Performance Task

22.5 Medical Applications of Radioactivity: Diagnostic Imaging and Radiation 18.

On the Environmental Protection Agency's website, a helpful tool exists to allow you to determine your average annual radiation dose. Use the tool to determine whether the radiation level you have been exposed to is dangerous and to compare your radiation dosage to other radiative events.

1. Visit the webpage and answer the series of questions provided to determine the average annual radiation dosage that you receive.
2. Table 22.5 shows the immediate effects of a radiation dosage. Using the table, explain what you would experience if your yearly dosage of radiation was received all over the course of one day. Also, determine whether your dosage is considered a low, moderate, or high.
3. Using the information input into the webpage, what percentage of your dosage comes from natural sources? The average percentage of radiation from natural sources for an individual is around 85 percent.
4. Research radiation dosages for evacuees from events like the Chernobyl and Fukushima meltdowns. How does your annual radiation exposure rate compare to the net dosage for evacuees of each event. Use numbers to support your answer.
5. The U.S. Department of Labor limits the amount of radiation that a given worker may receive in a 12 month period.
    a. Research the present maximum value and compare your annual exposure rate to that of a radiation worker. Use numbers to support your answer.
    b. What types of work are likely to cause an increase in the radiation exposure of a particular worker?

Provide one question based upon the information gathered on the EPA website.

Teacher Support

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- Most evacuees of Chernobyl received radiation doses of less than 50 mSv, although a few received more than 100 mSv. However, radiation doses on the day of the accident exceeded 20,000 mSv, and some workers tasked to clean up the site after the accident had doses greater than 500 mSv.
- Regarding the Fukushima meltdown—No harmful health effects were found in 195,345 residents living in the vicinity of the plant who were screened by the end of May 2011. All the 1,080 children tested for thyroid gland exposure showed results within safe limits, according to the report submitted to IAEA in June. By December, government health checks of some 1,700 residents who were evacuated from three municipalities showed that two thirds received an external radiation dose within the

normal international limit of 1 mSv/yr, 98 percent were below 5 mSv/yr, and ten people were exposed to more than 10 mSv.

- As regulated by the Occupational Health and Safety Administration, the maximum permissible amount of radiation exposure during a twelve-month period is 5 rem. Additional regulations exist for pregnant females.
- 1 sievert (Sv) = 100 rem