**ANSTO makes nuclear medicines**

ANSTO makes more than 10,000 doses of nuclear medicine every week. Our nuclear medicines are used to diagnose and treat diseases like cancer. Our employees need to work quickly and safely to make and distribute these nuclear medicines.

**Play:** Play the Half-life Hero game (<https://www.ansto.gov.au/education/apps>) and practice making medicines as a reactor operator

**Question:** Why do ANSTO employees need to work quickly to make nuclear medicines?

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**Question:** Do nuclear medicines usually have long or short half-lives? Why?

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**ANSTO has Australia’s only nuclear reactor**

|  |  |  |
| --- | --- | --- |
|  | **ANSTO research reactor** | **Average power reactor** |
|  |  |  |
| **Power** |  |  |
| **Uranium** |  |  |
| **Temp.** |  |  |
| **Uses** |  |  |

**Question:** You simulated nuclear fission as a class using pieces of scrunched paper. What did the following represent in your simulation?

Students: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Pieces of paper: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Question:** What products of the fission reaction weren’t represented in this simulation?

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**ANSTO uses radiation safely**

Large amounts of radiation can be dangerous, but we work safely with radiation by:

1. Reducing time spent near the radioactive source

2. Increasing distance from the radioactive source

3. Using shielding



You will do an experiment to test how distance affects radiation count.



**Prediction:** As the distance from the radioactive source gets larger,I think the radiation count on the Geiger Counter will:

=

Stay the same

Decrease

Increase

Why? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Write down the results of your experiment:

|  |  |
| --- | --- |
| **Distance from the source (cm)** | **Radiation (Counts per second)** |
| 1 cm |  |
| 2 cm |  |
| 4 cm |  |
| 8 cm |  |
| 16 cm |  |
| 32 cm |  |

Graph your results:

Distance from the source (cm)

2

4

6

8

10

12

14

16

18

20

22

24

26

28

30

32

0

2000

1500

1000

500

2500

Radioactivity (counts per second)

**Conclusion:**

Does your prediction match your results? Why?

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**Extension question:** What shape is the graph? Is it a straight line or a curve? Why?