

Radioactivity

Student Worksheet

Read the following

You will role play a particle in a radioactive nucleus which is unstable and will observe the difficulty of a large nucleus holding itself together.

Materials

blindfolds

stopwatch or other timer

1 meter diameter circle

student page

data collection sheets

Procedures

1. The circle represents a radioactive nucleus. Student partners stand back-to-back inside the circle with arms interlocked.
2. Allow one pair of students to be observers/timers. These students must set the timer and watch until a student steps on or over the line of the circle. The timer is stopped and the amount of time is recorded below.
3. Each "proton" and "neutron" is blindfolded. The circle is packed with the remaining pairs of students. The students should try to move a little without stepping over the circle line.
4. Reset the timer. Time the same "protons" and "neutrons" a second and third time. Write down their times below. Compute the average time and record it on the line.
5. Student pairs return to the circle and begin their random movement again. This time, alternating out one pair to replace the first set of observers/timers. Continue timing each nucleus three times until all "protons" and "neutrons" have been observers/timers.
6. Next, pack the circle with all "protons" and "neutrons". Ask the teacher to record the time it takes for one student to step outside the circle. Write the time below. Reset the timer. Time the entire group a second and third time. Write down their times below. Compute the average time needed for a neutron-proton pair to escape from the nucleus.
7. Compile the data for each group's average and obtain a class average of time needed to release a proton/neutron grouping from the nucleus. Compare the individual group's results to the results of the entire group. What variables can you name that affect the results of your individual group average? Of the entire group average?

Radioactivity

Data Collection Sheet

Group 1 (Write names of "protons" and "neutrons" below)

Trial 1: _____ Trial 2: _____ Trial 3: _____ Average: _____

Group 2 (Write names of "protons" and "neutrons" below)

Trial 1: _____ Trial 2: _____ Trial 3: _____ Average: _____

Group 3 (Write names of "protons" and "neutrons" below)

Trial 1: _____ Trial 2: _____ Trial 3: _____ Average: _____

Group 4 (Write names of "protons" and "neutrons" below)

Trial 1: _____ Trial 2: _____ Trial 3: _____ Average: _____

Entire Group (Write names of "protons" and "neutrons" below)

Trial 1: _____ Trial 2: _____ Trial 3: _____ Average: _____