

"1905: Einstein's Miracle Year"

6th Grade Unit 4

by John Schwartz from *The New York Times Upfront*

How an unknown scientist rewrote the rules of physics, and in the process, changed the world forever.

¶1 One hundred years ago, a young patent clerk in Switzerland named Albert Einstein began publishing his revolutionary theories of how the physical universe worked, and the world hasn't been the same since.

¶2 Einstein was 26 and unknown in 1905 when, in the course of a year, he completed three scientific papers that would begin to rewrite the rules of physics and make him a star. While the term *genius* is often overused, Einstein's enormous accomplishments, beginning in what has been called his "miracle year," established him as the most famous genius in the world. And his reputation has only grown in the decades since his death.

¶3 Einstein's "Special Theory of Relativity," one of his accomplishments of 1905, postulated that time and space were not absolute, but instead varied, depending on one's perspective; in other words, they were "relative."

¶4 The same theory yielded modern science's most important equation, $E=MC^2$, which states that energy (E) is equal to mass (M) times the speed of light squared. While deceptively simple, its consequences were monumental because it described the enormous amounts of energy that might be liberated from matter—so much that a penny, if it could be completely converted into energy, would provide all the power used by New York City for two years. The same concept would lead to the idea of harnessing the energy in matter to develop atomic weapons and nuclear power.

¶5 Einstein received the kind of adulation now reserved for rock stars and movie heartthrobs. On his first trip to the United States in 1921, crowds waited for hours at the dock in New York for his ship to come in, and thousands more lined the streets to cheer for him.

¶6 A *Times* reporter described Einstein's arrival: *A man in a faded gray raincoat and a flopping black felt hat that nearly concealed the gray hair that straggled over his ears stood on the boat deck of the steamship Rotterdam yesterday, timidly facing a battery of cameramen. In one hand he clutched a shiny briar pipe and with the other clung to a precious violin. He looked like an artist—a musician. He was. But underneath his shaggy locks was a scientific mind whose deductions have staggered the ablest intellects of Europe.*

¶7 Twelve years later, the world-famous Einstein returned to America for good, fleeing Nazi Germany and its persecution of Jews, and settled in New Jersey to work at Princeton University. His theories, and those of other physicists, led Einstein to believe that science could unlock the promise of $E=MC^2$.

¶8 In August 1939, with World War II looming, he wrote a letter to President Franklin D. Roosevelt that launched the massive effort to build the atomic bomb. Einstein had been a lifelong pacifist.

¶9 The two atom bombs dropped on Japan in August 1945 brought the war to a close, but Einstein was devastated by the resulting destruction and loss of life. "I made one great mistake in my life—when I signed the letter to President Roosevelt recommending that atom bombs be made," he later wrote, adding, "but there was some justification—the danger that the Germans would make them."

¶10 After the war, Einstein and other physicists pushed to control the power they had helped to unleash, calling for arms control. Einstein was offered the presidency of Israel in 1952, but turned it down. He died a U.S. citizen in Princeton, in April 1955, at age 76. In an editorial following his death, the *Times* said that what distinguished Einstein was his passionate devotion to truth, and his great imagination. "Mathematical physicists in Einstein's class are the epic poets of our time," the paper said. "The universe we conceive is their intellectual creation."

Words to Know

pacifist: (*n.*) someone who believes that wars are wrong and refuses to use violence

from *Shutting Out the Sky: Life in the Tenements of New York 1880–1924*

by Deborah Hopkinson

Settling In: Boarders and Greenhorns

¶1 One early morning in December 1900, a sixteen-year-old boy left Ellis Island and made his way alone into New York City. Struggling with his heavy bundles, Marcus Ravage elbowed his way through the crowded streets of the Lower East Side.

¶2 Marcus shivered in the bitter cold. If only he'd followed his mother's advice and brought his heavy coat to America. He'd been so sure he wouldn't need it. Why should he bother carrying old clothes when he'd soon be rich enough to buy new ones?

¶3 But Marcus had brought something almost as precious as a warm coat. It was just a crumpled bit of paper, but it was a link between his old life in Romania and his new one. On the paper was scribbled the New York address of distant relatives from back home.

¶4 Before long, Marcus found himself in the apartment of the Segal family, who had arrived from Romania just three months before. Mrs. Segal, along with her son and five daughters, lived in a five-room apartment on the third floor of a Rivington Street tenement. Looking around at the sofa, kitchen table, and ever so many chairs, Marcus felt sure that the Segals were already rich. And he wouldn't be far behind.

¶5 Mrs. Segal told Marcus he could stay for free for a few days. After that, he would be expected to find a job and pay fifty cents a week for his bed.

¶6 That evening, people Marcus had never seen before began to stream into the apartment, tired from a long day of work. As the hours ticked by and the strangers didn't leave, Marcus realized they were boarders—they lived there, too! They paid Mrs. Segal for a bed, and perhaps for meals and laundry. Where would everyone sleep? he wondered.

¶7 Marcus soon found out. It wasn't long before everyone began to rush about, lining up chairs in rows to make beds. Marcus and three other young men shared the sofa, sleeping with their heads on the cushions and feet propped awkwardly on chairs. Nine bodies pressed together on the floor, huddling like seals on a rock. In the kitchen, Mrs. Segal and one child cuddled on top of the washtubs while the rest of the children slept on the floor.

¶8 Soon the rooms were filled with deep breathing, dreadful snoring, and smells of all kinds. Yet despite his new, strange circumstances, Marcus fell asleep right away. Next morning he woke to the puffing of steam engines and clatter of wheels outside the windows. Once again the rooms hummed with activity. People raced to put the furniture back into place; the men scrambled to get dressed before the girls awoke.

¶9 After everyone else had hurried off to work or school, Marcus and Mrs. Segal were left alone in the now neat and tidy apartment. He was thoroughly surprised to see Mrs. Segal clean the kitchen floor with precious soap rather than sand, as his mother would have back home.

¶10 When Mrs. Segal came back from the market, Marcus felt more confused than ever. She'd bought the largest eggplant he'd ever seen, as well as an exotic yellow fruit in the shape of a cucumber—a banana. To say nothing of meat—which she cooked for lunch!

¶11 Back home in his village only rich people could indulge in the luxury of meat, eat such extraordinary vegetables, use soap to clean floors, or live on the second floor of such a nice apartment.

¶12 But, Marcus puzzled, if the Segals were rich, why did they share their fine apartment with so many boarders?

¶13 To a newcomer, or “greenhorn,” like Marcus, it was all very confusing.

Words to Know

circumstances: (*n.*) the conditions or situation

exotic: (*adj.*) something that is exotic seems unusual and interesting because it is related to a foreign country

Directions: Read “1905: Einstein’s Miracle Year” and dig deep into the language and what the authors are trying to convey to answer the text-based questions.

Text Structure

1. What is the effect of using the heading that begins “How an unknown scientist rewrote the rules of physics...?”

Key Ideas and Details

2. Why does the author compare Einstein to “rock stars and movie heartthrobs” in **paragraph 5**?

Words and Phrases in Context

3. What words and phrases develop the comparison of Einstein to “an artist—a musician” in both a literal and figurative sense?

Directions: Read from “Shutting Out the Sky: Life in the Tenements of New York 1880-1924” and dig deep into the language and what the authors are trying to convey to answer the text-based questions.

Key Ideas and Details

1. What is Marcus’s overall impression of his relatives and their life in America? Support your answer with details from the text.

Key Ideas and Details

2. Determine the narrative perspective of the text. What is the effect of including Marcus’s inner thoughts in the narration?

Words and Phrases in Context

3. Why does the narrator describe the banana Mrs. Segal brings back from the market as “an exotic yellow fruit in the shape of a cucumber”?