**Learning Objective:**

* Understand the concept and real-world application of Time, Distance & Shielding as it pertains to Radiation Safety.

Radiation Safety is accomplished through a variety of strategies and is pertinent to several high-risk career areas. Radiation safety protocol will look different for an airline pilot than it does for a gamma radiographer and likewise, a medical X-ray technician has yet a different set of constraints (patients, the public). The concept of Time Distance and Shielding in an effort to achieve ALARA is relevant to all exposure risk careers, but our primary focus here is industrial radiography – both gamma and X-rays.

From the NRC:

Time, distance, and shielding measures minimize your exposure to radiation in much the same way as they would to protect you against overexposure to the sun (as illustrated in the figure below):

* **Time:**For people who are exposed to radiation in addition to natural background radiation, limiting or minimizing the exposure time reduces the dose from the radiation source.
* **Distance:**Just as the heat from a fire is less intense the further away you are, so the intensity and dose of radiation decreases dramatically as you increase your distance from the source.
* **Shielding:** Barriers of lead, concrete, or water provide protection from penetrating radiation such as gamma rays and neutrons. This is why certain radioactive materials are stored under water or in concrete or lead-lined rooms, and why dentists place a lead blanket on patients receiving x-rays of their teeth. Similarly, special plastic shields stop beta particles, and air stops alpha particles. Therefore, inserting the proper shield between you and a radiation source will greatly reduce or eliminate the dose you receive.

