



ONE LESS STAR IN THE UNIVERSE

– STEPHEN HAWKING, 1942 - 2018



The world's best-known scientist died on March 14th.

Stephen Hawking was a brilliant theoretical physicist and cosmologist. He made important discoveries about gravity, black holes, the Big Bang, and quantum physics.

Dr. Hawking had one of the brightest minds the world has ever known. He is compared to Charles Darwin (Theory of Evolution), Isaac Newton (Laws of Gravity and Motion), and Albert Einstein (Theory of General Relativity and the existence of black holes).

The British scientist received many honours and awards in

his life, including 13 honorary degrees. He also wrote many books. *A Brief History of Time*, which explained his ideas to the general public, was a bestseller.

GRIT, DRIVE, AND STUBBORNNESS

When he was young, Stephen Hawking was inquisitive. His friends called him 'Einstein.' However, he was an average – and lazy – student.

"When I was 12, one of my friends bet a bag of sweets that I would never amount anything," he said.

Yet he went on to study at Cambridge University. Then, at age 21, he found out he had ALS

DID YOU KNOW?

Stephen Hawking had an important connection with Canada – especially to the Waterloo, Ontario region. Dr. Hawking was a distinguished visiting research chair at the Perimeter Institute for Theoretical Physics and the Institute for Quantum Computing in Waterloo. His position at these Canadian research centres raised their international profiles.

(Amyotrophic Lateral Sclerosis). Over a short period of time, he could expect to lose control over his muscles and eventually, his breathing. Doctors gave him two years to live.

DEFINITIONS

BIG BANG: the cosmic explosion that is hypothesized to have marked the origin of the universe

CHAIR: the position of a senior professor at a university

COSMOLOGIST: someone who studies the origin and nature of the universe

HONORARY DEGREE: a university degree given to someone who isn't a student but who has done something important

INQUISITIVE: curious

QUANTUM PHYSICS: a branch of physics that explores the theory that certain properties occur only in tiny amounts

THEORETICAL PHYSICIST: a physics scientist who uses mathematics to understand, explain, and predict natural phenomena



Dr. Hawking decided to make the most of the time he had left. As his body weakened, he kept working. He explored black holes and how the **universe** began. He developed new theories about space, time, and gravity.

When he could no longer write out equations, he worked them in his head. When he lost his ability to speak, he started using a communication device.

AN UNLIKELY CELEBRITY

Dr. Hawking did not fit the **stereotype** of a science nerd. He was daring, funny, and definitely not boring.

He wanted to go into space. At 65, he took a zero-gravity flight to experience **weightlessness**.

“The zero-g part was wonderful,” he said. “I could have gone on and on. Space, here I come.”

He also appeared on television shows like *Star Trek*, *The Big Bang Theory*, and *The Simpsons*. He met with U.S. presidents and popes. He gave lectures and a TED talk. His life story became an award-winning movie, *The Theory of Everything*.

NO RUSH

Stephen Hawking changed the way the world views science and people with **disabilities**.

A BEAUTIFUL MIND

Most people know that Stephen Hawking was an important scientist. Not as many people understand why.

Early in his career, he wowed his peers with his theories on black holes and how our universe started. Dr. Hawking and a **colleague** showed that if there was a Big Bang, it must have started from an **infinitely** small point – in physicist speak, a ‘singularity.’ In the trillionth of a second after the Big Bang, the universe exploded in size.

Scientists once thought a black hole’s gravitational pull was so strong that not even light could escape. Dr. Hawking had a shocking idea. He thought black holes emitted ‘Hawking’ radiation. These particles made black holes lose energy and mass, until eventually they exploded with the force of a million megaton **hydrogen** bombs.

Dr. Hawking later theorized that black holes could even leak matter.

“So if you feel you are in a black hole, don’t give up. There’s a way out,” he joked.

Matter sucked in by a black hole would look different when it escaped, though. The atoms would be scrambled.

Dr. Hawking dreamed of finding the **elusive** Grand Unified Theory. This “Theory of Everything” would link the major theories of physics.

Two weeks before he died, the physics pioneer finished the groundwork for his last scientific paper. It would prove the existence of other universes outside of our own. These parallel universes are called the ‘multiverse.’

“Stephen always had interesting new ideas,” said his colleague and co-author Thomas Hertog. “Science was an adventure for him, and you were never sure where it would take him.”

“I’m not afraid of death, but I’m in no hurry to die,” he once said. “I have so much I want to do first.”

The professor was 76 when he passed away. He is the longest known survivor of ALS. His ashes will be buried at

Westminster Abbey in London, near Isaac Newton and Charles Darwin. ★

DEFINITIONS

COLLEAGUE: a fellow worker

STEREOTYPE: a very firm and simple idea about what a particular type of person or thing is like



ON THE LINES

Answer the following in complete sentences:

1. Describe Stephen Hawking when he was a young student.

2. What diagnosis did he receive when he was 21 years old?

3. How did this news affect Mr. Hawking?

4. How did Professor Hawking manage to keep working as his health declined?

5. Explain why his life was remarkable from a medical point of view.

6. List at least two areas of research that Stephen Hawking investigated.

7. Which three other famous scientists is he often compared to?

8. Which theory did he dream of finding?



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BETWEEN THE LINES

An *inference* is a conclusion drawn from evidence. A *plausible inference* is supported by evidence in the article and is consistent with known facts outside of the article.

What inference(s) can you draw from the fact that Stephen Hawking's remains will be buried in London's historic Westminster Abbey, near those of Isaac Newton and Charles Darwin?

JUST TALK ABOUT IT

1. As you see it, what is the significance of Stephen Hawking's life? Of his death? Explain.
2. Consider the following quotes by Stephen Hawking:
 - *I have noticed even people who claim everything is predestined, and that we can do nothing to change it, look before they cross the road.*
 - *However difficult life may seem, there is always something you can do and succeed at.*
 - *Intelligence is the ability to adapt to change.*
 - *Work gives you meaning and purpose and without it life is empty.*

Choose one of the quotes, and respond to it. What is your understanding of this quote? Do you agree or disagree with the speaker? What does this quote tell you about Stephen Hawking? Explain.

ONLINE

Note: The links below are listed at www.lesplan.com/en/links for easy access.

1. Watch "Top 10 MIND-BLOWING Things About Stephen Hawking," a list of interesting facts about Stephen Hawking, at <https://youtu.be/3idujFWGa8I> [13:01]
2. Watch "This is Stephen Hawking's Last Inspiring Message to Humanity," at <https://youtu.be/VYxjumUhjio> [3:05]
3. Hear what journalist and author Lucy Hawking has to say about growing up with Stephen Hawking as a father by watching "My Father, Stephen Hawking," at <https://youtu.be/RVVR4QyiqMc> [5:41]
4. Find out more about the disease that affected Stephen Hawking at <https://www.medicalnewstoday.com/articles/164342.php> ★