X -> Y + Z + energy

1. The equation above represents a nuclear decay, in which nucleus *X* decays into particle *Y* and nucleus *Z* and releases energy. Which of the following can explain why energy is released in the decay?

   A) The mass of *X* is less than the sum of the masses of *Y* and *Z*.
   B) The mass of *X* is less than the difference between the masses of *Y* and *Z*.
   C) The mass of *X* is greater than the sum of the masses of *Y* and *Z*.
   D) The mass of *X* is greater than the difference between the masses of *Y* and *Z*.

Key

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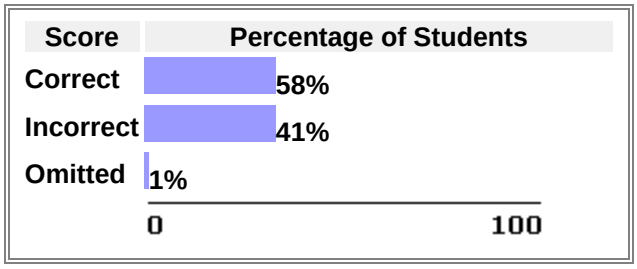
2000 National Performance Results



Note:

- These results are for public and nonpublic school students.
- Percentages may not add to 100 due to rounding.

The Fields of Science: *Physical Sciences* (Sub content classification: *Matter and Its Transformations*)
Knowing and Doing Science : *Conceptual Understanding*

The Fields of Science

Physical Sciences

This question measures basic knowledge and understanding of the following:

Knowing and Doing Science

Conceptual Understanding

Conceptual understanding includes the body of scientific knowledge that students draw upon when conducting a scientific investigation or engaging in practical reasoning. Essential scientific concepts involve a variety of information, including facts and events the student learns from both science instruction and experiences with natural environment; and scientific concepts, principles, laws, and theories that scientists use to explain and predict observations of the natural world.