

APPENDIX A

Excerpt from physical science text used in study

Stephen Hawking: Changing Our View Of The Universe

Paragraph 1:

Scientists have long struggled to find the connection between two branches of physics. One of these branches deals with the forces that rule the world of atoms and subatomic particles. The other branch deals with gravity and its role in the universe of stars and galaxies. Physicist Stephen Hawking has set himself the task of discovering the connection. Leading theoretical physicists agree that if anyone can discover a unifying principle, it will certainly be this extraordinary scientist.

Paragraph 2:

Dr. Hawking's goal, as he describes it, is simple. "It is complete understanding of the universe, why it is as it is and why it exists at all." In order to achieve such an understanding, Dr. Hawking seeks to "quantize gravity." Quantizing gravity means combining the laws of gravity and the laws of quantum mechanics into a single universal law. Dr. Hawking and other theoretical physicists believe that with such a law, the behavior of all matter in the universe, and the origin of the universe as well, could be explained.

Paragraph 3:

Dr. Hawking's search for a unifying theory has led him to study one of science's greatest mysteries: black holes. A black hole is an incredibly dense region in space whose gravitational pull attracts all nearby objects, virtually "swallowing them up." A black hole is formed when a star uses up most of the nuclear fuel that has kept it burning. During most of its life as an ordinary star, its nuclear explosions exert enough outward force to balance the powerful inward force of gravity. But when the star's fuel is used up, the outward force ceases to exist. Gravity takes over and the star collapses into a tiny core of extremely dense material, possibly no bigger than the period at the end of this sentence.

Paragraph 4:

Hawking has already proved that a black hole can emit a stream of electrons. Prior to this discovery, scientists believed that nothing, not even light, could escape from a black hole. So scientists have hailed Hawking's discovery as "one of the most beautiful in the history of physics."

Paragraph 5:

Probing the mysteries of the universe is no ordinary feat. And Stephen Hawking is no ordinary man. Respected as one of the most brilliant physicists in the world, Hawking is also considered one of the most remarkable. For Dr. Hawking suffers from a serious disease of the nervous system that has confined him to a wheelchair, barely able to move or to speak. Although

Dr. Hawking gives numerous presentations and publishes countless articles and papers, his addresses must be translated and his essays written down by other hands.

Paragraph 6:

Hawking became ill during his first years at Cambridge University in England. The disease progressed quickly and left the young scholar quite despondent. He even considered giving up his research, as he thought he would not live long enough to receive his Ph.D. But in 1965, Hawking's life changed. He married Jane Wilde, a fellow student and language scholar. Suddenly life took on new meaning. "That was the turning point," he says. "It made me determined to live, and it was about that time that I began making professional progress." Hawking's health and spirits improved. His studies continued and reached new heights of brilliance. Today, Dr. Hawking is professor of mathematics at Cambridge University and a husband and father who leads a full and active life.

Paragraph 7:

Dr. Hawking believes that his illness has benefitted his work. It has given him more time to think about physics. So although his body is failing him, his mind is free to soar. Considered to be one of the most brilliant physicists of all times, Dr. Hawking has taken some of the small steps that lead science to discovery and understanding. With time to ponder the questions of the universe, it is likely that Stephen Hawking will be successful in uniting the world of the tiniest particles with the world of the stars and galaxies.