

Activity name: Understanding Natural Radiation

This activity is meant to provide a real-world application of the ATEEC Recommended Core Curriculum's math, science, technical, communications, or critical thinking knowledge and skill concepts, which have been identified by the ATEEC Fellows as necessary preparation for environmental technology occupations.

Appropriate for which course(s)? High school and college physics, chemistry, environmental technology or science

Concept/skill learned (i.e. from K/S Tables):

- Physics:
 1. Differentiate among alpha, beta and gamma radiation and describe their relative penetration through various materials.
 2. Demonstrate knowledge of the transmutation of elements that takes place in radioactive decay.
 3. Define the half-life of radioactive isotopes.
- Mathematics:
 1. Interpret and apply linear and exponential relationships.
 2. Construct, read and interpret graphs.
 3. Interpret and extrapolate data on tables.
 4. Calculate the slope of a line.
- Statistics:
 1. Compare numerical values for decision making.
 2. Calculate mean, media, mode, standard deviation, standard error and range.
 3. Extrapolate trends in data.
 4. Apply statistical analysis; calculate probability.
 5. Graph distribution.

Approximate time to complete activity:

Source of idea or activity (for published source, please include author, title, publisher, date): ATEEC Fellows Institute, Kelly Bringhurst

Materials/resources needed (equipment, print media, electronic media, videos, supplies, etc.): Computer access including: word processing, spread sheet software, Internet access

Description of activity:

Research the sources of radiation at the surface of the earth:

- natural vs. introduced
- ionizing vs. nonionizing
- relative energy and penetration capability of alpha, beta and gamma radiation

Research how radiation is measured:

- types and accuracy of instruments
- types of radiation measured
- units of measurements

Collect data:

- access newnet site: <http://newnet.jdola.lanl.gov/newnet.html>
 - go to page listing radiation monitoring stations
 - using graphs and tables, collect the average dose of radiation for each site
- find the elevation of each location either from Internet searching, topographic maps or an atlas.

Enter data into a spread sheet program:

- check data entry for accuracy
- graph data putting microrem on vertical axis and elevation on horizontal axis
- look for trends in data
- Fit a line to graph

Interpret data:

- Is there an apparent relationship between elevation and radiation levels?
- What other factors could causes differences in levels of radiation?
- Can you think of ways to evaluate other factors?

Report results:

- Write a technical paper (check with instructor for paper requirements) describing your procedures, findings, graphs, and statistics.

Activity submitted by: Kelly Bringhurst

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