



Nuclear Physics for General Education and High



School Courses

Rachele Dominguez CSAAPT 2022 Fall Meeting



Course details

No pre-requisites, only basic math used

Intended for non-science majors, all years

Honors program course

Six contact hours per week, lots of class total time

Structure of the course



SEMINAR LECTURE LABORATORY





Student-led seminars based on readings

- Rhodes: Philosophical Underpinnings of Science
- Preston
 - "Before the Fallout: From Marie Curie to Hiroshima"
- Other reading selections
 - Nuclear Power
 - Nuclear Testing and Arsenals
 - Chernobyl and Other Accidents

Love, loss, and scandal







Persecution and Purge









Secret cities, moral dilemmas







Atomic Legacy



Laboratories









Radiocarbon Dating (PHET and Pivot Interactives)

Photoelectric Effect





Dying Dice (Meaning of Half Life)



Barium Half Life





Nuclear Shielding



Laboratories and links

- Atomic Properties (PHET Atom Builder, Isotopes and Atomic Mass, and Pivot)
- Penny Isotopes (<u>Pivot</u>)
- Radiocarbon Dating (<u>PHET</u> and <u>Pivot</u>)
- Photoelectric Effect (<u>PHET</u> and <u>Pivot</u>)
- Dying Dice (300 dice + Excel)
- Measure the Half-life of Barium (<u>Isotope generator kit</u>, Geiger counters and accessories: we use Pasco)
- Nuclear Shielding (<u>Radioactive button sources</u>, Geiger counters and accessories)
- Atomic Fingerprints (<u>Hand-held spectrometers</u> or <u>diffraction gratings</u>, <u>spectrum analysis tubes</u> <u>and lamps</u>, OR <u>Pivot</u>)



Films, etc.

DIRE

CAMER

TAKE

SENE



On Amazon Prime



CHERNOBYL





Fat Man and Little Boy (1989)

70th Anniversary Platinum Edition

TRINITY & BEYOND: THE ATOMIC BOMB MOVIE

THE ULTIMATE FILM ABOUT WEAPONS OF MASS DESTRUCTION

Narrated By WILLIAM SHATNER



Copenhagen by Michael Frayn (1998)

Student feedback from non-science majors

- "I was able to learn the material very easily because I found it interesting."
- Student-led seminars were "a good use of class time."
- "The material was offered in multiple ways and allowed everyone to have a good grasp of the material presented."
- "[I feel like I can] now approach science from different angles."

Thank you!