

FARLabs Nuclear > Radioactivity Inverse-square experiment. Learning Goals:

- Become familiar with radioactivity by observing real radioactive sources
- Understand that there is a relationship between distance and intensity
- Express the nature of that relationship

Directions:

Plotting your graph

Method:

1. Make sure that your source is as close to the detector as possible. You can do this by clicking the “Smallest Gap” button underneath the diagram (Check that the source is right up against the detector in the video feed on the left). The “Gap Size” should say 20 mm.
2. Wait for a few seconds and then take at least five recordings of the “Counts” and make a note in your lab books OR
3. Use the “Count History” graph next to the video screen to record the counts. Wait for your Count History graph to record at least 15 seconds of data then click the “Make PNG” button under the graph. A snapshot of the graph at that point will open in a new window.
4. Find the average by adding up your recordings and dividing by 5 (if you did step 2 and wrote down 5 numbers) OR by ruling a straight line horizontally across your Count History graph where you think the middle value is (if you did step 3).
5. Once you find the average you can start filling in the table below the video feed. The number for the “Gap Size” is above the video feed while the “Average Counts” is the average you just found.
6. Repeat this process for several different distances and keep filling in the table. Ask your teacher how many distances you need to do.
7. When you have enough values, you can see what your graph looks like by clicking the “Plot” button. Before you click Plot ask your partner what they think the graph will look like. What do you think?

Question:

Can you explain why the Counts decrease in the way you have observed?

Test your knowledge:

1. What shape did the graph have? Was this what you expected?
2. If you double the distance away from the source what happens to the counts?
3. Do you think that a different radiation source (alpha/beta/gamma) would produce a different graph? If so, how? Would the shape be different?