

Name: _____

Date: _____

Student Exploration: Nuclear Decay

Vocabulary: alpha particle, atomic number, beta particle, daughter product, gamma ray, isotope, mass number, nuclear decay, positron, radioactive, subatomic particle

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

The chart below gives the locations, charges, and approximate masses of three **subatomic particles**. The approximate mass of each particle is given in universal mass units (u).

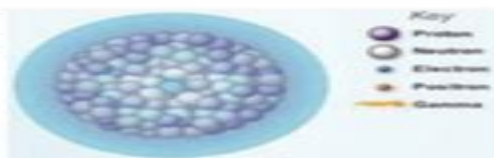
Particle	Location	Charge	Approximate mass
Proton	Nucleus	1^+	1 u
Neutron	Nucleus	0	1 u
Electron	Orbitals	1^-	0 u

- The **mass number** of an atom is equal to the sum of protons and neutrons in the nucleus. A helium atom has 2 protons and 2 neutrons. What is the mass number of this atom? _____
- The **atomic number** of an element is equal to the number of protons in each atom of the element. All helium atoms have 2 protons. What is the atomic number of helium? _____

Gizmo Warm-up

While most atoms are stable, some are **radioactive**, which means that they have a tendency to undergo spontaneous **nuclear decay**. The decay of radioactive atoms generally results in the emission of particles and/or energy.

Several types of nuclear decay can be explored with the Nuclear Decay Gizmo™. On the Gizmo, check that **Alpha decay** and **Uranium** are selected.



- Click **Play** (▶) and then click **Pause** (⏸) when the **alpha particle** is clearly visible. What is an alpha particle made of? _____
- Click **Play** and observe. Besides the alpha particle, what else is emitted from the nucleus during alpha decay? _____

Gamma rays are energetic electromagnetic waves; they are often emitted in nuclear decay.

Activity A: Alpha decay	Get the Gizmo ready: ∞ Click Reset (↺). ∞ Check that Alpha decay and Uranium are selected.	
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Question: How does alpha decay change the nucleus of a radioactive atom?

- Predict:** As you observed in the warm-up activity, an alpha particle consists of two protons and two neutrons. How will the emission of an alpha particle affect the following?
 - The atomic number of the atom: _____
 - The mass number of the atom: _____
- Calculate:** Turn on **Write equation**. What you see is an equation that shows the original uranium atom on the left. The boxes on the right represent the **daughter product**—the atom produced by radioactive decay—and the emitted alpha particle.
 - In the top left box, write the mass number of the daughter product and press "Enter" on your keyboard. What is this number? _____

Student Exploration Nuclear Decay Answer Key

B Lingard



Student Exploration Nuclear Decay Answer Key:

Nuclear Science Abstracts ,1960 **Government Reports Announcements & Index** ,1995 *Energy Abstracts for Policy Analysis* ,1979-07 **Monthly Catalogue, United States Public Documents** ,1979 **Resources in Education** ,1980 *Bulletin of the Atomic Scientists* ,1996-05 The Bulletin of the Atomic Scientists is the premier public resource on scientific and technological developments that impact global security Founded by Manhattan Project Scientists the Bulletin s iconic Doomsday Clock stimulates solutions for a safer world **Bulletin of the Atomic Scientists** ,1992-05 *Energy Research Abstracts* ,1985 *Monthly Catalog of United States Government Publications* ,1996-07 Science & Technology Review ,1998 **Bulletin of the Atomic Scientists** ,1986-04 The Bulletin of the Atomic Scientists is the premier public resource on scientific and technological developments that impact global security Founded by Manhattan Project Scientists the Bulletin s iconic Doomsday Clock stimulates solutions for a safer world **Scientific and Technical Aerospace Reports** ,1966 **Bulletin of the Atomic Scientists** ,1970-06 The Bulletin of the Atomic Scientists is the premier public resource on scientific and technological developments that impact global security Founded by Manhattan Project Scientists the Bulletin s iconic Doomsday Clock stimulates solutions for a safer world Industrial Research & Development ,1982

Physical Science Richard Zajac,2001-01-19 This laboratory manual is designed to be used with the text Physical Science What the Technology Professional Needs to Know Developed for the aspiring technology professional with little or no background in the study of physics or chemistry it provides the experience necessary for students to develop skills in experimentation and data interpretation Like all of the books in the critically acclaimed Preserving the Legacy series this manual is easy to understand and use with clear instructions and a discovery approach The book contains 26 experiments that have been carefully selected to illustrate major physics and chemistry concepts They require simple inexpensive equipment and are designed to be completed within three hours Each experiment starts with a review of the background concepts information and formulas necessary to carry out the experiment Three or four investigations are then presented each with its own objectives procedures and interpretation Next students are asked to demonstrate their understanding by bringing together selected data and conclusions in the preparation of a Report Sheet In a final section students are given the opportunity to demonstrate their understanding of the concepts by applying them to a new situation Topics addressed in the experiments include Measurements Matter and energy Acids and bases Motion Electricity Optics Nuclear processes Chemical reactions **Who's who in Engineering** ,1995 Congressional Record United States. Congress,1973

Who's who in Frontiers of Science and Technology ,1985 **Physics Briefs** ,1994 **Publications Listing, National Academy of Sciences, National Academy of Engineering, Institute of Medicine, National Research Council** National Academy of Sciences (U.S.),1972

The Top Books of the Year Student Exploration Nuclear Decay Answer Key The year 2023 has witnessed a remarkable surge in literary brilliance, with numerous compelling novels captivating the hearts of readers worldwide. Lets delve into the realm of popular books, exploring the fascinating narratives that have enthralled audiences this year. The Must-Read : Colleen Hoover's "It Ends with Us" This touching tale of love, loss, and resilience has captivated readers with its raw and emotional exploration of domestic abuse. Hoover skillfully weaves a story of hope and healing, reminding us that even in the darkest of times, the human spirit can succeed. Uncover the Best : Taylor Jenkins Reids "The Seven Husbands of Evelyn Hugo" This spellbinding historical fiction novel unravels the life of Evelyn Hugo, a Hollywood icon who defies expectations and societal norms to pursue her dreams. Reids absorbing storytelling and compelling characters transport readers to a bygone era, immersing them in a world of glamour, ambition, and self-discovery. Discover the Magic : Delia Owens "Where the Crawdads Sing" This captivating coming-of-age story follows Kya Clark, a young woman who grows up alone in the marshes of North Carolina. Owens weaves a tale of resilience, survival, and the transformative power of nature, captivating readers with its evocative prose and mesmerizing setting. These top-selling novels represent just a fraction of the literary treasures that have emerged in 2023. Whether you seek tales of romance, adventure, or personal growth, the world of literature offers an abundance of compelling stories waiting to be discovered. The novel begins with Richard Papen, a bright but troubled young man, arriving at Hampden College. Richard is immediately drawn to the group of students who call themselves the Classics Club. The club is led by Henry Winter, a brilliant and charismatic young man. Henry is obsessed with Greek mythology and philosophy, and he quickly draws Richard into his world. The other members of the Classics Club are equally as fascinating. Bunny Corcoran is a wealthy and spoiled young man who is always looking for a good time. Charles Tavis is a quiet and reserved young man who is deeply in love with Henry. Camilla Macaulay is a beautiful and intelligent young woman who is drawn to the power and danger of the Classics Club. The students are all deeply in love with Morrow, and they are willing to do anything to please him. Morrow is a complex and mysterious figure, and he seems to be manipulating the students for his own purposes. As the students become more involved with Morrow, they begin to commit increasingly dangerous acts. The Secret History is a exceptional and suspenseful novel that will keep you speculating until the very end. The novel is a cautionary tale about the dangers of obsession and the power of evil.

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