

ENIGMA 5

Visual and format

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When Marie Curie scribbled in her notebook, little did she know that many years later, physicists would need to assess the contamination from the radioactive material found in the binding. Many of are possessions are known to be contaminated with radioactive material.

Her notebook is one of many artefacts at the Wellcome Library in London. The library has over 750,000 books and journals and on extensive range of manuscripts, archives and films which If story of medical and scientific history. As a result, many fluvousnds of readets visit in birary each year, primarily historians, students and academics. However, anyone is free to visit once they have a birary factory.

As suspected, analysis showed the notebook to be contaminated with the radionuclide radium-226. It is remarkable to think that the atoms of radium-226 within this book are the same atoms that Marie Curie herself painstakingly isolated from pitchblende, a black, rocky mineral.

The total activity of the notebook was calculated to be around 120kBq (or 3.2 micro Curies) of radium-226. The radioactive material is fixed within the pages – in fact the majority is held in the back of its thick cover binding. You can just imagine Marie Curie placing it down on the dusty workbenches in her peaks behorstory. It's worth noting here that radium-226 has a half-life of approximately 1,600 years, so here issues about keeping this notebook won't be going away any time soon. It is found that potential the awarmal doses to those handling the notebook were low; whole-body dose are also being marginally whole-body doses of less than 10µSv and hand doses of less than 35µSv. To put this in perspective, DiµSv is roughly the dose you would receive on a return flight from the UK to Spain.

However, the notebook does potentially present an internal exposure hazard. The contamination is fixed within the book fixelf, but if it's delicate pages or cover become damaged, then this could allow small tragements to flake of whital the netbooks its handled. A handling procedure is now in place to prevent the spread of contamination and as such aims to prevent ingestion or inhalation of radioactive matherial. This includes using a dedicated reading area away from the usual reading rooms, use of personal protective equipment, and extensive contamination monitoring during and after handling.

Throughout her work with radium and polonium, Marie was unaware of the effects of radioactivity exposure on the body. In her lab, she would keep tubes of radium in her pocket. She began to suspect that radium negatively impacted health when one of her fellow researchers died of a blood disease, and then a few years later her personal assistant died of a blood disease. Even though she suspected that radium exposure was bad for her health, she did very little to monitor her own blood. In 1932, she borke her wrist and the beest kook wuch longer to heal then it should have. She then began to notice that her vision was deteriorating and radiation hums on her fingers were becoming more and more painful. Some days she felt too ill to even go to the lab, and finally on July 4, 1934, Marie died moral likely because there weren't any effective treatments for radium poisoning yet. At the time, most likely because there weren't any effective treatments for radium poisoning yet. At the time, they manipulated calcium intake. This caused little to no improvements, so parathyroid formone was added to the treatment. Again, there was some reduction of radium, but not a significant amount. It added to the treatment. Again, there was some reduction of radium, but not a significant amount. It als cat of the repairs of cherative treatment as explainer is in the bones, it is extremely difficult to extract. The lack of the repairs of her late.

Disease 1:

A medical condition in which the blood is low in normal red blood cells. It's thought mainly to be caused by an autionimune process that makes a person unable to produce a substance in the stomach called intrinsic factor.

Symptoms:

- fatique
- weakness
- headaches
- chest pain
- weight losspale skin
- nausea and vomiting
- confusion
- constipation
- loss of appetite
- heartburn

Complications:

- peripheral nerve damage
- digestive tract problems
- · memory problems, confusion, or other neurological symptoms
- heart problems

Disease 2:

A collection of health effects that are caused by being exposed to ionizing factors, in a short period of time.

Symptoms:

- nausea
- vomiting
- loss of appetite
- diarrhea
- fever



Read the mirrored text in the report by using a reflective surface. Find the condition which Marie Curie and her fellow researchers suffered from. You can use cards with disease's symptoms. The names of the diseases are hidden on the back of the cards. You can choose to open the name of only ONE disease and present it as the correct answer. Use the name abbreviation as a code to exit the escape room.

In a





Estimated solving time

Solution

The correct disease is acute radiation syndrome (the name of it is on the back of the card with its symptoms). The abbreviation is ARS.

Answer: ARS

15 min

Depends on

The student's ability of comprehensive reading and knowledge about radiation effect on the organism.

Benefits

They will learn about the effects of radiation on the human body

Hints:

Hint 1 (subtle)

The name of the disease is on the back of the cards.

Hint 2 (easy)

Not all the symptoms of the disease have to be found in the text about Marie and her fellow researchers.



Hidden place/placement

Behind a large model of a DNA molecule in the form of an old health report to the medical centre of the facility.

Material needed

- Paper
- Pen/ pencil
- Highlighter