Biography

Sir Isaac Newton: The Gravity of Genius

BIOGRAPHY relates the story of Isaac Newton's life from his birth during a plague in an English village through his seminal work in mathematics, theology, alchemy and astronomy. Newton devoted his life to the study of the natural world, discovering the laws of gravity, analyzing light, and developing the three laws of motion to explain the movement of the planets and their satellites. The documentary provides in depth discussions of each of Newton's major discoveries, including calculus, gravity and the reflecting telescope. It traces his studies of ancient history and of the Bible, and details his struggle to gain public recognition for his scientific work. Sir Isaac Newton: The Gravity of Genius will be useful for students interested in mathematics, science, and European history.

Discussion Questions

1. At the conclusion of the documentary, the British physicist Stephen Hawking calls Isaac Newton one of the greatest scientists in history. Explain why Hawking confers this accolade on Newton.
2. What is calculus? Why was Newton's invention of calculus significant? What does calculus help scientists to explain?
3. Why did Newton study Euclidian geometry? How did he apply geometry to study the motion of the planets?
4. Why did Newton study alchemy? Why did he study the Bible? How did he reconcile his religious beliefs with his scientific discoveries?
5. What did Newton discover about light? Why was light considered a scientific problem in the sixteenth century? What did Newton believe was the relationship between light and objects?
6. How were scientific experiments financed and publicized in the seventeenth century? How is scientific work funded today? How did the education of a seventeenth-century scientist differ from the education offered to young scientists today?
7. What was the significance of Newton's work at the royal mint? How did he alter the way money was defined and exchanged?
8. How did the work of other scientists influence Newton's work? Why were questions about light, motion, and the planets among the most prominent problems facing seventeenth-century science?
9. In what ways is the modern space program the child of Isaac Newton? Would the exploration of space be possible if we did not know or understand Newton's laws of gravity?

Extended Activities

1. Beginning with Copernicus, trace the development of knowledge concerning the structure and order of the universe. Make a time-line showing when significant discoveries were made, concluding with the state of contemporary knowledge.
2. What were Newton's three laws of motion? Write an essay in which you explain each of the laws of motion and detail their significance in terms of the motion of objects in space.
3. For hundreds of years, alchemy was considered a science. Write an essay in which you explain what alchemy is, trace its history, and discuss why contemporary scientists no longer consider alchemy to be legitimate science. Why don't scientists study alchemy today? What did seventeenth-century scientists, like Newton, expect to
learn from their alchemic experiments? Are there scientific disciplines which scientists of today study and which may in the future be considered quackery?