

## Relationship Between

Decay Constant                      –                      Linear Attenuation Coefficient

$$\lambda = \frac{\ln 2}{T_{1/2}}$$

$$\mu = \frac{\ln 2}{\text{HVL}}$$

Fraction Decayed

Fraction Attenuated

$$\frac{A_t}{A_o}$$

$$\frac{I}{I_o}$$

Activity after decay ( $A_t$ )

Radiation after attenuation ( $I$ )

$$A_t = A_o e^{-\lambda t}$$

$$I = I_o e^{-\mu \chi} \quad I = I_o e^{-.693 \times (\chi/\text{HVL})}$$

Time passed from decay

Determine thickness of shield

$$t = \frac{-T_{1/2} \times \ln \frac{A_t}{A_o}}{0.693}$$

$$\chi = \frac{-\text{HVL} \times \ln \frac{I}{I_o}}{0.693}$$

Determine half-life

Determine HVL

$$T_{1/2} = -0.693 \times \frac{t}{\ln \frac{A_t}{A_o}}$$

$$\text{HVL} = \frac{-0.693 \times \chi}{\ln \frac{I}{I_o}}$$