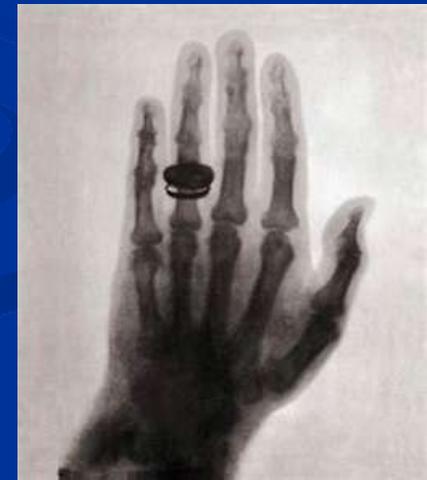




Radiologic Technology

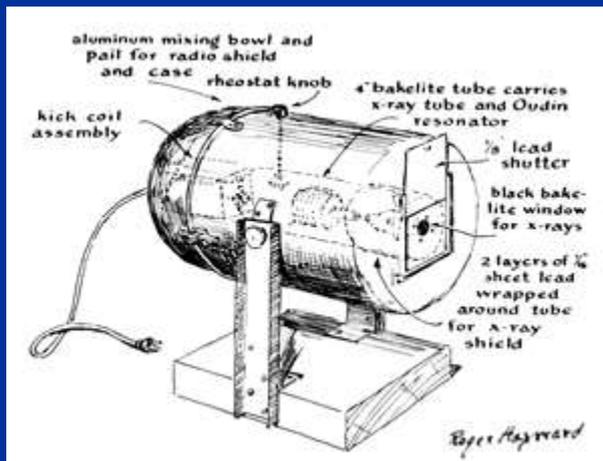
Art and Science

The Eyes of Medicine



Radiologic Technology

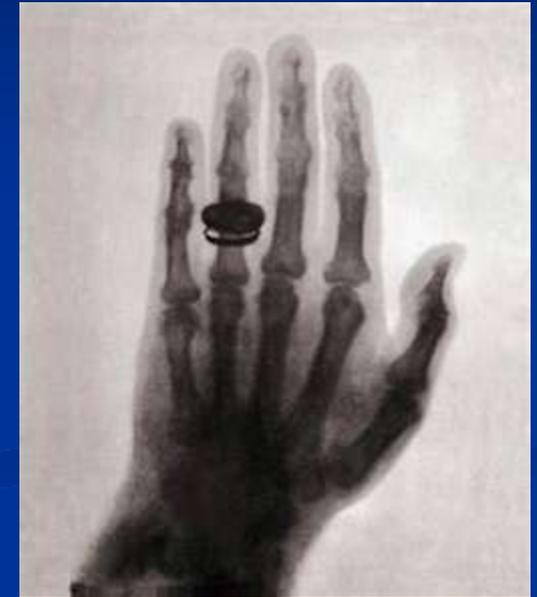
- Radiography is the recording of images created by the use of x-ray energy
- It is both an art and a science



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Discovery of X-Rays

- November 8, 1895 by Wilhelm Conrad Rontgen
- Performed various experiments with cathode rays
- Was not an accident.
- Rontgen was not working alone.
- Rontgen's original paper: "On a New Kind of Rays" was published 50 days after the discovery on December 28.
- None of his conclusions have yet been proven false.
- 1901 received first Nobel Prize for physics.



Carlton, R. & Adler, A. (2006). Principles of Radiographic Imaging: An art and science. Canada: Cengage Learning

WHAT IS X-RAY?



Properties of X-Rays

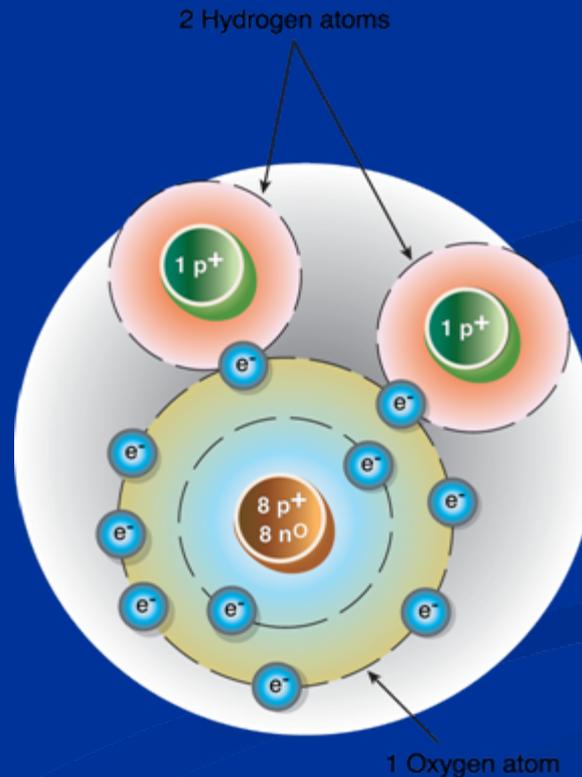
- X-rays:
 - Highly penetrating, invisible rays which are a form of electromagnetic radiation
 - Are electrically neutral and not affected by either electric or magnetic fields
 - Can be produced over a wide variety of energies and wavelengths
 - Release very small amounts of health upon passing through matter
 - Travel in straight lines
 - Travel at the speed of light
 - Can ionize matter
 - Cause fluorescence the emission of light of certain crystals
 - Cannot be focused by a lens
 - Affect photographic film
 - Produce chemical and biological changes in matter through ionization and excitation
 - Produce secondary and scatter radiation

Matter and Energy

- Physics studies relationships between matter and energy
- Matter has mass and occupies space
- Energy is the force used to do work

Molecules

- Smallest particle of a compound possessing characteristics of the compound

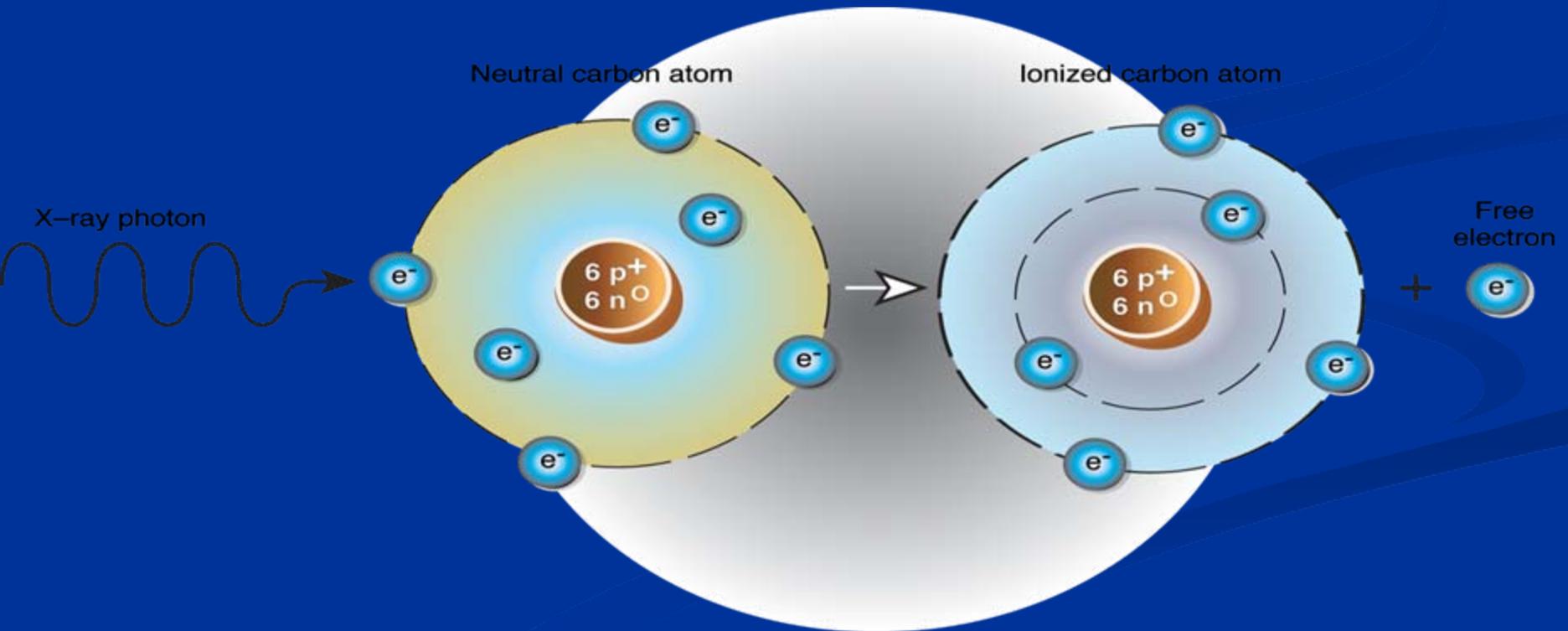


Matter

- States of matter
 - Solid, liquid, gas
- Dependent upon varying degrees of molecular attraction
 - Largely due to temperature

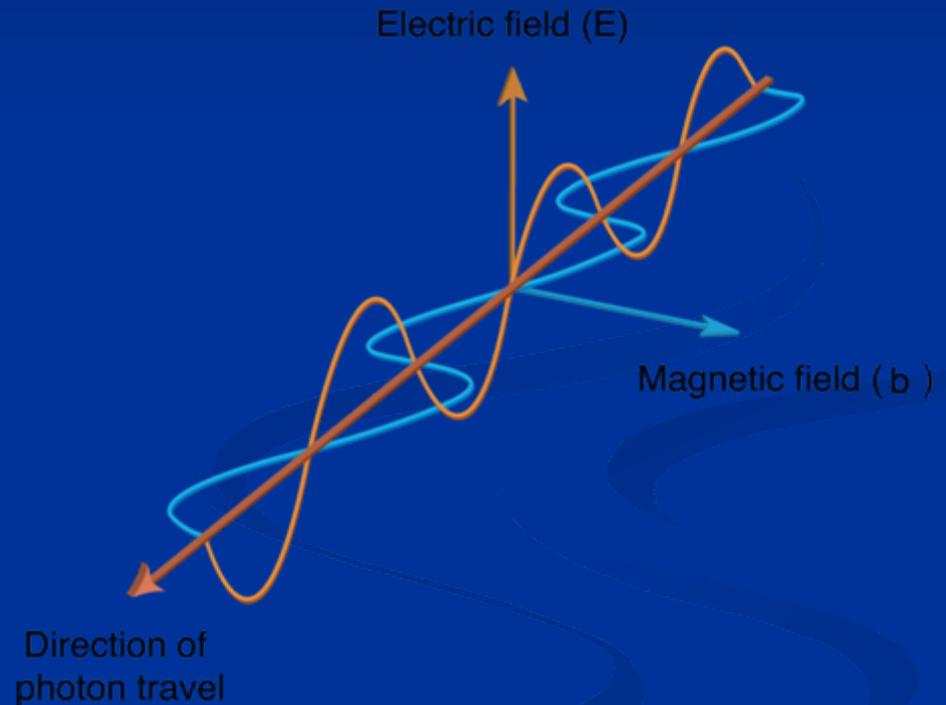
Ionization

- An x-ray photon can interact with an electron and eject it from an atom.
- This removal of an electron results in the ionization of the atom.



Electromagnetic (EM) Energy

- Combination of electric and magnetic fields traveling through space

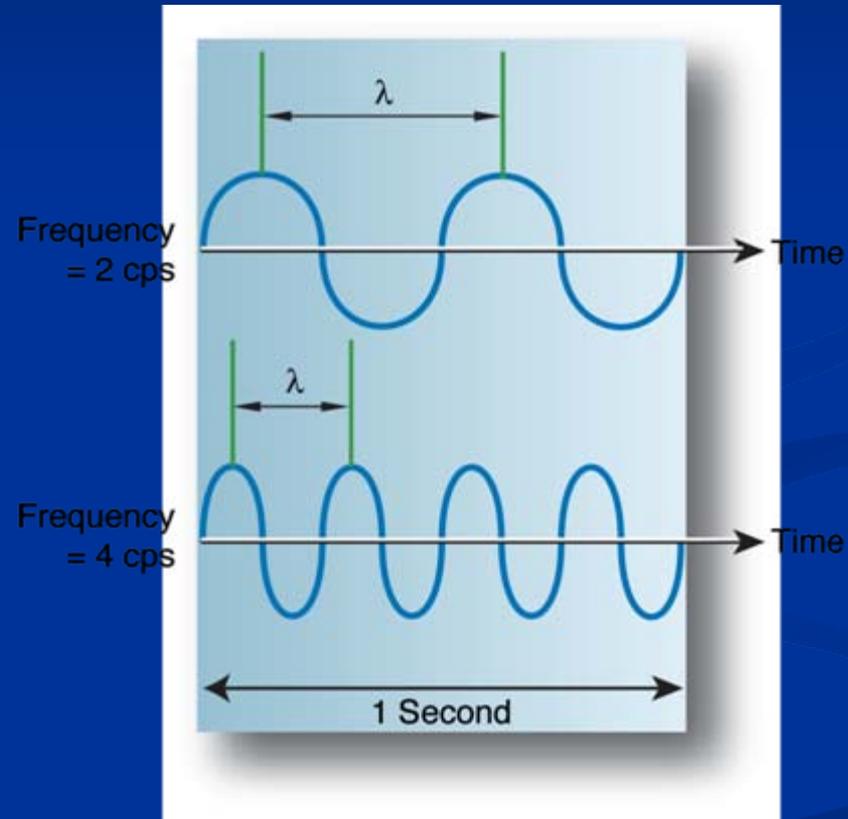


Electromagnetic Energy

- Results from acceleration of a charge
 - EM Radiation can travel through a medium or vacuum
 - Wave/particle duality
 - Excitation/ionization
- 

Characteristics of EM Radiation

- Wavelength
- Energy
- Frequency



Radiography as an Art Form

- Radiography has often been used to produce a unique perspective of flowers, fruit and other plants as well as shells and fish.
- Grenz Ray radiography has been used during curation and restoration of paintings and other art objects. It can detect images underneath existing paint, frame, and canvas construction and different types of paint and brush stylings.
- Radiography also useful as an archaeological tools.
- Inspiration for poets and authors.

Radiography as a Career

- Emerging technologies are opening doors to careers that were non-existent 20 years ago.
- Growing and demanding allied health profession
- Must complete an educational program ranging from 2 – 4 years.
- Professional, caring, in demand field and career



Who are Radiologic Technologists

- Are medical professionals who perform diagnostic imaging examinations and administer radiation therapy treatments.
- Educated in anatomy, patient positioning, examination techniques, equipment protocols, radiation safety, radiation protection and basic patient care.
- Are responsible for accurately positioning and ensuring that a quality diagnostic image is produced.
- Registered Radiologic Technologists have completed 2 or 4 year educational program from an accredited academic institution and passed a national certification examination. To remain registered, a Rad Tech must complete continuing education credits.

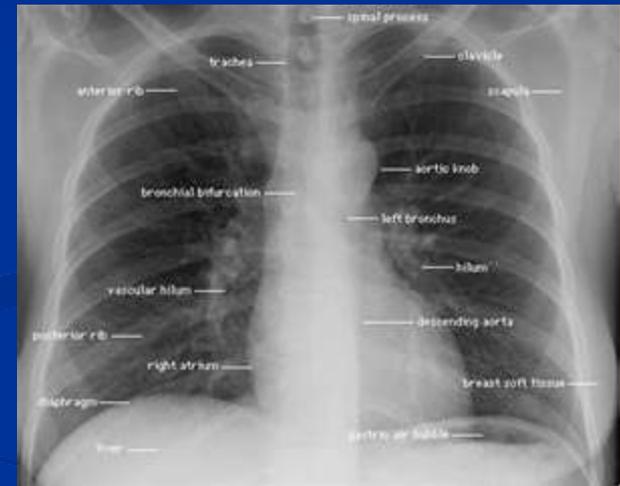
Who are Radiologists

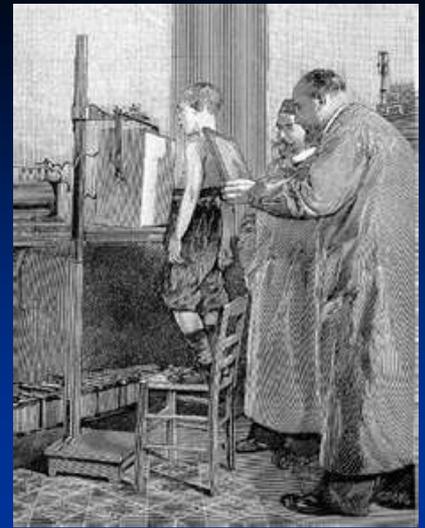
- Physicians who earn a four year doctoral degree to become an M.D. or D.O.
- Completed a 4 year residency in diagnostic radiology or radiation oncology
- Can be certified by the American Board of Radiology (ABR) indicating that they have passed a standardized national examination in radiology
 - Diagnostic Radiologist specialize in the interpretation of medical images:
 - MR scan, CT scans, radiographs, nuclear medicine scans, mammograms, and ultrasounds.
 - May specialize in fields: Neuroradiology, angiography, cardiovascular-interventional radiology, pediatric radiology, nuclear medicine, mammography, sonography, general radiology
 - Radiation Oncologists are physicians who specialize in treatment of cancer. They consult with the patient and the primary care physician to treat the cancer. Also work with a medical dosimetrist to calculate radiation dose to be delivered during therapy.
 - Interventional radiologist ' no surgical treatments for a number of medical conditions, mostly vascular disease.
- Interpret and make diagnosis based on the images produced using the various modalities.



Modalities / Areas of Concentration

- Bone Densitometry
- Cardio-Vascular Interventional
- Magnetic Resonance
- Computed Tomography
- Mammography
- Nuclear Medicine
- Quality Management
- Sonography
- General Radiology





Q& A

Thank you and Good Luck.

