

Spring 2017 Modern Physics Project – The passage of particles through matter

Part II: The class will be split into two groups, one group will study **radiation shielding** the other group will study **human exposure to radiation**. Each student will be required to submit a 2 page document of condensed knowledge about their topic. This is NOT to be a usual essay or report. This document should have no introduction, conclusion, or sources. Instead students should use their limited space to describe what they know/have learned about their topic.

Sources: Students from both sections will submit **one unique source** to a google doc (I will provide this for each of the groups). These should be reputable sources, and preferably be online. The source that a student submits must be unique, if another student has already submitted that source, then a different source must be found. When writing their documents students can only use sources that are listed in the google doc. If a student finds a source after the due date that they want to use, they can email it to me and I will add it to the google doc.

Sources are due by midnight of 2/28

Documents MUST be turned in at the start of class on 3/14. ONLY paper copies will be accepted.

Students in the Radiation Shielding Group: You should do research and learn about radiation shielding. Some questions and topics you should consider as you write your document...

- How to shield against different types of radiation (like photons, protons, or neutrons for instance)?
- How does the energy of the particle affect how much shielding you need?
- If you had a beam of a combination of high energy protons, neutrons, and photons what kind of shield would you use?
- What happens when high energy particles (100 MeV or higher) interact with the shielding material?
- What are...
 - bremsstrahlung
 - spallation
 - shower max
 - activation
 - $\frac{dE}{dx}$
 - radiation length
 - interaction length

Students in the Human Exposure to Radiation Group: You should do research and learn about how high energy radiation affects the human body. Some questions and topics you should consider as you write your document...

- How does radiation harm humans?
- Units of radiation dose
- Dose differences for different types of radiation
- Dose limits and how different doses affect humans
- Acute and chronic effects of radiation
- Medical treatments or preventative measures
- Body part/gender/age differences in radiation affects