

Sled Wars Gizmo Answer Key



Gizmos

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Student Exploration: Sled Wars

Directions: Follow the instructions to go through the simulation. Respond to the questions and prompts in the orange boxes.

Vocabulary: acceleration, energy, friction, kinetic energy, momentum, potential energy, speed

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

1. A firefighter is trying to break through a door. Is he more likely to break through if he runs at the door very slowly or if he runs at the door very fast? Explain your answer.

very fast because he gains more momentum



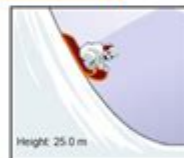
2. Two firefighters are trying to break through a door. One firefighter is heavy, and the other is light. If they run at the same speed, which one is more likely to break through? Explain.

the heavier one because he has more mass that can break the door

Gizmo Warm-up

The ability to crash through doors and cause other changes depends on an object's **energy**. With the Sled Wars Gizmo, you will explore the factors that affect the energy of a sled.

The Gizmo shows a Yeti named Burt riding his sled down a steep hill. Burt plays a game where he tries to wreck as many snowmen as he can.



1. Use the slider to set the **Snowmen** to 5. Check that the height of the sled is 25.0 m. Click **Play** (▶). How many snowmen does the sled destroy?
2. Click **Reset** (↺). Set the **Red sled mass** to 200 kg. Click **Play**. How many snowmen does the sled destroy this time?
3. Click **Reset**. Drag the sled to the top of the hill so the starting height is 50.0 m. Click **Play**.

1.23 snowmen

2.45 snowmen

- A. How many snowmen are destroyed now?

4.90 snowmen

- B. Why do you think this is so?

the sled moves faster

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Sled Wars Gizmo Answer Key: Unlocking the Secrets of Momentum and Friction

Are you stuck on the Sled Wars Gizmo activity? Frustrated with conflicting results and unsure how to interpret the data? You're not alone! Many students find this physics simulation challenging. This comprehensive guide provides a detailed Sled Wars Gizmo answer key, breaking down the concepts of momentum, friction, and force to help you master this interactive lesson. We'll walk you through each section, providing explanations and insights to boost your understanding and help you achieve a perfect score. Prepare to conquer Sled Wars!

Understanding the Sled Wars Gizmo Simulation

The Sled Wars Gizmo is a dynamic simulation designed to teach students about Newton's Laws of Motion, specifically focusing on momentum and friction. You'll experiment with different sled masses, initial velocities, and surface types to observe their impact on the final outcome of the "sled war." Understanding the interplay of these factors is crucial to successfully completing the Gizmo activities and answering the assessment questions correctly.

Sled Wars Gizmo: Key Concepts Explained

Before diving into specific answers, let's solidify the fundamental concepts:

1. Momentum:

Momentum is a measure of an object's mass in motion. It's calculated by multiplying an object's mass (m) by its velocity (v): $\text{Momentum (p)} = m \cdot v$. A heavier sled moving at the same speed as a lighter sled will have greater momentum. This is crucial in understanding which sled "wins" the collision in the Gizmo.

2. Friction:

Friction is a force that opposes motion between two surfaces in contact. In the Sled Wars Gizmo, friction slows down the sleds. Different surface types (e.g., ice, snow, grass) exhibit varying levels of friction. Lower friction means less resistance, allowing sleds to travel farther.

3. Force and Newton's Laws:

Newton's laws of motion are central to the Gizmo's mechanics. Newton's First Law (inertia) states that an object at rest stays at rest, and an object in motion stays in motion unless acted upon by an unbalanced force. Newton's Second Law ($F=ma$) explains that the acceleration of an object is directly proportional to the net force acting on it and inversely proportional to its mass. Newton's Third Law highlights that for every action, there's an equal and opposite reaction - crucial in understanding the collision between sleds.

Sled Wars Gizmo Answer Key: A Guided Approach

Providing a direct "answer key" that simply lists the numerical results would defeat the purpose of the Gizmo. The true learning comes from understanding why you get specific results. However, we can guide you through the process of obtaining accurate answers. Remember to carefully record your data and analyze the trends.

Activity A: Introduction to Momentum

This section introduces the basic concepts of momentum. Experiment with different masses and velocities to observe the impact on momentum. The Gizmo itself will guide you through the calculations. Pay close attention to how the momentum changes with variations in mass and velocity.

Activity B: Collision Analysis

This is where the "sled war" takes place. Carefully note the initial momentum of each sled before the collision. The total momentum before the collision should equal the total momentum after the collision (considering the direction). This is the law of conservation of momentum in action. Analyze how different masses and initial velocities influence the outcome.

Activity C: Friction's Role

This section focuses on the effects of friction. Experiment with different surfaces to see how the friction coefficient impacts the sled's distance traveled. A lower coefficient of friction means less friction and a longer travel distance. Observe how friction affects both the initial velocity and the final outcome.

Activity D: Advanced Challenges (If applicable)

This section usually presents more complex scenarios, combining elements of momentum and friction. Apply your understanding from the previous activities to tackle these challenges. Remember to meticulously record your observations and data.

Conclusion

The Sled Wars Gizmo is an excellent tool for grasping the fundamental concepts of momentum, friction, and Newton's Laws of Motion. By carefully conducting the experiments, recording data, and analyzing the results, you'll develop a deep understanding of these crucial physics principles. Remember, the key to success lies not just in finding the "answers" but in understanding the process and the underlying scientific principles. This guide provides the framework to help you achieve that understanding.

FAQs

1. What if my Gizmo results differ slightly from the expected values? Slight variations are normal due to the inherent limitations of simulations. Focus on the trends and overall patterns rather than minor numerical discrepancies.
2. How can I improve my understanding of momentum? Practice calculating momentum using the formula ($p=mv$) with different mass and velocity values. Visualize the concept: a heavier object moving quickly has more momentum than a lighter object moving slowly.

3. Is there a cheat sheet for the Sled Wars Gizmo? While specific numerical answers aren't provided here, this guide offers a detailed explanation of the principles involved, enabling you to derive the correct answers independently. Rote memorization of answers won't help you understand the underlying physics.

4. My sleds aren't behaving as expected. What could be wrong? Double-check your input parameters (mass, velocity, surface type) to ensure accuracy. Sometimes a small error in data entry can significantly affect the results.

5. Can I use this guide for other similar physics simulations? The fundamental concepts explained here – momentum, friction, and Newton's Laws – apply to many physics simulations. Understanding these principles will greatly benefit you in similar activities.

sled wars gizmo answer key: The Gizmo Paul Jennings, 1994 Stephen's bra is starting to slip. His pantyhose are sagging. His knickers keep falling down. Oh, the shame of it. He stole a gizmo-and now it's paying him back. Another crazy yarn from Australia's master of madness. The Paul Jennings phenomenon began with the publication of *Unrealin* 1985. Since then, his stories have been devoured all around the world.

sled wars gizmo answer key: The Road to Revolution Theodore John Kaczynski, 2008

sled wars gizmo answer key: The Hacker Crackdown, Features the book, *The Hacker Crackdown*, by Bruce Sterling. Includes a preface to the electronic release of the book and the chronology of the hacker crackdown. Notes that the book has chapters on crashing the computer system, the digital underground, law and order, and the civil libertarians.

sled wars gizmo answer key: Dangling Man Saul Bellow, 2013-04-04 Expecting to be inducted into the army, Joseph has given up his job and carefully prepared for his departure to the battlefield. When a series of mix-ups delays his induction, he finds himself facing a year of idleness. *Dangling Man* is his journal, a wonderful account of his restless wanderings through Chicago's streets, his musings on the past, his psychological reaction to his inactivity while war rages around him, and his uneasy insights into the nature of freedom and choice.

sled wars gizmo answer key: Spartan Up! Joe De Sena, Jeff O'Connell, 2014 An introduction to Spartan Races (races meant to challenge, to push, to intimidate, to test) from one of the founding few and creators, Joe De Sena.

sled wars gizmo answer key: Transforming Anxiety Doc Childre, Deborah Rozman, 2006-05-03 The Perfect Antidote to Anxiety Feelings of anxiety can sap your energy, joy, and vitality. But now the scientists at the Institute of HeartMath® have adapted their revolutionary techniques into a fast and simple program that you can use to break free from anxiety once and for all. At the core of the HeartMath method is the idea that our thoughts and emotions affect our heart rhythms. By focusing on positive feelings such as appreciation, care, or compassion, you can create coherence in these rhythms-with amazing results. Using the HeartMath method, you'll learn to engage your heart to bring your emotions, body, and mind into balance. Relief from anxiety, optimal health, and high performance all day long will follow. (HeartMath® is a registered trademark of the Institute of HeartMath.)

sled wars gizmo answer key: Machine-Guns and the Great War Paul Cornish, 2009-09-19 An in-depth study of how these direct fire weapons were actually employed on the battlefields and their true place in the armory of World War I. The machine-gun is one of the iconic weapons of the Great War—indeed of the twentieth century. Yet it is also one of the most misunderstood. During a four-year war that generated unprecedented casualties, the machine-gun stood out as a key weapon. In the process it took on an almost legendary status that persists to the present day. It shaped the tactics of the trenches, while simultaneously evolving in response to the tactical imperatives thrown up by this new form of warfare. Paul Cornish, in this authoritative and carefully considered study,

reconsiders the history of automatic firepower, and he describes in vivid detail its development during the First World War and the far-reaching consequences thereof. He dispels many myths and misconceptions that have grown up around automatic firearms, but also explores their potency as symbols and icons. His clear-sighted reassessment of the phenomenon of the machine-gun will be fascinating reading for students of military history and of the Great War in particular. "For those wanting a little more in-depth information about the role and development of machine guns during the war, this book offers an excellent, well written and easily accessible account of what became the iconic weapon of the war, mainly due to the massive casualties it was able to inflict . . . This really is well worth reading." —Great War Magazine

sled wars gizmo answer key: *Using Research and Reason in Education* Paula J. Stanovich, Keith E. Stanovich, 2003 As professionals, teachers can become more effective and powerful by developing the skills to recognize scientifically based practice and, when the evidence is not available, use some basic research concepts to draw conclusions on their own. This paper offers a primer for those skills that will allow teachers to become independent evaluators of educational research.

sled wars gizmo answer key: *The Know-It-All's Guide to Life* John T. Walbaum, 2003 These topics and many more are illuminated with wit and brevity. You'll get useful advice about a myriad of subjects including: personal finance, health, sports, travel, automobiles, careers, and food. And the information is not hidden behind a lot of jargon or filler material. With just a few pages devoted to each area of discussion, you will learn things like how to negotiate with a contractor, try your own court case, join Mensa, become a movie star, get a patent, avoid being hit by lightning, run a democracy...even save the Earth. And that's just a small sample of topics -- from the glorious to the goofy -- covered within. Book jacket.

sled wars gizmo answer key: *The Gizmo Again* Paul Jennings, 1995 Watch out for the gizmo! It can make anything happen, and it might have a surprise in store for you! Here is another weird and wacky tale from this phenomenally successful author.

sled wars gizmo answer key: *Handmade Electronic Music* Nicolas Collins, 2009 No further information has been provided for this title.

sled wars gizmo answer key: *The Philosophy of Christopher Nolan* Jason T. Eberl, George A. Dunn, 2017-06-20 As a director, writer, and producer, Christopher Nolan has substantially impacted contemporary cinema through avant garde films, such as *Following* and *Memento*, and his contribution to wider pop culture with his Dark Knight trilogy. His latest film, *Interstellar*, delivered the same visual qualities and complex, thought-provoking plotlines his audience anticipates. *The Philosophy of Christopher Nolan* collects sixteen essays, written by professional philosophers and film theorists, discussing themes such as self-identity and self-destruction, moral choice and moral doubt, the nature of truth and its value, whether we can trust our perceptions of what's "real," the political psychology of heroes and villains, and what it means to be a "viewer" of Nolan's films. Whether his protagonists are squashing themselves like a bug, struggling to create an identity and moral purpose for themselves, suffering from their own duplicitous plots, donning a mask that both strikes fear and reveals their true nature, or having to weigh the lives of those they love against the greater good, there are no simple solutions to the questions Nolan's films provoke; exploring these questions yields its own reward.

sled wars gizmo answer key: *Anagram Solver* Bloomsbury Publishing, 2009-01-01 *Anagram Solver* is the essential guide to cracking all types of quiz and crossword featuring anagrams. Containing over 200,000 words and phrases, *Anagram Solver* includes plural noun forms, palindromes, idioms, first names and all parts of speech. Anagrams are grouped by the number of letters they contain with the letters set out in alphabetical order so that once the letters of an anagram are arranged alphabetically, finding the solution is as easy as locating the word in a dictionary.

sled wars gizmo answer key: *Film Quarterly* Brian Henderson, Ann Martin, Lee Amazonas, 1999-01-01 A collection of articles that appeared in the journal *film quarterly* that appeared over the

last 40 years.

sled wars gizmo answer key: *Paralysis Resource Guide* Sam Maddox, 2020

sled wars gizmo answer key: Million Mile Road Trip Rudy rucker, 2019-05-07 Three teens ride a car across the universe and back. Look out for the flying saucers! Tipping his hat to Thomas Pynchon, Jack Kerouac, and Douglas Adams, Rucker immerses readers in a fantastical roadtrip adventure that's a wild ride of unmitigated joy. . . . he ties everything together with internal consistency, playful use of language that keeps his ideas alien yet accessible, and a solid grounding in fourth-dimensional math. This wacky adventure is a geeky reader's delight.—Publishers Weekly, starred review

sled wars gizmo answer key: Make It So Nathan Shedroff, Christopher Noessel, 2012-09-17 Many designers enjoy the interfaces seen in science fiction films and television shows. Freed from the rigorous constraints of designing for real users, sci-fi production designers develop blue-sky interfaces that are inspiring, humorous, and even instructive. By carefully studying these "outsider" user interfaces, designers can derive lessons that make their real-world designs more cutting edge and successful.

sled wars gizmo answer key: Home Court (STAT: Standing Tall and Talented #1) Amar'e Stoudemire, 2012-08-01 STAT: Standing Tall And Talented-- A slam-dunk new fiction series from NBA superstar Amar'e Stoudemire! Eleven-year-old Amar'e Stoudemire has a lot going on. He loves to go skateboarding in the park. He takes his school work very seriously. He helps out with his dad's landscaping company. And he likes to play basketball with his best friends-but just for fun. When a group of older kids start disrespecting his boys on their neighborhood basketball court, there is only one solution. Amar'e must step in and use his athletic ability and intelligence to save the day. This experience leads Amar'e to realize that basketball is his true passion. Based on the life of All-Star NBA sensation Amar'e Stoudemire, who overcame many obstacles to become one of the most popular figures in sports today. Amar'e is just as versatile in his off the court life as he is on. He is devoted to several charities. He promotes literacy and education. He is a media darling. And he has an amazing story to tell in this heartfelt, accessible middle-grade series.

sled wars gizmo answer key: Every Second Counts Lance Armstrong, 2004 Continuing where It's Not About the Bike left off, recounts Armstrong's life after cancer, his relationship with the French, disproved accusations of doping, and his work restoring a chapel in Spain.

sled wars gizmo answer key: Come Back Gizmo Paul Jennings, Keith McEwan, 1996 The third story in the successful Gizmo series, involving a mean-spirited hoodlum who - via a toilet seat getting stuck on his head - discovers compassion and becomes a hero.

sled wars gizmo answer key: Typeset in the Future Dave Addey, 2018-12-11 A designer's deep dive into seven science fiction films, filled with "gloriously esoteric nerdery [and] observations as witty as they are keen" (Wired). In Typeset in the Future, blogger and designer Dave Addey invites sci-fi movie fans on a journey through seven genre-defining classics, discovering how they create compelling visions of the future through typography and design. The book delves deep into 2001: A Space Odyssey, Star Trek: The Motion Picture, Alien, Blade Runner, Total Recall, WALL·E, and Moon, studying the design tricks and inspirations that make each film transcend mere celluloid and become a believable reality. These studies are illustrated by film stills, concept art, type specimens, and ephemera, plus original interviews with Mike Okuda (Star Trek), Paul Verhoeven (Total Recall), and Ralph Eggleston and Craig Foster (Pixar). Typeset in the Future is an obsessively geeky study of how classic sci-fi movies draw us in to their imagined worlds.

sled wars gizmo answer key: The Victim Saul Bellow, 2013-09-26 It's sweltering summer in New York City, and Asa Leventhal is alone. His co-workers ignore or condescend to him, his wife is away with her mother, and his estranged brother has run off, abandoning his wife and two sons. One night, Leventhal is confronted by a stranger--'one of those guys who want you to think they can see to the bottom of your soul'--who reveals himself to be a marginal figure from his distant past. Leventhal, accused of ruining the man's life, becomes shocked and dismissive, vehemently denying any part in the man's unhappy lot. But as time passes, he is increasingly unable to separate his own

good fortune from the bad luck of this down-and-out stranger, who will not leave him be. A brief, haunting rumination on the vagaries of fate and responsibility, *The Victim* is, in the words of Norman Rush, Saul Bellow's purest creation.

sled wars gizmo answer key: *Social Life Of Plants* Datta, Sukanya, 2000-01-01 The book explains the interesting social life of the plant world.

sled wars gizmo answer key: *Deadlands Players' Guide* Shane Lacy Hensley, 1998-12-01 The *Weird West Player's Guide* is not a complete game. The *Marshal's Handbook* is also required to play... -- From back cover

sled wars gizmo answer key: *Murray Leinster* Billee J. Stallings, Jo-an J. Evans, 2011-08-12 Will F. Jenkins, known to science fiction fans by his penname Murray Leinster, was among the most prolific American writers of the 20th century. The Dean of Science Fiction, as he was sometimes known, published more than 1,500 short stories and 100 books in a career spanning more than fifty years. This biography, written by his two youngest daughters, chronicles Murray Leinster's private and literary life from his first writings for *The Smart Set* and early pulp magazines such as *Argosy*, *Amazing Stories* and *Astounding Stories*, through the golden age of science fiction in the 1930s through the 1950s, to his death in 1975. Included as appendices are his famous 1946 story *A Logic Named Joe* and 1954 essay *To Build a Robot Brain*.

sled wars gizmo answer key: *Fundamentals of Physics* David Halliday, Oriel Incorporated, 2001-07-05 The publication of the first edition of *Physics* in 1960 launched the modern era of physics textbooks. It was a new paradigm then and, after 40 years, it continues to be the dominant model for all texts. The big change in the market has been a shift to a lower level, more accessible version of the model. *Fundamentals of Physics* is a good example of this shift. In spite of this change, there continues to be a demand for the original version and, indeed, we are seeing a renewed interest in *Physics* as demographic changes have led to greater numbers of well-prepared students entering university. *Physics* is the only book available for academics looking to teach a more demanding course.

sled wars gizmo answer key: *Art of He-Man and the Masters of the Universe* Various, 2015-04-28 In 1983, the world was introduced to He-Man and the Masters of the Universe. What followed was a cultural sensation that changed the landscape of children's entertainment forever! Join Mattel and Dark Horse in this comprehensive retrospective chronicling He-Man's decades-long epic journey from toy, to television, to film, to a true pop culture phenomenon!

sled wars gizmo answer key: *Children Beware!* Filipa Antunes, 2020-01-17 How does a culture respond when the limits of childhood become uncertain? The emergence of pre-adolescence in the 1980s, which is signified by the new PG-13 rating for film, disrupted the established boundaries between childhood and adulthood. The concept of pre-adolescence affected not only America's pillar ideals of family and childhood innocence but also the very foundation of the horror genre's identity, its association with maturity and exclusivity. Cultural disputes over the limits of childhood and horror were explicitly articulated in the children's horror trend (1980-1997), a cluster of child-oriented horror titles in film and other media, which included *Gremlins*, *The Gate*, the *Goosebumps* series, and others. As the first serious analysis of the children's horror trend, with a focus on the significance of ratings, this book provides a complete chart of its development while presenting it as a document of American culture's adaptation to pre-adolescence. Each important children's horror title corresponds to a key moment of ideological negotiation, cultural power struggles, and industrial compromise.

sled wars gizmo answer key: *Spartan Fit!* Joe De Sena, John Durant, 2016-08-02 From the best-selling author of *Spartan Up!* a complete 30-day workout and diet plan to help you reach peak performance Joe De Sena designed the Spartan races to test overall conditioning: strength, flexibility, endurance, and speed. His signature take-no-prisoners approach to achieving physical and mental fitness has taken the endurance world by storm and inspired millions. Now in *Spartan Fit!*, De Sena breaks down that approach and gives readers the tools they need to conquer the course — and life, including: • A 30-day workout and diet plan to prepare for the Spartan Sprint — or to just

get you in shape • Full-body workouts requiring no gym, no weights • How to build on one race to the next • Inspiring, motivating stories of Spartans A complete Spartan training guide, Spartan Fit! will arm readers with the strength, knowledge, and grit to never question their potential again.

sled wars gizmo answer key: *Letters to Santa Claus* The Elves, 2015-10-05 A "poignant" collection of real letters sent to Santa Claus—a town in Indiana—from the 1930s to the twenty-first century, from both children and adults (The New York Times). For countless Christmases, children—and sometimes adults—have stuffed their dreams, wishes, and promises into envelopes. Over many decades, millions of these letters have poured into Santa Claus, Indiana. Arriving from all corners of the globe, the letters ask for toys, family reunions, snow, and help for the needy—sometimes the needy being the writers themselves. They are candid, heartfelt, and often blunt. Many children wonder how Santa gets into their chimneyless homes. One child reminds Santa that she has not hit her brothers over 1,350 times that year, and another respectfully requests two million dollars in "cold cash." One child hopes to make his life better with a time machine, an adult woman asks for a man, and one miscreant actually threatens Santa's reindeer! Containing more than 250 actual letters and envelopes from the naughty and nice reaching back to the 1930s, this moving book will touch hearts and bring back memories of a time in our lives when the man with a white beard and a red suit held out the hope that our wishes might come true. "Often very affecting . . . also offers an unusual window into American history." —Library Journal "The letters . . . are alternately silly and somber, hilarious and heartfelt." —The Weekly Standard

sled wars gizmo answer key: *Stewardson, the First 100 Years* Anonymous, 2017-08-24 This work has been selected by scholars as being culturally important, and is part of the knowledge base of civilization as we know it. This work was reproduced from the original artifact, and remains as true to the original work as possible. Therefore, you will see the original copyright references, library stamps (as most of these works have been housed in our most important libraries around the world), and other notations in the work. This work is in the public domain in the United States of America, and possibly other nations. Within the United States, you may freely copy and distribute this work, as no entity (individual or corporate) has a copyright on the body of the work. As a reproduction of a historical artifact, this work may contain missing or blurred pages, poor pictures, errant marks, etc. Scholars believe, and we concur, that this work is important enough to be preserved, reproduced, and made generally available to the public. We appreciate your support of the preservation process, and thank you for being an important part of keeping this knowledge alive and relevant.

sled wars gizmo answer key: *Weapons & War Machines* , 1976

sled wars gizmo answer key: *The Passover Papers* Paul R. Finch, 2008 The Passover Papers is a good old fashioned Bible Study that explores in-depth the many faceted problems of the timing factors involved in determining the correct date and time of the Passover sacrifice, the Wednesday Crucifixion theory, the Saturday Resurrection theory, the meaning of various Hebrew terms involved, how the Bible originally counted days, and much more. Rarely has a work come along so compelling in pointing out the flaws of previous works on the subject. Passover Papers does not present theologically biased opinions of a religious organization, nor does it have any particular ax to grind. It simply guides the reader into all the various arguments on all sides, and lets the reader draw their own conclusion.

sled wars gizmo answer key: *Developmental Reading Assessment* Joetta Beaver, Mark A. Carter, 2003 Gives middle school teachers a range of tools to help monitor literacy behavior continuously as they teach, as well as conduct periodic assessments for accountability. Intended to guide teachers' ongoing observations of student's progress within a literature-based reading program.

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