For estimating pi, I used a cylindrical coordinate system. I generated random X’s and Y’s from 0 to 1, then I tested to see if sqrt(X^2+Y^2)<1/2. On several trials with different numbers, my code is accurate to 3.141.

For the model of the nuclear reactor, I created a model for 3-D uranium rods in a graphite medium. I placed the uranium rods at a variable distance away, spread evenly, and the parameter I was testing was that distance R. I used 3 layers of rods, each spaced with distance R between them.

One thing I had to determine was when the number of graphite atoms per unit cm^3. I found the density of graphite was around 2.15 g/cm^3. The molar mass of graphite is 12, meaning there are 6.02\*10^23/12 carbon atoms in a gram. So, in 1 cm^3, there are 2.15\*6.02\*10^23/12 carbon atoms.

From the Mathematica graph attached, the max is at 8 cm. From an example I found online, 7.6 cm thickness was used, so this is fairly accurate. The general shape also looks similar to the suggested one online, although there are differences. These could be explained by the fact that those are graphs for the linear model, while I was using one with rods.

I also made a program that calculated the velocity\*cross section, and also got 8 cm as being the best choice.