GEORGIA | PEACH STATE PATHWAYS

Career, Technical, & Agricultural Education

HEALTHCARE SCIENCE

COURSE: 25.525 Medical Services General Medicine

UNIT: 5.1 Diagnostic Imaging Service

SUB UNIT: Diagnostic Imaging

INTRODUCTION

Annotation:

In this unit students will demonstrate understanding of Diagnostic Imaging Services used for diagnosis, treatment and monitoring in the medical field, including the types of medical information/records each generates. These services include but are not limited to Computer Assisted Tomography (CAT), Magnetic Resonance Imaging (MRI), Positron Emissions Tomography (PET), Ultrasound Imaging, X-Rays, arrhythmia monitoring, pulmonary monitoring, and Obstetrical/Neonatal monitoring.

Grade(s):

	9th
	10th
x	11th
x	12th

Time: Eight 50 minute periods

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Students with Disabilities:

For students with disabilities, the instructor should refer to the student's IEP to be sure that the accommodations specified are being provided. Instructors should also familiarize themselves with the provisions of Behavior Intervention Plans that may be part of a student's IEP. Frequent consultation with a student's special education instructor will be beneficial in providing appropriate differentiation.

FOCUS STANDARDS

GPS Focus Standards:

HS-TGM-16. Students will demonstrate understanding of the services provided in diagnostic imaging – Diagnostic Imaging Services (Radiology).

- **a.** Differentiate between the types of diagnostic imaging techniques, including but not limited to: diagnostic, treatment, and monitoring systems and the types of medical information/records each generates including Computer Assisted Tomography (CAT), Magnetic Resonance Imaging (MRI), Positron Emissions Tomography (PET), Ultrasound Imaging, X-Rays, arrhythmia monitoring, pulmonary monitoring, and Obstetrical/Neonatal monitoring.
- **b.** Examine the types of medical information/records each generates including but not limited to: Computer Assisted Tomography (CAT), Magnetic Resonance Imaging (MRI), Positron Emissions Tomography (PET), Ultrasound Imaging, X-Rays, arrhythmia monitoring, pulmonary monitoring, and Obstetrical/Neonatal monitoring.
- **c.** Discuss the impact of technology on diagnostic imaging techniques and treatments such as fiber optics and laser therapy.

GPS Academic Standards:

ELA9RL. The student understands and acquires new vocabulary and uses it correctly in reading and writing.

SCSh3. Students will identify and investigate problems scientifically.

SCSh4. Students use tools and instruments for observing, measuring and manipulating scientific equipment and materials.

National / Local Standards / Industry / ISTE:

UNDERSTANDINGS & GOALS

Enduring Understandings:

An essential component of patient care may include using appropriate diagnostic imaging to assist in determining patients' diagnosis and prescribing treatment. Diagnostic Imaging procedures employ various aspects of technology to perform a wide range of tests, procedures, and treatments that vary in

cost, risk and value. It is important for the healthcare worker to understand the nature various diagnostic imaging procedures that a physician may order and information that may be derived from various procedures and tests. Understand methods used to image anatomy and physiology.

Essential Questions:

- How do various diagnostic imaging procedures compare including cost, risk, and value?
- How has technology impacted diagnostic imaging techniques and treatments?
- What types of information is generated from the various diagnostic imaging procedures and treatments?

Knowledge from this Unit:

The student will know:

- Methods used to make an image of anatomy or physiological process.
- The differences between imaging modalities including cost, risk, and value.
- Discuss the information generated from arrhythmia monitoring, pulmonary monitoring, and Obstetrical/Neonatal monitoring.
- Discuss the impact of technology on diagnostic imaging techniques and treatments such as fiber optics and laser therapy.
- Medical terms for body planes, cavities, and positions.

Skills from this Unit:

The student will be able to:

- Lab: Prepare images for viewing by a physician.
- Patient Teaching Lab: Diagnostic Procedures

ASSESSMENT(S)

Assessment Method Type: Select one or more of the following. Please consider the type(s) of differentiated instruction you will be using in the classroom.

_____ Pre-test
_____ Objective assessment - multiple-choice, true- false, etc.
__ Quizzes/Tests
__ Unit test
_____ Group project
_x_ Individual project
_x_ Self-assessment - May include practice quizzes, games, simulations, checklists, etc.

_____
__ Self-check rubrics
__ Self-check during writing/planning process
__ Journal reflections on concepts, personal experiences and impact on one's life
__ Reflect on evaluations of work from teachers, business partners, and competition judges
__ Academic prompts
__ Practice quizzes/tests

x Subjective assessment/Informal observations
__ Essay tests
__ Observe students working with partners
__ Observe students role playing

_____ Peer-assessment
__ Peer editing & commentary of products/projects/presentations using rubrics
__ Peer editing and/or critiquing

_____ Dialogue and Discussion
__ Student/teacher conferences
__ Partner and small group discussions
__ Whole group discussions
__ Interaction with/feedback from community members/speakers and business partners

x Constructed Responses
__ Chart good reading/writing/listening/speaking habits
_x_ Application of skills to real-life situations/scenarios

_____ Post-test

Assessment(s) Title:

- Patient Teaching Lab: Diagnostic Imaging
- Lab Prepare Images for View by Physician
- Diagnostic Procedure Oral Report

Assessment(s) Description/Directions:

1. Make copies of *Diagnostic Scavenger Hunt* & Diagnostic Imaging Procedures Chart (1 for each student)
2. Make copies of *Patient teaching lab* (uses communication techniques to give the patient instructions on Diagnostic Procedures (use Resources from ACR for student instruction.) http://www.acr.org/SecondaryMainMenuCategories/quality_safety/guidelines/dx/
3. Copy Lab "*Prepare Images for View by Physician"* and prepare images (you may have old radiographs or make them from files by copying onto overhead transparencies) and view box.
4. Prepare a lecture to review anatomical positions and locations in relation to radiographs.
5. Prepare Activity handout TGM 16 C: Discuss the Impact of Technology (make copy for each student)

Attachments for Assessment(s): Please list.

- Diagnostic Scavenger Hunt
- Patient Teaching Lab: Diagnostic Imaging
- Lab Prepare Images for View by Physician

- Diagnostic Procedure Oral Report
- Impact of Technology Assignment

LEARNING EXPERIENCES

Instructional planning: Include lessons, activities and other learning experiences in this section with a brief description of the activities to ensure student acquisition of the knowledge and skills addressed in the standards. Complete the sequence of instruction for each lesson/task in the unit.

Sequence of Instruction

Lesson One

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

HS-TGM-16. Students will demonstrate understanding of the services provided in diagnostic imaging –Diagnostic Imaging Services (Radiology).

2. Review Essential Questions.

- How do various diagnostic imaging procedures compare including cost, risk and value?
- How has technology impacted diagnostic imaging techniques and treatments?
- What types of information is generated from the various diagnostic imaging procedures and treatments?

3. Identify and review the unit vocabulary.

Computer Assisted Tomography (CAT), Magnetic Resonance Imaging (MRI), Positron Emissions Tomography (PET), Ultrasound Imaging, X-Rays, arrhythmia monitoring, pulmonary monitoring, and Obstetrical/Neonatal monitoring.

4. Assessment Activity.

- Write X-Ray, CT Scan, and MRI Scan on the board.
- Introduce lesson by asking students to raise their hands if they know of someone who has had to have any of these tests. Give students the scavenger hunt and ask them to complete by following directions on the sheet and gathering information from other students in the class. Turn this in to the instructor.
- State in this lesson you will learn about different diagnostic test. We will mainly focus on examining procedures performed on the gastrointestinal and reproductive systems.
- Lecture (multimedia presentation) on Diagnostic Imaging and have students take notes (give outline of notes to special needs students if needed).

Introduction to Diagnostic Imaging Healthcare delivery systems

- Imaging
- History
- Current Trends

Briefly discuss types of diagnostic imaging

- Radiology Interventional Radiography Fluro
- Conventional
- Sonography
- CT
- MRI
- Nuclear Medicine
- PET
- Mammography

Assign diagnostic procedure report topics –this can be individual students or paired students (allow time to research the topic and prepare report). Give students a copy of the Diagnostic Procedure Oral Report rubric and a copy of the Diagnostic Imaging Procedures Chart (use list for assigning topics for diagnostic procedures and for students to use for note taking)

Lesson Two-Three

1. Review standards, essential questions and digestive system vocabulary
2. Discuss and have students take notes

Radiation Safety

- Protection: times, distance & shielding, OSHA guidelines
- Equipment Introduction
- production and capture of image
- Contrast Agents and Media

3. Allow students to work on selected diagnostic procedure and present during lesson 3-Have students take notes on each student's presentations on the Diagnostic Imaging Procedures Chart, they will be able to use this information to plan patient teaching assignment

Lesson Four, Five and Six

1. Using Digestive System sub unit plan, ask students to recall digestive system structures and complete identification activity in small groups

Give students a copy of the GI system vocabulary. Place students in small cooperative groups and have them use their textbook to define GI vocabulary

2. Discuss diagnostic imaging tests that may be performed on the digestive system.

Lesson Seven and Eight

1. Refer to Reproductive System sub unit plan

Lesson Nine

1. Allow students to present report on the reproductive system

Ask students to recall the components of effective communication by asking two students to demonstrate the components of communication and have the group identify the components. Ask students how they think communication skills could be used in working with patients who are having a diagnostic procedure performed. Write responses on the board and discuss.

2. Review communication techniques and give students the Patient Teaching Lab Rubric. Ask students to practice and demonstrate patient teaching. They should use the patient teaching pamphlet created for the reproductive system unit to perform the patient teaching.

Lesson Ten

Have students practice and present patient teaching assignment

Lesson Eleven

1. Lecture using multimedia presentation (Lab Prepare Images for View by Physician). Assign lab, allow time for practice.

2. Check off labs after students have practiced

3. Give students the handout for them to answer. Discuss the impact of technology on diagnostic imaging techniques and treatments such as fiber optics and laser therapy.

Attachments for Learning Experiences: Please list.

- Diagnostic Imaging Chart
- Diagnostic Scavenger Hunt
- Patient Teaching Lab: Diagnostic Procedures
- Lab Prepare Images for View by Physician
- Diagnostic Procedure Oral Report

Notes & Reflections:

Resources from ACR (American College of Radiology). PDF's can be printed and used as resource or used online.

CULMINATING PERFORMANCE TASK (Optional)

Culminating Unit Performance Task Title:

- Lab Prepare Images for View by Physician
- Patient Teaching Lab: Diagnostic Procedures
- Diagnostic Procedures Oral Report

Culminating Unit Performance Task Description/Directions/Differentiated Instruction:

- Lab Prepare Images for View by Physician: the student will use knowledge of anatomical positions to display images for viewing, locating parts of the body and using correct medical terminology.
- Patient Teaching Lab: After researching different imaging modalities, the students will use communication skills to explain the procedure to the patient and answer questions

Attachments for Culminating Performance Task: Please list.

- Patient Teaching Lab: Diagnostic Procedures
- Diagnostic Scavenger Hunt
- Lab Prepare Images for View by Physician
- Diagnostic Procedure Oral Report

UNIT RESOURCES

Web Resources:

Resource for Radiologic exams and procedures:
http://www.acr.org/SecondaryMainMenuCategories/quality_safety/guidelines/dx/

Resource for Contrast Safety Issues (ppt):
http://www.esur.org/fileadmin/Guidelines/ESUR_2007_Guideline_6_Kern_Ubersicht.pdf

Contrast media safety form:
www.pioneervalleyhospital.com/
http://www.pioneervalleyhospital.com/gedownload!/contrast_media_assessment_4_07.pdf?item_id=163021&version_id=163022

MRI: http://www.parksidemri.com/patient/forpat.html (good video of procedure)

PET: http://www.radiologyinfo.org/en/info.cfm?PG=pet&bhcp=1

http://www.communitycare.com/Practices/ImageCare/MRI_Prep.asp

Above: site with good descriptions of all procedures

http://tetonnuclearmedicine.com/index.html

http://www.torrancememorial.org/nuclear.medicine.treadmill.stress.tests.cardiolite.or.thallium_145.tmmc

http://www.cardiodocs.org/procedures/nuclear_treadmill.html

http://www.northshore.org/clinicalservices/cardiology/treatment/imaging/tests/default.aspx?id=3709

Above: picture with motion of exam

Attachment(s): Supplemental files not listed in assessment, learning experiences, and performance task.

Materials & Equipment:

- X-ray viewbox or equivalent software
- Radiographs (kub, chest, spine, extremities)
- Internet for research or copies of PDF files from ACR

What 21st Century Technology was used in this unit:

x	Slide Show Software		Graphing Software		Audio File(s)
	Interactive Whiteboard		Calculator		Graphic Organizer
	Student Response System		Desktop Publishing	x	Image File(s)
	Web Design Software		Blog		Video
	Animation Software		Wiki		Electronic Game or Puzzle Maker
	Email		Website		