brain tinglers

edited by
Rod O'Connor
Texas A&M University
College Station, TX 77843

SECONDARY SCHOOL CHEMISTRY

Radioactive Friends (and Relatives)

Thomas E. Taylor
Texas A&M University
College Station, TX 77843

Do you need a Geiger counter or a film badge before you hug your girlfriend (or boyfriend)? Unless she (or he) glows in the dark, you can assume that her (his) body composition includes about 18.5% by mass C and 0.35% by mass K. In all living things, 1.29×10^{-10}% of the carbon atoms are ^{14}C with a half-life of 5570 years, and 0.012% of the potassium atoms in nature are ^{40}K with a half-life of 1.28×10^{9} years. How many radioactive disintegrations are occurring *per minute* in *each gram* of your sweetheart's (or your own)body?

Answer:

2.8 from ^{14}C
6.7 from ^{40}K
9.5 Total

Adapted from Taylor, T. E., mastery level problems in "Study Guide for Chemical Principles," Benjamin Cummings, **1979.**

To obtain detailed solutions or to submit problems for "Brain Tinglers," write to Dr. Rod O'Conner, Department of Chemistry, Texas A&M University, College Station, TX 77843.