of medical terminology should be demonstrated in written and oral communication with physicians and allied health professionals.

Written communication should include recording medical history and reading prescriptions and orders, whether in handwritten or electronic format. Oral communication should include face-to-face conversations and telephone conversations.

Process/Skill Questions

• Why should radiologic technologists use medical terminology instead of lay terms when communicating with medical professionals?
• Why should radiologic technologists be careful to use descriptions and not diagnoses when communicating with other medical professionals?
• What are possible consequences of misspelling medical terms?

HOSA Competitive Events (High School)

Health Science Events

○ Medical Terminology

Teamwork Events
Understanding Human Anatomy and Physiology

Task Number 48

Identify the basic structural levels of body organization, anatomical structure, and body cavities.

Definition

Identification includes

- chemical components
- each body system and its general function
- each major organ and its general function
- location of body cavities.

Process/Skill Questions

- What is the true anatomical position? How does the anatomical position relate to radiographic planes?
- Which organs are located in each body cavity?
- Why is a thorough knowledge of anatomy and physiology important for the radiographic technologist?

HOSA Competitive Events (High School)

Teamwork Events

- HOSA Bowl

Task Number 49
Identify chemical components of the body.

Definition

Identification includes

- structures of an atom and a molecule
- explanation of ionic and covalent bonding
- elements, compounds, and mixtures
- chemical symbols for major electrolytes
- pH scale
- types of organic compounds
- composition and work of enzymes.

Process/Skill Questions

- Why is organic chemistry important in the study of human anatomy?
- What happens to the human body when the pH and electrolytes are out of balance?
- What is the difference between compounds and mixtures within the body? How are both important to body function?

HOSA Competitive Events (High School)

Teamwork Events

- HOSA Bowl

Task Number 50

Identify the structures and functions of the cell.

Definition

Identification should include the

- composition, location, and function of deoxyribonucleic acid (DNA) in the cell
- process of protein synthesis
- relationships among cells, tissues, organs, and systems.

Process/Skill Questions

- What is the difference between ribonucleic acid (RNA) and DNA?
• What makes a cell vulnerable to radiation damage?
• Which cells are more sensitive to radiation accumulation?

HOSA Competitive Events (High School)

Teamwork Events

○ HOSA Bowl

Task Number 51

Identify the structures and functions of tissues, membranes, and glands.

Definition

Identification should include the types of

• tissues, their locations, and their characteristics
• epithelial tissue
• muscle tissue
• membranes
• glands.

Process/Skill Questions

• Which tissues are more sensitive to radiation accumulation?
• Which glands are more sensitive to radiation accumulation?
• How does dense muscle tissue affect diagnostic imaging?

HOSA Competitive Events (High School)

Teamwork Events

○ HOSA Bowl

Task Number 52
Identify the structures and functions of the integumentary system.

Definition

Identification should include the

- names and descriptions of the layers of the skin
- functions of the skin
- location and functions of the appendages of the skin.

Process/Skill Questions

- How does the degree of skin color affect ionizing radiation absorption?
- Why is loss of skin one of the greatest dangers to a burn patient?
- How does over-radiation affect the dermis of the skin? How can this condition be treated?

HOSA Competitive Events (High School)

Teamwork Events

- HOSA Bowl

Task Number 53

Identify the structures and functions of the skeletal system.

Definition

Identification should include

- the two divisions of the skeleton
- the types, structure, functions, and formations of bones
- bone marrow, cranial sinuses, cartilage
- the number of vertebrae in each segment of the vertebral column
- the difference between the male and female pelvis
- changes in skeleton across the life span
- recognition of radiographic characteristics of the most common pathologies and how to compensate technical factors to accommodate.

Process/Skill Questions
• Why are the male and female pelvis shaped differently?
• What are the four curvatures of the spine? How do the spine curvatures impact positioning of the patient?
• Why does bone density play an important part in radiographic technique?

HOSA Competitive Events (High School)

Teamwork Events

○ HOSA Bowl

Task Number 54

Identify the structures and functions of the muscular system.

Definition

Identification should include the

• basic unit of muscle tissue
• three types of muscle tissue, their characteristics, and their functions
• physiology and types of muscle contractions
• effects of aging on muscles
• recognition of radiographic characteristics of the most common pathologies and how to compensate technical factors to accommodate.

Process/Skill Questions

• What are the dominant muscles seen on an abdomen/kidney, ureter, bladder (KUB) radiograph?
• What muscle group is demonstrated on a cervical spine radiograph? What does the absence of the normal curvature mean for that muscle group?
• Why does a fractured hip result in eversion of the leg?

HOSA Competitive Events (High School)

Teamwork Events

○ HOSA Bowl
Task Number 55

Identify the structures and functions of the cardiovascular system.

Definition

Identification should include

- the types of elements formed in blood
- formation of blood cells
- blood clotting
- the compatibility of blood, including the Rh factor
- the relationship of the autonomic nervous system and the heart
- the types of vessels, structures, and functions
- oxygenated vs. unoxygenated blood
- factors influencing blood flow
- factors affecting pulse rate
- the location, structures, and functions of the heart
- the circulation of blood
- the cardiac cycle
- the electrical conduction system
- coronary circulation
- recognition of radiographic characteristics of the most common pathologies and how to compensate technical factors to accommodate.

Process/Skill Questions

- What is the difference between systolic and diastolic pressures?
- How does iodinated contrast enhance the circulatory system in diagnostic imaging?
- What is situs inversus? How does it affect diagnostic imaging?

HOSA Competitive Events (High School)

Teamwork Events

- HOSA Bowl

Task Number 56
Identify the structures and functions of the respiratory system.

Definition

Identification should include

- the process of pulmonary ventilation
- external and internal respiration
- the structure and function of organs of the respiratory system
- the pathway of gases
- the transportation of oxygen and carbon dioxide in blood
- a comparison of air pressures
- the production of carbonic acid
- recognition of radiographic characteristics of the most common pathologies and how to compensate technical factors to accommodate.

Process/Skill Questions

- Why is the chest radiograph the most common radiograph? Why is it the most difficult to read? Why is comparison with past films essential?
- What effects do post-radiation treatment, pneumonia, bronchitis, emphysema, and asthma have on a chest radiograph?
- Why is it important for the patient to take a double inspiration when the chest is being imaged?

HOSA Competitive Events (High School)

Teamwork Events

- HOSA Bowl

Task Number 57

Identify the structures and functions of the nervous system.

Definition

Identification should include

- the central and peripheral systems
- neurons
• nerve impulses
• the role of myelin
• the role of the spinal cord
• the role of the brain
• recognition of radiographic characteristics of the most common pathologies and how to compensate technical factors to accommodate.

Process/Skill Questions

• What effect does an improper needle stick have on the nervous system?
• What special considerations are involved when imaging a patient with nervous system disorders (e.g., multiple sclerosis, cerebral palsy, Parkinson’s disease)?
• Why would a radiologic technologist extract cerebral spinal fluid under fluoroscopy?

HOSA Competitive Events (High School)

Teamwork Events

  o HOSA Bowl

Task Number 58

Identify the structures and functions of the urinary system.

Definition

Identification should include

• the male and female reproductive systems
• the process of fertilization
• recognition of radiographic characteristics of the most common pathologies and how to compensate technical factors to accommodate.

Process/Skill Questions

• What is the importance of normal kidney function before injecting iodinated contrast?
• What is the significance of ureteral reflux?
• What does an intravenous urogram (IVU) demonstrate?

HOSA Competitive Events (High School)

Teamwork Events
Task Number 59

Identify the structures and functions of the male and female reproductive systems.

Definition

Identification includes

- the male and female reproductive systems
- the process of fertilization
- recognition of radiographic characteristics of the most common pathologies and how to compensate technical factors to accommodate.

Process/Skill Questions

- What is the significance of a tubal pregnancy?
- What types of examination can be performed on the female reproductive system?
- What types of examination can be performed on the male reproductive system?
- What precautions must be taken when diagnostic imaging is ordered for a patient who is pregnant?

HOSA Competitive Events (High School)

Teamwork Events

- HOSA Bowl

Task Number 60

Identify the structures and functions of the lymphatic system, including the concept of immunity.

Definition

Identification should include
• the functions of the lymphatic system
• the structures of the lymphatic system
• the location of lymph nodes
• blood and lymphatic capillaries
• the circulation of lymphatic fluid
• forms of immunity
• recognition of radiographic characteristics of the most common pathologies and how to compensate technical factors to accommodate.

Process/Skill Questions

• What is the significance of enlarged lymph nodes?
• What is the difference between passive and active immunities?
• How does the lymphatic system affect the spread of cancer?

HOSA Competitive Events (High School)

Teamwork Events

  o HOSA Bowl

Task Number 61

Identify the structures and functions of the gastrointestinal system.

Definition

Identification should include

• the organs, structures, and functions of the digestive tract
• a discussion of associated structures of digestion
• labeling of various ducts and their points of convergence
• essential mechanical and chemical steps in digestion
• factors of absorption
• the role of blood sugar in the gastrointestinal system
• the role of the hypothalamus in the gastrointestinal system
• defining basal metabolic rate
• recognition of radiographic characteristics of the most common pathologies and how to compensate technical factors to accommodate.

Process/Skill Questions
• Why is barium the most common contrast medium used for gastrointestinal imaging? When should barium not be used?
• Why is it important for the radiologist to know about allergies before imaging?
• What is the importance of peristalsis to digestion? To diagnostic imaging?

**HOSA Competitive Events (High School)**

**Teamwork Events**

- HOSA Bowl

---

**Task Number 62**

**Identify the structures and functions of the endocrine system.**

**Definition**

Identification should include the

- distinction between endocrine and exocrine glands
- functions of hormones
- recognition of radiographic characteristics of the most common pathologies and how to compensate technical factors to accommodate.

**Process/Skill Questions**

- What is the importance of shielding the radiologic technologist’s thyroid when imaging?
- What modalities best demonstrate thyroid function?
- What modalities best demonstrate the pituitary gland?

**HOSA Competitive Events (High School)**

**Teamwork Events**

- HOSA Bowl

---

**Task Number 63**
Identify the structures and functions of the sensory system.

Definition

Identification should include

- special and general senses
- protective sensory mechanisms
- the role of the eyes in sensation
- the role of the ears in sensation
- recognition of radiographic characteristics of the most common pathologies and how to compensate technical factors to accommodate.

Process/Skill Questions

- Why is it necessary to have eyewash stations in the radiology department?
- Why have universal precautions expanded to include eye protection?
- What modalities best demonstrate the cochlea? The internal auditory canal?
- How are radiologic systems used with sensory systems?

HOSA Competitive Events (High School)

Teamwork Events

- HOSA Bowl

Applying Critical Thinking and Problem Solving in the Healthcare Setting

Task Number 64

Identify the qualities of a critical thinker.

Definition

Identification should include

- active listening skills
• the ability to express ideas clearly and concisely
• intellectual curiosity
• open-mindedness
• logical thinking
• objectivity
• analytical thinking
• a willingness to examine ideas from others’ perspectives
• the determination to see a problem or challenge to its resolution or solution
• the ability to accept multiple “correct” answers or solutions

Process/Skill Questions

• What are the criteria for active listening?
• Why can there never be just one way to do any radiographic examination?
• Why is it necessary to think outside the box when assessing, adjusting, and executing a radiograph?

HOSA Competitive Events (High School)

    Teamwork Events
        o Biomedical Debate
        o Creative Problem Solving

Task Number 65

Demonstrate basic critical-thinking skills.

Definition

Demonstration should include

• identifying assumptions, ethics, and values in written works
• discerning fallacies in arguments
• controlling psychological impediments to sound reasoning (e.g., importance of remaining calm)
• presenting valid facts, evidence, and statistics
• evaluating statistics, rhetoric, and advertising claims

Process/Skill Questions

• Why is objectivity important to critical thinking?
• How can the radiologic technologist's psychological demeanor impede good patient care? The patient’s psychological demeanor?
• Why does cultural bias negatively affect good patient care?

HOSA Competitive Events (High School)

Teamwork Events

  o Biomedical Debate
  o Creative Problem Solving

Task Number 66

Apply critical-thinking skills to healthcare situations.

Definition

Application should include using critical-thinking skills in situations related to radiologic technology, such as learning or revising a procedure or evaluating a new technology.

Process/Skill Questions

  • How are critical-thinking skills important in imaging trauma patients?
  • Why is it important not to make assumptions when approaching a patient? When imaging a patient?
  • How can cross-training improve critical-thinking skills?

HOSA Competitive Events (High School)

Teamwork Events

  o Creative Problem Solving

Task Number 67

Identify the steps in the problem-solving process.

Definition

Identification should include the following steps:
- Clarify the healthcare issue or issues involved.
- Identify adequate, reliable information and resources for problem solving.
- Create alternative choices for solving the problem.
- Evaluate potential consequences of alternative choices.
- Use standards to make decisions.
- Implement decisions.
- Evaluate outcomes.
- Revise the solution, if necessary.

**Process/Skill Questions**

- Why are assessing, adjusting, and executing all important aspects of problem solving during the diagnostic imaging process?
- What problems may be encountered in a diagnostic imaging setting? How might these problems be approached?
- What may be the consequences of not following protocol in problem solving?

**HOSA Competitive Events (High School)**

**Teamwork Events**

- Creative Problem Solving

---

**Task Number 68**

**Apply the problem-solving process to the healthcare setting.**

**Definition**

Application should include situations related to radiologic technology, such as

- technological problems
- ethical problems
- diagnostic problems
- communication problems.

**Process/Skill Questions**

- What types of technological problems may be encountered when imaging?
- What types of ethical problems may reveal themselves when imaging?
- What types of communication problems can occur because of language barriers?
- What types of communication problems can occur because a patient is hearing-impaired?
Task Number 69

Describe the organization and operation of a radiology department.

Definition

Description should include the

- role of the hospital administrator, radiology administrator, and radiation safety officer
- components of a radiology organizational chart
- functions of a radiology manager in relation to the needs of the imaging department
- importance of the imaging cycle (i.e., tracing a patient from injury to treatment).

Process/Skill Questions

- What are the duties of the radiology administrator, radiology managers, and radiology supervisors?
- What is radiology’s role in overall health care? How does this role affect patient care?
- What is meant by chain of command? What is the typical chain of command in the radiology department?

Task Number 70

Explain the importance of Health Insurance Portability and Accountability Act of 1996 (HIPAA).

Definition
Explanation should include that HIPAA

- refers to the federal privacy standards to protect patients’ medical records and other health information provided to health plans, doctors, hospitals, and other healthcare providers
- includes standards developed by the Department of Health and Human Services (HHS) and may be accessed through their website.

Process/Skill Questions

- Why is it important to maintain patient confidentiality?
- What are the risks to patient confidentiality?
- How are medical records protected?

HOSA Competitive Events (High School)

Health Science Events

- Knowledge Test: Medical Law and Ethics

---

Task Number 71

Explain legalities governing radiologic technology practice.

Definition

Explanation should include

- legal issues, as applied to the practice of radiologic technology, such as
  - malpractice
  - professional liability
  - breaches in confidentiality
  - professional negligence
- a review of the requirements, laws, and regulations for licensing in Virginia
- the licensing requirements for preceptors.

Process/Skill Questions

- How has the high cost of medical malpractice affected the imaging profession?
- What is the difference between slander and libel? What is the difference between assault and battery? How might these legal issues relate to the work of a radiologic technologist?
- What are examples of professional negligence in diagnostic imaging? What can be the consequences?
Task Number 72

**Explain ethical issues related to radiologic technology practice.**

**Definition**

Explanation should be based on the ethical codes developed by professional associations.

Teacher resources:
- Standards of Ethics, ARRT
- The Practice Standards for Medical Imaging and Radiation Therapy, ASRT

**Process/Skill Questions**

- What is a professional code of ethics? What are the consequences of violating the code of ethics?
- What are examples of ethical violations in diagnostic imaging?
- How can a radiologic technologist protect himself or herself from false accusations?
- Who is required to obtain state licensure?

Task Number 73

**Describe the influence of government agencies on the delivery of health care.**

**Definition**
Description should include

- state government agencies, such as
  - Virginia Board of Medicine
  - Virginia Department of Health (VDH)
  - Joint Commission on Health Care (JCHC)
  - Virginia Department of Health Professions
- national government agencies, such as
  - U.S. Department of Health and Human Services (HHS)
  - The Joint Commission
  - U.S. Food and Drug Administration (FDA)
  - Nuclear Regulatory Commission (NRC).

Process/Skill Questions

- What is the importance of a healthcare facility being accredited?
- What is the role of the HHS in ensuring patient rights and services?
- How does The Joint Commission serve the medical community?

HOSA Competitive Events (High School)

**Health Science Events**

- Knowledge Test: Medical Law and Ethics

**Task Number 74**

Research career opportunities and the education, credentials, and responsibilities associated with each.

**Definition**

Research may include

- radiologic technologist positions in one or more imaging modalities, such as
  - computed tomography (CT)
  - magnetic resonance imaging (MRI)
- professional environments and opportunities, such as
  - private physicians’ offices
  - hospitals
  - clinics
  - administration
Research should include radiology and other healthcare organizations’ websites, as well as Virginia Career VIEW.

Process/Skill Questions

- What is the benefit of multiple-modality accreditation in career development?
- What are the differences between working in an outpatient setting vs. a hospital?
- Why is radiologic technology considered a portable career?
- What career opportunities are available for radiologic technologists outside the traditional healthcare setting?

HOSA Competitive Events (High School)

Teamwork Events

- Health Career Display

SOL Correlation by Task

<p>| Trace the historical development of radiology. | English: 11.5, 12.5 |
| History and Social Science: VUS.8, VUS.9, VUS.10, VUS.11, WHII.10, WHII.11 |
| Identify by name and abbreviation the leading professional organizations for medical imaging. | English: 11.5, 12.5 |
| Adapt communication and patient skill techniques for diverse populations. | English: 11.5, 12.5 |
| History and Social Science: GOVT.3, GOVT.11 |
| Describe the essentials for patient/radiologic technologist interaction. | English: 11.5, 12.5 |
| History and Social Science: GOVT.3, GOVT.11, GOVT.16 |
| Describe the essentials for interactions among the multidisciplinary healthcare team. | English: 11.5, 12.5 |
| History and Social Science: GOVT.16 |</p>
<table>
<thead>
<tr>
<th>Task</th>
<th>وقالت English: 11.6, 11.7, 12.6, 12.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform patient-related and administrative documentation.</td>
<td>English: 11.3, 12.3</td>
</tr>
<tr>
<td>Explain commonly used prefixes, roots, and suffixes in medical terminology.</td>
<td>English: 11.3, 12.3, WHI.5, WHI.6</td>
</tr>
<tr>
<td>Explain medical terminology commonly used in radiologic technology.</td>
<td>English: 11.3, 12.3</td>
</tr>
<tr>
<td>Use medical terminology in communication with medical professionals.</td>
<td>English: 11.3, 12.3</td>
</tr>
<tr>
<td>Identify the basic structural levels of body organization, anatomical structure, and body cavities.</td>
<td>English: 11.5, 12.5, WHII.4, BIO.4</td>
</tr>
<tr>
<td>Identify chemical components of the body.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>Identify the structures and functions of the cell.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>Identify the structures and functions of tissues, membranes, and glands.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>Identify the structures and functions of the integumentary system.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>Identify the structures and functions of the skeletal system.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>Identify the structures and functions of the muscular system.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>Identify the structures and functions of the cardiovascular system.</td>
<td>English: 11.5, 12.5, WHII.4, BIO.4</td>
</tr>
<tr>
<td>Identify the structures and functions of the respiratory system.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>Identify the structures and functions of the nervous system.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>Identify the structures and functions of the urinary system.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>Task</td>
<td>Course Code</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Identify the structures and functions of the male and female reproductive systems.</td>
<td>Science: BIO.4, English: 11.5, 12.5</td>
</tr>
<tr>
<td>Identify the structures and functions of the lymphatic system, including the concept of immunity.</td>
<td>Science: BIO.4, English: 11.5, 12.5</td>
</tr>
<tr>
<td>Identify the structures and functions of the gastrointestinal system.</td>
<td>Science: BIO.4, English: 11.5, 12.5</td>
</tr>
<tr>
<td>Identify the structures and functions of the endocrine system.</td>
<td>Science: BIO.4, English: 11.5, 12.5</td>
</tr>
<tr>
<td>Identify the structures and functions of the sensory system.</td>
<td>Science: BIO.4, English: 11.5, 12.5</td>
</tr>
<tr>
<td>Identify the qualities of a critical thinker.</td>
<td>Science: BIO.4, English: 11.5, 12.5</td>
</tr>
<tr>
<td>Demonstrate basic critical-thinking skills.</td>
<td>History and Social Science: GOVT.1, English: 11.5, 12.5</td>
</tr>
<tr>
<td>Apply critical-thinking skills to healthcare situations.</td>
<td>History and Social Science: GOVT.1, English: 11.5, 12.5</td>
</tr>
<tr>
<td>Identify the steps in the problem-solving process.</td>
<td>Science: BIO.1, English: 11.5, 12.5</td>
</tr>
<tr>
<td>Apply the problem-solving process to the healthcare setting.</td>
<td>History and Social Science: GOVT.1, English: 11.5, 12.5</td>
</tr>
<tr>
<td>Describe the organization and operation of a radiology department.</td>
<td>History and Social Science: GOVT.1, English: 11.5, 12.5</td>
</tr>
<tr>
<td>Explain the importance of Health Insurance Portability and Accountability Act of 1996 (HIPAA).</td>
<td>History and Social Science: GOVT.9, English: 11.5, 12.5</td>
</tr>
<tr>
<td>Explain legalities governing radiologic technology practice.</td>
<td>History and Social Science: GOVT.9, English: 11.5, 12.5</td>
</tr>
<tr>
<td>Explain ethical issues related to radiologic technology practice.</td>
<td>History and Social Science: GOVT.3, GOVT.11, GOVT.16, English: 11.5, 12.5</td>
</tr>
<tr>
<td>Describe the influence of government agencies on the delivery of health care.</td>
<td>History and Social Science: VUS.13, VUS.14, English: 11.5, 12.5</td>
</tr>
</tbody>
</table>
Research career opportunities and the education, credentials, and responsibilities associated with each.

Teaching Resources

- National HOSA Interactive Human Body. [http://www.hosa.org/hosa102/Module2.htm](http://www.hosa.org/hosa102/Module2.htm). Includes lots of links to teaching resources from many areas of medical science.
- _______. *Introduction to Nuclear Medicine Presentation*. [33](http://www.jointcommission.org/).
• Rizzo, Donald C. Fundamentals of Anatomy and Physiology. Clifton Park, NY: Thomson Delmar Learning, 2006. (Available to Virginia public educators from the CTE Resource Center library at library@cteresource.org.)

• University of Texas Health Science Center at San Antonio. Teacher Enrichment Initiatives. http://teachhealthk-12.uthscsa.edu/.

• Virginia Career VIEW. “Radiologic Technicians.” http://www.vaview.vt.edu/careers/career/29-2099.06.
Appendix: Credentials, Course Sequences, and Career Cluster Information

Industry Credentials: Only apply to 36-week courses

- College and Work Readiness Assessment (CWRA+)
- Limited Licensed Radiology Technologist (LLRT) Examination
- National Career Readiness Certificate Assessment
- Workplace Readiness Skills for the Commonwealth Examination

Concentration sequences: A combination of this course and those below, equivalent to two 36-week courses, is a concentration sequence. Students wishing to complete a specialization may take additional courses based on their career pathways. A program completer is a student who has met the requirements for a CTE concentration sequence and all other requirements for high school graduation or an approved alternative education program.

- Introduction to Health and Medical Sciences (8302/36 weeks)
- Introduction to Health and Medical Sciences (8301/18 weeks)
- Radiologic Technology II (8376/36 weeks)

Career Cluster: Health Science

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Occupations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostics Services</td>
<td>Radiologic Technologist, Radiographer</td>
</tr>
<tr>
<td></td>
<td>Radiologist</td>
</tr>
<tr>
<td>Therapeutic Services</td>
<td>Dental Assistant</td>
</tr>
</tbody>
</table>