TEACHER'S NOTES 4

WHAT IS THE RELATIONSHIP BETWEEN RADIOACTIVITY AND RADON?

BACKGROUND

Most people, including most students, need to have more knowledge about the phenomenon of radioactivity because radioactivity and radioactive substances are natural and important parts of our daily lives. Please be sure that you review the material presented in Section III-Background Information before beginning this lesson plan. It is important for students to recognize that the half-life of the radioactive element as well as the kind of radiation emitted and the energy of the radiation determine any possible biological effects from radiation.

The half-life of a radioactive element is extremely important in influencing the behavior and effects of the element and its radiation. Half-life tells us how long the radioactive element will last before decaying into something else. It also provides information on the frequency of radioactive disintegrations. An extremely long-lived radioactive element will only infrequently emit its radiation. A radioactive element with a short half-life will repeatedly emit its radiation during a short period of time. The concept of probability will help students understand radioactive half-life. The procedures outlined in this lesson plan should help communicate this concept to the students.

Note: If you write a letter on school stationery to the M&M/Mars Candy Company, you can get a coupon for a free bag of m&m's to use in this exercise. Have the students compose the letter, and also compose a "thank you" letter afterwards. See Resources, Equipment/Materials.

WARM-UP

This lesson plan should be preceded by a hands-on geiger counter activity, which will help tremendously to get the students excited about the content material. Have students record changes in the amount of radioactivity detected by the geiger counter in response to 1) changing the distance from the radioactivity source, and 2) shielding the source with different kinds of materials (e.g., paper, thin plastic, aluminum foil, wood, etc.). See Resources, Equipment/ Materials.

TEACHING TIPS

Review with students the concept of half-life and radioactivity prior to beginning the activity.

GROUPING

A small group configuration (3 to 4 students) is suggested to promote student interaction while responding to each of the questions contained in the student handout.

MINIMUM RECOMMENDED TIME ALLOCATION

One class period.

LEARNING PROCESS SKILLS

Science	Math	Social Studies	Social or Group
Communicating Inferring Ordering Applying	Investigating Analyzing	Judging information related to a problem	Collaborating with others

STUDENT RESPONSES

Question 3: Radon would be a lesser health threat if the half-life was either very short (it would not make its way out of the soil before being transformed from a gas to a solid) or very long (it would escape from the house before it decayed to polonium).

Question 5: The polonium would likely be cleared from the lungs prior to emitting its radioactivity if the half-life was as long as 20 days. Remember that it is the radioactive emission inside the lungs that causes the problem.

Question 6: The properties of radon that contribute to its importance as a health concern include:

- it is a gas and can escape from soil into the house
- it has a medium-length half-life relative to the movement of gas (air) into and out of the house
- it decays to form a solid that can lodge in the lungs
- its immediate decay product has a high-energy (potentially damaging) alpha emission
- its immediate decay product has a short half-life, and therefore has a high probability of decaying while inside the lungs.

EXTENDED ACTIVITIES

1. Have students research the origin of key terms used in this lesson plan and throughout the teacher's guide (e.g., radon, radioactivity, isotope, curie, etc.)
2. Have students prepare a research report on the effects of radon on the human health of underground miners.
3. Have students conduct an electronic (computer) literature search for an aspect of the radon issue, such as mitigation techniques, measurement devices, or health effects.

Radon Alert
Lesson Plan Evaluation Sheet
and FREE POSTER AND STORYBOOK offer

The New Jersey Department of Environmental Protection is happy to provide these lesson plans for use by teachers. In order to evaluate the use of the lesson plans, we would greatly appreciate your response to the following questions. All teachers who return these forms will receive a FREE RADON POSTER depicting information about radon in a colorful format and a STORYBOOK about a Native American child and his experience with radon in his home.

1. Which Radon Alert lesson plan(s) did you use?

_____

2. How useful did you find it/them (check one) ?

___ Not useful
___ Slightly useful
___ Moderately useful
___ Very useful
___ Extremely useful

3. Do you plan to use them again in the future? ___Yes ___ No

4. In your view, what would make the lesson plans MORE useful:

Your name:_____ Phone Number: _____

Subject area: _____Grade:_____

Mailing address:

_____

_____

To receive your FREE RADON POSTER and STORYBOOK, mail or fax this completed form to:
NJDEP Radon Program, P. O. Box 415, Trenton, NJ 08625
Fax: 609-984-5595.

(Questions? Call the Radon Program at 1-800-648-0394.)